

# PROJECT MANUAL

## ATLAS SAND MINE REMEDIATION (No. 21-004)

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*Prepared For:*



Bid Date: January 15, 2021, 11:00 am

*Prepared By:*



**INTEGRATED**  
Science &  
Engineering

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Revision Date: 11/24/2020  
ISE No. 1020.1802

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**END OF SECTION**

AVAILABLE PROJECT INFORMATION

**1.01 SUMMARY**

- A. Document Includes:
  - 1. Subsurface and physical conditions.
  - 2. Underground facilities.
  - 3. Hazardous environmental condition.
- B. Available Project information has been furnished by Owner to Engineer for use in designing this Project.
  - 1. Each Bidder shall be fully familiar with available Project information, which has been prepared for Owner by separate consultants.
  - 2. Available Project Information is offered solely for reference and shall not be considered part of Contract Documents. Data contained in Documents prepared by Owner's separate consultants is believed to be reliable; however, Owner and Architect/Engineer do not guarantee their accuracy or completeness.
  - 3. In preparing their Bids, Bidders shall consider and evaluate data contained in available Project information as well as Contract Documents prepared by Architect/Engineer.

**1.02 SUBSURFACE AND PHYSICAL CONDITIONS REPORT**

- A. A copy of an environmental report is included as an attachment to this Document, titled Voluntary Remediation Plan, dated November 10, 2020, and prepared by Geotechnical and Environmental Consultants, Inc..

**1.03 UNDERGROUND FACILITIES REPORT**

- A. A copy of an underground facilities report is included as an attachment to this Document, titled N/A, dated N/A, and prepared by N/A.

**1.04 HAZARDOUS ENVIRONMENTAL CONDITION REPORT**

- A. A copy of a Hazardous Environmental Condition Report is available from the Owner upon request, titled Phase 1 Environmental Site Assessment, dated August 20, 2020, and prepared by Geotechnical and Environmental Consultants, Inc.

**END OF SECTION**

## **PART 1 SUMMARY**

### **1.01 SUBSURFACE AND PHYSICAL CONDITIONS REPORT**

- A. A copy of the TABLES and FIGURES from a recent environmental report are included in subsections 00 31 32.1 and 00 31 32.2 to this manual. These TABLES and FIGURES are from a report titled Voluntary Remediation Program Application, dated November 10, 2020, and prepared by Geotechnical and Environmental Consultants, Inc..

### **1.02 UNDERGROUND FACILITIES REPORT**

- A. A copy of an underground facilities report is included as an attachment to this Document, titled N/A, dated N/A, and prepared by N/A.

### **1.03 HAZARDOUS ENVIRONMENTAL CONDITION REPORT**

- A. A copy of a Hazardous Environmental Condition Report is available upon request from the Owner. Phase 1 Environmental Site Assessment, dated August 20, 2020, and prepared by Geotechnical and Environmental Consultants, Inc.

- 1.04** Reports and studies listed herein have been furnished by Owner to Engineer for use in designing this Project. Available Project Information is offered solely for reference and shall not be considered part of Contract Documents. Data contained in Documents prepared by Owner's separate consultants is believed to be reliable; however, Owner and Architect/Engineer do not guarantee their accuracy or completeness.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



**COMPILED FIGURES**

**EXCERPT FROM:**

**VOLUNTARY REMEDIATION PROGRAM APPLICATION**

**ATLAS SAND MINE**

**216 SHADY OAKS DRIVE**

**GUYTON, EFFINGHAM COUNTY, GEORGIA**

**GEC PROJECT NO.: HN185042**

**PREPARED BY**

**GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.**

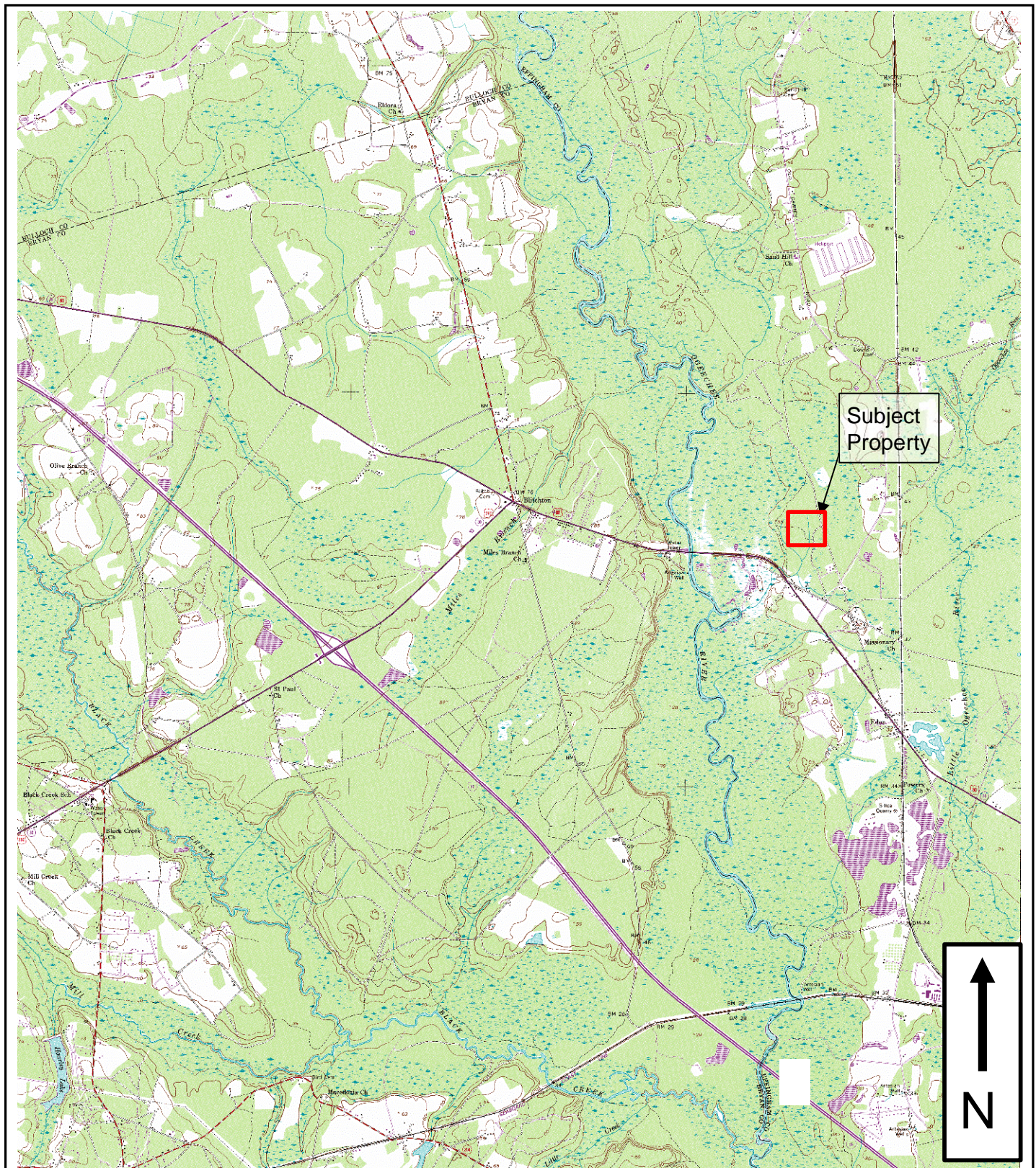
**514 HILLCREST INDUSTRIAL BOULEVARD**

**MACON, GEORGIA 31204**

**ISSUE DATE**

**November 10, 2020**



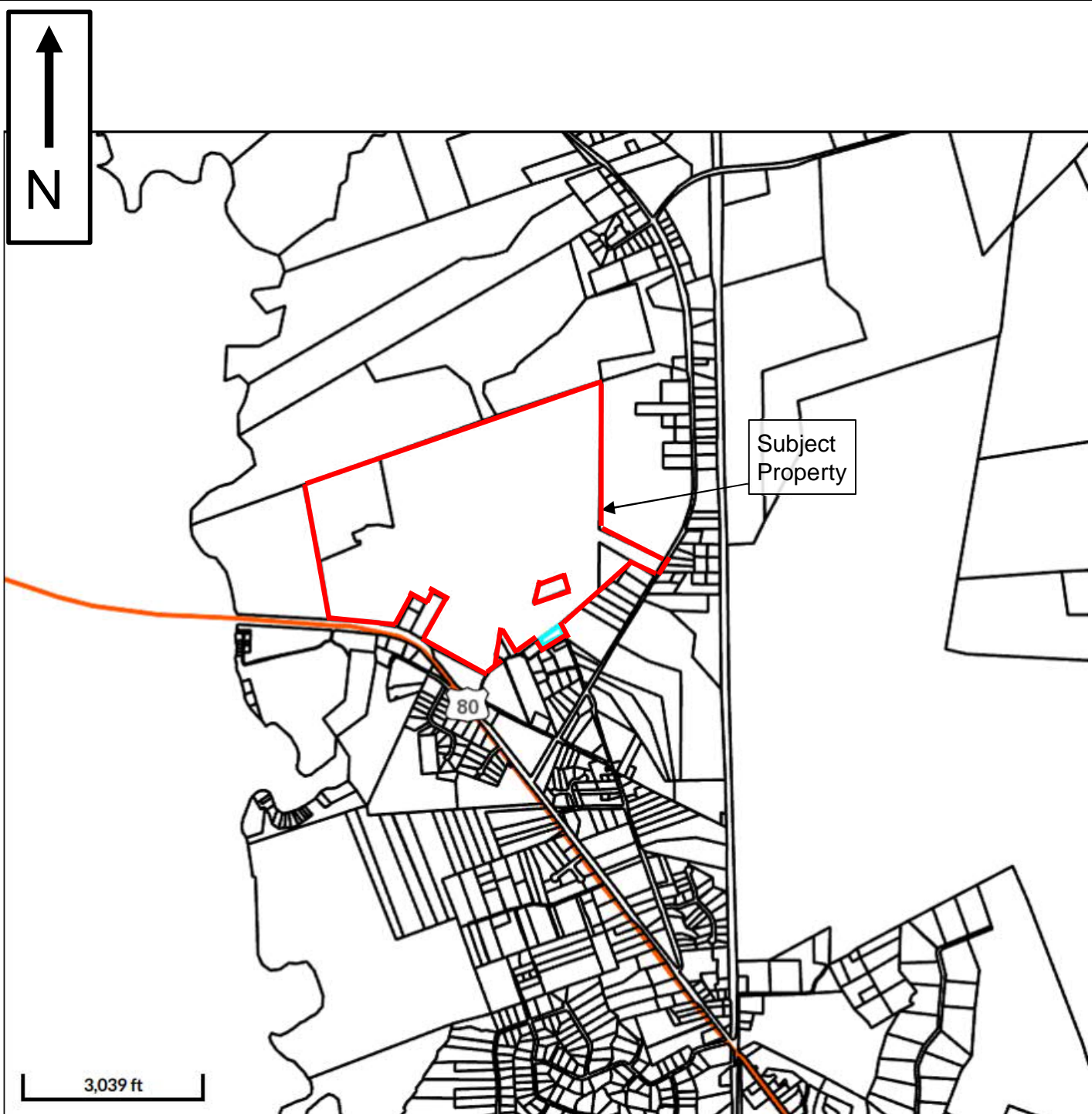


**Figure 1**  
**Site Location Map**  
**(U.S.G.S. Topographic Map)**  
**Atlas Sand Mine**  
**216 Shady Oaks Drive**  
**Guyton, Effingham County, Georgia**  
**GEC Project No. HN185042**  
**Source: Eden, GA Quadrangle (1976)**

**GEC**

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**A Terracon COMPANY**



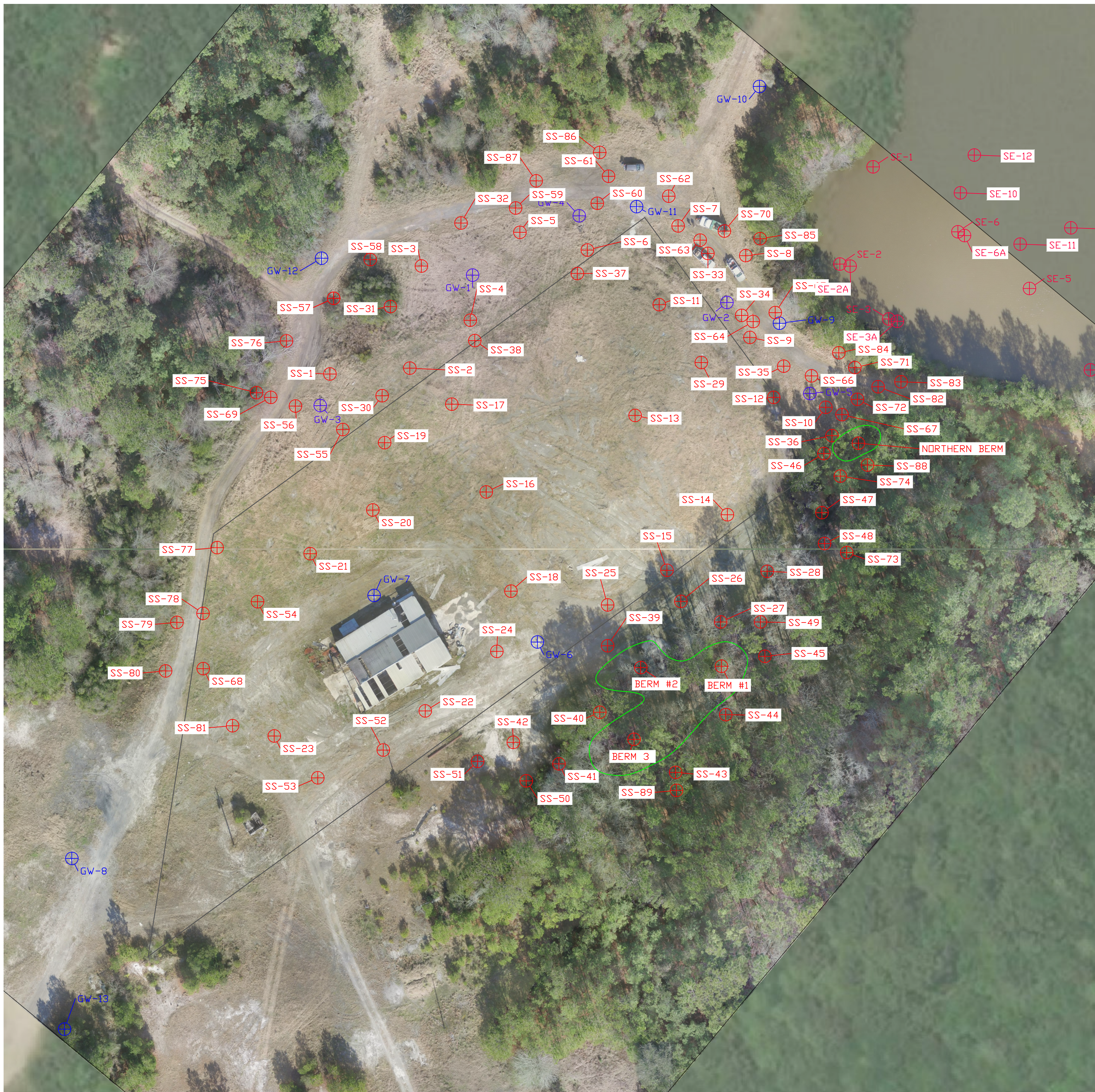


**Figure 2**  
**Tax Map**  
**Atlas Sand Mine**  
**216 Shady Oaks Drive**  
**Guyton, Effingham County, Georgia**  
**GEC Project No. HN185042**  
**Source: Effingham County Tax Assessors**






**GEC**

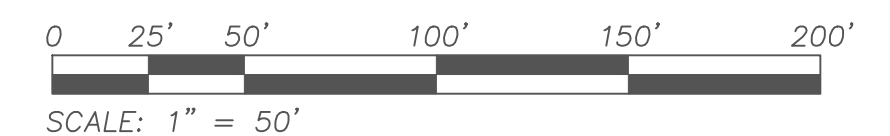
**GEOTECHNICAL  
&  
ENVIRONMENTAL  
CONSULTANTS, INC**  
**A Terracon COMPANY**





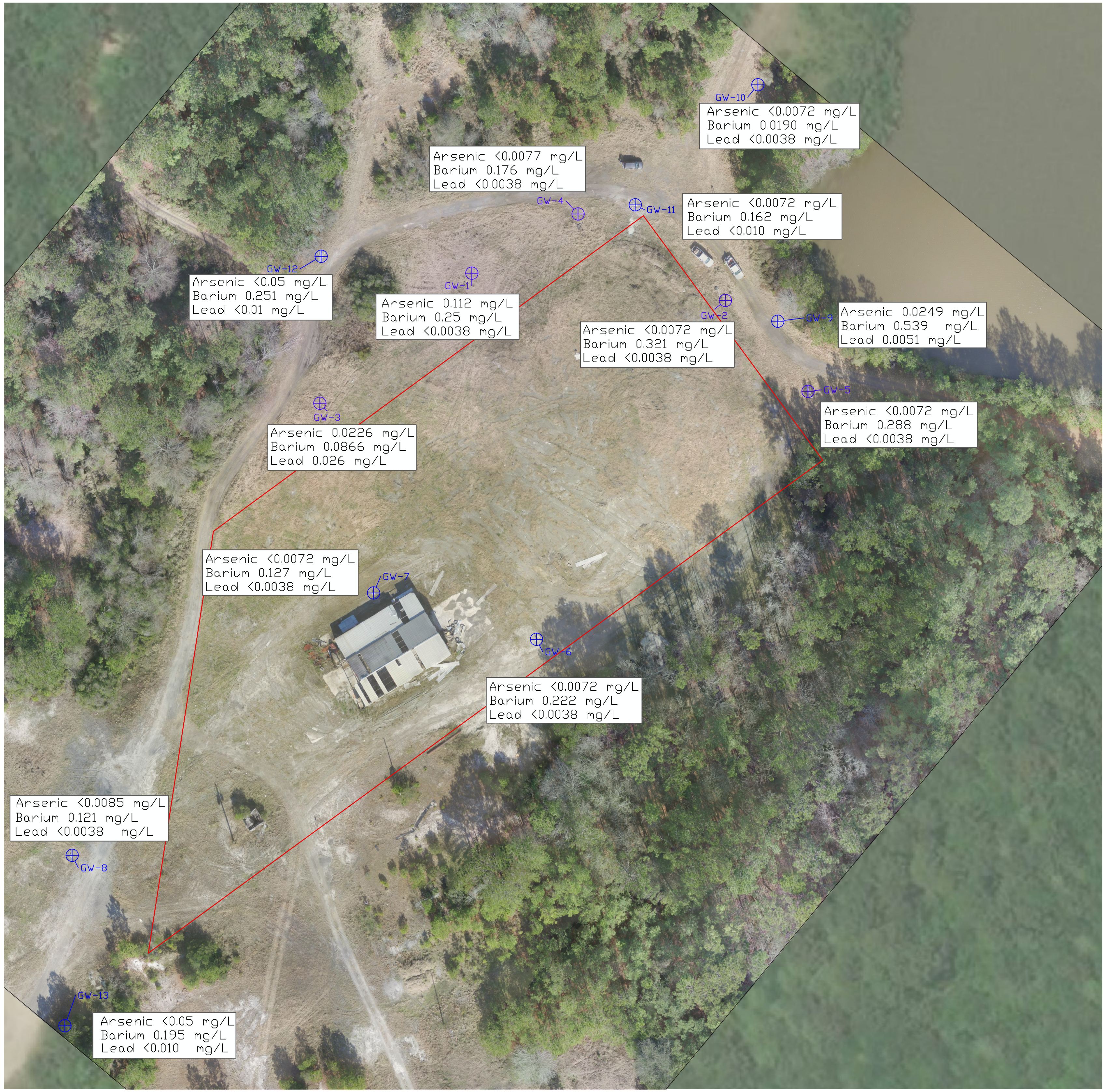
## Legend:

-  Soil Test Location
-  Monitoring Well Location
-  Sediment Sample Location
-  SAFSC Parcel Boundary
-  SBM/Copper Slag Berm



**Figure 3**  
**Sample Location Map**  
**Atlas Sand Mine**  
**Guyton, Effingham County, Georgia**  
**GEC Project No. HN185042**





**Arsenic**  
Type 1 RRS 0.01 mg/L  
Type 2 RRS 0.000568 mg/L

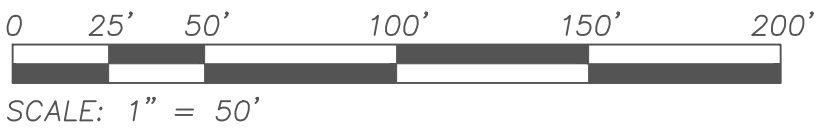
**Barium**  
Type 1 RRS 2 mg/L  
Type 2 RRS 3.13 mg/L

**Lead**  
Type 1 RRS 0.015 mg/L  
Type 2 RRS 0.015 mg/L

**Legend:**

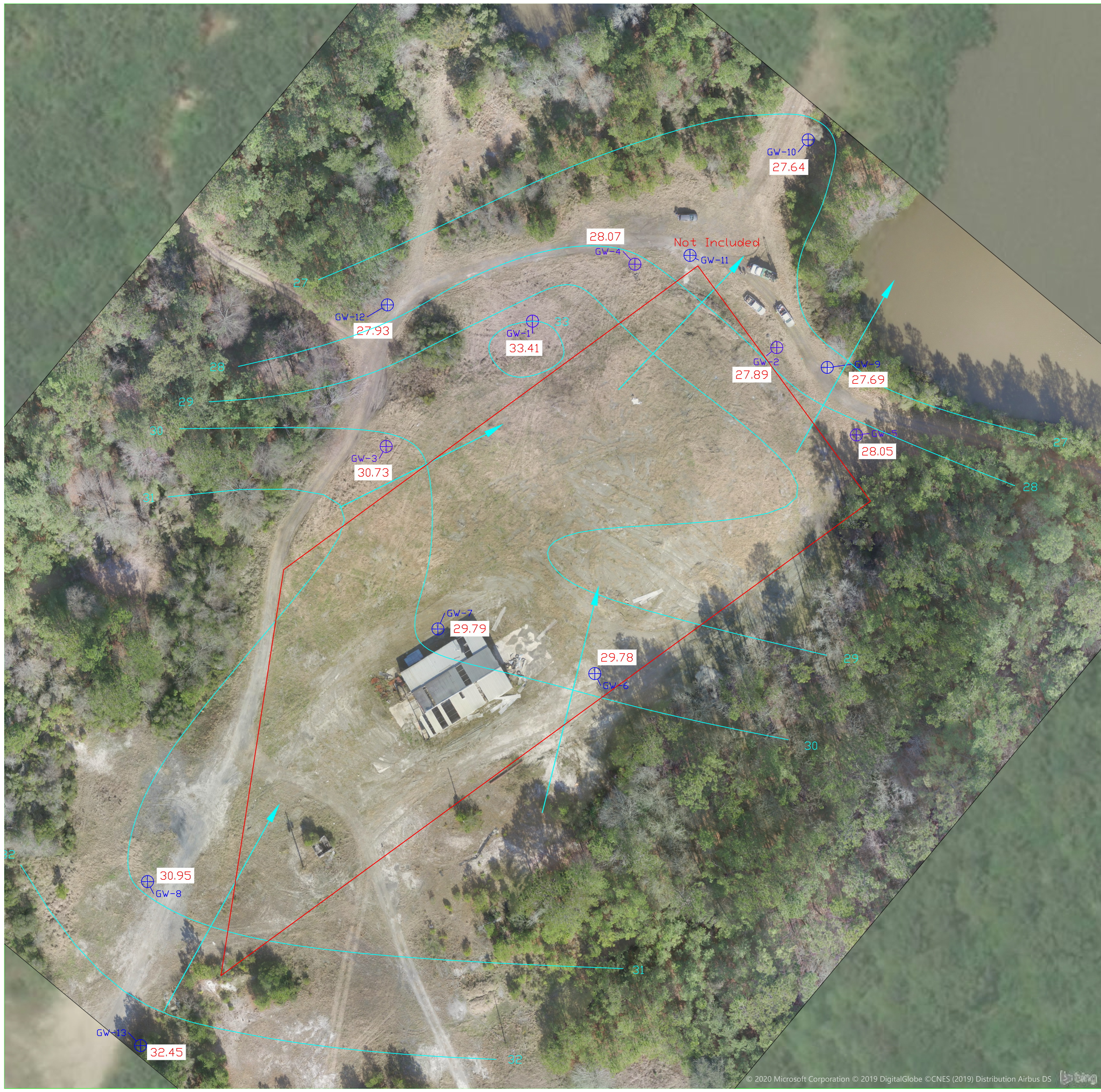
- ⊕ Groundwater Sample Location
- SAFSC Parcel Boundary
- ▭ Onsite Structure
- Direction of groundwater movement
- Contour Interval
- SBM/Copper Slag Berm

**Note: Groundwater results displayed are filtered results from the December 2019 sampling event**

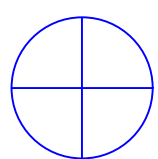


**Figure 4**  
**Groundwater Results Map**  
**Atlas Sand Mine**  
**Guyton, Effingham County, Georgia**  
**GEC Project No. HN185042**





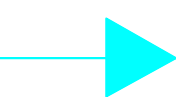
# Legend:



Groundwater Sample Location



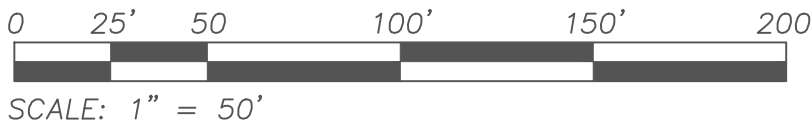
Parcel Boundary



Direction of groundwater movement



Contour Interval



**Figure 5**  
**Potentiometric Contour Map**  
**Atlas Sand Mine**  
**Guyton, Effingham County, Georgia**  
**GEC Project No. HN185042**



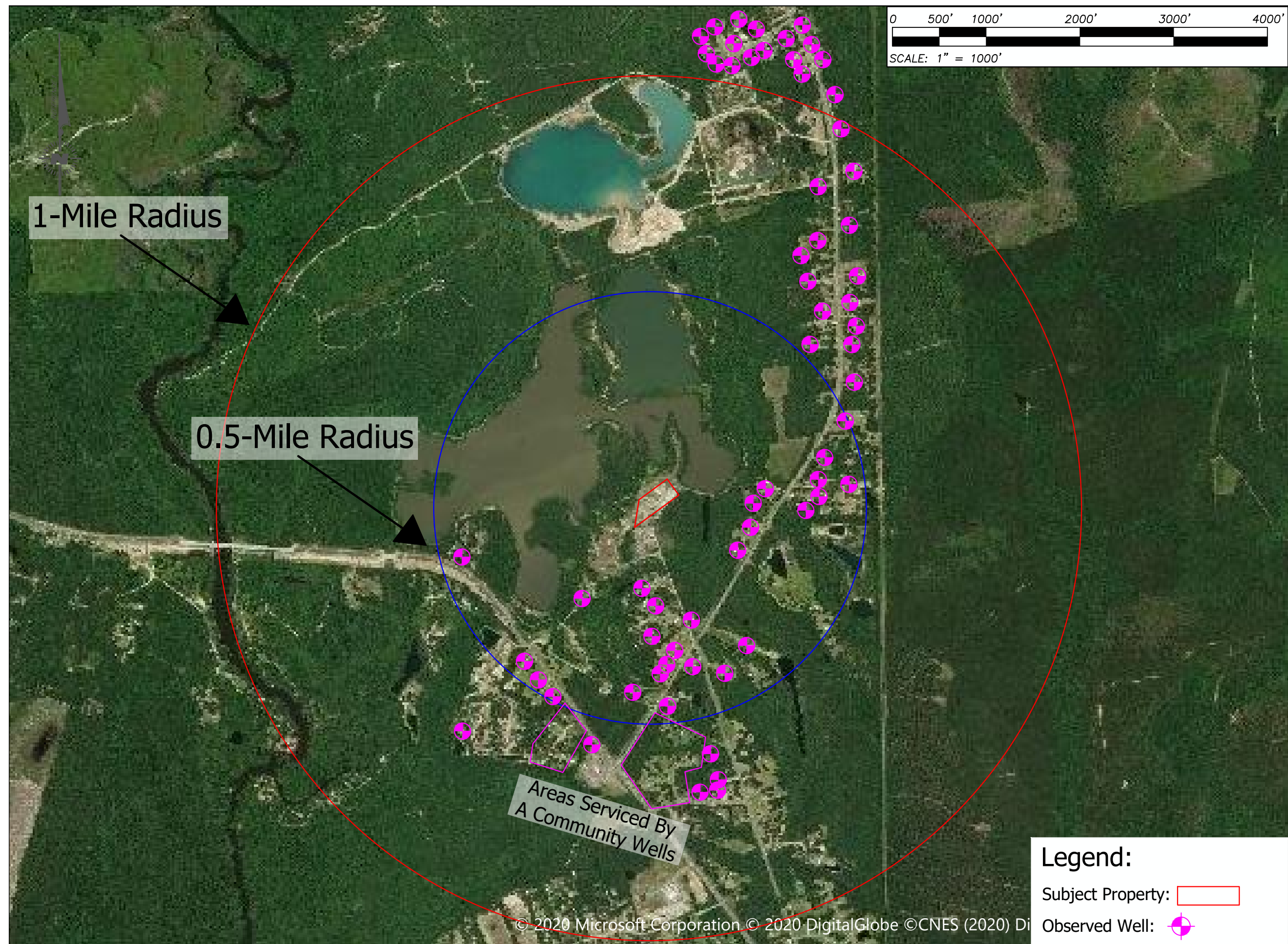


Figure 6

Water Survey Map

Atlas Sand

216 Sandy Oaks Road

Guyton, Effingham County, Georgia

GEC Project No. HN185042

**GEC**

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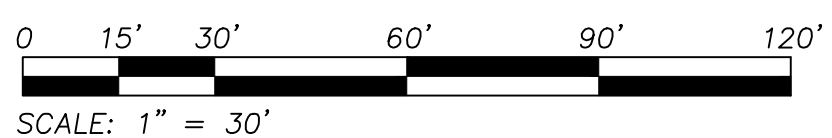


Ecological Screening Value (ESV) & Refinement Screening Value (RSV):

	ESV	RSV
Arsenic:	9.8	33.3
Barium:	20.0	60.0
Copper:	31.6	149.0
Lead:	35.8	128.0

Legend:

- Sediment Test Location
- SAFSC Parcel Boundary
- Analytical Lab Data



**Figure 7**  
**Sediment Sample Location Map**  
**Atlas Sand Mine**  
**Guyton, Effingham County, Georgia**  
**GEC Project No. HN185042**











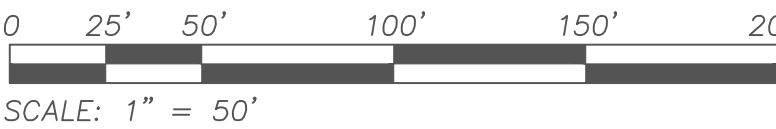
# Volume:

Total = 29190 cubic yards  
County Property = 10700 cy  
Arnold Property = 17000 cy  
SBM/Copper Slag Berm = 1490 cy

Depth	County	Arnold
0-1'	3136.49	4239.29
1-2'	2703.88	3024.16
2-3'	2034.53	2584.69
3-4'	1481.34	2537.39
4-6'	1287.01	4431.30
Total	10643.25	16816.84

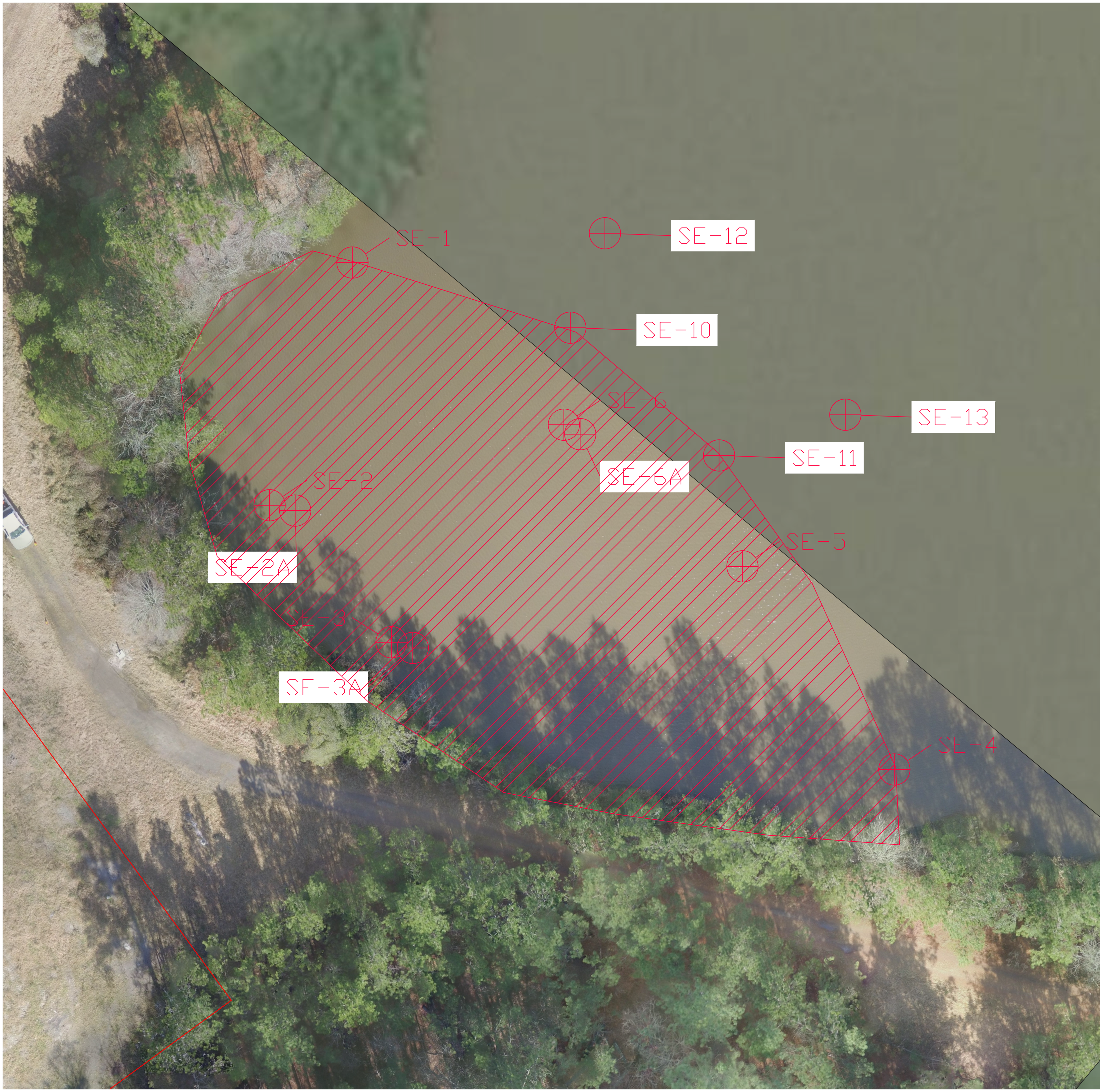
# Legend:

-  Area Requiring Excavation to 1'
-  Area Requiring Excavation to 2'
-  Area Requiring Excavation to 3'
-  Area Requiring Excavation to 4'
-  Area Requiring Excavation to 6.5'
-  SBM/Copper Slag Berm



**Figure 8**  
**Excavation Plan**  
**Atlas Sand Mine**  
**Guyton, Effingham County, Georgia**  
**GEC Project No. HN185042**



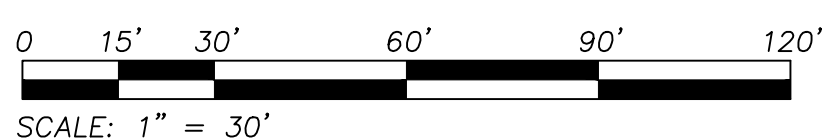


Ecological Screening Value (ESV) & Refinement Screening Value (RSV):

	ESV	RSV
Arsenic:	9.8	33.3
Barium:	20.0	60.0
Copper:	31.6	149.0
Lead:	35.8	128.0

Legend:

- Sediment Test Location
- SAFSC Parcel Boundary
- Analytical Lab Data Proposed Excavation Area (~1000 cubic yards)



**Figure 9**  
**Approximate Sediment Excavation**  
**Atlas Sand Mine**  
**Guyton, Effingham County, Georgia**  
**GEC Project No. HN185042**



**COMPILED TABLES**

**EXCERPT FROM:**

**VOLUNTARY REMEDIATION PROGRAM APPLICATION**

**ATLAS SAND MINE**

**216 SHADY OAKS DRIVE**

**GUYTON, EFFINGHAM COUNTY, GEORGIA**

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**514 HILLCREST INDUSTRIAL BOULEVARD**

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**ISSUE DATE**

**November 10, 2020**

Table 1 : Soil Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Depth (ft)	Sample Collection Date	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
SS-1	Surface	4/26/2018	mg/kg	9.15	101	<2.40	9.00	NT	230	<0.108	<4.80	<2.40
SS-1	6"	4/26/2018	mg/kg	<4.38	45.4	<2.19	6.53	NT	22.2	<0.107	<4.38	<2.19
SS-2	Surface	4/26/2018	mg/kg	166	2500.0	3.26	52.1	NT	2380.0	<0.110	<4.34	<2.17
SS-2	6"	4/26/2018	mg/kg	91.6	1220.0	<2.08	25.8	NT	1190.0	<0.0984	<4.16	<2.08
SS-2	1'	5/31/2018	mg/kg	<3.87	48.5	NT	NT	NT	49.3	NT	NT	NT
SS-2	2'	5/31/2018	mg/kg	5.34	68.4	NT	NT	NT	72.1	NT	NT	NT
SS-3	Surface	4/26/2018	mg/kg	99.1	1440.0	2.50	33.4	NT	1480.0	<0.108	<4.27	<2.13
SS-3	6"	4/26/2018	mg/kg	58.0	899.0	<2.09	23.3	NT	853.0	<0.104	<4.18	<2.09
SS-3	1'	5/31/2018	mg/kg	7.0	78.0	NT	NT	NT	141.0	NT	NT	NT
SS-3	2'	5/31/2018	mg/kg	329.0	3720.0	NT	NT	NT	4190.0	NT	NT	NT
SS-4	Surface	4/26/2018	mg/kg	335.0	5280.0	6.47	71.6	NT	3650.0	<0.104	<4.23	<2.11
SS-4	6"	4/26/2018	mg/kg	305.0	4330.0	5.83	74.6	NT	3710.0	<0.132	<5.49	<2.75
SS-4	1'	5/31/2018	mg/kg	6.0	91.5	NT	NT	NT	84.2	NT	NT	NT
SS-4	2'	5/31/2018	mg/kg	<6.30	74.2	NT	NT	NT	46.7	NT	NT	NT
SS-5	Surface	4/26/2018	mg/kg	39.5	377.0	<2.00	14.8	NT	603.0	<0.0944	<4.01	<2.00
SS-5	6"	4/26/2018	mg/kg	34.9	353.0	<2.01	14.1	NT	589.0	<0.0964	<4.03	<2.01
SS-5	1'	5/31/2018	mg/kg	171	1450.0	NT	NT	NT	2640.0	NT	NT	NT
SS-5	2'	5/31/2018	mg/kg	146	1770.0	NT	NT	NT	3040.0	NT	NT	NT
SS-6	Surface	4/26/2018	mg/kg	<4.21	50.9	<2.10	3.33	NT	64.3	<0.102	<4.21	<2.10
SS-6	6"	4/26/2018	mg/kg	102.0	1540.0	<2.11	31.5	NT	1490.0	<0.0934	<4.22	<2.11
SS-6	1'	5/31/2018	mg/kg	137.0	1680.0	NT	NT	NT	2700.0	NT	NT	NT
SS-6	2'	5/31/2018	mg/kg	186.0	1900.0	NT	NT	NT	3360.0	NT	NT	NT
SS-7	Surface	4/26/2018	mg/kg	90.6	1290.0	<2.13	32.7	NT	1350.0	<0.100	<4.27	<2.13
SS-7	6"	4/26/2018	mg/kg	270.0	4060.0	5.43	87.3	NT	3480.0	<0.102	<4.25	<2.13
SS-7	1'	5/31/2018	mg/kg	271.0	3000.0	NT	NT	NT	5110.0	NT	NT	NT
SS-7	2'	5/31/2018	mg/kg	104.0	1210.0	NT	NT	NT	2120.0	NT	NT	NT
SS-8	Surface	4/26/2018	mg/kg	120.0	1440.0	2.57	41.9	NT	1700.0	<0.103	<3.98	<1.9
SS-8	6"	4/26/2018	mg/kg	<4.10	20.5	<2.05	5.54	NT	10.8	<0.105	<4.10	<2.05
SS-9	Surface	4/26/2018	mg/kg	233.0	3620.0	4.24	59.1	NT	2960.0	<0.0937	<4.35	<2.17
SS-9	6"	4/26/2018	mg/kg	283.0	4400.0	5.53	64.4	NT	3390.0	<0.0957	<4.23	<2.12
SS-9	1'	5/31/2018	mg/kg	177.0	2010.0	NT	NT	NT	3180.0	NT	NT	NT
SS-9	2'	5/31/2018	mg/kg	267.0	2770.0	NT	NT	NT	4440.0	NT	NT	NT
SS-10	Surface	4/26/2018	mg/kg	207.0	3490.0	3.94	55.6	NT	2690.0	<0.0985	<4.82	<2.41
SS-10	6"	4/26/2018	mg/kg	90.9	1280.0	<2.04	38.0	NT	1370.0	<0.108	<4.08	<2.04
SS-10	1'	5/31/2018	mg/kg	<4.30	45.8	NT	NT	NT	38.4	NT	NT	NT
Type 1 (Residential) Risk Reduction Standards (RRS)			mg/kg	20.0	1600.0	7.5	100.0	920.0	270.0	2.1	5.2	16.0
Type 3 (Non-Residential) Risk Reduction Standards (RRS)			mg/kg	30.0	1650.0	39.0	3,600,000	1500.0	400.0	17.0	36.0	96.6

Table 1 : Soil Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Depth (ft)	Sample Collection Date	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
SS-10	2'	5/31/2018	mg/kg	<4.58	27.6	NT	NT	NT	13.9	NT	NT	NT
SS-11	0-1	12/10/2019	mg/kg	262.00	2880.0	5.09	74.6	252	3120.0	NT	<3.82	<2.73
SS-11	1-2	12/10/2019	mg/kg	283.00	2820.0	4.79	67.4	261	3180.0	NT	<3.33	<2.38
SS-11	2-3	12/10/2019	mg/kg	197.00	2120.0	4.55	55.5	186	2800.0	NT	<2.62	<1.87
SS-11	3-4	12/10/2019	mg/kg	273.00	2860.0	7.47	71.3	261	3480.0	NT	<3.23	<2.31
SS-11	5-6'	12/10/2019	mg/kg	90.70	1090	<3.01	32.7	79.5	1250	NT	<4.21	<3.01
SS-11*	7-8'	12/10/2019	mg/kg	338.00	3600	6.53	69.4	270	3090	NT	<2.98	<2.13
SS-12	0-1	12/9/2019	mg/kg	243.00	2490	4.98	74.1	211.0	2800.0	NT	<2.73	<1.95
SS-12	1-2	12/9/2019	mg/kg	172.00	2050	3.66	60.6	156.0	2290.0	NT	<3.00	<2.15
SS-12	2-3	12/9/2019	mg/kg	175.00	1640	4.97	63.4	173.0	2780.0	NT	<3.64	<2.6
SS-12	3-4	12/9/2019	mg/kg	73.80	960	<2.85	33.6	67.9	1130.0	NT	<3.99	<2.85
SS-13	0-1	12/10/2019	mg/kg	295.00	2830.0	5.09	64.8	237	2790.0	NT	<3.23	<2.31
SS-13	1-2	12/10/2019	mg/kg	346.00	3520.0	6.27	82.1	341	3620.0	NT	<3.16	<2.26
SS-13	2-3	12/10/2019	mg/kg	242.00	2060.0	5.44	62.8	231	2850.0	NT	<3	<2.14
SS-13	3-4	12/10/2019	mg/kg	348.00	3740.0	9.81	84.3	340	4200.0	NT	<3.21	<2.29
SS-13	4-5'	12/10/2019	mg/kg	212.00	2340	4.71	50.3	184	2330	NT	<4.02	<2.87
SS-13	5-6'	12/10/2019	mg/kg	297.00	3450	6.91	65.1	257	2970	NT	<3.25	<2.32
SS-14	0-1	12/10/2019	mg/kg	269.00	2960.0	5.25	69.3	251	3360.0	NT	<3.74	<2.67
SS-14	1-2	12/10/2019	mg/kg	257.00	2960.0	5.22	70.9	254	3060.0	NT	<3.32	<2.37
SS-14	2-3	12/10/2019	mg/kg	280.00	2650.0	6.19	76	260	3600.0	NT	<3.87	<2.77
SS-14	3-4	12/10/2019	mg/kg	256.00	2790.0	7.06	64.8	244	3240.0	NT	<3.30	<2.36
SS-14	4-5'	12/10/2019	mg/kg	106.00	1250	2.43	34.3	92.8	1400	NT	<3.40	<2.43
SS-14	5-6'	12/10/2019	mg/kg	182.00	2130	4.04	54.5	166	2300	NT	<3.10	<2.21
SS-15	0-1	12/10/2019	mg/kg	325.00	3550.0	8.37	82.5	298	3500.0	NT	4.10	<2.05
SS-15	1-2	12/10/2019	mg/kg	260.00	3340.0	6.6	73	258	3140.0	NT	6.2	<2.04
SS-15	2-3	12/10/2019	mg/kg	39.50	368.0	<2.4	17.1	36.7	548.0	NT	<3.36	<2.4
SS-15	3-4	12/10/2019	mg/kg	3.1	75.4	<2.30	30.2	8.92	48.7	NT	<3.22	<2.30
SS-16	0-1	12/9/2019	mg/kg	401.00	4300	10.4	96.7	395.0	4540	NT	8.44	<2.37
SS-16	1-2	12/9/2019	mg/kg	315.00	3370	8.25	84.6	313.0	3760	NT	6.16	<2.24
SS-16	2-3	12/9/2019	mg/kg	326.00	2920	7.35	85.1	304.0	3910	NT	<3.66	<2.61
SS-16	3-4	12/9/2019	mg/kg	355.00	4370	10.4	87.3	334.0	4490	NT	<3.84	<2.74
SS-16	4-5	12/9/2019	mg/kg	9.27	106	<3.29	15.2	26.4	96	NT	<4.61	<3.29
SS-17	0-1	12/9/2019	mg/kg	295.00	2960	7.56	72.0	281.0	4960	NT	6.32	<2.10
SS-17	1-2	12/9/2019	mg/kg	195.00	2050	4.86	54.7	168.0	2280	NT	<2.80	<2.00
SS-17	2-3	12/9/2019	mg/kg	484.00	3530	11.3	108.0	470.0	5720	NT	<3.62	<2.58
SS-17	3-4	12/9/2019	mg/kg	326.00	3640	9.06	81.3	315.0	4070	NT	<3.60	<2.57
Type 1 (Residential) Risk Reduction Standards (RRS)			mg/kg	20.0	1600.0	7.5	100.0	920.0	270.0	2.1	5.2	16.0
Type 3 (Non-Residential) Risk Reduction Standards (RRS)			mg/kg	30.0	1650.0	39.0	3,600.000	1500.0	400.0	17.0	36.0	96.6

Table 1 : Soil Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Depth (ft)	Sample Collection Date	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
SS-17	4-5	12/9/2019	mg/kg	66.10	715	<2.33	23.5	60.2	1040	NT	<3.26	<2.33
SS-17	5-6	12/9/2019	mg/kg	199.00	2740	4.7	51.4	205	2500	NT	<2.74	<1.95
SS-18	0-1	12/9/2019	mg/kg	304.00	3910	7.89	83.3	301.0	3530	NT	7.32	<2.12
SS-18	1-2	12/9/2019	mg/kg	35.50	339	<1.97	15.1	35.6	559	NT	<2.79	<1.97
SS-18	2-3	12/9/2019	mg/kg	9.94	122	<4.21	17.9	22.3	115	NT	<5.9	<4.21
SS-19	0-1	12/9/2019	mg/kg	191.00	2220	4.9	54.3	186.0	2320	NT	4.9	<2.18
SS-19	1-2	12/9/2019	mg/kg	16	230	<2.07	8.5	14.6	223	NT	<2.90	<2.07
SS-20	0-1	12/9/2019	mg/kg	140.00	1530	3.75	47.2	135.0	1920	NT	<3.59	<2.57
SS-20	1-2	12/9/2019	mg/kg	60.60	661	<2.07	22.0	65.5	818	NT	<2.89	<2.07
SS-20	2-3	12/9/2019	mg/kg	3.3	36	<2.68	16.1	3.3	19	NT	<3.76	<2.68
SS-21	0-1	12/9/2019	mg/kg	31.70	340	<2.18	18.0	34.4	476	NT	<3.06	<2.18
SS-21	1-2	12/9/2019	mg/kg	23.70	205	<2.17	13.6	21.7	349	NT	<3.04	<2.17
SS-22	0-1	12/10/2019	mg/kg	77.10	936.0	<2.23	25	74.9	1120.0	NT	<3.12	<2.23
SS-22	1-2	12/10/2019	mg/kg	<2.55	13.5	<2.55	6.29	<2.55	<5.09	NT	<3.57	<2.55
SS-23	0-1	12/10/2019	mg/kg	20.30	200.0	<2.23	18.3	31.9	364.0	NT	<3.13	<2.23
SS-23	1-2	12/10/2019	mg/kg	<2.19	8.59	<2.19	3.39	<2.19	<4.38	NT	<3.07	<2.19
SS-24	0-1	12/9/2019	mg/kg	123.00	1450.0	3.52	44	126	1670.0	NT	3.36	<2.00
SS-24	1-2	12/9/2019	mg/kg	15.8	159.0	<2.14	9.9	18.4	246.0	NT	<2.99	<2.14
SS-25	0-1	12/9/2019	mg/kg	248.00	2430.0	5.73	58.8	199	2600.0	NT	4.47	<1.97
SS-25	1-2	12/9/2019	mg/kg	8.53	90.5	<2.30	12.6	10.8	112.0	NT	<3.22	<2.30
SS-26	0-1	12/10/2019	mg/kg	230.00	2660.0	5.96	58.5	221	2720.0	NT	5.38	<2.02
SS-26	1-2	12/10/2019	mg/kg	218.00	2710.0	5.85	59	213	2580.0	NT	<2.82	<2.01
SS-26	2-3	12/10/2019	mg/kg	185.00	1900.0	4.22	51.2	175	2470.0	NT	<3.74	<2.67
SS-26	3-4	12/10/2019	mg/kg	167.00	1990.0	4.55	50.2	163	2290.0	NT	<3.64	<2.60
SS-26	4-5'	12/10/2019	mg/kg	143.00	1670	3.53	40	127	1830	NT	<3.94	<2.81
SS-26	5-6'	12/10/2019	mg/kg	266.00	3450	5.73	68.3	256	2820	NT	<3.08	<2.20
SS-27	0-1	12/10/2019	mg/kg	206.00	2420.0	4.19	62.2	208	2590.0	NT	<3.11	<2.22
SS-27	1-2	12/10/2019	mg/kg	97.60	1140.0	<2.68	39.1	99.3	1440.0	NT	<3.76	<2.68
SS-27	2-3	12/10/2019	mg/kg	30.70	84.9	<3.14	28.7	9.96	66.1	NT	<4.39	<3.14
SS-28	0-1	12/10/2019	mg/kg	321.00	2640.0	5.16	84	252	3000.0	NT	<3.50	<2.50
SS-28	1-2	12/10/2019	mg/kg	261.00	2870.0	5.22	68.3	254	3120.0	NT	<3.58	<2.56
SS-28	2-3	12/10/2019	mg/kg	239.00	2310.0	5.86	66.5	225	3100.0	NT	<3.35	<2.39
SS-28	3-4	12/10/2019	mg/kg	158.00	1840.0	4.45	55.9	164	2300.0	NT	<3.60	<2.57
SS-28	4-5'	12/10/2019	mg/kg	179.00	2020	4.38	60.1	159	2440	NT	<3.82	<2.73
SS-28	5-6'	12/10/2019	mg/kg	94.90	1090	<2.22	34.4	75.1	1500	NT	<3.11	<2.22
SS-29	0-1	12/10/2019	mg/kg	264.00	3030.0	4.93	73.1	246	3040.0	NT	<3.41	<2.43
Type 1 (Residential) Risk Reduction Standards (RRS)			mg/kg	20.0	1600.0	7.5	100.0	920.0	270.0	2.1	5.2	16.0
Type 3 (Non-Residential) Risk Reduction Standards (RRS)			mg/kg	30.0	1650.0	39.0	3,600,000	1500.0	400.0	17.0	36.0	96.6

Table 1 : Soil Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Depth (ft)	Sample Collection Date	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
SS-29	1-2	12/10/2019	mg/kg	296.00	3170.0	5.52	75.7	275	3220.0	NT	<3.61	<2.58
SS-29	2-3	12/10/2019	mg/kg	298.00	2840.0	6.92	72.1	275	3630.0	NT	<3.36	<2.4
SS-29	3-4	12/10/2019	mg/kg	345.00	3610.0	9.27	87.7	338	4250.0	NT	<3.28	<2.35
SS-29	4-5'	12/10/2019	mg/kg	361.00	3780	7.89	83.8	354	3840	NT	<3.85	<2.75
SS-29	5-6'	12/10/2019	mg/kg	302.00	3660	6.33	73.9	278	3100	NT	<2.99	<2.14
SS-30	0-1	12/9/2019	mg/kg	266.00	3040	5.12	68.5	229.0	2850	NT	<2.89	<2.06
SS-30	1-2	12/9/2019	mg/kg	339.00	2860	5.91	59.6	220.0	2710	NT	<2.81	<2.00
SS-30	2-3	12/9/2019	mg/kg	<2.02	24	<2.02	10.3	2.8	10	NT	<2.83	<2.02
SS-31	0-1	12/9/2019	mg/kg	230.00	2630	4.74	61.7	210.0	2830	NT	<2.90	<2.07
SS-31	1-2	12/9/2019	mg/kg	198.00	2250	4.12	62.2	171.0	2660	NT	<3.20	<2.28
SS-31	2-3	12/9/2019	mg/kg	160.00	1620	3.95	40.7	133.0	2050	NT	<3.25	<2.32
SS-32	0-1	12/9/2019	mg/kg	12.1	152	<2.01	9.5	12.8	204.0	NT	<2.82	<2.01
SS-32	1-2	12/9/2019	mg/kg	<1.98	30.1	<1.98	6.2	2.6	28.3	NT	<2.77	<1.98
SS-33	0-1	12/9/2019	mg/kg	130.00	1400	2.62	46.3	114.0	1730.0	NT	<2.89	<2.06
SS-33	1-2	12/9/2019	mg/kg	9.48	104	<2.01	13.5	9.87	160.0	NT	<2.81	<2.01
SS-34	0-1	12/9/2019	mg/kg	99.40	1090	2.21	33.1	83.4	1340.0	NT	<2.79	<2.00
SS-34	1-2	12/9/2019	mg/kg	35.60	337	<2.05	16.1	31.1	570.0	NT	<2.87	<2.05
SS-34	2-3	12/9/2019	mg/kg	36.40	340	<2.59	14.1	31.0	623.0	NT	<3.62	<2.59
SS-34	3-4	12/9/2019	mg/kg	<2.42	61.2	<2.42	19.3	3.6	49.3	NT	<3.39	<2.42
SS-35	0-1	12/9/2019	mg/kg	211.00	2500	4.3	58.8	188.0	2450.0	NT	<2.90	<2.07
SS-35	1-2	12/9/2019	mg/kg	508.00	3910	31	133.0	498.0	5000.0	NT	<2.75	<1.97
SS-35	2-3	12/9/2019	mg/kg	5.93	129	<3.45	7.4	13.7	235.0	NT	<4.82	<3.45
SS-36	0-1	12/9/2019	mg/kg	246.00	2620	4.99	62.0	209.0	2740.0	NT	<2.81	<2.0
SS-36	1-2	12/9/2019	mg/kg	57.10	616	<2.04	20.0	48.6	786.0	NT	<2.86	<2.04
SS-36	2-3'	12/9/2019	mg/kg	2.67	38	<2.6	13.2	3.4	27.5	NT	<3.64	<2.6
SS-37	0-1	12/9/2019	mg/kg	277.00	3060	5.28	69.8	245.0	3050	NT	<3.02	<2.16
SS-37	1-2	12/9/2019	mg/kg	258.00	2930	5.2	67.5	232.0	2850	NT	<2.90	<2.07
SS-37	2-3	12/9/2019	mg/kg	263.00	2390	6.13	68.5	257.0	3280	NT	<3.02	<2.16
SS-37	3-4	12/9/2019	mg/kg	310.00	3220	8.2	82.4	341.0	3940	NT	<3.85	<2.75
SS-38	0-1	12/9/2019	mg/kg	212.00	1980	4.08	48.0	151.0	2140	NT	<2.84	<2.03
SS-38	1-2	12/9/2019	mg/kg	108.00	1250	2.35	32.3	91.6	1400	NT	<2.90	<2.08
SS-38	2-3	12/9/2019	mg/kg	166.00	1480	3.57	43.2	130.0	2010	NT	<3.83	<2.74
SS-38	3-4	12/9/2019	mg/kg	211.00	2500	5.61	55.9	204.0	2810	NT	<3.16	<2.26
SS-38	4-5'	12/9/2019	mg/kg	155.00	2030	4.49	48.6	155	2090	NT	<3.18	<2.27
SS-39	0-1	12/10/2019	mg/kg	180.00	2070.0	3.72	55.9	185	2340.0	NT	<3.28	<2.35
SS-39	1-2	12/10/2019	mg/kg	118.00	1270.0	2.3	38.6	119	1580.0	NT	<2.67	<1.91
Type 1 (Residential) Risk Reduction Standards (RRS)			mg/kg	20.0	1600.0	7.5	100.0	920.0	270.0	2.1	5.2	16.0
Type 3 (Non-Residential) Risk Reduction Standards (RRS)			mg/kg	30.0	1650.0	39.0	3,600,000	1500.0	400.0	17.0	36.0	96.6

Table 1 : Soil Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Depth (ft)	Sample Collection Date	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
SS-39	2-3	12/10/2019	mg/kg	62.10	700.0	<2.43	20.4	61.1	891.0	NT	<3.41	<2.43
SS-39	3-4	12/10/2019	mg/kg	3.75	104.0	<2.47	13.4	7	101.0	NT	<3.45	<2.47
SS-40	0-1	12/10/2019	mg/kg	53.60	475.0	<2.22	16.2	58.9	814.0	NT	<3.10	<2.22
SS-40	1-2	12/10/2019	mg/kg	<2.69	33.5	<2.69	5.1	2.74	35.7	NT	<3.76	<2.69
SS-41	0-1	12/10/2019	mg/kg	13.6	157.0	<1.90	6.17	19.2	228.0	NT	<2.66	<1.90
SS-41	1-2	12/10/2019	mg/kg	99.40	874.0	<1.89	21.9	114	1270.0	NT	<2.65	<1.89
SS-41	2-3	12/10/2019	mg/kg	<1.76	26.6	<1.76	2.84	<1.76	11.1	NT	<2.47	<1.76
SS-42	0-1	12/10/2019	mg/kg	95.00	858.0	<2.20	29	101	1390.0	NT	<3.08	<2.20
SS-42	1-2	12/10/2019	mg/kg	3.93	11.7	<1.89	<1.89	2.69	31.6	NT	<2.64	<1.89
SS-43	0-1	12/10/2019	mg/kg	9.41	92.2	<2.34	7.13	13.1	308.0	NT	<3.28	<2.34
SS-43	1-2	12/10/2019	mg/kg	<2.07	24.7	<2.07	8.91	<2.07	11.4	NT	<2.90	<2.07
SS-44	0-1	12/10/2019	mg/kg	<2.16	17.4	<2.16	3.76	<2.16	22.8	NT	<3.02	<2.16
SS-44	1-2	12/10/2019	mg/kg	<2.23	41.3	<2.23	15	2.43	10.5	NT	<3.13	<2.23
SS-45	0-1	12/10/2019	mg/kg	<2.09	35.1	<2.09	5.23	<2.09	28.9	NT	<2.93	<2.09
SS-45	1-2	12/10/2019	mg/kg	<2.05	17.8	<2.05	5.05	<2.05	12.7	NT	<2.86	<2.05
SS-48	0-1'	1/30/2020	mg/kg	197.00	1910	3.89	56.8	167	2330	NT	<2.39	<1.70
SS-48	2-3'	1/30/2020	mg/kg	<1.87	6.95	<1.87	<1.87	<1.87	<3.73	NT	<2.61	<1.87
SS-49	0-1'	1/30/2020	mg/kg	317.00	1710	5.9	74.2	295	3570	NT	<2.43	<1.74
SS-49	1-2'	1/30/2020	mg/kg	<1.86	18	<1.86	3.69	<1.86	16.2	NT	<2.60	<1.86
SS-50	0-1'	1/30/2020	mg/kg	<2.41	23	<2.41	2.78	<2.41	<4.82	NT	<3.37	<2.41
SS-50	1-2'	1/30/2020	mg/kg	2.15	10.1	<1.86	<1.86	1.92	34.2	NT	<2.61	<1.86
SS-51	0-1'	1/30/2020	mg/kg	3.1	24.2	<1.79	2.56	2.18	67.5	NT	<2.50	<1.79
SS-51	1-2'	1/30/2020	mg/kg	<1.65	23.2	<1.65	2.44	<1.65	5.91	NT	<2.31	<1.65
SS-52	0-1'	1/30/2020	mg/kg	<1.70	15.6	<1.70	<1.70	<1.70	20.4	NT	<2.38	<1.70
SS-52	1-2'	1/30/2020	mg/kg	<2.17	12.8	<2.17	4.79	<2.17	<4.35	NT	<3.04	<2.17
SS-55	0-1'	1/30/22020	mg/kg	229.00	1990	5.22	56.4	214	2860	<0.115	<2.64	<1.88
SS-55	1-2'	1/30/2020	mg/kg	<1.74	29.4	<1.74	3.9	2.71	31.8	<0.111	<2.44	<1.74
SS-57	0-1'	1/30/2020	mg/kg	<1.884	74.2	<1.84	6.39	7.71	77.1	<0.112	<2.58	<1.84
SS-57	1-2'	1/30/2020	mg/kg	<2.06	16.2	<2.06	6.2	<2.06	8.39	<0.115	<2.89	<2.06
SS-58	0-1'	1/30/2020	mg/kg	<2.44	32.77	<2.44	10	3.71	17.2	<0.123	<3.42	<2.44
SS-58	1-2'	1/30/2020	mg/kg	<2.03	26	<2.03	5.99	3.25	19.9	<0.116	<2.84	<2.03
SS-58	2-3'	1/30/2020	mg/kg	<1.73	9.63	<1.73	4.66	<1.73	3.81	<0.106	<2.42	<1.73
SS-59	0-1'	1/30/2020	mg/kg	191.00	2240	4.29	64.6	185	2520	<0.125	<3.83	2.74
SS-59	1-2'	1/30/2020	mg/kg	<2.23	18.1	<2.23	4.66	<2.23	24.3	<0.110	<3.13	<2.23
SS-59	2-3'	1/30/2020	mg/kg	2.79	38.8	<1.78	7.24	4.42	56.6	<0.113	<2.49	<1.78
SS-61	0-1'	1/30/2020	mg/kg	61.90	800	<1.86	26.1	60.3	1080	<0.111	<2.61	<1.86
Type 1 (Residential) Risk Reduction Standards (RRS)				20.0	1600.0	7.5	100.0	920.0	270.0	2.1	5.2	16.0
Type 3 (Non-Residential) Risk Reduction Standards (RRS)				30.0	1650.0	39.0	3,600.000	1500.0	400.0	17.0	36.0	96.6



Table 1 : Soil Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Depth (ft)	Sample Collection Date	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
SS-61	1-2'	1/30/2020	mg/kg	<1.95	14.9	<1.95	7.4	1.99	9.19	<0.113	<2.73	<1.95
SS-61	2-3'	1/30/2020	mg/kg	6.24	77.3	<1.84	11.2	7.06	110	<0.116	<2.58	<1.84
SS-62	0-1'	1/30/2020	mg/kg	4.46	68	<2.27	8.4	6.89	97.5	<0.120	<3.17	<2.27
SS-62	1-2'	1/30/2020	mg/kg	<2.15	14.2	<2.15	6.47	2.24	15.9	<0.117	<3.02	<2.15
SS-62	2-3'	1/30/2020	mg/kg	<1.92	15.8	<1.92	6.88	<1.92	5.88	<0.114	<2.69	<1.92
SS-68	0-1'	1/30/2020	mg/kg	52.40	619	<1.68	23.4	52.6	823	<0.111	<2.35	<1.68
SS-68	1-2'	1/30/2020	mg/kg	<2.39	15.2	<2.39	10.3	2.58	7.2	<0.113	<3.35	<2.39
SS-70	0-1'	1/30/2020	mg/kg	46.30	394	<2.28	20.4	35.2	789	<0.111	<3.20	<2.28
SS-70	1-2'	1/30/2020	mg/kg	<2.41	18.9	<2.41	9.22	<2.41	6.74	NT	<3.37	<2.41
SS-72	0-1'	1/30/2020	mg/kg	52.80	447	<1.88	18.5	40.5	698	NT	<2.63	<1.88
SS-72	1-2'	1/30/2020	mg/kg	<2.68	36.1	<2.68	19.5	6.11	21.3	NT	<3.75	<2.68
SS-73	0-1'	1/30/2020	mg/kg	<2.30	23.7	<2.30	9.46	<2.30	17.7	NT	<3.23	<2.30
SS-73	1-2'	1/30/2020	mg/kg	<2.72	26.2	<2.72	12	<2.72	12.2	NT	<3.80	<2.72
SS-74	0-1'	1/30/2020	mg/kg	<2.31	25.5	<2.31	7.31	<2.31	11.7	NT	<3.24	<2.31
SS-74	1-2'	1/30/2020	mg/kg	<2.94	42	<2.94	26.7	4.48	15.9	NT	<4.12	<2.94
SS-75	0-1'	3/11/2020	mg/kg	4.72	52.9	NT	NT	NT	62.6	NT	NT	NT
SS-76	0-1'	3/11/2020	mg/kg	<1.86	19.9	NT	NT	NT	12.3	NT	NT	NT
SS-77	0-1'	3/11/2020	mg/kg	73.30	895.0	NT	NT	NT	1250.0	NT	NT	NT
SS-78	0-1'	3/11/2020	mg/kg	135.00	1440.0	NT	NT	NT	1930.0	NT	NT	NT
SS-79	0-1'	3/11/2020	mg/kg	53.70	769.0	NT	NT	NT	851.0	NT	NT	NT
SS-80	0-1'	3/11/2020	mg/kg	<1.87	9.56	NT	NT	NT	12.0	NT	NT	NT
SS-81	0-1'	3/11/2020	mg/kg	<2.19	8.54	NT	NT	NT	11.7	NT	NT	NT
SS-82	0-1'	3/11/2020	mg/kg	47.70	478.0	NT	NT	NT	683.0	NT	NT	NT
SS-82	1-2'	3/11/2020	mg/kg	34.90	264.0	NT	NT	NT	382.0	NT	NT	NT
SS-83	0-1'	3/11/2020	mg/kg	<2.44	36.8	NT	NT	NT	17.8	NT	NT	NT
SS-83	1-2'	3/11/2020	mg/kg	4.19	53.1	NT	NT	NT	57.3	NT	NT	NT
SS-84	0-1'	3/11/2020	mg/kg	<1.98	25.8	NT	NT	NT	11.3	NT	NT	NT
SS-84	1-2'	3/11/2020	mg/kg	6.63	95.0	NT	NT	NT	114.0	NT	NT	NT
SS-85	0-1'	3/11/2020	mg/kg	<1.98	17.3	NT	NT	NT	6.45	NT	NT	NT
SS-85	1-2'	3/11/2020	mg/kg	<2.10	22.0	NT	NT	NT	10.2	NT	NT	NT
SS-85	2-3'	3/11/2020	mg/kg	3.00	40.3	NT	NT	NT	11.6	NT	NT	NT
SS-86	0-1'	3/11/2020	mg/kg	<2.60	18.1	NT	NT	NT	9.0	NT	NT	NT
SS-86	1-2'	3/11/2020	mg/kg	<2.02	18.1	NT	NT	NT	8.9	NT	NT	NT
SS-86	2-3'	3/11/2020	mg/kg	<1.90	15.1	NT	NT	NT	5.0	NT	NT	NT
SS-87	0-1'	3/11/2020	mg/kg	<2.35	33.4	NT	NT	NT	13.5	NT	NT	NT
SS-87	1-2'	3/11/2020	mg/kg	<2.20	15.3	NT	NT	NT	6.55	NT	NT	NT
Type 1 (Residential) Risk Reduction Standards (RRS)			mg/kg	20.0	1600.0	7.5	100.0	920.0	270.0	2.1	5.2	16.0
Type 3 (Non-Residential) Risk Reduction Standards (RRS)			mg/kg	30.0	1650.0	39.0	3,600,000	1500.0	400.0	17.0	36.0	96.6

Table 1 : Soil Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Depth (ft)	Sample Collection Date	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
SS-87	2-3'	3/11/2020	mg/kg	<2.64	15.1	NT	NT	NT	5.41	NT	NT	NT
SS-88	0-1'	3/12/2020	mg/kg	<2.67	14.9	NT	NT	NT	7.69	NT	NT	NT
SS-88	1-2'	2/12/2020	mg/kg	<2.06	6.96	NT	NT	NT	<4.13	NT	NT	NT
SS-89	0-1'	3/12/2020	mg/kg	<2.79	14.3	NT	NT	NT	9.91	NT	NT	NT
GW-1	3.5-5'	4/25/2018	mg/kg	151.0	2420.0	3.19	46.8	NT	2150.0	<0.103	<3.96	<1.98
GW-1	8.5-10'	4/25/2018	mg/kg	<4.16	17.2	<2.08	6.11	NT	5.93	<0.103	<4.16	<2.08
GW-2	3.5-5'	4/26/2018	mg/kg	61.8	812.0	<2.21	24.8	NT	929.0	<0.107	<4.43	<2.21
GW-2	6-7.5'	4/26/2018	mg/kg	<4.90	5.81	<2.45	<2.45	NT	<4.90	<0.119	<4.90	<2.45
GW-3	3.5-5'	4/25/2018	mg/kg	<4.41	12.2	<2.20	4.73	NT	7.51	<0.107	<4.41	<2.20
GW-3	8.5-10'	4/25/2018	mg/kg	<4.66	36.0	<2.33	11.9	NT	10.2	<0.106	<4.66	<2.33
GW-4	3.5-5'	4/25/2018	mg/kg	4.30	61.2	<2.02	8.06	NT	106.0	<0.0979	<4.04	<2.02
GW-4	8.5-10'	4/25/2018	mg/kg	<4.33	42.1	<2.16	9.53	NT	8.65	<0.115	<4.33	<2.16
GW-5	3.5-5'	4/26/2018	mg/kg	<4.19	15.0	<2.10	3.70	NT	<4.19	<0.0977	<4.19	<2.10
GW-5	6-7.5'	4/26/2018	mg/kg	<4.58	<4.58	<2.29	<2.29	NT	<4.58	<0.116	<4.58	<2.29
GW-8	1-2.5	12/10/2019	mg/kg	<2.05	10.1	<2.05	4.87	<2.05	<4.10	NT	<2.87	<2.05
GW-13	1-2.5	12/10/2019	mg/kg	<1.95	4.3	<1.95	<1.95	<1.95	<3.89	NT	<2.73	<1.95
Type 1 (Residential) Risk Reduction Standards (RRS)			mg/kg	20.0	1600.0	7.5	100.0	920.0	270.0	2.1	5.2	16.0
Type 3 (Non-Residential) Risk Reduction Standards (RRS)			mg/kg	30.0	1650.0	39.0	3,600.000	1500.0	400.0	17.0	36.0	96.6

Notes:

\* Sample collected below the water table

#### Indicates exceedance of Type 1 RRS

#### Indicates exceedance of Type 3 RRS

Table 2 : Groundwater Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Date Sample Collected	Filtered/ Unfiltered	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Selenium	Silver	Mercury
GW-1	5/30/2018	Unfiltered	mg/L	0.359	0.233	<0.005	<0.010	NT	0.0433	<0.020	<0.010	<0.0002
GW-1	5/30/2018	Filtered	mg/L	0.396	0.24	<0.005	<0.010	NT	0.0429	<0.020	<0.010	<0.0002
GW-1	12/12/2019	Unfiltered	mg/L	0.211	0.251	0.0020 (J)	<0.0032	0.0020 (J)	<0.0038	<0.0074	<0.0026	<0.00004
GW-1	12/12/2019	Filtered	mg/L	0.112	0.25	0.0023 (J)	<0.0032	<0.0015	<0.0038	<0.0074	<0.0026	0.00032
GW-2	5/30/2018	Unfiltered	mg/L	0.262	0.0711	<0.005	<0.010	NT	<0.010	<0.020	<0.010	<0.0002
GW-2	5/30/2018	Filtered	mg/L	0.285	0.0697	<0.005	<0.010	NT	<0.010	<0.020	<0.010	<0.0002
GW-2	12/12/2019	Unfiltered	mg/L	0.0219	0.35	<0.0019	0.0115	0.0024 (J)	0.0078 (J)	<0.0074	<0.0026	<0.00004
GW-2	12/12/2019	Filtered	mg/L	<0.0072	0.321	<0.0019	<0.0032	<0.0015	<0.0038	<0.0074	<0.0026	0.00006 (J)
GW-3	5/30/2018	Unfiltered	mg/L	<0.050	0.135	<0.005	0.0136	NT	0.124	<0.020	<0.010	<0.0002
GW-3	5/30/2018	Filtered	mg/L	<0.050	0.0797	<0.005	<0.010	NT	0.0208	<0.020	<0.010	<0.0002
GW-3	12/12/2019	Unfiltered	mg/L	0.0594	0.131	<0.0019	0.0176	0.0124	0.0792	<0.0074	<0.0026	0.00008 (J)
GW-3	12/12/2019	Filtered	mg/L	0.0226	0.0866	<0.0019	<0.0032	0.0053 (J)	0.026	<0.0074	<0.0026	0.00006 (J)
GW-4	5/30/2018	Unfiltered	mg/L	<0.050	0.264	<0.005	<0.010	NT	<0.010	<0.020	<0.010	<0.0002
GW-4	5/30/2018	Filtered	mg/L	<0.050	0.253	<0.005	<0.010	NT	<0.010	<0.020	<0.010	<0.0002
GW-4	12/12/2019	Unfiltered	mg/L	0.0100 (J)	0.184	<0.0019	0.0037 (J)	0.0058 (J)	0.0064 (J)	<0.0074	<0.0026	0.00051
GW-4	12/12/2019	Filtered	mg/L	0.0077 (J)	0.176	<0.0019	<0.0032	<0.0015	<0.0038	<0.0074	<0.0026	0.00006 (J)
GW-5	5/30/2018	Unfiltered	mg/L	<0.050	0.229	<0.005	<0.010	NT	<0.010	<0.020	<0.010	<0.0002
GW-5	5/30/2018	Filtered	mg/L	<0.050	0.226	<0.005	<0.010	NT	<0.010	<0.020	<0.010	<0.0002
GW-5	12/12/2019	Unfiltered	mg/L	0.0149	0.283	<0.0019	<0.0032	<0.0015	<0.0038	<0.0074	<0.0026	<0.00004
GW-5	12/12/2019	Filtered	mg/L	<0.0072	0.288	<0.0019	<0.0032	<0.0015	<0.0038	<0.0074	<0.0026	0.00005 (J)
GW-6	12/12/2019	Unfiltered	mg/L	<0.0072	0.218	<0.0019	0.0056 (J)	0.0028 (J)	0.0057 (J)	<0.0074	<0.0026	<0.00004
GW-6	12/12/2019	Filtered	mg/L	<0.0072	0.222	<0.0019	<0.0032	<0.0015	<0.0038	<0.0074	<0.0026	0.00005 (J)
GW-7	12/12/2019	Unfiltered	mg/L	<0.0072	0.158	<0.0019	0.0085 (J)	0.0032 (J)	<0.0038	<0.0074	<0.0026	<0.00004
GW-7	12/12/2019	Filtered	mg/L	<0.0072	0.127	<0.0019	<0.0032	<0.0015	<0.0038	<0.0074	<0.0026	<0.00004
GW-8	12/12/2019	Unfiltered	mg/L	<0.0358	0.435	<0.0019	0.0533	0.0369	0.0634	<0.0074	<0.0026	0.00037
GW-8	12/12/2019	Filtered	mg/L	0.0085 (J)	0.121	<0.0019	0.0068 (J)	0.0041 (J)	<0.0038	<0.0074	<0.0026	<0.00004
GW-9	12/12/2019	Unfiltered	mg/L	0.0624	0.534	<0.0019	<0.0032	0.0017 (J)	0.0119	<0.0074	<0.0026	<0.00004
GW-9	12/12/2019	Filtered	mg/L	0.0249	0.539	<0.0019	<0.0032	<0.0015	0.0051 (J)	<0.0074	<0.0026	0.00005 (J)
GW-10	12/12/2019	Unfiltered	mg/L	<0.0072	0.0372	<0.0019	0.0074 (J)	0.0027 (J)	0.0052 (J)	<0.0074	<0.0026	<0.00004
GW-10	12/12/2019	Filtered	mg/L	<0.0072	0.0190 (J)	<0.0019	0.0035 (J)	<0.0015	<0.0038	<0.0074	<0.0026	0.00005 (J)
GW-11	12/12/2019	Unfiltered	mg/L	<0.050	0.167	<0.005	0.0755	<0.010	<0.010	<0.020	<0.010	<0.0002
GW-11	12/12/2019	Filtered	mg/L	<0.0072	0.162	<0.005	0.0628	<0.010	<0.010	<0.020	<0.010	<0.0002
Residential Type 1 RRS			mg/L	0.01	2	0.005	0.1	1.3	0.015	0.05	0.1	0.002
Residential Type 2 RRS			mg/L	0.000568	3.13	0.00782	0.1	0.799	0.015	0.0782	0.0782	0.000167

Table 2 : Groundwater Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Date Sample Collected	Filtered/ Unfiltered	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Selenium	Silver	Mercury
GW-12	12/12/2019	Unfiltered	mg/L	<0.050	0.266	<0.005	<0.010	<0.010	<0.010	<0.020	<0.010	<0.0002
GW-12	12/12/2019	Filtered	mg/L	<0.050	0.251	<0.005	<0.010	<0.010	<0.010	<0.020	<0.010	<0.0002
GW-13	12/12/2019	Unfiltered	mg/L	<0.050	0.22	<0.005	<0.010	<0.010	<0.010	<0.020	<0.010	<0.0002
GW-13	12/12/2019	Filtered	mg/L	<0.050	0.195	<0.005	<0.010	<0.010	<0.010	<0.020	<0.010	<0.0002
Residential Type 1 RRS			mg/L	0.01	2	0.005	0.1	1.3	0.015	0.05	0.1	0.002
Residential Type 2 RRS			mg/L	0.000568	3.13	0.00782	0.1	0.799	0.015	0.0782	0.0782	0.000167

Notes:

#### Indicates exceedance over select Residential Risk Reduction Standard (RRS) (Type 1 or Type 2)

Residential Type 1 RRS obtained from Appendix III, Table 2 of the GAEPD Chapter 391-3-19 or Type 2 RRS were calculated in accordance with GAEPD Guidance

(J) - indicates estimated value detected below reporting limit; as noted in the analytical laboratory report

Table 3 : Groundwater In Situ Parameters  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Sample Date	Temperature (celsius)	pH	Oxidation Reduction Potential (ORPmv)	Conductivity (ms/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/ L DO)
GW-1	12/12/2019	17.57	7.84	-179	2.03	17	5.95
GW-2	12/12/2019	20.05	6.65	-37	1.17	89.7	3.01
GW-3	12/12/2019	18.5	6.24	97	0.264	88.8	4.18
GW-4	12/12/2019	18.88	6.52	18	0.891	33	2.67
GW-5	12/12/2019	17.36	5.74	25	0.97	30.3	3.75
GW-6	12/12/2019	17.28	7	-25	0.46	11.5	3.71
GW-7	12/12/2019	17.11	6.37	41	0.266	9.9	3.26
GW-8	12/12/2019	NT	NT	NT	NT	NT	NT
GW-9	12/12/2019	17.43	6.33	-16	1.09	83.4	4.43
GW-10	12/12/2019	NT	NT	NT	NT	NT	NT
GW-11*	12/12/2019	22.16	12.74	-197	5.28	34.2	3.44
GW-12	12/12/2019	17.93	6.19	50	0.62	29.2	6.57
GW-13	12/12/2019	16.68	6.11	58	0.268	114	3.23

Notes:

NT - Not Tested

\*Double-cased deep well

Table 4-Groundwater Elevation Data  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Well ID	Total Depth from Top of Casing (ft)	Depth to Water from TOC (ft)	Top of PVC (ft above MSL)	Top of Survey Bolt (ft above MSL)	Total Depth (ft BGS)	Depth to Water (ft BGS)	Groundwater Elevation (ft above MSL)	Top of Screen (ft BGS)	Bottom of Screen (ft BGS)	Top of Screen Elevation	Bottom of Screen Elevation
GW-1	18.65	5.98	39.39	36.81	16.07	3.4	33.41	5.6	15.57	31.24	21.24
GW-2	15.40	9.44	37.33	34.93	13.00	7.0	27.89	2.5	12.50	32.43	22.43
GW-3	14.90	9.43	40.16	37.71	12.45	7.0	30.73	2.0	11.95	35.76	25.76
GW-4	14.40	10.42	38.49	35.84	11.75	7.8	28.07	1.3	11.25	34.59	24.59
GW-5	15.40	9.92	37.97	35.61	13.04	7.6	28.05	2.5	12.54	33.07	23.07
GW-6	15.40	9.04	38.82	36.63	13.21	6.9	29.78	2.7	12.71	33.92	23.92
GW-7	15.35	10.25	40.04	37.50	12.81	7.7	29.79	2.3	12.31	35.19	25.19
GW-8	18.45	10.55	41.50	38.65	15.60	7.7	30.95	5.1	15.10	33.55	23.55
GW-9	15.35	9.65	37.34	34.65	12.66	7.0	27.69	2.2	12.16	32.49	22.49
GW-10	14.00	10.36	38.00	35.37	11.38	7.7	27.64	0.9	10.88	34.50	24.50
GW-11*	37.50	21.35	38.75	36.00	34.75	18.6	17.40	29.3	34.25	6.75	1.75
GW-12	18.18	12.80	40.73	38.23	15.68	10.3	27.93	5.2	15.18	33.05	23.05
GW-13	17.10	8.56	41.01	38.13	14.23	5.7	32.45	3.7	13.73	34.41	24.41

\*Data not used for determining groundwater flow direction

Table 5 : Sediment Analytical Results - Metals  
Atlas Sand Mine  
Savannah, Chatham County, Georgia  
GEC Project No. HN185042

Sample Location	Depth (ft)	Sample Collection Date	Units	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury*	Selenium*	Silver
SE-1	Surface	1/31/2020	mg/kg	<4.03	65.4	<4.03	14.50	9.05	68.4	NT	<5.65	<4.03
SE-2	Surface	1/31/2020	mg/kg	50.9	150.0	<2.91	28.1	65.2	1040.0	NT	<4.08	<2.91
SE-2A	Surface	3/12/2020	mg/kg	<2.98	33.1	<2.98	8.00	NT	34.5	NT	<4.18	<2.98
SE-2A	6"	3/12/2020	mg/kg	<3.09	74.5	<3.09	12.2	NT	28.4	NT	<4.32	<3.09
SE-3	Surface	1/31/2020	mg/kg	28.1	48.7	<2.41	24.5	54.7	863.0	NT	<3.38	<2.41
SE-3A	Surface	3/12/2020	mg/kg	<2.33	24.5	<2.33	7.85	NT	39.4	NT	<3.26	<2.33
SE-3A	6"	3/12/2020	mg/kg	3.69	34.1	<2.59	9.66	NT	67.4	NT	<3.63	<2.59
SE-4	Surface	1/31/2020	mg/kg	<2.37	6.55	<2.37	<2.37	<2.37	24.1	NT	<3.31	<2.37
SE-5	Surface	1/31/2020	mg/kg	<4.16	63.5	<4.16	17.8	7.1	51.8	NT	<5.82	<4.16
SE-6	Surface	1/31/2020	mg/kg	29.3	128.0	<5.00	33.5	36.3	656.0	NT	<6.99	<5.00
SE-6A	Surface	3/12/2020	mg/kg	<4.77	102.0	<4.77	28.4	NT	200.0	NT	<6.68	<4.77
SE-6A	9"	3/12/2020	mg/kg	8.33	106.0	<4.30	23.8	NT	145.0	NT	<6.02	<4.30
SE-7	Surface	1/31/2020	mg/kg	<7.93	84.8	<7.93	22.5	<7.93	31.9	NT	<11.1	<7.93
SE-8	Surface	1/31/2020	mg/kg	<4.57	35.1	<4.57	7.19	<4.57	13.4	NT	<6.40	<4.57
SE-9	Surface	1/31/2020	mg/kg	<2.74	11.3	<2.74	<2.74	<2.74	<5.48	NT	<3.84	<2.74
SE-10	Surface	3/12/2020	mg/kg	<2.58	11.4	<2.58	3.42	NT	11.9	NT	<3.61	<2.58
SE-11	Surface	3/12/2020	mg/kg	<2.71	8.85	<2.71	2.72	NT	12.7	NT	<3.79	<2.71
SE-12	Surface	3/12/2020	mg/kg	<3.10	21.1	<3.10	5.87	NT	13.0	NT	<4.34	<3.10
SE-13	Surface	3/12/2020	mg/kg	<2.59	6.35	<2.59	<2.59	NT	6.64	NT	<3.63	<2.59
Ecological Screening Value (ESV)			mg/kg	9.8	20.0	1.0	43.4	31.6	35.8	0.18	0.72	1.0
Refinement Screening Value (RSV)			mg/kg	33.0	60.0	5.0	111.0	149.0	128.0	1.10	2.9	2.2

Notes:

#### Indicates exceedance of Ecological Screening Value for Freshwater Sediment

#### Indicates exceedance of Refinement Screening Value for Freshwater Sediment

Screening values obtained from Table 2a - Region 4 Sediment Screening Values for Hazardous Waste Sites Non-Narcotic Modes of Action; Region 4 Ecological Risk Assessment Supplemental Guidance March 2018 Update

\* Bioaccumulative chemical

## CERTIFICATE OF SUBSTANTIAL COMPLETION

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Project: Atlas Sand Mine Remediation

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Owner: Effingham County Board of Commissioners

Owner's Contract No.: 21-004

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Engineer's Project No.: 1020.1802

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**This [tentative] [definitive] Certificate of Substantial Completion applies to:**☐ All Work under the Contract Documents:☐ The following specified portions of the Work:

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Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

**The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:**

☐ Amended Responsibilities☐ Not Amended

Owner's Amended Responsibilities:

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Contractor's Amended Responsibilities:

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The following documents are attached to and made part of this Certificate:

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This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

\_\_\_\_\_  
Executed by Engineer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Accepted by Contractor

\_\_\_\_\_  
Date

\_\_\_\_\_  
Accepted by Owner

\_\_\_\_\_  
Date

**END OF SECTION**

## SECTION 00 94 39

### FIELD ORDER

No. \_\_\_\_\_

Date of Issuance:

Effective Date:

Project: Atlas Sand Mine Remediation	Owner's Contract No.: 21-004
Owner: Effingham County Board of Commissioners	Date of Contract:
Contractor:	Engineer's Project No.: 1020.1802

**Attention:**

You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.04.A, for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference:

\_\_\_\_\_  
(Specification Section(s))

\_\_\_\_\_  
(Drawing(s) / Detail(s))

Description:


Attachments:

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	Engineer:
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Receipt Acknowledged by Contractor:	Date:
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Copy to Owner

**END OF SECTION**

## SECTION 00 94 49

### WORK CHANGE DIRECTIVE

No. \_\_\_\_\_

Date of Issuance:

Effective Date:

Project: Atlas Sand Mine Remediation	Owner's Contract No.: 21-004
Owner: Effingham County Board of Commissioners	Date of Contract:
Contractor:	Engineer's Project No.: 1020.1802

**Contractor is directed to proceed promptly with the following change(s):**

Item No.	Description

**Attachments (list documents supporting change):**

#### **Purpose for Work Change Directive:**

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

- ☐ Nonagreement on pricing of proposed change.
- ☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

#### **Estimated change in Contract Price and Contract Times:**

Contract Price \$ \_\_\_\_\_ (increase/decrease)      Contract Time \_\_\_\_\_ (increase/decrease)  
days

Recommended for Approval by Engineer:	Date
Authorized for Owner by:	Date
Received for Contractor by:	Date
Received by Funding Agency (if applicable):	Date:

**END OF SECTION**

## SECTION 00 94 63

### CHANGE ORDER

No. \_\_\_\_\_

Date of Issuance:

Effective Date:

Project:

Atlas Sand Mine Remediation

Owner's Contract No.:

21-004

Owner:

Effingham County Board of Commissioners

Date of Contract:

Contractor:

Engineer's Project No.:

1020.1802

**The Contract Documents are modified as follows upon execution of this Change Order:**

Description:

**Attachments (list documents supporting change):**

#### CHANGE IN CONTRACT PRICE:

Original Contract Price:

\$ \_\_\_\_\_

[Increase] [Decrease] from previously approved Change Orders No. \_\_\_\_\_ to No. \_\_\_\_\_:

\$ \_\_\_\_\_

Contract Price prior to this Change Order:

\$ \_\_\_\_\_

#### CHANGE IN CONTRACT TIMES:

Original Contract Times: ☐ Working days ☐ Calendar days

Substantial completion (days or date): \_\_\_\_\_

Ready for final payment (days or date): \_\_\_\_\_

[Increase] [Decrease] from previously approved Change Orders No. \_\_\_\_\_ to No. \_\_\_\_\_:

Substantial completion (days): \_\_\_\_\_

Ready for final payment (days): \_\_\_\_\_

Contract Times prior to this Change Order:

Substantial completion (days or date): \_\_\_\_\_

Ready for final payment (days or date): \_\_\_\_\_

[Increase] [Decrease] of this Change  
Order:

\$ \_\_\_\_\_

[Increase] [Decrease] of this Change Order:

Substantial completion (days or date): \_\_\_\_\_

Ready for final payment (days or date): \_\_\_\_\_

Contract Price incorporating this Change  
Order:

\$ \_\_\_\_\_

Contract Times with all approved Change Orders:

Substantial completion (days or date): \_\_\_\_\_

Ready for final payment (days or date): \_\_\_\_\_

---

RECOMMENDED:

By: \_\_\_\_\_  
Engineer (Authorized Signature)

Date: \_\_\_\_\_

Approved by Funding Agency (if applicable):  
\_\_\_\_\_

ACCEPTED:

By: \_\_\_\_\_  
Owner (Authorized Signature)

Date: \_\_\_\_\_

ACCEPTED:

By: \_\_\_\_\_  
Contractor (Authorized  
Signature)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**END OF SECTION**

ADMINISTRATIVE REQUIREMENTS

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Contractor coordination requirements.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Preinstallation meetings.
- E. Closeout meeting.
- F. Alteration procedures.

**1.2 CONTRACTOR COORDINATION REQUIREMENTS**

- A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements [**, with provisions for accommodating items installed later**].
- B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.
- D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.
- E. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.
- F. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

### 1.3 PRECONSTRUCTION MEETING

- A. **Owner/Engineer** will schedule and preside over meeting after **[Notice of Award]**.
- B. Attendance Required: Engineer, Owner, **[Resident Project Representative,]** **[appropriate governmental agency representatives,]** **[Construction Manager,]** **[major Subcontractors,]** and Contractor.
- C. Minimum Agenda:
  1. **[Execution of Owner-Contractor Agreement.]**
  2. Submission of executed bonds and insurance certificates.
  3. Distribution of Contract Documents.
  4. Submission of **[list of Subcontractors,]** list of products, schedule of values, and Progress Schedule.
  5. Designation of personnel representing parties in Contract.
  6. Communication procedures.

7. Procedures and processing of requests for interpretations, field decisions, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
  8. Scheduling.
  9. Critical Work sequencing.
  10. Scheduling activities of [**Geotechnical Engineer, testing agencies, utilities verification, etc.**].
- D. Owner will: Record minutes and email to participants within [**ten**] days after meeting.

#### **1.4 PROGRESS MEETINGS**

- A. Contractor to schedule and administer meetings throughout progress of the Work at [**monthly**] intervals.
- B. Attendance Required: Job superintendent, major [**Subcontractors**], suppliers, and [**Engineer,**] and [**Owner,**] as appropriate to agenda topics for each meeting.
- C. Minimum Agenda:
  1. Review minutes of previous meetings.
  2. Review of Work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems impeding planned progress.
  5. Review of submittal schedule and status of submittals.
  6. Review of off-Site fabrication and delivery schedules.
  7. Maintenance of Progress Schedule.
  8. Corrective measures to regain projected schedules.
  9. Planned progress during succeeding work period.



10. Coordination of projected progress.
  11. Maintenance of quality and work standards.
  12. Effect of proposed changes on Progress Schedule and coordination.
  13. Other business relating to Work.
- D. **[Contractor:]** Will record minutes and email to participants within **[five]** days after meeting.

## 1.5 PREINSTALLATION MEETINGS

- A. When required in individual Specification Sections, convene preinstallation meetings at **[Project Site]** before starting Work of specific Section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific Section.
- C. Notify Engineer **[four]** days in advance of meeting date.
- D. Prepare agenda and preside over meeting:
  1. Review conditions of installation, preparation, and installation procedures.
  2. Review coordination with related Work.

## 1.6 CLOSEOUT MEETING

- A. Contractor will schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.
- B. Attendance Required: **[Contractor]**, **[Subcontractors]**, **[Engineer]**, **[Owner]**, and others appropriate to agenda.
- C. Notify Engineer **[five]** days in advance of meeting date.
- D. Minimum Agenda:

1. Start-up of facilities and systems.
2. Operations and maintenance manuals.
3. Testing, adjusting, and balancing.
4. System demonstration and observation.
5. Operation and maintenance instructions for Owner's personnel.
6. Contractor's inspection of Work.
7. Contractor's preparation of an initial "punch list."
8. Procedure to request Engineer inspection to determine date of Substantial Completion.
9. Completion time for correcting deficiencies.
10. Inspections by authorities having jurisdiction.
11. Certificate of Occupancy and transfer of insurance responsibilities.
12. Partial release of retainage.
13. Final cleaning.
14. Preparation for final inspection.
15. Closeout Submittals:
  - a. Project record documents.
  - b. Operating and maintenance documents.
  - c. Operating and maintenance materials.
  - d. Affidavits.
16. Final Application for Payment.
17. Contractor's demobilization of Site.

- 18. Maintenance.
- E. Engineer to record minutes and email to participants within **[five]** days after meeting.

## **PART 2 PRODUCTS (Not Used)**

## **PART 3 EXECUTION**

### **3.1 ALTERATION PROCEDURES**

- A. **[Designated areas of existing facilities] [Entire facility]** will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.
  - 1. Perform Work not to interfere with operations of occupied areas.
  - 2. Keep utility and service outages to a minimum and perform only after written approval of Owner.
  - 3. Clean Owner-occupied areas daily. Clean spillage, mud, and heavy collection of dust in Owner-occupied areas immediately.
- B. Materials: As specified in product Sections; match existing products with new **[and salvaged]** products for patching and extending Work.
- C. Employ **[skilled and experienced]** installer to perform alteration and renovation Work.
- D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 01 70 00 - Execution and Closeout Requirements.
- E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- F. Remove debris and abandoned items from area and from concealed spaces.

- G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.
- H. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to **[original]** **[or]** **[specified]** condition.
- I. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- J. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Engineer for review.
- K. Finish surfaces as specified in individual product Sections.

**END OF SECTION**

### SUBMITTAL PROCEDURES

#### **PART 1 GENERAL**

##### **1.01 SCOPE**

General procedures and requirements for submittals during the course of construction.

##### **1.02 SECTION INCLUDES**

- A. Submittal Procedures.
- B. Construction progress schedules.
- C. Shop drawings.
- D. Product data.
- E. Samples
- F. Miscellaneous Submittals.
- G. Construction photographs / videos.
- H. Resubmission requirements.

##### **1.03 SUBMITTAL PROCEDURES**

- A. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix. (Example 1-A, 1-B, etc.)
- B. Identify Project, Contractor, Subcontractor or supplier, pertinent Drawing sheet and detail number, and specification Section number, as appropriate.
- C. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the work and Contract Documents.
- D. Submit submittal to Engineer.
- E. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed work.

- F. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.
- G. In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal.

#### **1.04 CONSTRUCTION PROGRESS SCHEDULES**

- A. Submit 3 copies of initial progress schedule within 20 days after date of Owner-Contractor Agreement established in Notice to Proceed for Engineer review.
- B. Revise and resubmit as required.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- E. Indicate estimated percentage of completion for each item of work at each submission.
- F. Indicate submittal dates required for shop drawings, product data, samples, and product delivery including those furnished by Owner and under Allowances.

#### **1.05 SHOP DRAWINGS**

- A. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance curves, schedules, templates, patterns, test reports, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawing is prepared. In addition to the number of copies required for return by the contractor submit 5 additional copies for Engineer.
- B. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, specification section, schedule or room numbers shown on the Contract Drawings.
- C. Engineer Review
  - 1. Allow a minimum of 30 days for the Engineer's initial processing of each submittal requiring review and response, except allow longer periods where Shop Drawings, Product Data and Samples processing must be delayed for coordination with subsequent submittals. The Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of two weeks for reprocessing each submittal. Advise the Engineer on each submittal as to whether processing time is critical to progress of the Work, and therefore the Work would be expedited if processing time could be foreshortened.

2. Acceptable submittals will be marked "**No Exceptions Taken**". A minimum of five copies will be retained by the Engineer for Engineer's and the Owner's use and the remaining copies will be returned to the Contractor.
  3. Submittals requiring minor corrections before the product is acceptable will be marked "**Make Corrections Noted**", The Contractor may order, fabricate and ship the items included in the submittals, provided the indicated corrections are made. Drawings must be resubmitted for review and marked "No Exceptions Taken" prior to installation or use of products,
  4. Submittals marked "**Revise and Resubmit**" must be revised to reflect required changes and the initial review procedure repeated.
  5. The "**Rejected**" notation is used to indicate products which are not Acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.
  6. Only two copies of items marked "Revise and Resubmit" and "Rejected" will be reviewed and marked. One copy will be retained by the Engineer and the other copy with all remaining unmarked copies will be returned to the Contractor for resubmittal.
- D. No work or products shall be installed without a drawing or submittal bearing the "No Exceptions Taken" notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer's stamp.
- E Substitutions: In the event the Contractor obtains the Engineer's approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor's own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.
- F Use of the "No Exceptions Taken" notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Engineer's review shall not relieve the Contractor of responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

## 1.06 PRODUCT DATA

- A. Product data includes standard printed information on materials, products and systems, not specially prepared for this Project, other than the designation of selections from among available choices printed therein.

- B. Collect required data into one submittal for each unit of work or system, and mark each copy to show which choices and options are applicable to the Project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked and special coordination requirements.

#### **1.07 SAMPLES**

- A. Samples include both fabricated and un-fabricated physical examples of materials, products and units of work, both as complete units and as smaller portions of units of work, either for limited visual inspection or, where indicated, for more detailed testing and analysis.
- B. Provide units identical with final condition of proposed materials or products for the work. Include "range" samples, not less than three units, where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where the Engineer's selection is required. Prepare samples to match the Engineer's sample where indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by the Engineer. Engineer will note "test" samples, except as otherwise indicated, for other requirements, which are the exclusive responsibility of the Contractor.

#### **1.08 MISCELLANEOUS SUBMITTALS**

Miscellaneous submittals related directly to the Work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, security/protection/safety keys and similar information, devices and materials applicable to the Work but not processed as shop drawings, product data or samples.

#### **1.09 PROGRESS PHOTOGRAPHS / VIDEOS**

- A. Provide photographs and video of entire site depicting existing conditions as indicated in 01 20 00 Price and Payment Procedures.
- B. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to the Engineer and Owner.
- C. Construction Photographs: Take construction photographs prior to each application for payment of the work accomplished for that payment period and as follows:
  - 1. Site clearing.



2. Excavations and installed underground utilities.
  3. Foundations/subgrade.
  4. Infrastructure installations.
  5. Paving
  6. Erosion control measures.
  7. Equipment installations.
  8. Final completion.
- D. Aerial Photographs [**Not Required**]
1. Provide aerial photographs from four cardinal views at project completion.
  2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- E. Deliver photographs with each Application for Payment with transmittal letter specified in this Section. Final completion photographs are to be delivered with request for final payment. Delivery of photographs may be in printed or digital format. If printed, each photograph shall be a minimum of 4-inches by 6-inches in dimension and shall be labeled to describe the photograph subject, location and date. If provided digitally, the photographs shall be provided in JPEG format and accompanied with a PDF format document describing each photograph with subject, location and date.
- F. Deliver prints with each Application for Payment with transmittal letter specified in this Section. Final prints are to be delivered with request for final payment.

#### **1.10 RESUBMISSION REQUIREMENTS**

- A. Shop Drawings
1. Revise initial drawings as required and resubmit as specified for initial submittal, with the resubmittal number shown.
  2. Indicate on drawings all changes which have been made other than those requested by the Engineer.
- B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal with the resubmittal number shown.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

QUALITY REQUIREMENTS

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Regulatory requirements.
- B. Quality control.
- C. Tolerances.
- D. References standards.
- E. Labeling.
- F. Mock-up requirements.
- G. Manufacturer's field services.

**1.02 REGULATORY REQUIREMENTS**

- A. Permits: Unless otherwise noted in the bidding documents or specification section 01 10 00 Summary, the Contractor shall, without additional expense to the Owner, be responsible for obtaining all necessary licenses and permits, including building permits, etc.
- B. The contractor shall take proper safety and health precautions to protect the Work, the workers, the public and the property of others.
- C. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the Work.

**1.03 QUALITY CONTROL**

- A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- C. Perform Work using persons qualified to produce required and specified quality.

- D. Products, materials, and equipment may be subject to inspection by Engineer [**and Owner**] at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.
- E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

#### **1.04 TOLERANCES**

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

#### **1.05 REFERENCE STANDARDS**

- A. Whenever reference is made to conforming to the standards of any technical society, organization, body, code or standard, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the time of advertisement for Bids. This shall include the furnishing of materials, testing of materials, fabrication and installation practices. In those cases where the Contractor's quality standards establish more stringent quality requirements, the more stringent requirement shall prevail. Such standards are made a part hereof to the extent which is indicated or intended.
- B. The inclusion of an organization under one category does not preclude that organizations' standards from applying to another category
- C. In addition, all work shall comply with the applicable requirements of local codes, utilities and other authorities having jurisdiction.
- D. All material and equipment, for which a UL standard, and AGA or NSF approval or and ASME requirements is established, shall be so approved and labeled or stamped. The label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.
- E. The standards which apply to this Project are not necessarily restricted to those organizations which are listed below.
- F. **STANDARD ORGANIZATIONS**
  - 1. Piping and Valves

ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
DIPRA	Ductile Iron Pipe Research Association
FCI	Fluid Controls Institute
MSS	Manufacturers Standardization Society
NCWPB	National Certified Pipe Welding Bureau
NCPI	National Clay Pipe Institute
NSF	National Sanitation Foundation
PPI	Plastic Pipe Institute
Uni-Bell PVC	Pipe Association

## 2. Materials

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials

## 3. Painting and Surface Preparation

NACE	National Association of Corrosion Engineers
SSPC	Steel Structures Painting Council

## 4. Electrical and Instrumentation

AEIC	Association of Edison Illuminating Companies
AIEE	American Institute of Electrical Engineers
EIA	Electronic Industries Association
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society

IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
TIA	Telecommunications Industries Association
UL	Underwriter's Laboratories
VRCI	Variable Resistive Components Institute
IEC	International Electrotechnical Commission
IESNA	Illuminating Engineering Society of North America
LPI	Lighting Protection Institute
NECA	National Electrical Contractors Association
NETA	International Electrical Testing Association

5. Aluminum

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association

6. Steel and Concrete

ACI	American Concrete Institute
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
CRSI	Concrete Reinforcing Steel Institute
NRMA	National Ready-Mix Association
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute

7. Welding

ASME	American Society of Mechanical Engineers
AWS	American Welding Society

8. Government and Technical Organizations

AIA	American Institute of Architects
APHA	American Public Health Association
APWA	American Public Works Association
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASQC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
CFR	Code of Federal Regulations
CSI	Construction Specifications Institute
EDA	Economic Development Administration
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FmHA	Farmers Home Administration
FS	Federal Specifications
IAI	International Association of Identification
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
NBFU	National Board of Fire Underwriters
NFPA	National Fluid Power Association
NBS	National Bureau of Standards
NISO	National Information Standards Organization
OSHA	Occupational Safety and Health Administration
SI	Salt Institute
SPI	The Society of the Plastics Industry, Inc.
USDC	United States Department of Commerce
WEF	Water Environment Federation

## 9. General Building Construction

AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AITC	American Institute of Timber Construction
APA	American Parquet Association, Inc.
APA	American Plywood Association
BHMA	Builders Hardware Manufacturers Association
BIFMA	Business and Institutional Furniture Manufacturers Association
DHI	Door and Hardware Institute
FM	Factory Mutual Fire Insurance Company
HPMA	Hardwood Plywood Manufacturers Association
HTI	Hand Tools Institute
IME	Institute of Makers of Explosives
ISNATA	International Staple, Nail and Tool Association
ISDSI	Insulated Steel Door Systems Institute
IWS	Insect Screening Weavers Association
MBMA	Metal Building Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NAGDM	National Association of Garage Door Manufacturers
NCCLS	National Committee for Clinical Laboratory Standards
NFPA	National Fire Protection Association
NFSA	National Fertilizer Solutions Association
NKCA	National Kitchen Cabinet Association
NWMA	National Woodwork Manufacturers Association
NWWDA	National Wood Window and Door Association
RMA	Rubber Manufacturers Association
SBC	SBCCI Standard Building Code
SDI	Steel Door Institute
SIA	Scaffold Industry Association
SMA	Screen Manufacturers Association



	SPRI	Single-Ply Roofing Institute
	TCA	Tile Council of America
	UBC	Uniform Building Code
10.	Roadways	
	AREA	American Railway Engineering Association
	DOT	Department of Transportation
	SSRBC	Standard Specifications for Road and Bridge Construction, Georgia Department of Transportation
11.	Plumbing	
	AGA	American Gas Association
	NSF	National Sanitation Foundation
	PDI	Plumbing Drainage Institute
	SPC	SBCCI Standard Plumbing Code
12.	Refrigeration, Heating, and Air Conditioning	
	AMCA	Air Movement and Control Association
	ARI	American Refrigeration Institute
	ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
	ASME	American Society of Mechanical Engineers
	CGA	Compressed Gas Association
	CTI	Cooling Tower Institute
	HEI	Heat Exchange Institute
	IIAR	International Institute of Ammonia Refrigeration
	NB	National Board of Boilers and Pressure Vessel Inspectors
	PFMA	Power Fan Manufacturers Association
	SAE	Society of Automotive Engineers
	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
	SMC	SBCCI Standard Mechanical Code
	TEMA	Tubular Exchangers Manufacturers Association

### 13. Equipment

AFBMA Anti-Friction Bearing Manufacturers Association, Inc.

AGMA American Gear Manufacturers Association

ALI Automotive Lift Institute

CEMA Conveyor Equipment Manufacturers Association

CMAA Crane Manufacturers Association of America

DEMA Diesel Engine Manufacturers Association

MMA Monorail Manufacturers Association

OPEI Outdoor Power Equipment Institute, Inc.

PTI Power Tool Institute, Inc.

RIA Robotic Industries Association

SAMA Scientific Apparatus Makers Association

#### 1.06 LABELING

- A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by **[applicable code]**.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
  - 1. Model number.
  - 2. Serial number.
  - 3. Performance characteristics.
- C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

#### 1.07 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.
- B. Assemble and erect specified or indicated items with specified or indicated attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mockups shall be comparison standard for remaining Work.

- D. Where mockup has been accepted by Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Architect/Engineer.

#### **1.08 MANUFACTURER'S FIELD SERVICES**

- A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment, commissioning, etc. as applicable, and to initiate instructions when necessary.
- B. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

TEMPORARY FACILITIES AND CONTROLS

**PART 1 GENERAL**

**1.01 SCOPE**

Section includes requirements for installation, maintenance, and removal of temporary utilities, controls, facilities, and construction aids during construction.

**1.02 SECTION INCLUDES**

- A. Temporary facilities which may be necessary for this work include, but are not necessarily limited to:
  - A. Temporary utilities (such as water, sewer, electricity, telephone, and internet).
  - B. First aid facilities.
  - C. Construction offices.
  - D. Parking facilities.
  - E. Traffic regulation.
  - F. Dust control.
  - G. Progress cleaning and waste removal.
  - H. Environmental protection.
  - I. Security.
  - J. Project Sign.
  - K. Removal of utilities, facilities, and controls.

**1.03 TEMPORARY UTILITIES**

- A. Potable Water: [**Not Available**] from the Owner. Contractor shall cover costs to tap existing water pipeline and connect the pipeline to the designated water source. Potable water can be used for construction and for drinking. Potable water must be available to the workers for their consumption during any construction activities. However, the water for worker consumption can be from a cooler.

- B. Sanitary Sewer: **[Not available]** from the Owner. Contractor must provide portable toilets or portable septic facilities during and construction activities. The contractor shall pay all costs for sanitary facilities. Contractor's personnel may not use Owner's or Engineer's rest rooms.
- C. Electricity: Electricity **[not available]** at site. Contractor shall pay all costs to connect temporary facilities for both contractor and engineer to electricity. Contractor may also desire second temporary pole mounted transformer to be set in area of raw water pump station. Contractor shall be responsible for this cost. Any costs associated with establishment of final power to site for Owner shall be paid for by owner.
- D. Internet/Camera: Contractor **[shall not]** be required to provide a high-speed Cable/DSL internet connection for use by the Engineer, however Contractor shall provide suitable outdoor color photos for on-site and off-site viewing of construction in progress for the project duration. This may be live camera accessible via internet or uploaded photos to shared location for viewing by the Contractor and Owner/Engineer. All costs associated with internet connection, outlet(s), service and cameras and photo collection and storage shall be paid for by the contractor.

#### **1.04 FIRST AID FACILITIES**

The Contractor shall provide a suitable first aid station, equipped with all facilities and medical supplies necessary to administer emergency first aid treatment. The Contractor shall have standing arrangements for the removal and hospital treatment of any injured person. All first aid facilities and emergency ambulance service shall be made available by the Contractor to the Owner and Engineer's personnel.

#### **1.05 CONSTRUCTION OFFICES [NOT REQUIRED]**

Contractor must supply the following office facilities at the project site. The Engineer's and the contractor's offices may be in the same building or modular unit.

- A. For the Engineer:
  - 1. Size – 128 square feet minimum with separate rest room from that of the Contractor. Sink with hot and cold water to be available in rest room.
  - 2. Door to the outside with heavy duty security lock.
  - 3. Air conditioned and heated with controls in the Engineer's area.
  - 4. 1 - desk.
  - 5. 1 - layout table.
  - 6. 2 - chairs, which must be on rollers.

7. 1 - HON® 400, 30" Wide Lateral File, 4 Drawers, 53 1/4"H x 30"W x 19 1/4"D, Color - Putty
  8. 1 - plan rack with room for 6 sets of plans, includes 6 metal plan binders.
  9. Interior/Exterior Lights.
  10. Four electrical outlets.
  11. CAT 5e 10/100/1000 LAN computer outlet(s) and patch cable(s).
  12. Closet – 20 square foot minimum, with one shelf and hanging rod.
  13. Construct temporary stairs, landing, and landing roof as directed by the Resident inspector.
  14. 4-in-1 copy, fax scanner, printer.
  15. 1 – Indoor/Outdoor thermometer. Unit shall display indoor temperature and humidity, outdoor temperature and humidity, barometric pressure and time. Unit shall also display minimum and maximum temperature and humidity.
  16. 1 – Rain Gauge. Gauge shall be made of glass or plastic and capable of measuring six (6) inches or more of rainfall.
- B. For the contractor
1. Size – As required
  2. Door to the outside
  3. Furnishings and accessories as required
  4. Access to a rest room without going through engineer's office
- C. General
1. Locate offices per owner's requirements
  2. Sweep and remove refuse from offices at least once per week
  3. Post and enforce no smoking signs inside offices

## 1.06 PARKING FACILITIES

- A. The Contractor shall maintain a gravel parking area for use by Contractor and all Subcontractors', Owner and Engineer throughout the duration of the contract through periodic restoration (including regrading and dressing the surface with fresh graded aggregate base ([GAB]) of the gravel surface to lines and grades existing at the time of contract award. Deterioration of the areas due to erosion or intrusion of other material (such as mud, dirt, silt, etc.) shall be repaired as necessary or determined by the Engineer.

- C. Provide unimpeded access for emergency vehicles.
- D. Provide and maintain access to fire hydrants free of obstructions.
- E. Provide means of removing mud from vehicle wheels before entering streets.

## **1.07 TRAFFIC REGULATION**

- A. Signs, Signals, and Devices:
  - 1. Post-Mounted and Wall-Mounted Traffic Control and Informational Signs: As approved by authorities having jurisdiction.
  - 2. [Automatic] Traffic Control Signals: As approved by local jurisdictions.
  - 3. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.
  - 4. Flag Person Equipment: As required by authorities having jurisdiction.
- B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.
- C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
- D. Haul Routes:
  - 1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.
  - 2. Drawings indicate haul routes designated by authorities having jurisdiction for use by construction traffic.
  - 3. Confine construction traffic to designated haul routes.
  - 4. Provide traffic control at critical areas of haul routes to regulate traffic and to minimize interference with public traffic.
- E. Traffic Signs and Signals:
  - 1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
  - 2. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.
  - 3. Relocate signs and signals as Work progresses, to maintain effective traffic control.
- F. Removal:

1. Remove equipment and devices when no longer required.
2. Repair damage caused by installation.
3. Remove post settings to depth of two feet.

#### **1.08 DUST CONTROL**

Limit blowing dust caused by construction operations by applying water or employing other appropriate means or methods to maintain dust control, subject to the approval of the Owner. As a minimum, this may require the use of a water wagon twice a day to suppress dusty conditions.

#### **1.09 PROGRESS CLEANING AND WASTE REMOVAL**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.
- B. Remove debris and rubbish from construction activities and other closed or remote spaces, before enclosing spaces.
- C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from Site periodically and dispose of off-Site.

#### **1.10 ENVIRONMENTAL PROTECTION**

The Contractor shall provide and maintain environmental protection of the site during the life of the contract as defined herein. Environmental protection shall be provided to correct conditions that develop during the construction of permanent environmental protection features, or that are required to control pollution that develops during normal construction activities but are not associated with the permanent control structures included in the Project. The Contractor's activities shall comply with all applicable federal, state and local regulations pertaining to water, air, solid waste, hazardous and oily substances, fish and wildlife, historical and Archaeological Resources, and noise pollution.

#### **1.11 SECURITY**

Provide security and facilities to protect Work, and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

#### **1.12 PROJECT SIGN [NOT REQUIRED]**



- A. Structure and Framing: New, wood, and structurally adequate. To be located in a conspicuous position along a main road indicating access to site.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum ¾ inch.
- C. Rough Hardware: Galvanized.
- D. Paint and Primers: Exterior quality, two coats; sign background of white color.
- E. Lettering: Pre-Cut vinyl self-adhesive products contrasting colors.
- F. One painted sign, 32 sq ft area, bottom 6 feet above ground
- G. Content
  - 1. Project number, title, logo and name of as indicated on Contract Documents.
  - 2. Name of Owner
  - 3. Name of Contractor
  - 4. Name of Consultants
  - 5. Name of major Subcontractors

#### **1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, and materials before Final Application for Payment inspection.
- B. Remove underground installations to minimum depth of two feet.
- C. Clean and repair damage caused by installation or use of temporary Work.
- D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

**END OF SECTION**

TRAFFIC CONTROL

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

- A. CONTRACTOR shall furnish all materials, equipment and labor for the installation and continuous maintenance of traffic control devices throughout the project.
- B. This item of work shall include furnishing, installing, maintaining, relocating and removing all traffic control devices used to regulate, warn or direct traffic and pedestrians, if necessary, through the construction work zone.
- C. Upon completion of work, warning devices are to be removed by the CONTRACTOR.

**1.02 SAFETY**

- A. The CONTRACTOR shall furnish sufficient flaggers, signs, warning lights, channelization devices and other safety devices as may be necessary to properly protect, warn and safeguard the traveling public and protect onsite construction workers.
- B. No work shall be started on any phase of the project until all appropriate traffic control devices are in place and in operation.
- C. CONTRACTOR is to take all practical precautions needed to maintain traffic flow, and provide safety for workers and the general public.
- D. The contractor is to immediately clear the roadway of all dirt and debris to maintain safe travel lanes.
- E. When not relevant to the current phase of construction, traffic control devices shall be removed or covered so as not to be visible to traffic.

**1.03 REFERENCES**

- A. Manual for Uniform Traffic Control Devices (MUTCD) (current edition).
- B. Georgia Department of Transportation (Georgia DOT) Special Provisions Section 150.
- C. Georgia Department of Transportation (Georgia DOT) Construction Standards and Details (current edition).
- D. The Plans.
- E. Applicable Supplemental Specifications.

- F. Project Specifications.

## **PART 2 PRODUCTS**

### **2.01 TRAFFIC CONTROL DEVICES**

- A. Traffic Control Devices include, but are not limited to: signs and their supports, signals, pavement markings, barricades, channelizing devices, warning lights, arrowboards, flaggers, or any other device used for the purpose of regulating, warning or guiding traffic through the construction zone.
- B. All Traffic Control Devices used on this project shall conform to the plans, Georgia DOT specifications, and the MUTCD.
- C. Traffic Control Devices shall be in proper, acceptable condition when in use. Devices which are unclear, excessively weathered, damaged, or not correctly positioned shall be promptly restored to fully operational condition.

## **PART 3 EXECUTION**

### **3.01 PLAN AND EXECUTION**

- A. CONTRACTOR is responsible for preparing his/her own traffic control plan and instituting the plan in compliance with all applicable Georgia DOT requirements.
- B. The CONTRACTOR shall be responsible for the proper location, installation, and arrangement of all traffic control devices and the use of traffic flaggers.
- C. The contractor shall verify that construction warning signs, channeling devices and other devices guiding traffic are in agreement with the actual conditions in existence at any given time. Devices which are inconsistent or not applicable with current conditions shall be covered or removed. The purpose of this provision is to make sure that clear, correct and concise information is being provided to vehicular traffic without any conflicting information.
- D. Construction signs referring to flagmen ahead or daytime lane closures during working hours shall be removed or covered during non-working hours.
- E. The CONTRACTOR shall ensure all Traffic Control Devices are operational and visible 24 hours a day in all weather conditions. Provide additional inspections at regular intervals.
- F. When traveling in lanes open to public traffic, the contractor's vehicles shall always move with and not against or across the flow of traffic. These vehicles shall enter or

leave work areas in a manner which will not be hazardous to, or interfere with, traffic and shall not park or stop except within designated work areas. Personal vehicles shall not park within the right of way except in specific areas designated by the CITY.

- G. Access shall be maintained at all times to individual parcels of property unless alternative arrangements have been agreed to in writing with the owner/tenant.
- H. **Flaggers** shall be provided by the contractor as required to coordinate traffic flow. All traffic flaggers shall be certified from a Georgia DOT approved training program and shall have their certification card with them whenever they are providing flagging services. In addition to being certified, it is the contractor's responsibility to verify that flaggers are sufficiently experienced to handle traffic flagging under specific traffic conditions.
- I. The CONTRACTOR shall arrange his operation to keep lane closures and other major traffic interruptions to an absolute minimum. Efforts should be made to avoid scheduling work that substantially impacts traffic flow in peak-hour volume times.
- J. Pedestrian considerations - All existing pedestrian facilities, including access to transit stops, shall be maintained. Where pedestrian routes are closed, alternate routes shall be provided.
- K. Worksite Traffic Control Supervisor - The Contractor shall designate a qualified individual as the Worksite Traffic Control Supervisor (WTCS) who shall be responsible for administering traffic control provisions. The Worksite Traffic Control Supervisor (WTCS) shall meet the requirements set forth in the Georgia DOT Special Provision Section 150.
- L. Traffic Interruption Reports (TIR) are required to be filed with the Georgia DOT for all work that could potentially impact traffic flow on state roads. The report shall be filed by the contractor and must describe current and planned road closures, emergency road closures, and other road conditions including, but not limited to, travel lane closures, shoulder closures, traffic paces, and/or moving operations.
- M. Traffic control devices and warning signs should be documented with video recordings as soon after installation as practicable and again after each major staging change to document the changes.
- N. When any provisions of this Specification or the Plans do not meet the minimum requirements of the MUTCD, the MUTCD shall control.

#### **END OF SECTION**

EXECUTION AND CLOSEOUT REQUIREMENTS

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Field engineering.
- B. Closeout procedures.
- C. Project record documents.
- D. Project Warranty and bonds
- E. Examination.
- F. Execution.
- G. Protecting installed construction.
- H. Final cleaning.

**1.2 FIELD ENGINEERING**

- A. Construction staking shall include all of the surveying work required to layout the work and control the location of the finished Project. The Contractor shall have the full responsibility for constructing the Project to the correct horizontal and vertical alignment, as shown on the Drawings, as specified, or as ordered by the Owner. The Contractor shall assume all costs associated with rectifying work constructed in the wrong location.
- B. Owner will locate and Contractor shall protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
- C. Control datum for survey is established by Owner-provided survey indicated on Drawings.
- D. Prior to beginning Work, verify and establish elevations of existing facilities to ensure that new Work will meet existing elevations in smooth and level alignment except where specifically detailed or indicated otherwise.
- E. Verify setbacks and easements; confirm Drawing dimensions and elevations.
- F. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.

- G. Maintain complete and accurate log of control and survey Work as Work progresses.
- H. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.
- I. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- J. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

### **1.3 CLOSEOUT PROCEDURES**

- A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
  - 1. Submit maintenance manuals, Project record documents, digital images of construction photographs, videos made during construction, and other similar final record data in compliance with this Section.
  - 2. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
  - 4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
  - 5. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
  - 6. Perform final cleaning according to this Section.
- B. Substantial Completion Inspection:
  - 1. When Contractor considers Work to be substantially complete, submit to Engineer and/or Owner:
    - a. Written certificate that Work, or designated portion, is substantially complete.
    - b. List of items to be completed or corrected (initial punch list).
  - 2. Within [**seven**] days after receipt of request for Substantial Completion, Engineer and/or Owner will make inspection to determine whether Work or designated portion is substantially complete.

3. Should Engineer and/or Owner determine that Work is not substantially complete:
    - a. Engineer and/or Owner will promptly notify Contractor in writing, stating reasons for its opinion.
    - b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer and/or Owner.
    - c. Engineer and/or Owner will reinspect Work.
    - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's and/or Owner's inspection.
  4. When Engineer and/or Owner finds that Work is substantially complete, Engineer and/or Owner will:
    - a. Prepare Certificate of Substantial Completion on [**EJCDC C-625 - Certificate of Substantial Completion**] accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
    - b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
  5. After Work is substantially complete, Contractor shall:
    - a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
    - b. Complete Work listed for completion or correction within time period stipulated.
  6. Owner will occupy all of the Work as specified in Section 01 10 00 - Summary.
- C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
1. When Contractor considers Work to be complete, submit written certification that:
    - a. Contract Documents have been reviewed.
    - b. Work has been examined for compliance with Contract Documents.
    - c. Work has been completed according to Contract Documents.
    - d. Work is completed and ready for final inspection.
  2. Submittals: Submit following:
    - a. Final punch list indicating all items have been completed or corrected.

- b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
  - c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
  - d. Accounting statement for final changes to Contract Sum.
  - f. Record Drawings with annotations made by the contractor during construction of the work, and including As-Built coordinates and elevations on all structures, pipe inverts and key locations as required by Engineer.
  - h. The Contractor shall furnish the Owner with certified copies of paid invoices (or other proof) indicating Georgia Sales Tax paid on items for which the Owner is eligible for tax refunds. Tax refunded will be to the Owner, with none credited to the Contractor.
  - i. Retainage will not be paid until the above documents have been submitted and are satisfactory and acceptable to the Owner.
  - j. Contractor's affidavit of payment of debts and claims per Section 00 65 19.
  - k. Contractor affidavit of release of liens per Section 00 65 20.
  - l. Consent of surety to final payment per Section 00 65 21.
- 3. Perform final cleaning for Contractor-soiled areas according to this Section.
- D. Final Completion Inspection:
  - 1. Within **[seven]** days after receipt of request for final inspection, Engineer and/or Owner will make inspection to determine whether Work or designated portion is complete.
  - 2. Should Engineer and/or Owner consider Work to be incomplete or defective:
    - a. Engineer and/or Owner will promptly notify Contractor in writing, listing incomplete or defective Work.
    - b. Contractor shall remedy stated deficiencies and send second written request to Engineer and/or Owner that Work is complete.
    - c. Engineer and/or Owner will reinspect Work.
    - d. Redo and Inspection of Deficient Work: Repeated until Work passes **[Engineer's]** **[Owner's]** inspection.



3. Final Payment: Upon Final Completion of the Work in accordance with the Contract Documents, the Contractor will be authorized to prepare a final estimate of the work and a Final Payment request. The Engineer will review the final payment request and will, if all items are satisfactory, recommend approval to the Owner. The Engineer will submit to the Owner the final estimate and the final payment request, together with a certification stating that the work is complete and in substantial conformance with these Contract Documents. The entire balance found to be due the Contractor including any retainages, except such sums as may be lawfully retained by the Owner, will be paid to the Contractor.

## **1.5 PROJECT RECORD DOCUMENTS**

- A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
  1. Drawings.
  2. Specifications.
  3. Addenda.
  4. Change Orders and other modifications to the Contract.
  5. Reviewed Shop Drawings, product data, and Samples.
  6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
  1. Manufacturer's name and product model and number.
  2. Product substitutions or alternates used.
  3. Changes made by Addenda and modifications.
- F. Record Drawings: Legibly mark each item to record actual construction as follows:
  1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
  2. Include locations of concealed elements of the Work.

3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
  4. Identify and locate existing buried or concealed items encountered during Project.
  5. Field changes of dimension and detail.
  6. Details not on original Drawings.
- G. Submit marked-up paper copy documents to Engineer with claim for final Application for Payment.
  - H. Submit PDF electronic files of marked-up documents to Engineer with claim for final Application for Payment.

## **1.8 PRODUCT WARRANTIES AND PRODUCT BONDS**

- A. Obtain warranties and bonds executed by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.
- B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include table of contents and assemble in three D side ring binder with durable cover.
- F. Submit prior to final Application for Payment.
- G. Time of Submittals:
  1. Make other submittals within **[ten]** days after date of Substantial Completion, prior to final Application for Payment.
  2. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within **[ten]** days after acceptance, listing date of acceptance as beginning of warranty or bond period.
- H. The Contractor shall warrant and guarantee for a period of one year from the date of Substantial Completion of the Work, that the completed Work is free from all defects due to faulty products or workmanship. The Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the warranty period.

- I. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of gross negligence operation or maintenance, or as a result of improper work or damage by another Contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.
- J. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the Work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.
- K. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility not designated for removal, resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.
- L. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of Substantial Completion. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.
- M. In the event the Contractor fails to proceed to remedy the defects upon notification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.
- N. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.
- O. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual Specification Sections.
- D. Verify that utility services are available with correct characteristics and in correct locations.

### **3.2 EXECUTION**

- A. Comply with manufacturer's installation instructions, performing each step-in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
- E. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
  - 1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
  - 2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.
- F. Adjust operating products and equipment to ensure smooth and unhindered operation.
- G. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

### **3.5 PROTECTING INSTALLED CONSTRUCTION**

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

- C. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- D. Prohibit traffic from landscaped areas.

### **3.6 FINAL CLEANING**

- A. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having Jurisdiction.
- B. The Contractor shall handle hazardous waste and materials in accordance with applicable local, state, and federal regulations. Waste shall also be disposed of in approved landfills as applicable.
- C. Burning or burying rubbish and waste materials on the site shall not be allowed,
- D. Disposal of hazardous wastes or materials into sanitary or storm sewers shall not be allowed.
- E. Unless otherwise shown on the Drawings, specified or directed, the Contractor shall legally dispose off the site all surplus materials and equipment from demolition and shall provide suitable off-site disposal site, or utilize a site designated by the Owner.
- F. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
- G. Hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.
- H. Cleanup all evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, as directed by the Engineer.
- E. Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. The Engineer will decide what method of restoration shall be used.
- J. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall remain with the Contractor.

### **END OF SECTION**

### DEMOLITION

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

Construction Plans and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

### 1.02 DESCRIPTION OF WORK

- A. Extent of demolition work is indicated on the Construction Plans.
- B. Demolition includes all operations necessary for demolition of the existing structures, foundations and utilities as shown.
- C. Remove debris, rubbish and other materials resulting from demolition operations from the site. Transport and legally dispose of materials off site.

### 1.03 SUBMITTALS

- A. Schedule: Submit schedule indicating proposed methods and sequence of operations for demolition work to Owner's Representative for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection. The procedures shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The submittal shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operation.
- B. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
- C. Coordinate with Owner's continuing occupation of portions of existing building/site, with Owner's partial occupancy of completed new addition/site.

### 1.04 JOB CONDITIONS

- A. Occupancy: Owner will be continuously occupying areas of the building/site immediately adjacent to areas of selective demolition. Conduct selective demolition

work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.

- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
- C. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- D. Partial Demolition and Removal: Items indicated to be removed but of salvable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
- E. Storage or sale of removed items on site will not be permitted.
- F. Protection: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.
- G. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building/site.
- H. Erect temporary covered passageways as required by authorities having jurisdiction.
- I. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.
- J. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
- K. Protect floors with suitable coverings when necessary.
- L. Construct temporary insulated solid dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.
- M. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
- N. Remove protections at completion of work.
- O. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

- P. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
- Q. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- R. Explosives: Use of explosives will not be permitted unless otherwise noted.
- S. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
- T. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
- U. Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
- V. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- W. NESHAP Compliance: The Contractor is responsible for being aware of and complying with the National Emission Standard for Hazardous Air Pollutants (NESHAP) Section 112 of the Federal Clean Air Act regarding asbestos.

## **PART 2 PRODUCTS (NOT APPLICABLE)**

## **PART 3 EXECUTION**

### **3.01 INSPECTION**

Prior to commencement of demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.

### **3.02 PREPARATION**

- A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.



- B. Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
- C. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.
- D. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
- E. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust-proof partitions of minimum 4" studs, 5/8" drywall (joints taped) on occupied side 1/2" fire-retardant plywood on demolition side, and fill partition cavity with sound-deadening insulation.
- F. Provide weatherproof closures for exterior openings resulting from demolition work.
- G. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
- H. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shut-down of service is necessary during change-over.

### **3.03 DEMOLITION**

- A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on the Plans in accordance with demolition schedule and governing regulations.
- B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
- C. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
- D. All existing structures shall be completely removed where denoted on the Plans. All foundations and slabs shall be broken up and removed from the site. Sidewalks, curbs, gutters, streets and street light bases shall be completely removed. It is not anticipated that piling will be encountered under any of the structures to be removed; however, where pilings are encountered, they shall be removed to a point three feet below existing ground.
- E. When approved in writing by the Engineer and when authorized by the proper authorities, the Contractor may dispose of such debris by burning on the Project site provided all requirements set forth by the governing authorities are met. The authorization to burn shall not relieve the Contractor in any way from damages which

result from the Contractor's operations. On easements through private property, the Contractor shall not burn on the site unless written consent is also secured from the property owner, in addition to authorization from the proper authorities.

- F. Demolish foundation walls to a depth of not less than 12" below existing ground surface. Demolish and remove below-grade wood or metal construction. Break up below-grade concrete slabs.
- G. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
- H. Completely fill below-grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel or sand, free of trash and debris, stones over 6" diameter, roots or other organic matter.
- I. If anticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.

### **3.04 SALVAGE MATERIALS**

- A. Salvage Items: Where indicated on the Plans as "Salvage-Deliver to Owner", carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.
- B. Historic artifacts, including cornerstones and their contents, commemorative plaques and tables, antiques, and other articles of historic significance remain the property of the Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

### **3.05 DISPOSAL OF DEMOLISHED MATERIALS**

- A. Remove debris, rubbish and other materials resulting from demolition operations from the site. Transport and legally dispose of materials off site.
- B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
  - 1. Burning of removed materials is not permitted on project site.

### **3.06 DEMOLITION AND REPAIR**

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

**END OF SECTION**

### REMOVAL AND DISPOSAL OF CONTAMINATED SOILS

## PART 1 GENERAL

### 1.01 DESCRIPTION

- A. The work covered by this specification includes all work required for the removal of contaminated soils including without limitation excavation, handling, stockpiling, transporting, and disposing of existing contaminated material either known or unknown to exist that may be encountered during the work.
- B. This section includes preparation of a Soil Contamination Management Plan (SCMP) that includes methods and procedures to complete the work. Contaminated materials include those defined in the General Conditions. This section also includes procedures applicable to Contractor's generation, use, and/or release of contaminated substances in the course of Contractor's operation, for which Contractor is responsible under the General Conditions.
- C. The project area previously operated as a sand mine and consists of approximately 5 acres. A comprehensive assessment of the subsurface soil and groundwater has been performed of the area and identified concentrations of arsenic, lead and barium in the soil and ground above applicable regulatory standards. The onsite concentrations have been analyzed by Toxicity Characteristic Leaching Procedures (TCLP) and are not considered to be hazardous waste. The impacted material extends from the surface to groundwater, which has been determined to be at a depth ranging from the surface to 7 feet below ground surface. The contaminated sediments are also located within the pond as indicated on the site development plans.
- D. The project area is located adjacent to a pond and includes a dilapidated metal building that will need to be removed as part of the project. In addition, soil contamination extends into the tree line which will require clearing and tree removal to access these impacted areas.

### 1.02 RELATED SECTIONS

- A. Geotechnical Report - Section 00 31 32 (If provided in bidding documents)
- B. Site Clearing - Section 31 10 00
- C. Trench Excavation and Backfill - Section 31 23 16

### **1.03 DEFINITIONS**

- A. Contaminated Soil: Means soils or fills affected by a known or suspected release and determined, or reasonably expected, to contain substances exceeding applicable regulatory standards.
- B. Engineer: The third-party Engineering or Environmental Engineer for the project.
- C. ECBOC: Effingham County Board of Commissioners
- D. SCMP: Soil Contamination Management Plan
- E. PPCAP: Prospective Purchaser Corrective Action Plan

### **1.04 GENERAL REQUIREMENTS**

- A. In general, the scope of work will entail the excavation, transportation and proper off-site disposal of soil found to exceed applicable regulatory standards. The Contractor will be required to work closely with the Engineer to ensure the project is performed in accordance with Georgia EPD guidelines.
- B. Potentially contaminated soils and/or water may be encountered during the work that may require excavation, handling, stockpiling, temporary storing, and disposal. The Contractor shall manage these materials in compliance with applicable statutes and regulations and in consultation with the Engineer.
- C. Potential contaminants that may be encountered include, among others, arsenic, barium, cadmium, chromium and lead.
- D. The approximate extent of known contaminated materials and the types of known contaminants are provided in the reference information. Notify the Engineer immediately if contaminated substances are discovered that were not previously identified or assumed, or if other discrepancies between data provided and actual field conditions are discovered.
- E. Conduct work in accordance with direction received from the Engineer; and with applicable federal, state, and local statutes, regulations, and guidance.
- F. Obtain all required permits and notifications for removal (excavation/dewatering), storage, transportation, and disposal of contaminated material
- G. The contractor and its employees working on site must have proper HAZWOPER training and current applicable certifications.

### **1.05 SUBMITTALS**

- A. Submittals shall be in accordance with Section 01 33 00 Submittal Procedures.
- B. Submit safety manual for review and approval by ECBOC or its authorized representative.
- C. Submit copies of all receipts for disposing contaminated soil at the disposal facility.

- D. Submit SCMP to the Engineer for review and acceptance within 14 Days after Notice to Proceed. No work, with the exception of site inspections and surveys, shall be performed until the SCMP is accepted. The Contractor shall allow 7 days in the schedule for the Engineer's review. No adjustment for time or money will be made if re-submittals of the SCMP are required due to deficiencies. At a minimum, the SCMP shall include:
1. Schedule of activities;
  2. Methods and procedures of excavation and equipment to be used;
  3. Shoring or side-wall slopes proposed;
  4. Staging and storage (stockpiling) methods, procedures, and locations providing for run-on, runoff, leaching, and fugitive dust controls;
  5. Methods, procedures, and proposed documentation for the transportation, disposal, and offsite treatment, if required, of contaminated materials, including the identification of disposal and/or treatment facilities, and certified, licensed transporters;
  6. Equipment decontamination procedures;
  7. Water Management Plan that describes collection, storage, and disposal of water collected during the work.
- E. Submit records, reports, or certificates of contaminated soil disposal within 5 business days of disposal.
- F. Submit records, reports, or certificates of contaminated water disposal within 5 business days of disposal.

#### **1.06 QUALITY ASSURANCE / QUALITY CONTROL**

- A. The Engineer will monitor the Contractor's activities associated with the Work of this Section. This monitoring will include, but not be limited to:
1. Observing and screening excavated soils as necessary to confirm that their quality is consistent with the findings in the PPCAP prepared by Geotechnical and Environmental Consultants, Inc. (GEC) dated 8/31/2020;
  2. Establishing requirements for stockpiling, segregating, and handling if the quality of the excavated soils is not consistent with the PPCAP prepared by Geotechnical and Environmental Consultants, Inc. (GEC) dated 8/31/2020;
- B. The Contractor shall assist the Engineer in collection of soil samples for screening and observation purposes at no additional cost to ECBOC
- C. The Contractor shall be responsible for establishing and maintaining vertical and horizontal control of layout in the field. Limits shall be field staked by the Contractor at locations and at frequencies directed by the Engineer to enable verification of lines and grades. The Contractor shall immediately comply with the Engineer's request to re-establish control as work progresses.

## **PART 2 PRODUCTS**

### **2.01 STOCKPILE AND HAULING/ CONTAINMENT OF CONTAMINATED SOILS**

- A. Polyethylene to be used as liner and as a material cover and shall be leak proof with minimum thickness of 6-mils.
- B. Polyethylene liner(s), 6-mils in thickness minimum shall be used to line dump trucks to prevent loss of contaminated soils or water onto the public right-of-way.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. The Contractor shall mobilize all equipment and personnel necessary to perform the specified work to the site.
- B. The Contractor shall secure the site prior to the start of any earthwork.
- C. The Contractor shall control access to the work areas at all times.
- D. The Contractor shall maintain responsibility for the health and safety of its workers.
- E. The Engineer will provide field and laboratory evaluation of materials suspected of being contaminated.
- F. Notify the Engineer 48 hours before excavating in an area of known or suspected contamination.
- G. The Contractor shall prepare the site by constructing loading areas, haul roads, stockpile areas, wheel washing areas, and any other improvements as necessary to complete the work on site, and shall be located as indicated on the drawings.
- H. The Engineer will designate which materials are contaminated and which are suitable for use in the work.
- I. The Engineer will determine the disposition of all materials.
- J. The Contractor shall assist the Engineer in collecting soil samples from the excavator buckets or by briefly stopping work to allow observations or samples to be collected.

- K. Contractor shall repair, at its own expense, any damage caused to the public or private property, remove from the site all debris, excess materials, tools, and equipment, and shall leave the premises in a neat and orderly condition, to the satisfaction of the Engineer and ECBOC.

### 3.02 SITE CONTROL MEASURES

- A. The Contractor will be required to provide the following throughout the duration of the project:
  - 1. All stormwater control measures as required by local and state regulations;
  - 2. Dust control measures to minimize dust generation;
  - 3. Trucks and equipment must be decontaminated prior to leaving the site to ensure contaminated soil is not tracked off-property; and
  - 4. Secure the site at all times during the project to prevent unauthorized access to the work zone during active remediation and deter trespasser access to the excavation during non-working hours (i.e. providing security fencing and warning signs around all open excavations).

### 3.03 EXCAVATION OF CONTAMINATED SOILS

- A. Conduct all work according to the SCMP
- B. As depicted on the drawings, contaminated soils shall be excavated at various depths from the surface to groundwater which is estimated to be at a depth of 5 to 7 feet below ground surface. The approximate volume of the excavation area is estimated to be approximately **34,000 cubic yards** which includes the berm shown on the site development plans but does not include the sediment quantity. The estimated soil quantities are provided for reference purposes only and do not constitute a guarantee of final quantities, which may be greater or less than the estimated amount.
- C. The Engineer will field locate the horizontal limits of the areas required to be remediated and will be onsite throughout the remediation process to confirm that the excavation depth requirements have been satisfied.
- D. The Contractor shall excavate Contaminated Soils to the depths and horizontal limits shown on the Drawings and as indicated by the Engineer.
- E. Engineer will continually evaluate field conditions to determine if additional excavation is required to achieve remedial objectives. This evaluation may require Engineer to work in close proximity to Contractor's excavation equipment, and may require frequent pauses in the work. Contractor shall work in a cooperative manner at all times during these operations to ensure the safety of Engineer, and to allow for thorough field evaluations to be conducted.
  - 1. When contaminated material excavation is undertaken, Engineer will make the final determination as to the limits of excavation required to achieve remediation



objectives. Such limits may be greater than or less than the limits identified on the drawings and shall be based upon actual conditions encountered at the time of excavation.

2. If required, Engineer will define those areas beyond the limits originally indicated where additional contaminated material excavation shall be required based upon field observations.
- F. In areas where contamination is suspected, Contractor shall place soil in staging areas for disposal characterization by the Engineer.
  - G. Excavation shall be performed in a manner to limit the potential for contaminated material to mix with uncontaminated material. The Contractor shall maintain an excavation of sufficient size to allow workers ample room to complete the work. Additional screening, excavation, and sampling may be required based on analytical results. The Contractor shall assist the Engineer with soil sample collection (e.g., sample collection from the excavator bucket). If required, additional soil sample collection and chemical analyses will be performed by the Engineer.
  - H. Install sheeting, bracing, or shoring in the absence of adequate side slopes if there is a need for workers to enter the excavated area.

### **3.03 DEWATERING METHOD - GEOTUBES OR EQUIVALENT**

- A. The Contractor shall provide a graded area free of debris, rocks, and roots etc. The area should be level from side to side with not more than a 0.5% grade from end to end. The Contractor may use more than one dewatering tube or bag if room permits.
- B. The Contractor shall provide containment diversions and berms as detailed on the site development plans around the dewatering site perimeter. The height of the containment berm should generally be approximately 33% to 67% the dewatering tube or bag height.
- D. The Contractor shall ensure drainage of clear, free-flowing filtrate from each dewatering tube back to the reservoir. In order to achieve the best water quality of effluent the Contractor shall employ a polymer specialist to treat the dredge material. The correct use of a polymer not only reduces dewatering time but also provides cleaner effluent water.
- F. Dewatering tube systems must be carefully monitored during the tube filling operation. Tubes are normally filled to 85% capacity with slurry mix capacity and then allowed to consolidate. Once consolidation has taken place the dewatering tubes are then refilled, and the cycle continues until the capacity of 85% consolidated solids is reached.
- G. Geotubes should be left in place to passively dewater over a period of time to achieve the best volume reduction. Reduction rates depend on slurry, organics, and conditions. Once consolidated, the tube material can then be trucked to an off-site location for disposal.

### **3.04 STOCKPILING**

- A. Excavated soil may be also need to be stockpiled onsite in order to dewater or for work efficiency. All stockpiled soils shall be secured against contamination migration due to wind, rain, etc. through the use of polyethylene liners and covers.
- B. Place contaminated soil in a stockpile separate from clean materials in the location as specified on the site development plans.
- C. Stockpile contaminated soil on impervious surface or on polyethylene sheeting. The perimeter of the polyethylene sheeting shall be elevated to prevent overland stormwater flow from contacting the contaminated soil. Pavement may substitute for the plastic sheeting if there is a method for preventing stormwater flow into the stockpile (i.e., a curb on the uphill side of the stockpile).
- D. Cover contaminated soil stockpile with plastic sheeting when the stockpile is not actively involved in construction. Secure the plastic covering to ensure it stays in place and that stormwater runoff from the cover does not pond on the cover or contact the contaminated soil.
- E. As shown on the site development plans the Contract shall wrap the stockpile location with a double row of type sensitive silt fence and place a layer of mulch between the rows to allow for water filtration of any runoff leaving the stockpile location. The Contractor shall take every measure necessary to prevent contamination from seeping, leaching or running off the stockpile location.

### **3.05 TRANSPORTATION OF EXCAVATED MATERIAL**

- A. The Contractor will be responsible for handling, re-handling, loading, transporting, and legal off-site removal of all excavated soils and materials to approved facilities.
- B. The Contractor will be responsible for the scheduling and coordination of all shipments of the soils to the approved facilities. The Contractor shall coordinate directly with the designated approved facility to ensure that the soils are received by the facility on schedule and that there will be no cause for delay in Work.
- C. The Contractor is responsible to ensure that the trucks gross weight meet DOT requirements and the requirements of the receiving facility.
- D. No soil shall be removed from the site without prior approval from the Engineer.
- E. Excavated soils and materials removed from the site shall be loaded within the site limits. All trucks leaving the site shall be covered and cleaned of debris that might fall from the trucks during transport.

- F. The Contractor shall install, operate, maintain and remove a wheel wash at each location where construction vehicles access and depart from the site.
- G. The Contractor shall take measures to prevent debris from being spilled from trucks or tracked from the site onto local streets. The Contractor shall sweep streets adjacent to the site as necessary or as directed by the Engineer.
- H. The Contractor shall ensure that any vehicle transporting materials off-site are properly labeled and placarded in accordance with federal and state DOT requirements.

### **3.06 DISPOSAL**

- A. Contractor shall be responsible for all disposal costs. All contaminated material shall be disposed of at the approved Subtitle-D Superior Landfill located 3001 Little Neck Road, Savannah, GA 31419. The Contractor shall be responsible for all trucking costs associated with transporting the contaminated material to the approved landfill. The Engineer will prepare and complete the waste profile prior to disposal. Legible manifests and weigh tickets for each load of soil transported for disposal from the site must be provided to the Engineer.

### **3.07 BACKFILLING**

- A. Backfill excavations in accordance with Section 31 23 16, Trench Excavation and Backfill.
- B. The excavated area must be backfilled with clean soil.
- C. Backfill excavations as soon as possible after Engineer has indicated that test results confirm remediation objectives have been achieved and backfilling may proceed.
- D. The source of the clean fill to be used at the site is subject to approval by Engineer **prior to acquisition or transporting to the site**. Upon notification of a potential clean fill source by the Contractor, Engineer will investigate the fill source. If there is any reason to believe that the source may have been impacted by petroleum or hazardous substances, the source will be rejected for use on this project. As part of Engineer's investigation of the fill source, the Contractor can provide an affidavit certifying the source of the fill material and that the fill is clean with respect to environmental contamination.
- E. The Contractor will be required to acquire, transport and place clean fill into the excavated area sufficient to return the excavation area to the surrounding grade.
- F. Legible weigh tickets for each load of clean fill placed on the site will need to be provided to the Engineer.
- G. All disturbed areas outside the backfill area shall be seeded with a hydro-mulch mixture with virgin wood fiber containing tackifiers at a rate of least 75 pounds per 1,000 square feet.

### **3.08 RESTORATION OF DISTURBED AREAS**

- A. The Contractor shall maintain all non-stockpile surfaces throughout the area free of contaminated soils to the maximum extent practicable. The Contractor shall restrict the spread of contaminated soil over the general project area.
- B. The Contractor shall restore all loading area(s), haul road(s), stockpile area(s), wheel washing area(s), and other improvements constructed by the Contractor.
- C. The Contractor is responsible for the restoration of all areas disturbed by the work to an equal or better condition than that encountered prior to construction.

**END OF SECTION**

## SITE CLEARING

**PART 1 GENERAL****1.01 SCOPE**

This Section describes materials and equipment to be utilized and requirements for their use in preparing the work site for construction. The Contractor shall furnish all materials, equipment and labor necessary to complete the work. The contractor is required to contact the **Utilities Protection Center, Inc.** in the **State of Georgia** call **811** prior to any excavation or construction.

**1.02 REFERENCES**

Georgia Manual for Erosion and Sedimentation Control, current edition.

**1.03 QUALITY ASSURANCE**

- A. Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.
- B. Layout work shall be done under supervision of a Civil Engineer or Registered Land Surveyor, registered in Georgia.
- C. Transit and measuring devices shall be calibrated to layout site and construction work.

**1.04 SITE CONDITIONS**

The area to be cleared and grubbed is shown schematically on the Drawings or specified below.

**PART 2 PRODUCTS****2.01 EQUIPMENT**

The Contractor shall furnish equipment of the type normally used in clearing and grubbing operations including, but not limited to, tractors, dozers, chippers, trucks, loaders, and root rakes.

**PART 3 EXECUTION**

### 3.01 PREPARATION

- A. Protect and maintain all benchmarks, monuments and reference points. Replace if disturbed or destroyed. If found at variance with the Drawings, notify the Engineer before proceeding with layout work.
- B. Install erosion and sedimentation control structures as shown on the Drawings.
- C. Protect all trees, vegetation, structures, utilities, and buildings not designated for removal for demolition.

### 3.02 TOPSOIL STRIPPING AND STOCKPILING

- A. Topsoil (top 6" – 8" of material) if present is to be removed from all cleared and grubbed areas and placed in designated stockpile areas as shown on the plans. **Topsoil must be certified as free from contaminants prior to being stockpiled.** The Contractor shall then grade the entire work site to conform, in general, to the finish elevations shown on the Plans.
- B. Shape topsoil stockpiles to drain without ponding water.
- C. Where trees are indicated to remain, stop topsoil stripping at drip line.

### 3.03 TREE PROTECTION

- A. Construct tree protection barricades, minimum 3'-0" high around individual trees and groups of trees designated to remain. Construct barricades at drip line.
- B. Protect tree root systems from damage due to deleterious materials caused by run-off or spillage during mixing, use or discarding of construction materials or drainage from stored materials. Protect root systems from compaction, flooding, erosion or excessive wetting.

### 3.04 EXCAVATION AROUND TREES TO REMAIN

- A. Where trenching for utilities is required within drip line, hand dig under or around roots. Cut no lateral roots or tap roots; cut smaller roots which interfere with new construction.
- B. Where excavation for new construction is required within drip line of trees, hand excavate to minimize damage to root systems. Use narrow tine spading forks and comb soil to expose roots. Relocate roots in backfill areas. If large, main lateral roots are encountered, expose beyond excavation limits, bend and relocate without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3" back from new construction.
- C. Allow no exposed roots to dry out before permanent backfill is placed; provide temporary earth cover, or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with backfill.

- D. Prune branches in accordance with standard horticultural practice to balance loss to root system caused by damage or cutting of root system. Engage qualified arborist approved by the Engineer to prune branches.

### **3.05 REPAIR FOR DAMAGED TREES**

- A. Engage a qualified arborist approved by the Engineer to perform tree repair work.
- B. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged trees.
- C. Remove dead trees and damaged trees in construction area which are determined by the tree arborist to be incapable of restoration to normal growth pattern.

### **3.06 CLEARING AND GRUBBING**

- A. Clear and grub each area before excavating. **All trees, herbaceous growth and stumps are to be chipped for mulch. Mulch will be stockpiled in the areas designated on the Plans or used for erosion control as required.** All other debris is to be removed to an approved landfill.
- B. Materials to be removed from the project site include, but are not limited to, trash, organic matter, construction waste materials (i.e. paving, concrete miscellaneous structures, houses), debris and abandoned utilities.
- C. Grubbing shall consist of completely removing roots, stumps, trash and other debris from all graded areas so that topsoil is free of roots and debris. Topsoil is to be left sufficiently clean so that further picking and raking will not be required.
- D. All foundations and planking embedded in the ground shall be removed and disposed. Butts of utility poles shall be removed.
- E. Landscaping features shall include, but not limited to, fences, cultivated trees and shrubbery, property corners, man made improvements and signs. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.
- F. Surface rocks and boulders shall be grubbed from the soil and removed from the site if not suitable as rip rap.
- G. The entire construction area shall be grubbed by heavy tractors with root rakes. Raking shall generally proceed along the contour rather than up and down slopes so as to inhibit soil erosion.
- H. Where the tree limbs interfere with utility wires, or where the trees to be felled are in close proximity to utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the utility.
- I. Any work pertaining to utility poles shall comply with the requirements of the appropriate utility.

- J. All fences adjoining any excavation or embankment that, in the Contractor's opinion, may be damaged or buried, shall be carefully removed, stored and replaced. Any fencing that, in the Engineer's opinion, is significantly damaged shall be replaced with new fence material.
- K. Stumps and roots shall be grubbed and removed to a depth not less than two feet below grade. All holes or cavities which extend below the subgrade elevation of the proposed work shall be filled with crushed rock or other suitable material, compacted to the same density as the surrounding material.
- L. The Contractor shall exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, etc. situated within the limits of the construction area but not directly within excavation and/or fill limits. The Contractor shall be held liable for any damage the Contractor's operations have inflicted on such property.
- M. The Contractor shall be responsible for all damages to existing improvements resulting from Contractor's operations.

### **3.07 DISPOSAL OF DEBRIS**

- A. The debris resulting from the clearing and grubbing operation shall be removed from the site and disposed of in accordance with all requirements of federal, state, county and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property. In no case shall any material or debris be left on the Project, shoved onto abutting private properties or buried on the Project.
- B. When approved in writing by the Engineer and when authorized by the proper authorities, the Contractor may dispose of such debris by burning on the Project site provided all requirements set forth by the governing authorities are met. The authorization to burn shall not relieve the Contractor in any way from damages which result from the Contractor's operations. On easements through private property, the Contractor shall not burn on the site unless written consent is also secured from the property owner, in addition to authorization from the proper authorities.

**END OF SECTION**



### EARTH MOVING

## PART 1 GENERAL

### 1.01 SCOPE

- A. This Section includes earthwork and related operations, including, but not limited to dewatering, excavating all classes of material encountered, pumping, draining and handling of water encountered in the excavations, handling, storage, transportation and disposal of all excavated and unsuitable material, construction of fills and embankments, backfilling around structures, compacting, all sheeting, shoring and bracing, preparation of subgrades, surfacing and grading, and any other similar, incidental, or appurtenant earthwork operations which may be necessary to properly complete the work.
- B. The Contractor shall provide all services, labor, materials, and equipment required for all earthwork and related operations, necessary or convenient to the Contractor, for furnishing complete work as shown on the Drawings or specified in these Contract Documents.

### 1.02 RELATED SECTIONS

- A. Geotechnical Report - Section 00 31 32 (If provided in bidding documents)
- B. Site Clearing - Section 31 10 00
- C. Trench Excavation and Backfill - Section 31 23 16

### 1.03 GENERAL

- A. The elevations shown on the Drawings as existing are taken from the best existing data and are intended to give reasonably accurate information about the existing elevations. They are not precise and the Contractor shall become satisfied as to the exact quantities of excavation and fill required.
- B. Earthwork operations shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards.
- C. All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments, and channels shall be maintained by the Contractor in good condition at all times until final acceptance by the Owner. All damage caused by erosion or other construction operations shall be repaired by the Contractor using material of the same type as the damaged material.

- D. The Contractor shall control grading in a manner to prevent surface water from running into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Free access must be provided to all fire hydrants and meters.
- E. Tests for compaction and density shall be conducted by the Engineer or by an independent testing laboratory selected in accordance with Section 01450 of these Specifications.
  - 1. The soils testing laboratory is responsible for the following:
    - a. Field compaction testing shall be based on using the maximum dry density determined by the Standard Proctor Compaction Test in accordance with ASTM D 698.
    - b. Determination of in-place backfill density shall be done in accordance with ASTM D 1556, "Density and unit weight of Soil In Place by the Sand-Cone Method", ASTM D 2937, "Density of Soil In Place by the Drive-Cylinder Method" or ASTM D 2922, "Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)".
    - c. Field density tests for each lift; one test for each 5,000 square feet of fill or minimum one test per lift.
    - d. Inspecting and testing stripped site, subgrades and proposed fill materials.
  - 2. Contractor's duties relative to testing include:
    - a. Notifying laboratory of conditions requiring testing.
    - b. Coordinating with laboratory for field testing.
    - c. Providing representative fill soil samples to the laboratory for test purposes. Provide 50-pound samples of each fill soil.
  - 3. Inspection
    - a. Earthwork operations, suitability of excavated materials for fill and backfill, and placing and compaction of fill and backfill is subject to inspection. Engineer will observe earthwork operations.
    - b. Foundations and shallow spread footing foundations are required to be inspected by an engineer to verify suitable bearing and construction.
- F. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, Excavations, Trenching, and Shoring, and Subpart O, Motor Vehicles, Mechanized Equipment, and Marine Operations, and shall be conducted in a manner acceptable to the Engineer.
- G. It is understood and agreed that the Contractor has made a thorough investigation of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains. The Contractor shall be responsible for providing all services, labor, equipment, and materials necessary or convenient to the Contractor for completing the work within the time specified in these Contract Documents.

H. Safety

Perform all trench excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations Part 1926, Subpart P "Excavation, Trenching & Shoring" as described in OSHA publication 2226.

## PART 2 PRODUCTS

### 2.01 SOILS CLASSIFICATIONS

Bedding materials listed here include a number of processed materials plus the soil types defined according to the Unified Soil Classification System (USCS) in ASTM D 2487, Standard Method for Classification of Soils for Engineering Purposes. (See below for description of soil classification). These materials are grouped into five broad categories according to their suitability for this application:

- A. Class I - Angular, 1/4 to 1 1/2 inches (6 to 40 mm) graded stone, including such as coral, slag, cinders, crushed shells and crushed stone. Note - The size range and resulting high voids ratio of Class I material make it suitable for use to dewater trenches during pipe installation. This permeable characteristic dictates that its use be limited to locations where pipe support will not be lost by migration of other embedment materials into the Class I material. When such migration is possible, the material's minimum size range should be reduced to finer than 1/4 inch (6 mm) and the gradation properly designed to limit the size of the voids.
- B. Class II - Coarse sands and gravels with maximum particle size of 1 1/2 inch (40 mm), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class. Note - Sands and gravels which are clean or borderline between clean and with fines should be included. Coarse-grained soils with less than 12% but more than 5% fines are neglected in ASTM D2487 and the USCS and should be included. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material may be critical to the pipe support and stability of the foundation and embedment if the material is imported and is not native to the trench excavation. A gradation other than well graded, such as uniformly graded or gap graded, may permit loss of support by migration into void spaces of a finer grained natural material from the trench wall and foundation.
- C. Class III - Fine sand and clayey (clay filled) gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil Types SM, GC, SM, and SC are included in this class.

- D. Class IV - Silt, silty clays and clays, including inorganic clays and silts of not to high plasticity and liquid limits. Soil Types MH, ML, CH, and CL are included in this class. Note- Caution should be used in the design and selection of the degree and method of compaction for Class IV soils because of the difficulty in properly controlling the moisture content under field conditions. Some Class IV soils with medium to high plasticity and with liquid limits greater than 50% (CH, MH, CH-MH) exhibit reduced strength when wet and should only be used for bedding, haunching and initial backfill in arid locations where the pipe embedment will not be saturated by ground water, rainfall and/or exfiltration from the pipeline system. Class IV soils with low to medium plasticity and with liquid limits lower than 50% (CL, ML, CL-ML) also require careful consideration in design and installation to control moisture content but need not be restricted in use to arid locations.
- E. Class V - This class includes the organic soils OL, OH, and PT as well as soils containing frozen earth, debris, rocks larger than 1 1/2 inch (40 mm) in diameter, and other foreign materials. These materials are not recommended for bedding, haunching or initial backfill.

#### DESCRIPTION OF EMBEDMENT MATERIAL CLASSIFICATIONS

SOIL CLASS	SOIL TYPE	DESCRIPTION MATERIAL CLASSIFICATION
Class I Soils *	---	Manufactured angular, granular material, 3/4 to 1 1/2 inches (6 to 40 mm) size, including materials having regional significance such as crushed stone, or rock, broken coral, crushed slag, cinders, or crushed shells.
Class II Soil **	GW	Well-graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean..
	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean
	SW	Well-graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
	SP	Poorly graded sands and gravelly sand, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.

Class III Soil ***	GM	Silty gravels, gravel-sand-silt mixtures. 50% or more retained on No. 200 sieve.
	GC	Clayey gravels, gravel-sand-clay mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve.
	SM	Silty sands, sand-silt mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
	SC	Clayey sands, sand-clay mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
Class IV Soils	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
	CH	Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
Class V Soils	OL	Organic silts and organic silty clays of low plasticity. Liquid limit 50% or less. 50% or less. 50% or more passes No. 200 sieve.
	OH	Organic clays of medium to high plasticity. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	PT	Peat, muck and other highly organic soils.

\* Soils defined as Class I materials are not defined in ASTM D2487.

\*\* In accordance with ASTM D2487, less than 5% pass No. 200 sieve.

\*\*\* In accordance with ASTM D2487, more than 12% pass No. 200 sieve. Soils with 5% to 12% pass No. 200 sieve fall in borderline classification, e.g. GP-GC.

## **2.02 FILL MATERIAL**

- A. Sand Fill: Material shall consist of a clean sand with a fineness modulus of 1.6 to 3.1 and containing not more than 10 percent by weight finer than No. 200 U.S. Standard Sieve.
- B. Earth Fill: Material shall consist of inorganic material free of roots, cobbles and boulders and classified as SM, ML, SC, or CL by ASTM D2487-85 "Standard Methods for Classification of Soils for Engineering Purposes". Earth Fill shall also conform to the following:
  - 1. Liquid Limit = 50 maximum
  - 2. Plasticity Index = 20 maximum
  - 3. Dry Unit Weight = 90 pcf minimum maximum density
- C. Coarse Aggregate (Crushed Stone): Coarse aggregate shall conform to the Georgia Department of Transportation Standard Specifications for Construction of Road and Bridges, Table 800.01 H, Size No. 57.

## **2.03 UNSUITABLE SITE FILL MATERIAL**

Material which does not conform to the above classifications (soil classification SP, SW, GM, CH, MH, OH, OL, and PT) may be used as Site Fill material in areas identified on the drawings as "spoil areas", in areas with no structures and or roads and other non-critical areas.

## **2.04 SHEETING, BRACING AND TIMBERING**

- A. Sheeting, Bracing and Timbering: The Contractor shall furnish, place and maintain all sheeting, bracing and timbering required to properly support trenches and other excavations in open cut and to prevent all movement of the soil, pavement, structures, or utilities outside of the trench or pit.
  - 1. General
    - a. Cofferdams and bracing design, including computations, shall be prepared before commencing construction operations. Drawings and design computations shall be signed and sealed by a professional engineer registered in the State of Georgia. The drawings and design computations shall be submitted to the Engineer for informational purposes only.
    - b. Sheeting, bracing and timbering shall be so placed as to allow the work to be constructed to the lines and grades shown on the Drawings and as ordered by the Engineer.

- c. If at any time the method being used by the Contractor for supporting any material or structure in or adjacent to any excavation is not reasonably safe, the Contractor shall provide additional bracing and support necessary to furnish the added degree of safety.
  - d. All sheeting in contact with the concrete or masonry shall be cut off as directed by the Engineer and left in place.
- 2. Timber: Timber may be substituted for steel sheet piling when approved by the Engineer. Timber for shoring, sheeting or bracing shall be sound and free of large or loose knots, and in good condition. Size and spacing shall be in accordance with OSHA regulations.
- 3. Steel Sheet Piling: Steel sheet piling shall be the continuous interlock type. The weight, depth, and section modulus of the sheet piling shall be sufficient to restrain the loads of earth pressure and surcharge from existing foundations and/or live loads. Procedure for installation and bracing shall be so scheduled and coordinated with the removal of the earth that the ground under existing structures shall be protected against lateral movement at all times. The Contractor shall provide closure and sealing between sheet piling and existing facilities. Steel piling shall be removed, unless otherwise directed by the Engineer.
- 4. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the structures and adjacent property. Leave sheeting in place when, in the opinion of the Engineer, it cannot be safely removed. Cut off sheeting left in place at least two feet below the surface.

## 2.05 FILTER FABRIC

- A. Filter fabric associated with bedding shall be a UV stabilized, spunbonded, continuous filament, needle punched, polypropylene, nonwoven geotextile.
- B. The fabric shall have an equivalent open size (EOS or AOS) of 120 - 70. The fabric shall also conform to the minimum property values listed in the following table:

Fabric Property	Unit	Test Procedure	Average Value	
			Typical	Minimum
Weight	oz/yd <sup>2</sup>	ASTM D 3776	8.3	
Thickness	mils	ASTM D 1777	105	
Grab Strength	lbs.	ASTM D 4632	240	210
Grab Elongation	%	ASTM D 4632	>50	50
Tear Strength	lbs.	ASTM D 4533	100	85

Mullen Burst	psi	ASTM D 3786	350	320
Puncture Resistance	lbs.	ASTM D 4833	115	100
Permittivity	sec <sup>-1</sup>	ASTM D 4491	1.7	
Water Permeability	cm/sec	ASTM D 4491	0.4	
Water Flow Rate	gpm/ft <sup>2</sup>	ASTM D 4491	120	
UV Resistance (500 hrs)	%	ASTM D 4355	>85	
PH			2 – 13	

C. Filter fabric shall be Polyfelt TS 700, Trevira 1125 or SuPac 7-MP.

## 2.06 CONCRETE

Concrete for initial backfill or encasement shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

## 2.07 FLOWABLE FILL

Flowable fill, where required for backfill, shall meet the requirements of Georgia Department of Transportation Standard Specifications, Section 600 for Excavatable or Non-Excavatable type.

# PART 3 EXECUTION

## 3.01 GENERAL

- A. Safety: Comply with local regulations and with the provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc., Occupational Safety and Health Act and all other applicable safety regulations.
- B. Topsoil
  - 1. Remove all topsoil to a depth at which subsoil is encountered, from all areas under buildings, pavements, and from all areas which are to be cut to lower grades or filled.
  - 2. With the Engineer's approval, topsoil to be used for finish grading may be stored on the site.



3. Other topsoil may be used for fill in non-critical areas with approval of the Engineer.
  4. Properly dispose of all excess topsoil in the designated area.
- C. Bracing and Sheeting
1. Furnish, put in place, and maintain all sheeting, bracing, and shoring as may be required to properly support the sides of all excavations and to prevent all movement of earth which could in any way injure the work, adjacent property or workers.
  2. Properly support all excavations where necessary to conform to all pertinent rules and regulations and these Specifications, even though, such locations are not indicated on the Drawings.
  3. Exercise care in the removal of sheeting, shoring, bracing and timbering to prevent collapse or caving of the excavation faces being supported and damage to the work and adjacent property.
  4. Do not leave any sheeting or bracing in the trench or excavation after completion of the work, unless approved by the Engineer.
- D. Obstructions
1. Remove and dispose of all boulders, sidewalks, driveways, pavement, pipes, and the like, as required for the performance of the work.
  2. Exercise care in excavating around catch basins, inlets and manholes so as to not disturb or damage these structures.
  3. Avoid removing or loosening castings or pushing dirt into catch basins, inlets and manholes.
  4. Damaged or displaced structures or casting shall be repaired, replaced and dirt entering the structures during the performance of the work shall be removed at no additional cost to the Owner.
- E. Utilities to be Abandoned
1. When pipes, conduits, sewers, or other structures are removed from the trench, leaving dead ends in the ground, such ends shall be fully plugged or sealed with brick and non-shrink grout.
  2. Abandoned structures such as manholes or chambers shall be entirely removed.
  3. All materials from abandoned utilities shall be removed from the site.
  4. All salvageable materials shall become the property of the Owner.
  5. All equipment to be salvaged is noted in the Specifications and shall be turned over to the Owner at a designated location.
- F. Extra Earth Excavation

1. In case soft or excessively wet material which, in the opinion of the Engineer, is not suitable, is encountered below the final subgrade elevation of an excavation or underneath a structure, the Engineer may order the removal of this material and its replacement with crushed stone, filter fabric, or other suitable material in order to make a suitable foundation for the construction of the structure.

**G. Cutting Paved Surfaces and Similar Improvements**

1. Remove existing pavement as necessary for installing pipe utilities and appurtenances or as otherwise shown on the Drawings.
2. Before removing any pavement, mark the pavement neatly, paralleling pipe lines and existing street lines. Space the marks the width of the trench.
3. Break asphalt pavement along the marks using rotary saws or other suitable tools. Break concrete pavement along the marks by use of scoring with a rotary saw and breaking below the score by the use of jackhammers or other suitable tools.
4. Do not pull pavement with machines until completely broken and separated from pavement to remain.
5. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement. No additional payment will be made for removing and replacing damaged adjacent pavement.
6. Remove and replace sidewalks disturbed by construction for their full width and to the nearest undisturbed joint.
7. The Contractor may tunnel under curbs that are encountered. Remove and replace any curb disturbed by construction to the nearest undisturbed joint.

## **3.02 EXCAVATION**

**A. Method**

1. All excavation shall be by open cut from the surface except as indicated on the Drawings.
2. All excavations for pipe appurtenances and structures shall be made in such a manner, and to such depth and width, as will give ample room for building the structures, and for bracing, sheeting, and supporting the sides of the excavation, for pumping and draining groundwater which may be encountered, and for the removal from the excavation of all materials excavated.
3. Take special care so that the soil below the bottom of the structure to be built is left undisturbed.

- B. Grades:** Excavate to grades indicated on the Drawings. Where excavation grades are not indicated on the Drawings, excavate as required to accommodate installation.

C. Disposal of Excavated Material

1. Remove and properly dispose of all excavated material not needed to complete filling, backfilling and grading.
2. Dispose of excess earth and rock excavated materials at locations on-site designated by the Engineer. Off-site disposal of all other material shall be and in accordance with all requirements of federal, state, county, and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or on any street. No debris shall be deposited on any private property, except by written consent of the property owner. In no case shall any material be shoved onto abutting private properties, or be buried in embankments or trenches on the Project.

### 3.03 EXCAVATING FOR STRUCTURES

- A. Earth Excavation: Earth excavation shall include all substances to be excavated other than rock. Earth excavation for structures shall be to limits not less than two feet outside wall lines, to allow for formwork and inspection, and further as necessary to permit the trades to install their work. All materials loosened or disturbed by excavation shall be removed from surfaces to receive concrete or crushed stone.
- B. Excavation for Foundations: Footings and slabs on grades shall rest on undisturbed earth, rock or compacted materials to insure proper bearing.
1. Unsuitable Foundation Material: Any material, in the opinion of the Engineer, which is unsuitable for foundation shall be removed and replaced with compacted crushed stone, or with compacted fill material as directed by the Engineer. No determination of unsuitability will be made until all requirements for dewatering are satisfactorily met.
  2. Foundation in Rock: Foundations for a structure shall be on similar materials. Should excavation for a foundation be partially in rock, the Contractor shall undercut that portion of the rock 12-inches and bring the excavation to grade with compacted crushed stone.
  3. Pipe Trenches Beneath Structures: Where piping or conduit passes beneath footings or slabs resting on grade, trenches shall be excavated to provide a minimum 6-inch clearance from all surfaces of the pipe or conduit. The trench shall be backfilled to the base of the structure with concrete.
  4. Unauthorized Excavation: Care shall be taken that excavation does not extend below bottom levels of footings or slabs on earth or rock. Should the excavation, through carelessness or neglect, be carried below such levels, the Contractor shall fill in the resulting excess excavation with concrete under footings and compacted crushed stone or other approved material under slabs. Should excavation be carried beyond outside lines of footings such excess excavation shall be filled with concrete, or formwork shall be provided, as directed by the Engineer.
- C. Unsuitable Bearing

1. If suitable bearings for foundations are not encountered at the elevations indicated on the Drawings, immediately notify the Engineer.
2. Do not proceed further until instructions are received.

### **3.04 DEWATERING REQUIREMENT**

- A. The Contractor may use any dewatering method he deems feasible so long as it results in working in the dry and stable soil conditions.
- B. The Contractor shall conform and meet all conditions, obtain necessary permits and requirements of the regulatory agencies that have jurisdiction.
- C. It is the intent of these specifications that an adequate dewatering system be installed to lower and control the groundwater in order to permit excavation, construction, grading and the placement of fill materials, all to be performed under dry conditions. The dewatering system shall be adequate to pre-drain the water-bearing strata above and below the bottom of the excavation.
- D. The Contractor shall be solely responsible for the arrangement, location and depths of dewatering system necessary to accomplish the work described under this section of the specifications. The dewatering shall be accomplished in a manner that will reduce the hydrostatic head below any excavation to the extent that the water level in the construction area are a minimum of three (3) feet below the prevailing excavation surface and any surface to be compacted; will prevent the loss of fines, seepage, boils, quick conditions, or softening of the foundation strata; will maintain stability of the sides and bottom of the excavation; and will result in all construction operations being performed in the dry.
- E. The Contractor shall promptly dispose of all water removed from the excavations in such a manner as will not endanger public health, damage public or private property, or affect adversely any portion of the work under construction or completed by him or any other Contractor. Contractor shall obtain written permission from the Owner for any property involved before digging ditches or constructing water courses for the removal of water.
- F. The disposal of water from the dewatering system shall meet the requirements of all regulatory agencies having jurisdiction.
- G. If the dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system, then loosening of the foundation strata, or instability of the slopes, or damage to the foundations or structures may occur. The supply of all labor and materials, and the performance of all work necessary to carry out additional work for reinstatement of the structures of foundation soil resulting from such inadequacy or failure shall be undertaken by the Contractor subject to the approval of the Engineer, and at no additional expense to the Owner.

### 3.05 ROCK EXCAVATION

- A. Definition of Mass Rock (only for payment purposes where payment is on a unit quantity basis): Any material which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than 56,000 pounds (comparable to Caterpillar D 8K or comparable to Caterpillar 973 front-end loader, and occupying an original volume of at least one cubic yard). The Engineer shall be the sole determinate as to the limits to which the material is classified as rock.
- B. Definition of Trench Rock (only for payment purposes where payment is on a unit quantity basis): Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 25,700 pounds (Caterpillar Model 225 or equivalent), and occupying an original volume of at least one-half (1/2) cubic yards.
- C. Excavation: Where rock is encountered within excavation for structures, it shall be excavated to the lines and grades indicated on the Drawings or as otherwise directed by the Engineer. The Contractor shall be responsible for obtaining any blasting permits required.
- D. Blasting: Blasting operations shall be conducted in accordance with all existing ordinances and regulations. All structures shall be protected from the effects of the blast. Blasting shall be performed and supervised by qualified and licensed workers. Dispose of excavated rock in accordance with applicable federal, state, county and local regulations. All blasting within 750 ft of an inhabited structure and or roadway must be seismic monitored for ground and air vibrations. Peak Particle Velocity shall be measured at nearest structure and shall be 0.5 inch per second or less during blasts. Shots must be covered with at least 6 feet of earthen and synthetic cover (blasting mats). Bore hole diameter must not exceed 4" in diameter. Blast hole cannot exceed 20 feet of solid rock with single delay detonator (in terms, if drill depth exceeds more than 20 feet in depth, decking must be done, accomplish by using multiple detonators in the blast hole. The blast holes must be stemmed with gravel, 89/57 stone. Pre-blast inspections are required. Inspections shall be via an engineer that includes inspection of structure, and pictures of any existing damage or cracks that structure may have prior to blasting.
- E. If excess excavation is made or the material becomes disturbed so as to require removal below final subgrade elevations or beyond the prescribed limits, the resulting space shall be refilled with concrete in accordance with Section 2.07 of this Specification
- F. Measurement for Payment  
  
All rock excavation shall be paid for as an incidental part of the item on which the work is done except where a separate, unqualified item for rock excavation is indicated in the BID FORM or where rock excavation is ORDERED as an EXTRA by the OWNER, by WRITTEN ORDER. Where payment for rock excavation is established by the BID FORM or ORDERED as an EXTRA by the OWNER, CONTRACTOR shall be paid only for the quantity of rock removed, measured as follows:

1. For all masonry structures such as buildings, tanks, vaults, catch basins, manholes and the like, the horizontal rock measurement shall be made to include 2-1/2 feet from the outside face of finished vertical sidewall of such structure and the vertical rock measurement shall be made from the top elevation of the rock, before disturbed or removed, to the elevation of the under or lower side of the bottom concrete slab of the structure. Any projection below the bottom slab of any structure required for sump, well, or other pertinent construction shall be measured separately.
2. For installation of pipe lines and fittings the horizontal rock measurement shall be the nominal outside diameter of the pertinent pipe plus 16-inches, except, however, that no horizontal measurement shall be considered to be less than 27-inches; the vertical rock measurement shall be made from the top elevation of the rock, before disturbance or removal, to an elevation of 9-inches below the bottom outside surface of the pipe for pipe having a diameter of 8-inches through 24-inches, and to an elevation of 12-inches below the bottom outside surface of the pipe for all pipe having a diameter greater than 24-inches.

G. Excess Rock Excavation

If rock excavated beyond the limits of payment indicated on the Drawings, specified, or authorized in writing by the OWNER, the excess excavation whether resulting from over breakage or other causes, shall be backfilled, by and at the expense of the CONTRACTOR.

H. Shattered Rock

If rock below normal depth is shattered due to drilling or blasting operations and such shattered rock is unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled as described above in EXCESS ROCK EXCAVATION. All such removal and backfilling shall be done at the expense of the CONTRACTOR.

### 3.06 COMPACTION

- A. Fill materials supporting roadways, parking areas, sidewalks, structures, and buildings and backfill around structures shall be compacted to 95 percent of the standard proctor density. The top 12-inches of fill materials supporting structures, concrete pads, pavement, curb and gutter shall be compacted to 98 percent of the standard proctor density. Fill placed for general site grading shall be compacted to 90 percent of the standard proctor density.
- B. Compaction of embankments shall be by vibratory sheepsfoot or pad-foot rollers with staggered, uniformly spaced knobs and suitable cleaning devices. The projected area of each knob and the number and spacing of the knobs shall be such that the total weight of the roller and ballast when distributed over the area of one row of knobs shall be 250 psi. Placement and compaction of materials shall extend at least 5 feet beyond the final contours sufficiently to insure compaction of the material at the resulting final surface. Final contours shall then be achieved by a tracked bulldozer shaping the face of the embankment.

- C. Compaction of backfill next to walls shall be accomplished with hand-powered tamping equipment. The backfill shall be placed in 8-inch maximum lifts, with each lift compacted to 95 percent of standard proctor density.
- D. If tests indicate that density of fill is less than that specified, the area shall be, as directed by the Engineer, either recompacted or undercut, filled, and compacted until specified density is achieved.

### **3.07 FILL**

#### **B. Controlled Fill**

1. The fill for roadways, parking areas, walks, structures, and building slabs on grade shall be controlled fill.
2. After the existing ground or excavated area has been proofrolled and examined by the Engineer, all holes and other irregularities shall be filled and compacted before the main fill is placed.
3. The fill shall be placed in even layers not exceeding 8-inches in depth and shall be thoroughly compacted as herein specified.
4. If an analysis of the soil being placed shows a marked difference from one location to another, the fill being placed shall not be made up of a mixture of these materials.
5. Each different type of material shall be handled continuously so that field control of moisture and density may be based upon a known type of material.
6. No fill shall be placed following a heavy rain without first making certain on isolated test areas that compaction can be obtained without damage to the already compacted fill.

#### **B. Proofrolling**

1. All areas where roadways, parking areas, sidewalks, structures, and buildings are to be constructed on cut areas, compacted fill, and other areas where indicated on the Drawings, shall be proofrolled to detect soft spots prior to the placement of fill material or building foundations.
2. Proof-rolling shall be performed using a fully loaded tandem-axle dump truck 20 tons or other suitable pneumatic tired equipment over the subgrade before the subgrade is shaped.
3. Proof-rolling shall be witnessed by the Engineer.
4. Subgrade shall be proofrolled with 10 overlapping passes of the roller. Depressions that develop during the proof-rolling operation shall be filled with suitable material and those filled areas shall be proofrolled with six passes of the roller. If, after having been filled and proofrolled, the subgrade areas that still "pump" or "rut", shall be further evaluated by a geotechnical engineer, and remedial work be determined based on the conditions found at locations under structures or

pavement. The contractor shall execute remedial work determined by the geotechnical engineer to achieve a subgrade acceptable to the Engineer.

5. After the proofrolled subgrade has been accepted by the Engineer, the surface of the subgrade shall be finish rolled with a smooth steel wheel roller weighing not less than 10 tons. Finished surface of the subgrade shall be within a tolerance of 1/4-inch at every point.
6. Conduits, pipes, culverts, and underdrains shall be neither disturbed nor damaged by proof-rolling operations. Rollers shall neither pass over, nor approach closer than five feet to, conduits, pipes, culverts, and underdrains unless the tops of those products are deeper than three feet.

C. Placement

1. Prior to placement of any material in embankments, the area within embankment limits shall be stripped of topsoil and all unsuitable materials removed in accordance with this Section. The area shall then be scarified to a depth of at least 6-inches.
2. Fill materials shall be placed in continuous, approximately horizontal layers extending the full width of the embankment cross-section and the full dimension of the excavation where practical and having an uncompacted thickness of not over 8-inches.

D. Final Grading: Upon completion of construction operations, the area shall be graded to finish contour elevations and grades shown on the Drawings. Graded areas shall be made to blend into conformation with remaining ground surfaces. All surfaces shall be left smooth and free to drain.

E. Excess Material: Surfaces and slopes of waste fills shall be left smooth and free to drain.

F. Moisture

1. Fill materials shall be placed at optimum moisture content within practicable limits, but not less or more than two percent of optimum. Optimum moisture shall be maintained by sprinkling the layers as placed or by allowing materials to dry before placement.
2. If fill material is too wet, provide and operate approved means to assist the drying of the fill until suitable for compaction.
3. If fill material is too dry, provide and operate approved means to add moisture to the fill layers.

### **3.08 BACKFILLING**

- A. Backfill carefully to restore the ground surface to its original condition. Dispose of excess material in accordance with this Section.
- B. Compact backfill underlying roadways, parking areas, sidewalks, structures and buildings in accordance with the requirements of Article 3.06 of this Section.



C. Backfilling Around Structures

1. General

- a. Remove debris from excavations before backfilling.
- b. Do not backfill against foundation walls until so directed by the Engineer nor until all indicated perimeter insulation and/or waterproofing is in place.
- c. Protect such insulation and/or waterproofing during filling operations.
- d. Do not backfill against water retaining structures until successful leakage tests have been completed.
- e. Wherever possible, backfilling shall be simultaneous on both sides of walls to equalize lateral pressures.
- f. Do not backfill against walls until all permanent construction is in place to furnish lateral support on both top and bottom of wall.
- g. Backfilling against walls shall take place after all the concrete in the affected members has attained the specified strengths.
- h. To prevent excessive lateral pressure on external walls, large compaction equipment shall not be allowed within a zone wall footing.

2. Materials: Backfill material placed against structures built or encountered during the work of this Section shall be suitable fill material. No broken concrete, bricks or similar materials will be permitted as backfill.

### 3.09 GRADING

- A. General: Perform all rough and finish grading required to attain the elevations indicated on the Drawings. Perform finish grading to an accuracy of  $\pm 0.10$  foot.
- B. Treatment After Completion of Grading
- 1. After grading is completed, permit no further excavation, filling or grading, except with the approval of the Engineer.
  - 2. Use all means necessary to prevent the erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

### 3.10 SETTLEMENT

- A. The Contractor shall be responsible for all settlement of backfill, fills and embankments which may occur within one year after final acceptance of the Work by the Owner.

- B. The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after receipt of written notice from the Engineer or Owner.

### **3.11 CLEAN-UP**

- A. Leave unused materials in a neat, compact stockpile.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

DEWATERING BY GEOTEXTILE CONTAINMENT

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Provide dewatering of dredging spoil material using geotextile containers as shown and as specified. Provide materials, equipment, polymer, polymer feed system, an incidental cost relating to deployment and filling of geotextile dewatering containers as required by geotextile product supplier.

**1.02 RELATED SECTIONS**

- A. Removal and Disposal of Contaminated Soils - Section 02 61 00
- B. Hydraulic Dredging – Section 35 20 23

**1.03 SUBMITTALS**

- A. Submit product literature and specifications for materials used to construct the geotextile dewatering system, including: filling port details, connection details, piping, manifold system, and related components.
- B. Submit Manufacturer's installation instructions for the geotextile containment system and ancillary features used to construct and manage system.
- C. Detailed Geotextile Containment Dewatering Plan: Submit dewatering plan within 14 days after Notice to Proceed and ahead of anticipated start of dewatering activities onsite including dewatering from the excavation area adjacent to the pond where ground water is anticipated to be within 5 to 7 feet of surface. Dewatering Plan shall include:
  - 1. Site plan, dewatering containment cell plan layout. Details must include evidence of stabilized site and ground preparation down gradient of the dewatering containment cell adequate to address erosion concerns.
  - 2. Pumping methods, mass balance of the pumping flow rates, chemical make-down, amount of dilution of water, filtrate volume, density measurement, and percent solids – all integrated into a real time control system, showing a method of collection and discharge point.

3. Details and layout of dry or emulsion polymer make down and metering system, including: chemical make-down details including polymer type, polymer injection system/location, flocculation monitoring and filling method.
- E. Submit a copy of Geotextile Dewatering Test (GDT) report for the specific material to be dewatered.

## **PART 2 PRODUCTS**

### **2.01 PRODUCT DELIVERY, HANDLING AND STORAGE**

- A. Product shall be delivered to the project site in protective wrap or cover. Each containment tube shall be clearly labeled for easy identification.
- B. No hooks, tongs, or other sharp instruments shall be used for handling geotextile containment tubes. In addition, the containment tubes shall not be dragged along the ground. Containment tubes shall be unrolled into position as recommended by the manufacturer.
- C. Geotextile containment tubes shall be stored in areas where water cannot accumulate, elevated off the ground, and protected from conditions that will affect its properties or performance. Geotextile containment tubes shall not be exposed to temperatures or duration of storage time that exceed manufacturer recommendations.

### **2.02 PRODUCT REPAIR (IF NEEDED)**

- A. If geotextile tubes are damaged during the project, repair per manufacturer's recommendations or replace tube with a new product. Report all damages to Engineer and allow for re-inspection by Engineer of the damaged area before re-starting the pumping and dewatering process.

### **2.03 DESIGN REQUIREMENTS**

- A. Contractor shall be responsible for: means and methods for dewatering work areas, including actual field dimensions, configurations, stability, and dewatering capacity. Contractor shall also be responsible for all safety precautions and programs related to the work.

### **2.04 GEOTEXTILE DEWATERING CONTAINMENT SYSTEM**

- A. Approved manufactured geotextile dewatering systems for this project include but are not limited to:
  1. Geo-Synthetics, LLC Geotrax Geotextile Tubes ([www.geo-synthetics.com/geotextile-tubes/](http://www.geo-synthetics.com/geotextile-tubes/))
  2. ACE Geosynthetics ACE Tube (<https://geoace.com/products>)

3. TenCate Geosynthetics – Geotubes (<https://www.tencategeo.us/en-us/>)
  4. US Fabrics 450T EcoTube (<https://www.usfabricsinc.com/products/us-450t-ecotube/>)
- B. Other Manufactured systems will be considered if submitted for approval in accordance with the Instructions to Bidders and Section 01 01 00.
- C. All geotextile dewatering containment systems used for the project are limited to a maximum circumference of 60 feet. Smaller circumferences bags and/or a combination of bag circumference sizes are allowed.

## **2.05 OTHER MATERIALS**

- A. Contactor shall furnish all materials and shall construct and maintain, as it deems necessary, all geotextile dewatering containment systems, channels, drains, sumps, and protective works for protection of work areas.

# **PART 3 EXECUTION**

## **3.01 SITE PREPARATION**

- A. Overall site preparation shall follow manufacturers' site preparation guidelines. In addition, the considerations below must be complied with:
1. All obstructions that could damage the geotextile containment system (such as roots, projecting stones, etc.) shall be removed. The prepared site surface shall be graded to a zero percent slope across the width of the geotextile containment area and a maximum slope of 0.5%- 1.0% max in the overall length direction of the geotextile container.
  2. The prepared site surface shall allow for adequate drainage to a lower outlet or sump or shall naturally drain by overland flow to the pond in an area upstream of the filter curtain.
  3. The surface must be prepared prior to the placement of the geotextile dewatering containment system. A liner is not required.
  4. All surface water drainage from the dewatering site both rainfall runoff and dewatering must be routed back to the pond as shown on the site development plans.

### **3.02 TESTING**

- A. Geotextile Dewatering Test (GDT) shall be completed prior to start of dewatering. The testing can help determine proper drainage, volume reduction, and type and dosage of conditioners and/or polymers. The GDT can aid in determining filtration rates that can be compared to full-scale flow rates. Conditioners and/or polymers are generally used to achieve the desired rate of dewatering and clarity of the effluent water. The Engineer must approve the chemical program prior to the start of dewatering.

### **3.03 PLACEMENT OF GEOTEXTILE CONTAINMENT SYSTEM**

- A. Place geotextile containment system within the limits shown on the site development plans.
- B. The geotextile containment system shall be placed on top of prepared dewatering site and be unrolled and/or unfolded per manufacturer recommendations.
- C. Fill ports should be located along the top of the geotextile containment system.

### **3.04 FILLING PROCESS**

- A. Filling with sediment from the source shall be accomplished in accordance with the approved Detailed Geotextile Containment Dewatering Plan. The discharge line of the dredge or pump shall be fitted with a valve or manifold system to allow for control of the rate of filling or which geotextile container to fill. The manifold system shall be fitted with an external mechanism (such as a pinch valve) to allow regulation of the filling rate and pressure into the geotextile container. The manifold system must also be fitted with a sampling port installed close to the first point of connection to the first geotextile container. This sampling port shall allow material being pumped to be sampled to ensure proper flocculation of conditioner and/or polymer are being used. Before begin filling, the fill ports not used for filling shall be closed in accordance with manufacturer recommendations to prevent loss of material during filling.
- B. The dredge or pump discharge pipe shall be free of protrusions that could tear the geotextile containment system. The dredge or pump discharge pipe shall be supported in a manner which reduces stress on the fill port. Excessive movement of the dredge or pump discharge pipe during filling can damage the geotextile containment port. The connection detail supplied by the manufacturer shall be followed to affix the dredge or pump discharge pipe to the fill port. The dredge or pump discharge flow rate shall not change abruptly causing hydraulic pulse action in the geotextile containment system that would temporarily exceed geotextile container's maximum tensile force design.

- C. The geotextile containment system shall be filled as evenly as possible until the design height has been achieved. Effluent water shall be allowed to adequately drain away from system.
- D. If allowed in manufacturer recommendations, after initial filling and allowing geotextile containers to dewater, the geotextile containers may be filled again to the recommended height. If allowed, this process may be repeated until the geotextile container has reached fill capacity set by manufacturer recommendations.
- E. Upon completion of filling the geotextile containment system, the fill port shall be closed according to manufacturer recommendations.

### **3.05 MANUFACTURER'S REPRESENTATIVE**

- A. A manufacturer's representative shall be present for the installation and filling of the first geotextile dewatering container unless the Contractor can provide proof of previous successful experience with geotextile dewatering technology. Proof of previous successful experience shall be measured as: two completed jobs with references provided and a statement from the manufacturer/owner of each project noting success.

**END OF SECTION**

## SEEDING

### PART 1 GENERAL

#### 1.01 SCOPE

This section pertains to seeding work, including preparing the seedbed, furnishing and placing of topsoil, seed and other required materials for a complete installation to the limits of construction and specified herein. Seeding operations shall be performed on all newly graded earth areas not otherwise specified covered by structures, pavements and/or surfacings, riprap, sod, sprigging, walkways, and other items of a similar nature; on all cleared and/or grubbed areas which are to remain as finish grade surfaces and not to be excavated or embankments constructed thereon; on all existing off site and on site turfed earth surfaces which are disturbed by construction operations and which are to remain as finish grade surfaces; and at all other locations which may be designated on the drawings or specified herein. The contractor shall follow the GA DOT Standard Specifications Construction of Roads and Bridges Section 700, 882, 890 and 891 latest edition and/or pages 6-35 thru 6-60 of the Manual for Erosion and Sediment Control in Georgia (1975 and as amended in the latest edition).

#### 1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Earth Moving- Section 31 20 00
- B. Site Clearing - Section 31 10 00

### PART 2 PRODUCTS

#### 2.01 TOPSOIL

Topsoil for planting shall be a rich friable loam containing a large amount of humus and shall be original surface sandy loam, topsoil of good rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than 1/2-inch in diameter, lime, cement, bricks, ashes, cinders, slag, concrete, bitumen or its residue, boards, sticks, chips, or other undesirable material harmful or unnecessary to plant growth. Topsoil shall be reasonably free from perennial weeds and perennial weed seeds, and shall not contain objectionable plant material, toxic amounts of either acid or alkaline elements or vegetable debris undesirable or harmful to plant life. Bermuda grass roots in topsoil will not be accepted, unless otherwise approved by the Engineer.



Topsoil shall be natural topsoil without admixture of subsoil material, and shall be classifiable as loam, silt loam, clay loam, or a combination thereof.

## **2.02 GRASS SEED**

All seeds shall be labeled in accordance with U.S.D.A. Rules and Regulations. Seeds shall be packaged in suitable containers in accordance with the Georgia Seed Laws, Rules and Regulations currently in effect. No seed shall be used which has become molded, wet or otherwise damaged. Seed shall be tested by the Georgia Department of Agriculture for the purity and germination within six months prior to the date of sowing.

1. Grass seed on level or slightly sloping ground shall consist of the following for the planting dates specified:
  - (a) March 1 to June 30

Common Bermuda (hulled)	10 lbs./acre
Tall Fescue	50 lbs./acre
  - (b) August 1 to November 1

Tall Fescue	50 lbs./acre
Common Bermuda (unhulled)	10 lbs./acre
  - (c) November 1 to March 1

Common Bermuda (unhulled)	10 lbs./acre
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2. Grass seed on slopes 3:1 or steeper and infrequently mowed areas shall consist of the following for the planting dates specified:
  - (a) March 1 to June 15

Weeping Lovegrass	5 lbs./acre
Sericea Lespedeza (scarified)	60 lbs./acre
  - (b) August 1 to November 1

Tall Fescue	50 lbs./acre
Sericea Lespedeza (unscarified)	75 lbs./acre
  - (c) November 1 to March 1

Common Bermuda (unhulled)	10 lbs./acre
Sericea Lespedeza (unscarified)	75 lbs./acre

When as directed by the Engineer, an approved quick growing species of grass seed such as rye, Italian rye, millet or other cereal grass, shall be applied at a rate of 30 lbs./acre in conjunction with and in addition to the seed mixture specified above.

### **2.03    SPRIGS**

Bermuda, common, healthy living stolons native to locality of project. Plant on day of removal from growing location. Plant sprigs from March 15 to July 15.

### **2.04    MULCH**

- A.     Dry Mulch: Dry mulch shall be straw or hay, consisting of oat, rye or wheat straw, or of pangola, peanut, coastal Bermuda or Bahia grass hay. Only undeteriorated mulch which can be readily cut into the soil shall be used. Application rate shall be 2 ½ tons per acre.
- B.     Mulch for hydroseeding: This material shall consist of wood cellulose fiber applied at 500 lbs./acre with dye color equal to Weyerhaeuser Company, or Conway Corporation material used for "hydroseeding" and suitable for this purpose.

### **2.05    FERTILIZER**

Fertilizer shall be of an accepted and approved commercial brand. Fertilizer shall be a ready mixed material containing the soil nutrients as specified and in a suitable form compatible with the equipment used to achieve uniform distribution of the fertilizer. The fertilizer mixture shall contain the following nutrients expressed in per cent of the total weight: 6% nitrogen, 12% available phosphoric acid, and 12% water soluble potash (6-12-12) analysis. Container tags shall have the name and address of the manufacturer, the brand name, net weight, and chemical composition of analysis. Fertilizer shall be applied at 1500 lbs./acre.

### **2.06    LIME**

Agricultural lime shall be within the specifications of the Georgia Department of Agriculture. Ground limestone is calcitic or dolomitic limestone ground so that 90 percent of the material shall pass a 10-mesh sieve, not less than 50 percent will pass through a 50-mesh sieve and at least 25% shall pass a 100-mesh sieve. Lime shall be applied as indicated by soil test, or the rate of 1 to 2 tons per acre.

### **2.07    WATER**

The water used in the grassing operations may be obtained from any approved spring, pond, lake, stream or municipal water system. The water shall be free of excess and harmful chemicals, acids, alkalis, or any substance which might be harmful to plant growth or obnoxious to traffic.

## **2.08 SOD**

Shall be healthy living, disease and weed free grass that has been freshly cut.

# **PART 3 EXECUTION**

## **3.01 HYDROSEEDING**

- A. The materials for grassing shall consist of a thoroughly mixed slurry of grass seed, fertilizer, lime and mulch as specified. The application rate for wood fiber mulch shall be approximately 500 lbs./acre. All materials shall be discharged within one hour after being combined in the hydroseeder.
- B. Each kind of leguminous seed shall be inoculated separately with the appropriate commercial culture according to instructions of the manufacturer of the material. All inoculated seed shall be protected from the sun and shall be planted the same day it is inoculated.
- C. Equipment for mixing and applying the slurry shall be especially designed for this purpose. It shall be capable of applying a uniform mixture over the entire area to be seeded. The slurry mixture shall be agitated during application to keep the ingredients thoroughly mixed. A suitable metering device to determine the rate of application and assist in obtaining uniform coverage of the grassed areas shall be incorporated as part of the equipment.
- D. Ground preparation for hydroseeding shall be the same as for conventional seeding.
- E. Hydroseeding shall not be performed when windy weather prevents even distribution; when the prepared surface is crusted; or when the ground is frozen, wet or otherwise in a non-tillable condition.

## **3.02 CONVENTIONAL SEEDING**

- A. Grading and Shaping  
Grade and shape to finish contours and to allow practical use of equipment.
- B. Seedbed Preparation
  - 1. Broadcast plantings:
    - a. Tillage as a minimum shall: adequately loosen the soil to a depth of 4 to 6 inches; alleviate compaction; incorporate lime and fertilizer; smooth and

firm the soil; allow for the proper placement of seed, sprigs, or plants; and allow for the anchoring of straw or hay mulch if a disk is to be used.

- b. Tillage may be done with any suitable equipment.
- c. Tillage may be done on the contour where feasible.
- d. On slopes too steep for the safe operation of tillage equipment, the soil surface will be pitted or trenched across the slope with appropriate hand tools to provide a place 6 to 8 inches apart in which seed may lodge and germinate.

2. Individual plants:

- a. Where individual plants are to be set, the soil will be well prepared by excavating holes, opening furrows, or dibble planting.
- b. For nursery stock plants, holes shall be large enough to accommodate roots without crowding.

### **3.03 SPRIGS**

Separate or shred and broadcast over area prepared for planting at 40 cu. ft. per acre. Harrow into ground with disc turned straight.

### **3.04 LIME/FERTILIZER APPLICATION**

Lime and fertilizer will be applied uniformly during land preparation so that it will be mixed with the soil during seedbed preparation. On steep surfaces, scarify slope prior to broadcasting lime and fertilizer.

### **3.05 PLANTING**

- A. Seeding will be done on a freshly prepared and firmed seedbed. For broadcast planting, use a cultipacker-seeder, drill, rotary seeder, other mechanical seeder, or hand seeding to distribute the seed uniformly over the area to be treated. Cover the seed lightly with a cultipacker or other suitable equipment.
- B. No-till seeding is permissible into annual cover crops when planting is done following maturity of the cover crop or if the temporary cover stand is sparse enough to allow adequate growth of the permanent species.
- C. No-till seeding must be done with appropriate no-till seeding equipment. The seed must be uniformly distributed and planted at the proper depth.

### 3.06 MULCHING

All seeded areas shall be mulched. Soil retention blankets, erosion control netting, and other manufactured materials may be required in addition to mulch on unstable soils and concentrated flow areas. Mulch shall be spread uniformly within 24 hours after seeding.

### 3.07 WATER, MAINTENANCE AND RESEEDING

- A. Contractor shall be responsible for maintaining the proper moisture content of the soil to ensure adequate plant growth until a satisfactory stand of grass is obtained. Watering shall be performed to maintain an adequate water content in the soil.
- B. **The Contractor shall mow and maintain all seeded areas without additional payment until final acceptance of the work by the Owner, and any regrading, refertilizing, reliming, reseeding or remulching shall be done at his own expense.** Seeding work shall be repeated on defective areas until a satisfactory uniform stand of grass is accomplished. A satisfactory stand of grass is defined as grass that covers at least 98% of the total area with no bare spots larger than one square foot and bare spots shall be scattered such that bare areas do not comprise more than 1/100 of any given area. **Damage resulting from erosion, gulleys, washouts, or other causes shall be repaired by filling with topsoil, compacting, and repeating the seeding work at the Contractor's expense.**

**END OF SECTION**

### PART 1 GENERAL

#### 1.01 DESCRIPTION

- A. Work covered by this specification shall consists of all labor and equipment necessary to perform the specified environmental hydraulic dredging and removal of contaminated soils located below the water surface as indicated on the site development plans and other related reports.
- B. The project area previously operated as a sand mine and consists of approximately five (5) acres. A comprehensive assessment of the subsurface soil and groundwater has been performed of the area and identified concentrations of arsenic, lead and barium in the soil and ground above applicable regulatory standards. The onsite concentrations have been analyzed by Toxicity Characteristic Leaching Procedures (TCLP) and are not considered to be hazardous waste. The impacted material extends various depths from the surface to groundwater, which has been determined to be at a depth ranging from 5 to 7 feet below ground surface.
- C. Contractor shall consult the approved site development plans and associated environmental reports prior to performing any work onsite.

#### 1.03 DEFINITIONS

- A. Contaminated Soil: Means soils or fills affected by a known or suspected release and determined, or reasonably expected, to contain substances exceeding applicable regulatory standards.
- B. Engineer: The third-party Engineering or Environmental Engineer for the project.
- C. ECBOC: Effingham County Board of Commissioners
- D. Environmental Dredging: Means dredging conducted with the use of hydraulics and other specialized pumps and equipment to remove contaminated sediments from the bottom of a body of water in a manner so as not to cause resuspension of soils or contaminants.
- E. SCMP: Soil Contamination Management Plan
- F. PPCAP: Prospective Purchaser Corrective Action Plan

#### **1.04 GENERAL REQUIREMENTS**

- A. In general, the scope of work will entail excavation by hydraulic dredging, handling, dewatering, and transportation and proper off-site disposal of soil found to exceed applicable regulatory standards. The Contractor will be required to work closely with the Engineer to ensure the project is performed in accordance with Georgia EPD guidelines.
- B. Potentially contaminated soils and/or water may be encountered during the work that may require excavation, handling, stockpiling, dewatering, temporary storing, and disposal. The Contractor shall manage these materials in compliance with applicable statutes and regulations and in consultation with Engineer.
- C. Potential contaminants that may be encountered include, among other, arsenic, barium, cadmium, chromium and lead.
- D. The extent of known contaminated materials and the types of known contaminants are provided in reference information. Notify the Engineer immediately if contaminated substances are discovered that were not previously identified or assumed, or if other discrepancies between data provided and actual field conditions are discovered.
- E. Conduct work in accordance with direction received from the Engineer; and with applicable federal, state, and local statutes, regulations, and guidance.
- F. Owner will obtain all necessary permits, if any are required, for the dredging and disposal of contaminated soils. The site is an old Sand Mine and therefore the impounded water is not considered state waters or navigable waters of the U.S.
- G. The contractor and its employees working on site must have proper HAZWOPER training and current applicable certifications.

#### **1.05 SUBMITTALS**

- A. Submittals shall be in accordance with Section 01 33 00 Submittal Procedures.
- B. Submit a Soil Contamination Management Plan (SCMP) to the Engineer for review and acceptance within 14 Days after Notice to Proceed. No work, with the exception of site inspections and surveys, shall be performed until the SCMP is accepted. The Contractor shall allow 7 days in the schedule for the Engineer's review. No adjustment for time or money will be made if re-submittals of the SCMP are required due to deficiencies. At a minimum, the SCMP shall include:
  - 1. Schedule of activities;
  - 2. Methods and procedures of hydraulic dredging and equipment to be used;

3. Staging and storage, dewatering methods, procedures, and locations providing for run on, runoff, leaching, and fugitive dust controls;
  4. Methods, procedures, and proposed documentation for the transportation, disposal, and offsite treatment, if required, of contaminated materials, including the identification of disposal and/or treatment facilities, and certified, licensed transporters;
  5. Equipment decontamination procedures;
  6. Water Management Plan that describes collection, storage, and disposal of water collected during the work.
- C. Submit weekly reports detailing hours of pumping and quantities of sediment discharged.
  - D. Submit copies of all receipts for disposing contaminated soil at the disposal facility.
  - E. Submit records, reports, or certificates of contaminated soil disposal within 5 business days of disposal.
  - F. Submit records, reports, or certificates of contaminated water disposal within 5 business days of disposal.

#### **1.06 QUALITY ASSURANCE / QUALITY CONTROL**

- A. The Engineer will monitor the Contractor's activities associated with the Work of this Section. This monitoring will include, but not be limited to:
  1. Observing and screening excavated soils as necessary to confirm that their quality is consistent with the findings in the PPCAP prepared by Geotechnical and Environmental Consultants, Inc. (GEC) dated 8/31/2020;
  2. Establishing requirements for stockpiling, segregating, and handling if the quality of the excavated soils is not consistent with the PPCAP prepared by Geotechnical and Environmental Consultants, Inc. (GEC) dated 8/31/2020;
- B. The Contractor shall assist the Engineer in collection of soil samples for screening and observation purposes at no additional cost to ECBOC.
- C. The Contractor shall be responsible for establishing and maintaining vertical and horizontal control of layout in the field. Limits shall be field staked by the Contractor at locations and at frequencies directed by the Engineer to enable verification of lines and grades. The Contractor shall immediately comply with the Engineer's request to re-establish control as work progresses.



## **PART 2 PRODUCTS**

### **2.01 GEOTEXTILE DEWATERING METHOD**

- A. GEOSTRUX or equivalent geotextile tubes made specifically for passive dewatering and filtration from hydraulic dredging operations shall be used in accordance with site development plans. Tubes can be made in varying lengths up to 250 feet with fill or discharge ports every 50' in length. Available in varying widths from 22.5' to 90' in circumference.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. The Contractor shall mobilize and demobilize all equipment and personnel as necessary to complete the specified environmental dredging and dewatering.
- B. The Contractor shall secure the site prior to start of any operation or associated work.
- C. The Contractor shall install best management practices as necessary for protection of environmentally sensitive areas,
- D. The Contractor shall maintain responsibility for the health and safety of its workers.
- E. The Engineer will provide field and laboratory evaluation of materials suspected of being contaminated.
- F. Notify the Engineer 48 hours before excavating in an area of known or suspected contamination.

### **3.02 DREDGING EQUIPMENT**

- A. Provide hydraulic pipeline dredge of approved type, dredge shall be minimum of 6 inches in size and capable of required quantity of dredge within the contract time.
- B. Provide booster pumping equipment as required to deposit dredged material in designated dewatering site.

- C. Types and capacities of equipment suitable for use at the site and production rates to be obtained are the responsibility of the contractor.

### **3.03 LAYOUT OF WORK**

- A. Lay out of work as indicated on the Site Development Plans (Drawings) and be responsible for all measurements. Furnish stakes, templated, platforms, equipment, range markers, and labor as required to lay out work. Contractor shall be responsible for execution of work to such lines and grades and shall monitor grades daily.
- B. Maintain and preserve stakes and other marks until authorized to remove them. Marks destroyed by Contractor or through its negligence prior to their authorized removal may be replaced by Owner at its discretion; expense of replacement will be deducted from amounts due or to become due Contractor.

### **3.04 SITE CONTROL MEASURES**

- A. The Contractor will be required to provide the following throughout the duration of the project:
  - 1. All stormwater control measures as required by local and state regulations;
  - 2. Dust control measures to minimize dust generation;
  - 3. Trucks and equipment must be decontaminated prior to leaving the site to ensure contaminated soil is not tracked off-property; and
  - 4. Secure the site at all times during the project to prevent unauthorized access to the work zone during active remediation and deter trespasser access to the excavation during non-working hours (i.e. providing security fencing and warning signs around all open excavations).

### **3.05 HYDRAULIC DREDGING**

- A. Conduct all work in accordance to the SCMP
- B. Provide hydraulic dredging to depths and widths as shown on the Drawings.
- C. Provide turbidity barrier/silt curtain around dredging equipment to contain any suspended solids during dredging operations. Design and location of the turbidity barrier shall be modified as necessary during the dredging to

accommodate a safe working area and to provide effective silt containment throughout the dredging process.

- D. Provide and maintain necessary diking, temporary access roads, haul roads, signal lights, buoys, and environmental protection; cost shall be incidental to contract.
- E. The Engineer will field locate the horizontal limits of the areas required to be remediated.
- F. **The approximate volume of the excavation area is estimated to be 1,500 cubic yards, approximately 15 inches of soil over an area as indicated on the site development plans.** This estimated soil quantity is provided for reference purposes only and does not constitute a guarantee of final quantities, which may be greater or less than the estimated amount.
- E. The Contractor shall conduct hydraulic dredging of specified volume of sediment (cubic yards) including up to 25% over dredge of soils,
- F. The Contractor shall install and maintain the transportation pipeline for the removal of dredged sediment to the dewatering location,
- G. The Contractor shall plan for and consider the time involved in the dredging, pumping, piping, and dewatering and provide sufficient control valves and manifolds to allow control of the of sediment flow through the system with minimal disruptions.
- F. Engineer will evaluate field conditions to determine if additional excavation is required to achieve remedial objectives **once initial pass has been completed.** This evaluation may require Engineer to work in close proximity to Contractor's equipment, and may require frequent pauses in the work. Contractor shall work in a cooperative manner at all times during these operations to ensure the safety of Engineer, and to allow for thorough field evaluations to be conducted.
  - 1. When contaminated material excavation is undertaken, Engineer will make the final determination as to the limits of excavation required to achieve remediation objectives. Such limits may be greater than or less than the limits identified on the drawings and shall be based upon actual conditions encountered at the time of excavation.
  - 2. If required, Engineer will define those areas beyond the limits originally indicated where additional contaminated material excavation shall be required based upon field observations.
- G. Excavation shall be performed in a manner to limit the potential for resuspension of sediment and contaminant release during the dredging process.

- H. The Contractor shall provide equipment that will allow a dredging accuracy of at least  $\pm 6$  inches vertical and horizontal by providing the following:
  - i. DPGS and/or RTK-GPS based positioning systems.
  - ii. Experienced and skilled operators.
  - iii. A proper quality control system to verify the positioning system at least once per day.

### **3.06 DEWATERING METHOD**

- A. The Contractor shall provide a graded area free of debris, rocks, and roots etc. as shown on the site development plans. The area should be level from side to side with not more than a 0.5% grade from end to end. The Contractor can use more than one dewatering tube if room permits.
- B. The Contractor shall provide containment diversions and berms as detailed on the site development plans around the dewatering site perimeter. The height of the containment berm should generally be approximately 33% to 67% the dewatering tube height.
- D. The Contractor shall ensure return drainage of clear, free-flowing filtrate from each dewatering tube back to the reservoir in any manner, including overland flow, that does not initiate erosion of the return water path. In order to achieve the best water quality of effluent the Contractor shall employ a polymer specialist to treat the dredged material. The correct use of a polymer not only reduces dewatering time but also provides cleaner effluent water.
- F. Dewatering tube systems must be carefully monitored during the tube filling operation. Tubes are normally filled to 85% capacity with slurry mix capacity and then allowed to consolidate. Once consolidation has taken place the dewatering tubes are then refilled, and the cycle continues until the capacity of 85% consolidated solids is reached.
- G. Dewatering tubes should be left in place to dewater over a period of time to achieve the best volume reduction. Reduction rates depend on slurry, organics, and conditions. Once consolidated, the tube material can then be trucked to an off-site location for disposal.

### 3.07 DISPOSAL

- A. The Contractor will be responsible for handling, re-handling, loading, transporting, and legal off-site removal of all excavated soils and materials to approved facilities.
- B. The Contractor will be responsible for the scheduling and coordination of all shipments of the soils to the approved facilities. The Contractor shall coordinate directly with the designated approved facility to ensure that the soils are received by the facility on schedule and that there will be no cause for delay in Work. The Contractor is responsible to ensure that the trucks gross weight meet DOT requirements and the requirements of the receiving facility.
- C. No soil shall be removed from the site without prior approval from the Engineer.
- D. Excavated soils and materials removed from the site shall be loaded within the site limits. All trucks leaving the site shall be covered and cleaned of debris that might fall from the trucks during transport.
- E. The Contractor shall install, operate, maintain and remove a wheel wash at each location where construction vehicles access and depart from the site.
- F. The Contractor shall take measures to prevent debris from being spilled from trucks or tracked from the site onto local streets. The Contractor shall sweep streets adjacent to the site as necessary or as directed by the Engineer.
- G. The Contractor shall ensure that any vehicle transporting materials off-site are properly labeled and placarded in accordance with federal and state DOT requirements.
- H. The Contractor shall be responsible for all disposal costs. All contaminated material shall be disposed of at the approved Subtitle-D Superior Landfill located 3001 Little Neck Road, Savannah, GA 31419. The Contractor shall be responsible for all trucking costs associated with transporting the contaminated material to the approved landfill. The Engineer will prepare and complete the waste profile prior to disposal. Legible manifests and weigh tickets for each load of soil transported for disposal from the site must be provided to the Engineer.

### END OF SECTION