

MEMORANDUM

TO: Cory Dilmore, P.E.
Florida Department of Environmental Protection, Permitting and Compliance

FROM: Alex Rivera, P.E.
Geosyntec Consultants, Inc.

REVIEWED

BY: Craig Browne, P.E., and Kwasi Badu-Tweneboah, Ph.D., P.E.
Geosyntec Consultants, Inc.

DATE: 8 May 2019 (revised 4 June 2019)

SUBJECT: April 2019 Supplemental Site Assessment Results and Recommendations
Rolling Hills Construction and Demolition (C&D) Debris Disposal Facility
6990 Rolling Hills Road
Pensacola, Escambia County, Florida

This memorandum summarizes the results of the supplemental site assessment performed by Geosyntec Consultants, Inc. (Geosyntec) at the Rolling Hills C&D Debris Disposal Facility (Site or Facility) (WACS ID No. 3133). Geosyntec conducted the field activities on 3 to 5 April 2019, as authorized by the Florida Department of Environmental Protection (FDEP or Department) under the approved Task Assignment SW001D (March 2019) for Subtasks Nos. 2 and 3. The purpose of this memorandum is to supplement observations documented in the January 2018 and April 2018 Site Assessment Memoranda (provided to FDEP on 5 January and 30 April 2018, respectively) and revise the construction quantity estimates, as needed, for completing final closure of the Site.

Field data and observations referenced in this memorandum were documented by Alex Rivera, P.E. of Geosyntec. Brad Hartshorn of FDEP was onsite daily during the April 2019 Site assessment. The remainder of this memorandum provides a description of the Site, a summary of Site assessment activities and observations, and recommended corrective actions for final Site closure.

Site Description

To facilitate description of Site conditions in this memorandum, the approximately 20-acre disposal area has been divided into four areas as depicted in **Figure 1**. The areas are identified as the North Slope (extends approximately 1,100 feet (ft) from the northwest corner to the northeast corner of the Site), East Slope (extends approximately 1,400 ft from the northeast

corner to the southwest corner of the Site), West Slope (extends approximately 700 ft from the northwest corner to the southwest corner of the Site), and Top Deck Area (top area of the Site, generally graded at a 2 percent slope). The stormwater retention pond, also shown on **Figure 1**, is an ancillary feature at the Site.

Site Assessment

Summary of Field Activities

Geosyntec completed the following activities during the April 2019 Site assessment:

- Advancement of 48 test boreholes (19 at the Top Deck Area and 29 at the side slopes) with a hand auger, to evaluate the thickness of the cover system for compliance with paragraph 62.701-730(9)(b), Florida Administrative Code (F.A.C.) (i.e., 24-inch thick soil layer, with the upper six inches capable of supporting vegetation).
- Advancement of eight (8) test boreholes at the stormwater retention pond with a hand auger, to measure the sediment thickness and verify the quantity of sediment in the general area of the stormwater channel outlets (SWC5 and SWC6).
- Field measurements (e.g., square footage of areas exhibiting erosion of the cover system, linear footage of features requiring repair [i.e., perimeter channel and berm, and perimeter access road], etc.).
- Photographic documentation of general Site conditions and observations is presented in **Appendix A** and discussed below.

Cover System

Geosyntec evaluated the condition of the Site cover system for compliance with paragraph 62.701-730(9)(b), F.A.C. In December 2017 Geosyntec performed a Site assessment to evaluate the cover system at areas of the Site that exhibited erosion and little to no established vegetation (it was assumed that areas with established vegetation and no evidence of erosion would not require additional cover soil material). In April 2018, Geosyntec expanded the assessment area and evaluated areas of the cover system that were not evaluated during the December 2017 Site assessment (e.g., Top Deck Area and vegetated side slopes). The purpose of the April 2019 Site cover system assessment was to understand if the conditions of the cover system were consistent with previous Site assessments and to continue to fill data gaps to refine the construction quantities associated with repair of the cover system.

To evaluate the thickness of the cover system soils, Geosyntec advanced 48 hand-augured boreholes (TCV-01 to TCV-48) as illustrated in **Figure 1**. Borehole locations were selected in close proximity to previous borehole locations (i.e., to confirm previous measurements) and between previous borehole locations (i.e., to further refine estimated construction quantities).

Boreholes were advanced until visible evidence of waste was observed and the depth from ground surface to top of waste was measured with a tape measure. At each borehole location, a pin flag was used to mark the location, coordinate information was recorded using a handheld GPS unit, and the borehole was backfilled with the extracted soil cuttings and compacted manually. The coordinate data and measured soil cover thicknesses at each location is presented in **Table 1**. An updated summary of the cover thickness by area, is shown below:

Area	Cover Thickness (inches)		
	Minimum	Maximum	Average
East Slope	2	36	17.2
West Slope	6	33	18.4
North Slope	12	32	19.8
Top Deck Area	8	36	20.8

Generally, the average thickness of the cover system across the Site remained consistent with measurements documented during the previous Site assessments and changes in average thickness were negligible (i.e., less than 1 inch).

Cover system soil at the Site was classified per ASTM D2488 (“*Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)*”). Topsoil was characterized as tan to brown in color and classified as Unified Soil Classification System (USCS) soil type ML, SC, or SM, while general fill was characterized as orange, poorly graded sands with fines or USCS soil type SP, SP-SM, or SP-SC. Using this distinction, the topsoil layer was observed to be less than 4 inch thick at a majority of test boreholes.

Stormwater Retention Pond Sediment

To quantify the volume of sediment at the stormwater retention pond, Geosyntec advanced 8 hand-augured boreholes (STV-01 to STV-08) in the area between the discharge points of stormwater channels SWC5 and SWC6, as illustrated in **Figure 2**. The sediment was observed to be orange, poorly graded sand or USCS soil type SP when classified per ASTM D2488. Test boreholes were advanced through the accumulated sediment until visible evidence of the pond

bottom (e.g., gray, organic, silty material) was reached and the depth from pond bottom to top of the sediment was measured with a tape measure. At each borehole location, a pin flag was used to mark the location, coordinate information was recorded using a handheld GPS unit, and the borehole was backfilled with extracted sediment. Lateral measurements were recorded using a survey wheel to estimate the volume of sediment to be removed to restore the design elevation (i.e., Elevation 67 ft, NAVD88) of the stormwater retention pond. The coordinate data and measured sediment thicknesses at each location is presented in **Table 2**.

Generally, the thickness of the sediment adjacent to stormwater channel outlets SWC5 and SWC6 decreased (since the April 2018 Site assessment), though this may indicate that sediments have been transported further south from the outlets (see Photograph 11 of **Appendix A**). The sediment at the toe of the disposal area (between the stormwater channel SWC5 and SWC6 outlets) appeared to remain consistent with previous observations and the condition of the cover system immediately north of this area did not appear to have developed significant erosion since the April 2018 Site assessment. It is noted that vegetative cover may have obscured minor erosion of the cover system.

Miscellaneous Site Observations

In addition to the observations presented above, Geosyntec documented the following deficiencies during the April 2019 Site assessment which were not documented during previous Site assessments (see photographic log of **Appendix A**):

- Two (2) blowouts of the perimeter berm where stormwater was observed discharging from the perimeter channel (see Photographs 7 and 9).
- Portions of the perimeter access road exhibited significant erosion of road material due to breaches of the perimeter berm (see Photographs 8 and 10).
- Isolated areas of significant erosion (i.e., rills greater than 12 inches deep) of the cover system have developed on the East and West Slopes (see Photographs 1 to 3).
- Erosion was observed at the south extent of the stormwater retention pond embankment.
- The condition of the perimeter stormwater channel appears to have degraded, with a majority of the channel (i.e., nearly the entire length) now exhibiting some sediment deposits, displaced turf reinforcement mat (TRM) and underlying soils, and/or soft or yielding soils along the channel bottom. (see Photograph 12).

- The condition of the side slope bench (i.e., nearly the entire length) continues to deteriorate as channelized flow continues to erode material and fill the bench invert (see Photograph 5).
- The condition of the haul road has deteriorated, and sediments eroded from this area have accumulated in the perimeter stormwater channel, completely obscuring one of two culvert pipes under the road crossing (see Photograph 6).

Recommendations

This section provides recommendations from previous Site assessments for historical context along with additional recommendations based on the recent (April 2019) Site assessment observations.

December 2017 Site Assessment

Based on the field observations documented by Geosyntec during the December 2017 Site assessment, the following recommendations were provided in the January 2018 Site Assessment Memorandum and are presented herein for reference:

1. FDEP may desire to perform additional depth checks within the top deck area to confirm that 24 inches of cover soil is in place.
2. Portions of the Top Deck Area that do not meet the design grades and slopes should be regraded, topsoil sufficient of supporting vegetation placed, and permanently vegetated to promote positive stormwater conveyance.
3. Surficial soil at areas of the Site with deficient vegetative cover does not appear to be topsoil due to little to no permanently established vegetation (e.g., Bahia grass) or only temporary vegetation (e.g., brown top millet), not being tan to brown in color (characteristic of topsoil as described in test reports submitted by the Contractor for use at the Site), and not USCS soil type ML, SC, or SM, when classified per ASTM D2487, as required by Specification Section 02920 of the Closure Documents. It is recommended that topsoil as specified in the Construction Documents and Work Change Directives (WCDs) (presented in Attachment A of the January 2018 Site Assessment Memorandum) be installed prior to permanently vegetating bare areas of the Site.

4. Based on the soil fertility test results presented in Attachment D of the January 2018 Site Assessment Memorandum, a majority of the in-place cover soil (from areas of deficient vegetation) is alkaline (pH value greater than 7.0) and not capable of supporting a permanent vegetative material such as Bahia grass. At a minimum, topsoil material in compliance with the Construction Documents and WCDs should be installed prior to vegetation. If an alternate cover system is considered for portions of the Site, the soil fertility test results should be utilized as a general guidance to incorporate the appropriate soil amendments.
5. In areas exhibiting erosional damage, the rills should be tracked in and/or bladed to create a smooth surface that can be thoroughly compacted prior to placing any additional soil that may be required (see bullet below regarding additional soil fill requirements).
6. Install additional cover soil material within areas of the Site that are not compliant with paragraph 62.701-730(9)(b), F.A.C., (e.g., 24-inch thick soil layer, with the upper 6 inches capable of supporting vegetation). Topsoil material should be installed in accordance with the approved cover system amendment WCD within areas of the cover system identified as being deficient. In general, this applies to most portions of the West and North Slopes that do not currently have permanent vegetation. The appropriate thickness of general fill and topsoil material should be installed at areas of the cover system identified as being deficient. In general, this applies to most portions of the East Slope below the side slope bench that do not currently have permanent vegetation. Care must be taken to select a topsoil that meets the requirements of Specification Section 02930. An alternative vegetative cover system approach may include the installation of topsoil overlain by sod. It is assumed that areas with no evidence of erosion and permanently established vegetation will not require additional earthwork or grading. Every effort must be made to avoid ancillary disturbance of cover system areas with no evidence of erosion and established vegetation.
7. Once areas have been restored to design slopes and grades, utilizing the appropriate type and thickness of topsoil material, permanent vegetation must be established. Temporary stormwater best management practices (BMPs) (e.g., haybales, erosion control blankets, etc.) must be employed as needed to protect temporary vegetation or vegetation that has not yet been established, which includes areas with temporary vegetation and areas with recently placed sod or hydroseed. The Contractor should regularly water and maintain vegetated areas until permanent vegetation has been completely established.
8. Add topsoil, if needed, in accordance with the Closure Documents or the alternate cover system WCD (see Attachment A of the January 2018 Site Assessment Memorandum)

with the appropriate modifications (based on the results of the soil fertility tests in Attachment D of the January 2018 Site Assessment Memorandum) and vegetate portions of the cover system that exhibit sheet erosion. The design grades presented in the Closure Drawings should be maintained during grading activities. Vegetation should be established by installing sod or hydroseed immediately following earthwork activities to reduce the potential for erosion or washout of the vegetative layer due to environmental mechanisms. Appropriate temporary stormwater BMPs (e.g., haybales, erosion control blankets, etc.) must be employed to protect temporary vegetation or vegetation that has not yet been established, which includes areas with temporary vegetation and areas with recently placed sod and hydroseed. The Contractor should water and maintain vegetated areas until permanent vegetation has been completely established.

9. Consider implementing a sequence of construction in connection with appropriate stormwater BMPs that minimizes erosion and sedimentation impacts. For example, starting with Top Deck area repairs and moving to side slope areas, then the perimeter channel, and lastly the stormwater pond.
10. Consider implementing a phased construction approach where repairs are completed in a given area and vegetation is established prior to moving to the next area of repair.
11. Sediment should be removed from the perimeter channel and side slope bench to promote positive stormwater conveyance. Sediment removed from the perimeter channel and side slope bench should be sampled and analyzed for conformance with the Closure Documents to be considered for re-use. After maintenance of the perimeter channel and side slope bench has been completed, these features should be regraded, covered with topsoil as needed, and revegetated in accordance with the Closure Documents.
12. Repair and or re-construct the discharge locations of the side slope channels and the perimeter channels to the geometry and using the riprap materials indicated on the Construction Drawings.
13. Maintenance of the retention pond should be performed to maximize the pond capacity. Pond maintenance should include removal of sediment, regrading of the pond embankment, re-establishment of appropriate pond bottom grade (i.e., Elevation 67 ft, NAVD88), placement of topsoil along regraded embankments, and establishment of permanent vegetation along regraded and disturbed embankment areas. Sediment extracted from the retention pond should be sampled and analyzed for conformance with

the Closure Documents to evaluate re-use options. Sediment materials that do not meet either general fill or topsoil specification requirements could be considered for use as leveling layer material where grades need to be raised by more than 2 ft (e.g., portions of the top deck area). Another potential sediment re-use option could include amending with other materials, for example, mixing the sediment with organic and nutrient rich material such as compost. Prior to any re-use of sediment material, the Contractor should prepare a re-use plan and submit to FDEP for review and approval.

April 2018 Site Assessment

Based on field observations documented by Geosyntec during the April 2018 Site assessment, the following recommendations to achieve final Site closure were provided in the April 2018 Site Assessment Memorandum:

1. Based on the results of the geotechnical analyses, the sediment located in the stormwater retention pond is in general compliance with the requirements for general fill in Specification Section 02200 (e.g., USCS soil type SP). It should be noted that the geotechnical analyses test reports for cover system soils evaluated during the December 2017 Site assessment indicate a higher fines content (e.g., 9.5 to 31.7 percent) than the sediment located in the stormwater retention pond (e.g., 3.0 percent) and was classified as USCS soil types SP-SM, SM, and SC in the January 2018 Site Assessment Memorandum. Regardless, the sediments could be utilized for general fill and grading purposes in areas with more gradual slopes (e.g., Top Deck Area) or for repairs of ancillary Site features (e.g., perimeter channel berm). Furthermore, the moisture content of sediment removed from the stormwater retention pond should be monitored and excessively wet material should be dewatered prior to placement.
2. The sediment located in the stormwater retention pond does not meet the general requirements for topsoil in Specification Section 02920 and may not be capable of supporting a permanent vegetative material such as Bahia grass. As such, the sediment located in the stormwater retention pond should not be used as topsoil.
3. For areas that require less than 6 inches of additional cover system soil, a 6-inch thick layer of topsoil shall be placed to meet the requirement of paragraph 62.701-730(9)(b), F.A.C. (i.e., upper six (6) inches capable of supporting vegetation).
4. The exterior slope of the perimeter channel berms should be vegetated with sod to reduce erosion potential and associated long-term maintenance.

5. Segments of the perimeter channel along the East Slope that exhibit rill erosion (e.g., at the centerline of the channel) and displacement of the sod and underlying TRM should be repaired.
6. As discussed in the January 2018 Site Assessment Memorandum, it appears that significant stormwater conveyance has occurred along the unstabilized haul road and additional erosion was observed. The haul road should be repaired and graded to reduce the potential of stormwater conveyance. Repairs should include stabilization (e.g., cellular confinement system such as Geoweb® geocells) to minimize long-term maintenance of the haul road surface material.

April 2019 Site Assessment

Based on this April 2019 Site assessment, the following conclusions and additional recommendations to achieve final Site closure are provided:

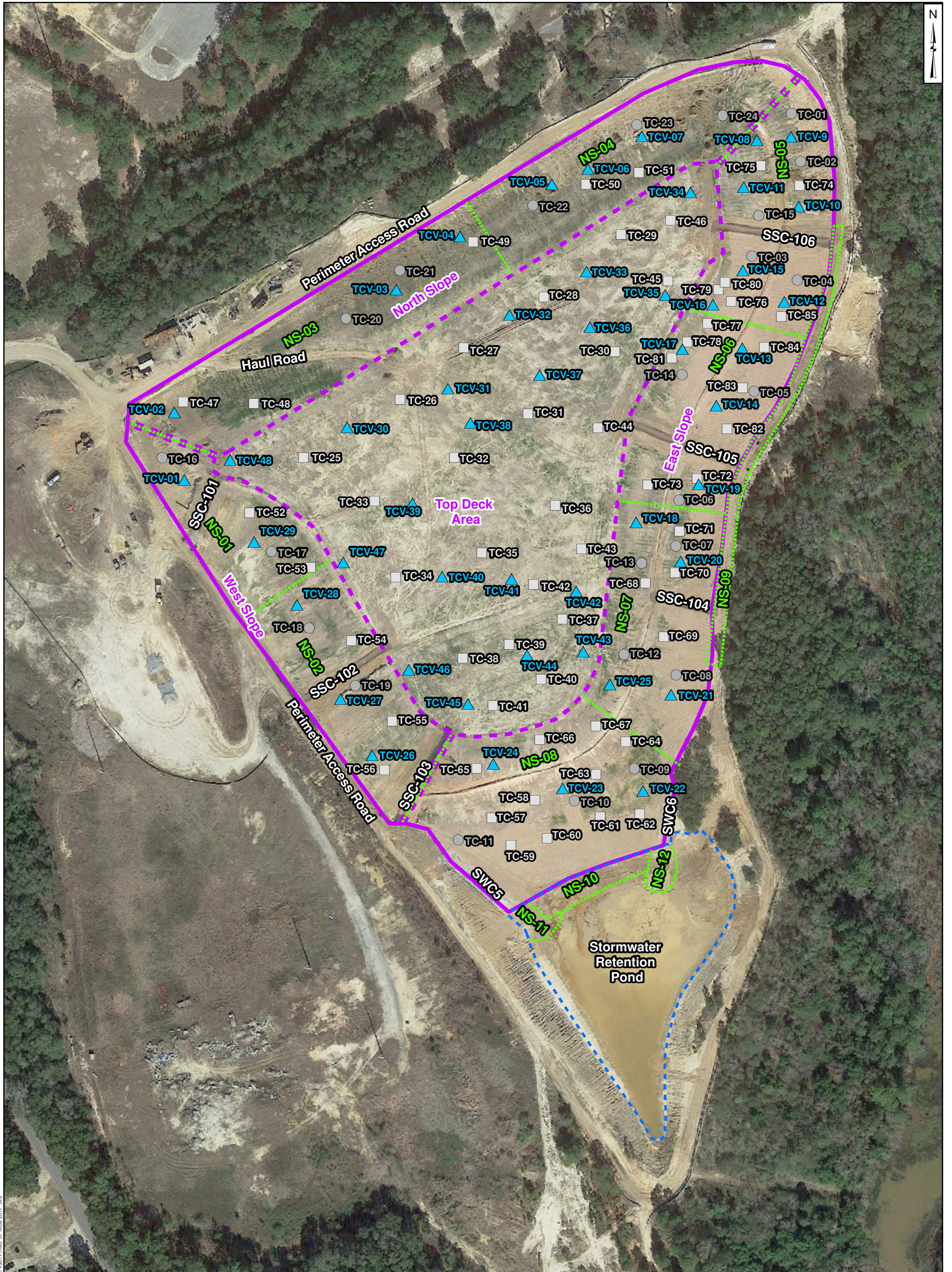
1. At the time of the Site assessment, large areas of the cover system were vegetated with tall grasses which may be obscuring evidence of erosion. Therefore, it may be anticipated that estimated quantities of earthwork materials to achieve a 24-inch thick soil layer, may increase to account for the infill of erosion rills not readily observed during the Site visit.
2. The average cover thickness measurements at test boreholes across the Site are presented in **Table 1**. As noted above, the average cover thickness for the East, West, and North Slopes and the Top Deck Area varied by less than 1 inch. The earthwork quantities will be revised to account for any additional soils required to construct a 24-inch cover system across the Site.
3. Test boreholes completed during the April 2019 Site assessment, generally indicate that the cover system thickness across the Site has a high degree of variability. In some instances, a cover system transition zone (e.g., transition between two adjacent areas of the cover system with varying thicknesses) may be necessary. In an effort to minimize transitional zones between adjacent areas of the cover system, it is recommended that FDEP consider allowing potential contractors the opportunity to provide a unit cost for installing a uniform layer of soil (e.g., 12 inches of cover soil) across large areas of cover to reduce the potential for inefficiencies from installing cover soils of varying lift thicknesses in adjacent areas.

4. A majority of the Site perimeter channel exhibited varying degrees of deficiency, including but not limited to: (i) impedance of stormwater conveyance due to sediment deposits; (ii) displacement of underlying soils and TRM; (iii) soft or yielding soils along the channel bottom; (iv) irregularity of channel grade (evidenced by pooling of stormwater); and (v) degradation of the perimeter berm. Due to the variability of deficiencies observed throughout the length of the channel, it is recommended that FDEP consider requesting a comprehensive linear foot unit rate to address the entire span of the channel (e.g., from SW-5 to SW-6) to restore positive stormwater conveyance and channel geometry in accordance with the May 2018 Closure Corrective Action Plan.
5. The stormwater retention pond side slope where the east and west embankments intersect (at the south extent) should be repaired and vegetated to mitigate further erosion.
6. Following repairs to the perimeter stormwater channel, the perimeter access road should be repaired with comparable road materials to allow vehicular access.
7. The culvert pipes under the road crossing should be flushed to allow unimpeded stormwater conveyance.
8. It is understood that FDEP is requesting an aggressive construction schedule to complete Site closure as soon as possible. It is recommended that FDEP consider postponing the start of construction to seasonally drier months (e.g., November, December, etc.) to avoid unanticipated weather delays and possible rework of completed construction activities.
9. Unobscured areas of the perimeter silt fence were in various degrees of disrepair. It is recommended that FDEP consider increasing the estimated quantity of silt fence needed to repair or replace existing silt fence.

The recommendations provided in the January 2018, April 2018, and this (May 2019) Site Assessment Memoranda shall be jointly considered to assist with final Site closure. The estimated construction quantities (based on the observation documented in the referenced memoranda) are included in **Table 3**.

* * * *

FIGURES



Legend

- ▲ Test Borehole Verification (April 2019)
- Test Borehole Location (April 2018)
- Test Borehole Location (December 2017)
- ⋯ Nutrient Soil Sample Area
- Stormwater Retention Pond
- Area Boundary
- Approximate Extent of Waste

Notes:

1. Source of parcel boundary: Escambia County Property Appraiser.
2. Source of 2017 aerial: Google Earth Pro.
3. SSC prefix on ID indicates sideslope channel (i.e. SSC106).
4. SWC prefix on ID indicates stormwater channel (i.e. SWC5).

150 75 0 150 Feet

Site Layout

6990 Rolling Hills Road
Pensacola, FL 32505

Tampa, FL

May 2019

Figure
1

Path: (thisview=0) \DATA\TC\USC\FE2732_Rolling_Hills\MSD\201905\Site_Layout_APP2019.mxd 07 May 2019 10:18



Legend

- ▲ Test Borehole Verification (April 2019)
- Sediment Test Borehole Location (April 2018)
- Nutrient Soil Sample Area
- Stormwater Retention Pond
- Area Boundary
- Approximate Extent of Waste

Notes:

1. Source of parcel boundary: Escambia County Property Appraiser.
2. Source of 2017 aerial: Google Earth Pro.
3. SWC prefix on ID indicates stormwater channel (i.e. SWC5).

<p>30 15 0 30 Feet</p>	
<p>Pond Area</p> <p>6990 Rolling Hills Road Pensacola, FL 32505</p>	
<p>Geosyntec consultants</p>	
Tampa, FL	May 2019
<p>Figure 2</p>	

Path: [Ilusville-01] \DATA\1\USGS_VF2732_Rolling_Hills_WMS\201905_Pond_Area.mxd 07 May 2019 10:18

TABLES

Table 1 - Cover Thickness Test Borehole Data
Rolling Hills C&D Debris Disposal Facility
Pensacola, Florida

ID	Latitude	Longitude	Cover Thickness (in.) ⁽⁴⁾	ID	Latitude	Longitude	Cover Thickness (in.) ⁽⁴⁾	ID	Latitude	Longitude	Cover Thickness (in.) ⁽⁴⁾
TC-01 ⁽¹⁾	30.490667	-87.269733	12	TC-46	30.490183	-87.270333	15	TCV-06	30.490400	-87.270760	21
TC-02	30.490455	-87.269681	12	TC-47	30.489333	-87.272783	18	TCV-07	30.490550	-87.270490	12
TC-03	30.490033	-87.269917	12	TC-48	30.489333	-87.272426	24	TCV-08	30.490545	-87.269905	20
TC-04	30.489933	-87.269683	12	TC-49	30.490067	-87.271333	32	TCV-09	30.490564	-87.269734	24
TC-05	30.489439	-87.269890	24	TC-50	30.490333	-87.270767	12	TCV-10	30.490257	-87.269685	20
TC-06	30.488953	-87.270256	12	TC-51	30.490389	-87.270499	18	TCV-11	30.490337	-87.269968	18
TC-07	30.488750	-87.270267	18	TC-52	30.488850	-87.272433	18	TCV-12	30.489837	-87.269747	24
TC-08	30.488183	-87.270250	20	TC-53	30.488617	-87.272117	12	TCV-13	30.489628	-87.269954	16
TC-09	30.487767	-87.270450	24	TC-54	30.488300	-87.271900	18	TCV-14	30.489373	-87.270080	18
TC-10	30.487617	-87.270750	12	TC-55	30.487950	-87.271683	33	TCV-15	30.489971	-87.269960	16
TC-11	30.487433	-87.271333	6	TC-56	30.487733	-87.271717	6	TCV-16	30.489816	-87.270109	12
TC-12	30.488267	-87.270517	24	TC-57	30.487533	-87.271167	30	TCV-17	30.489618	-87.270257	6
TC-13	30.488671	-87.270438	12	TC-58	30.487617	-87.270950	18	TCV-18	30.488850	-87.270471	16
TC-14	30.489505	-87.270255	16	TC-59	30.487417	-87.271067	24	TCV-19	30.489025	-87.270158	18
TC-15	30.490212	-87.269888	16	TC-60	30.487450	-87.270883	16	TCV-20	30.488683	-87.270240	10
TC-16	30.489083	-87.272883	26	TC-61	30.487550	-87.270617	19	TCV-21	30.488095	-87.270273	24
TC-17	30.488683	-87.272317	17	TC-62	30.487567	-87.270417	30	TCV-22	30.487669	-87.270403	36
TC-18	30.488350	-87.272117	17	TC-63	30.487737	-87.270644	29	TCV-23	30.487672	-87.270811	20
TC-19	30.488102	-87.271876	21	TC-64	30.487883	-87.270496	20	TCV-24	30.487772	-87.271166	18
TC-20	30.489717	-87.271967	24	TC-65	30.487750	-87.271250	18	TCV-25	30.488135	-87.270585	24
TC-21	30.489933	-87.271700	24	TC-66	30.487883	-87.270933	12	TCV-26	30.487796	-87.271781	18
TC-22	30.490233	-87.271033	17	TC-67	30.487950	-87.270650	12	TCV-27	30.488042	-87.271949	20
TC-23	30.490600	-87.270517	20	TC-68	30.488583	-87.270417	34	TCV-28	30.488451	-87.272181	14
TC-24	30.490650	-87.270083	16	TC-69	30.488350	-87.270317	18	TCV-29	30.488723	-87.272407	21
TC-25 ⁽²⁾	30.489100	-87.272167	24	TC-70	30.488633	-87.270267	9	TCV-30	30.489238	-87.271949	18
TC-26	30.489367	-87.271683	26	TC-71	30.488817	-87.270250	18	TCV-31	30.489419	-87.271443	30
TC-27	30.489600	-87.271367	31	TC-72	30.489050	-87.270167	18	TCV-32	30.489750	-87.271139	26
TC-28	30.489833	-87.270967	36	TC-73	30.489017	-87.270417	18	TCV-33	30.489949	-87.270754	24
TC-29	30.490117	-87.270583	24	TC-74	30.490350	-87.269683	16	TCV-34	30.490309	-87.270235	15
TC-30	30.489600	-87.270600	18	TC-75	30.490433	-87.269883	16	TCV-35	30.489854	-87.270352	12
TC-31	30.489317	-87.271033	22	TC-76	30.489833	-87.270017	18	TCV-36	30.489705	-87.270730	26
TC-32	30.489117	-87.271400	21	TC-77	30.489733	-87.270133	2	TCV-37	30.489489	-87.270978	30
TC-33	30.488917	-87.271800	26	TC-78	30.489650	-87.270233	4	TCV-38	30.489270	-87.271324	16
TC-34	30.488583	-87.271683	28	TC-79	30.489883	-87.270083	6	TCV-39	30.488911	-87.271609	17
TC-35	30.488700	-87.271250	24	TC-80	30.489917	-87.270050	12	TCV-40	30.488590	-87.271449	22
TC-36	30.488917	-87.270883	24	TC-81	30.489578	-87.270310	12	TCV-41	30.488587	-87.271096	22
TC-37	30.488417	-87.270833	14	TC-82	30.489271	-87.270022	16	TCV-42	30.488541	-87.270767	8
TC-38	30.488233	-87.271333	26	TC-83	30.489453	-87.269949	18	TCV-43	30.488276	-87.270723	12
TC-39	30.488300	-87.271100	13	TC-84	30.489634	-87.269843	20	TCV-44	30.488254	-87.271008	16
TC-40	30.488150	-87.270933	9	TC-85	30.489772	-87.269760	14	TCV-45	30.488033	-87.271302	22
TC-41	30.488028	-87.271175	14	TCV-01 ⁽³⁾	30.488990	-87.272768	16	TCV-46	30.488177	-87.271607	20
TC-42	30.488567	-87.270983	24	TCV-02	30.489284	-87.272828	24	TCV-47	30.488642	-87.271951	35
TC-43	30.488727	-87.270744	12	TCV-03	30.489850	-87.271717	16	TCV-48	30.48908199	-87.2725377	20
TC-44	30.489262	-87.270677	16	TCV-04	30.490090	-87.271399	24				
TC-45	30.489917	-87.270340	16	TCV-05	30.490330	-87.270940	14				

Legend:

- (1) Borehole ID's TC-01 to TC-24 were completed during the December 2017 Site assessment.
- (2) Borehole ID's TC-25 to TC-85 were completed during the April 2018 Site assessment.
- (3) Borehole ID's TCV-01 to TCV-48 were completed during the April 2019 Site assessment.
- (4) Shaded boreholes indicate the cover thickness meets or exceeds the 24-inch minimum thickness.

Table 2 - Sediment Thickness Test Borehole Data at Stormwater Retention Pond
Rolling Hills C&D Debris Disposal Facility
Pensacola, Florida

ID ⁽¹⁾	Latitude	Longitude	Sediment Depth (in.)	ID ⁽²⁾	Latitude	Longitude	Sediment Depth (in.)
ST-1	30.487092	-87.271043	12	STV-01	30.487182	-87.270935	16
ST-2	30.487056	-87.270939	10	STV-02	30.487156	-87.270872	18
ST-3	30.487038	-87.270857	6	STV-03	30.487085	-87.270947	8
ST-4	30.487086	-87.270804	2	STV-04	30.487053	-87.270882	6
ST-5	30.487141	-87.270921	9	STV-05	30.487389	-87.270261	12
ST-6	30.487162	-87.270951	12	STV-06	30.487332	-87.270225	12
ST-7	30.487196	-87.270885	18	STV-07	30.487356	-87.270322	8
ST-8	30.487174	-87.270854	9	STV-08	30.487300	-87.270290	8
ST-9	30.487230	-87.270795	24				
ST-10	30.487293	-87.270667	16				
ST-11	30.487267	-87.270650	6				
ST-12	30.487295	-87.270567	6				
ST-13	30.487330	-87.270578	12				
ST-14	30.487352	-87.270504	9				
ST-15	30.487330	-87.270487	0				
ST-16	30.487337	-87.270365	6				
ST-17	30.487390	-87.270356	12				
ST-18	30.487368	-87.270285	30				
ST-19	30.487320	-87.270295	18				
ST-20	30.487251	-87.270294	9				
ST-21	30.487226	-87.270290	0				
ST-22	30.487345	-87.270214	9				
ST-23	30.487414	-87.270235	20				

Legend:

- (1) Borehole ID's ST-01 to ST-23 were completed during the April 2018 Site assessment.
- (2) Borehole ID's STV-01 to STV-08 were completed during the April 2019 Site assessment.

Table 3 - Bid Form Rev. 1
Closure Corrective Action Construction
Rolling Hills C&D Debris Disposal Facility

Item No.	Item	Description	Qty.	Unit	Unit Cost	Total Cost	
Miscellaneous Items							
1	Mobilization and Demobilization	Item shall include mobilization and demobilization of equipment, manpower, and temporary infrastructure (e.g., office trailer, portable restroom facilities, storage containers, etc.) as required by Contractor for the duration of the project.	1	LS	\$	\$	
2	Construction Surveying and As-Built Drawings	Item shall include construction surveying for the duration of the project (e.g., preliminary surveys, conformance checks, as-built surveys and drawings) per Section 02100 of the Specifications.	1	LS	\$	\$	
Earthwork							
3	Mowing	Item shall include all labor and equipment for mowing vegetation to a nominal length of 4 inches on the cover system prior to construction.	95,300	SY			
4	Surface Preparation (Existing Surface)	Item shall include all labor and equipment for discing or scarifying existing surface area (e.g., to a minimum depth of 3 inches) per Section 02200 of the Specification and Construction Drawing 4.	70,400	SY	\$	\$	
5	Stormwater Pond - Sediment Removal ⁽¹⁾	Item shall include all labor and equipment for excavating and relocating sediment from the north extent of the existing stormwater pond per Construction Drawing 5. Sediment to be relocated to areas of the Top Deck Area that require general fill (see Line Items 10 and 11a) or as directed by FDEP.	900	CY	\$	\$	
General Fill - Top Deck Area ^{(2a)(2b)}			2,010	CY			
6	a	General Fill (Onsite Source) ⁽³⁾	Item shall include all labor and equipment for installation, grading, and compacting of general fill on the top deck (per Section 02200 of the Specification and Construction Drawing 4) that has been recovered from onsite sources.	2,010	CY	\$	\$
	b	General Fill (Offsite Source)	Item shall include all labor, material, and equipment for installation, grading, and compacting of general fill from offsite source(s) on the Top Deck Area (per Section 02200 of the Specification and Construction Drawing 4).	2,010	CY	\$	\$
General Fill - Sideslopes ^(2c)			8,400	CY			
7	General Fill (Offsite Source)	Item shall include all labor, material, and equipment for installation, grading, and compacting of general fill on sideslopes per Section 02200 of the Specification and Construction Drawing 4, from offsite source(s).	8,400	CY	\$	\$	
Topsoil ⁽⁴⁾ - Top Deck Area							
8	Topsoil (Offsite Source)	Item shall include all labor, material, and equipment for installation, grading, and compacting of topsoil on the Top Deck Area per Section 02920 of the Specification (i.e., 6 inches thick) and Construction Drawing 5.	18,790	SY	\$	\$	
Topsoil ⁽⁴⁾ - Sideslopes							
9	Topsoil (Offsite Source)	Item shall include all labor, material, and equipment for installation, grading, and compacting of topsoil on the sideslopes and stormwater pond embankment, per Section 02920 of the Specification (i.e., 6 inches thick) and Construction Drawing 5.	47,210	SY	\$	\$	
10	Sideslope Bench Repair	Item shall include all labor, equipment, and material for repairing the sideslope bench per Construction Drawings 5 and 6. Repair shall include installing and compacting topsoil to restore design geometry, grading to promote positive stormwater conveyance, and vegetating with sod.	1,370	LF	\$	\$	
11	Sideslope Channel Berm Repair	Item shall include all labor, equipment, and material for repairing the sideslope bench per Construction Drawings 5 and 6. Repair shall include installing and compacting topsoil to restore design geometry, grading to promote positive stormwater conveyance, and vegetating with sod.	1,780	LF	\$	\$	

Perimeter Channel and Berm Repair							
12	a	Earthwork Cut	Item shall include all labor and equipment for earthwork cut activities associated with excavating the perimeter channel from Station 0+79 to 33+57 to the elevations, grades, and geometry per Construction Drawing 6. Suitable general fill material (as defined by Section 02200) may be utilized by the Contractor as general fill for berm construction (Line Item 12b). Unsuitable material (i.e., organics, damaged TRM) shall be segregated and stockpiled onsite as directed by Geosyntec.	2,140	CY	\$	\$
	b	General Fill (Berm) (Offsite Source) ⁽²⁾	Item shall include all labor and equipment for installation, grading, and compacting offsite general fill activities associated with restoring the perimeter channel berm from Station 0+79 to 33+57 to the geometry per Construction Drawing 6.	1,460	CY	\$	\$
	c	Perimeter Channel - Install TRM ⁽⁵⁾	Item shall include all labor, material, and equipment for installing TRM at the perimeter channel per Section 02930 of the Specification and Construction Drawing 6.	3,280	LF	\$	\$
	d	Perimeter Channel and Berm - Install Sod ⁽⁵⁾	Item shall include all labor, material, and equipment for installing sod at the perimeter channel and berm per Section 02930 of the Specification and Construction Drawing 6.	9,164	SY		
13		Sideslope Channel Outlet	Item shall include all labor, equipment, and material for removing and relocating onsite (as directed by Geosyntec) existing riprap, installing riprap with geotextile fabric underlay at sideslope channel outlets for SSC-101 to 103 and SSC-105 and 106, per Section 02245 and Construction Drawings 5 and 8.	50	CY	\$	\$
Stormwater Pond Berm							
14	a	Mowing/Clearing	Item shall include all labor and equipment for mowing and/or clearing area for stormwater pond berm. Unsuitable materials shall be relocated onsite as directed by Geosyntec.	940	SY	\$	\$
	b	General Fill (Offsite Source) ⁽²⁾	Item shall include all labor, material, and equipment for installation, grading, and compacting of general fill on stormwater pond berm (per Section 02200 of the Specification and Construction Drawings 5 and 8) from offsite source(s).	350	CY	\$	\$
Vegetation ⁽⁵⁾							
15		Hydroseed	Item shall include all labor, material, and equipment for installing hydroseed on the Top Deck Area where topsoil has been placed per Section 02930 of the Specification.	18,790	SY	\$	\$
16		Sod	Item shall include all labor, material, and equipment for installing sod at all sideslope areas, the repaired embankments of the stormwater pond, stormwater pond berm per Section 02930 of the Specification and Construction Drawing 5.	48,680	SY	\$	\$
17		Maintenance	Item shall include all labor and equipment for maintaining installed vegetation (e.g. providing required watering of hydroseed and sod until established, per Section 02930 of the Specification).	1	LS	\$	\$
Haul Road							
18	a	Road Surface Removal	Item shall include all labor and equipment for removing existing haul road surface (e.g., asphalt millings, concrete, etc.) per Construction Drawing 8 and relocating onsite as directed by Geosyntec.	100	CY	\$	\$
	b	General Fill (Offsite Source) ⁽²⁾	Item shall include all labor, material, and equipment for installation, grading, and compaction of general fill per Section 02200 of the Specification and Construction Drawings 5 and 8.	190	CY	\$	\$
	c	Topsoil (Offsite Source) ⁽⁴⁾	Item shall include all labor, material, and equipment for installation, grading, and compaction of topsoil per Section 02920 of the Specification and Construction Drawing 8.	560	SY	\$	\$
	d	Turf Reinforcement Mats (TRM) ⁽⁵⁾	Item shall include all labor, material, and equipment for installation of TRM per Construction Drawing 8.	190	SY	\$	\$
	e	Sod ⁽⁵⁾	Item shall include all labor, material, and equipment for installation, grading, and compaction of general fill per Section 02930 of the Specification and Construction Drawings 5 and 8.	560	SY	\$	\$

Perimeter Access Road						
19	Road Construction	Item shall include all labor, material, and equipment for installing 12-foot wide all weather access road using 12-inch thick limerock, asphalt millings, or crushed concrete per Construction Drawing 5.	110	SY	\$	\$
Stormwater and Erosion Control Best Management Practices (BMPs)						
20	Silt Fence ⁽⁶⁾	Item shall include all labor, material, and equipment for installing and maintaining silt fence per Section 02290 of the Specification for the duration of the project.	3,000	LF	\$	\$
21	Construction Entrance	Item shall include all labor, material, and equipment for installing and maintaining construction entrance (per May 2016 Stormwater Pollution Prevention Plan Drawings 9 and 10) for the duration of the project.	1	LS	\$	\$
22	Other Stormwater Management Controls	Item shall include all labor, material, and equipment for installing and maintaining other stormwater management controls as needed (including, but not limited to BMP's identified on May 2016 Stormwater Pollution Prevention Plan Drawings 9 and 10) for the duration of the project.	1	LS	\$	\$
Contingency						
23	Performance Bond ⁽⁷⁾	Item shall include all labor and fees necessary for the Contractor to obtain a performance bond for the total amount of the Bid.	1	LS	\$	\$

TOTAL (NOT INCLUDING CONTINGENCY) \$

Notes:

- (1) Sediment quantity has been approximated using a limited number of test boreholes. Sediment shall be tested by the Contractor per Section 02200 of the Specification. Sediment that meets the requirements of general fill per Section 02200 may be utilized as fill material, as directed by Geosyntec. Sediment that does not meet the requirements of general fill per Section 02200 may be stockpiled onsite or as directed by Geosyntec. Sediment placed wet that exhibits pumping shall not be accepted. Wet Sediment, if used, shall be allowed to dry in place, if feasible, or replaced with suitable materials as directed by Geosyntec.
- (2a) **General fill quantities are in-place volumes and were developed by multiplying two-dimensional areas by the required thickness (i.e., based on a limited number of test boreholes). Contractor should apply bulking factors if necessary should loose material quantity pricing be utilized to develop a construction cost estimate. Contractor should add appropriate factor to these estimated quantities to account for additional materials and workmanship that may be required to provide sufficient access to perform repairs and to repair ancillary damage due to construction activities.**
- (2b) **Two dimensional areas were multiplied by a slope correction factor of 1.001 to estimate three-dimensional quantities at the Top Deck Area.**
- (2c) **Two dimensional areas were multiplied by a slope correction factor of 1.055 to estimate three-dimensional quantities on the sideslopes. Also, a multiplier of 1.2 has been added to the estimated quantities to account for fill required to repair existing rills and ruts caused by erosion.**
- (3) General fill quantities recovered from onsite sources may vary depending on whether the material meets the requirements of general fill per Section 02200 of the Technical Specification. As such, an onsite source unit cost is requested for reference, but the final construction estimate shall assume that only offsite borrow sources are to be used for general fill activities.
- (4) Topsoil shall be tested by the Contractor per Section 02920 of the Specification. Topsoil that does not meet the requirements of topsoil per Section 029200 may not be utilized for fill purposes.
- (5) Quantities represent two-dimensional estimates and Contractor should apply correction factors as necessary to account for slope correction. Contractor should add appropriate factor to estimated quantities to account for additional materials that may be required to repair ancillary damage due to construction activities.
- (6) A majority of perimeter silt fence has been installed and Line Item assumes linear feet of perimeter silt fence that may require replacement. Estimate also assumes silt fence shall be required for perimeter of construction staging and stockpile area(s). Contractor shall incorporate any additional cost necessary to account for silt fence that may be utilized for interim construction conditions (e.g., for controlling stormwater runoff when working on sideslopes). Contractor shall be responsible for maintaining existing and previously installed silt fence at the site.
- (7) The performance bond contingency shall not be included in the total tabulated bid.

ATTACHMENT A
PHOTOGRAPHIC LOG

GEOSYNTEC CONSULTANTS
Photographic Record



Client: FDEP

Project Number: FL2732E

Site Name: Rolling Hills C&D Facility

Site Location: 6990 Rolling Hills Road, Pensacola, FL

Photograph 1

Date: 04/03/2019

Direction: Northeast

View of rill erosion at West Slope that is partially obscured by vegetation.



Photograph 2

Date: 04/03/2019

Direction: East

Foreground – View of rill erosion along East Slope. Background – View of accumulation of eroded cover soil material along toe of East Slope.



GEOSYNTEC CONSULTANTS
Photographic Record



Client: FDEP

Project Number: FL2732E

Site Name: Rolling Hills C&D Facility

Site Location: 6990 Rolling Hills Road, Pensacola, FL

Photograph 3

Date: 04/03/2019

Direction: Northwest

View of erosion and exposed C&D debris along the East Slope.



Photograph 4

Date: 04/03/2019

Direction: Down

View of cover soil thickness verification borehole (TCV-17) at East Slope. Cover soil thickness was verified using a tape measure which indicates a 6-inch thick cover soil at this location.



GEOSYNTEC CONSULTANTS
Photographic Record



Client: FDEP

Project Number: FL2732E

Site Name: Rolling Hills C&D Facility

Site Location: 6990 Rolling Hills Road, Pensacola, FL

Photograph 5

Date: 04/03/2019

Direction: North

View of poor vegetative cover at sideslope bench on East Slope, allowing continued erosion to the cover system.



Photograph 6

Date: 04/04/2019

Direction: Southwest

View of obstructed culvert pipes at perimeter stormwater channel at haul road crossing. Note, the left pipe has been completely obstructed by sediments and displaced geotextile fabric.



GEOSYNTEC CONSULTANTS
Photographic Record



Client: FDEP

Project Number: FL2732E

Site Name: Rolling Hills C&D Facility

Site Location: 6990 Rolling Hills Road, Pensacola, FL

Photograph 7

Date: 04/05/2019

Direction: South

View of breach of perimeter berm (to left of photo) in southwest corner of West Slope and stormwater flow exiting to perimeter access road.



Photograph 8

Date: 04/04/2019

Direction: North

View of significant erosion of perimeter access road material (located downstream from breach noted in Photograph 7) caused by stormwater exiting perimeter stormwater channel.



**Geosyntec Consultants
Photographic Record**



Client: FDEP

Project Number: FL2732E

Site Name: Rolling Hills C&D Facility

Site Location: 6990 Rolling Hills Road, Pensacola, FL

Photograph 9

Date: 04/05/2019

Direction: South

View of breach of perimeter berm and exposed TRM near boundary of North and East Slopes.



Photograph 10

Date: 04/05/2019

Direction: West

View of erosion of perimeter access road (located downstream from breach noted in Photograph 9) caused by stormwater exiting perimeter stormwater channel.



GEOSYNTEC CONSULTANTS
Photographic Record



Client: FDEP

Project Number: FL2732E

Site Name: Rolling Hills C&D Facility

Site Location: 6990 Rolling Hills Road, Pensacola, FL

Photograph 11

Date: 04/05/2019

Direction: South

View of sediment accumulation in area of east stormwater channel (SWC-6) outlet. Foreground – pin flag marking the location of a verification boring to estimate the thickness of sediments in the stormwater retention pond.



Photograph 12

Date: 04/05/2019

Direction: South

View of perimeter stormwater channel located in the northeast corner of the East Slope. Background – displaced cover system soils impeding stormwater conveyance. Foreground – exposed TRM material.

