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SCS ENGINEERS

May 17, 2000
File No. 09195029.35

Mr. Kim B. Ford, P.E.
Florida Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Subject: Response to Request for Additional Information
Southeast County Landfill Capacity Expansion - Section 1
Pending Permit No.: 35435-004-SC

Dear Mr. Ford:

On behalf of the Hillsborough County Solid Waste Management Department (HCSWMD), SCS Engineers (SCS) we are submitting the following responses to your request for additional information letter dated April 13, 2000. For ease of review, the Florida Department of Environmental Protection (FDEP) comments are restated in bold, followed by our response.

FDEP Statement 1 - Proof of publication of notice of application pursuant to Rule 62-110.106, see attached notice.

Response: A copy of the notice, as published in the Tampa Tribune on April 28, 2000 is presented in Attachment 1.

FDEP Statement 2 - 62-701.300. An explanation to confirm that each of the prohibitions will not be violated.

TABLE 1. PROHIBITIONS RESPONSES, SOUTHEAST COUNTY LANDFILL CAPACITY EXPANSION

Reference	Subject	Response
62-701.300 (1) (a)	Permitted Site	The HCSWMD will not store, process, or dispose of waste in an unpermitted facility.
62-701.300 (1) (b)	Air and Water	The HCSWMD will not store, process, or dispose of waste that will cause air quality standards to be violated or water quality standards or criteria of receiving waters to be violated.
62-701.300 (2)	Location	The HCSWMD will store or dispose of solid waste in a manner that is in full compliance with all location prohibitions.

62-701.300 (3)	Burning	The HCSWMD will not burn solid waste, clean vegetative waste nor wood wastes.
62-701.300 (4)	Hazardous	No hazardous waste will be disposed at the site, as stated in Section E.5.B of the engineering report.
62-701.300 (5)	PCB's	Liquids containing a polychlorinated biphenyl (PCB) will not be disposed in the landfill.
62-701.300 (6)	Biohazard	No untreated biohazardous waste is knowingly deposited in the landfill.
62-701.300 (7)	Surface Water	The Capacity Expansion is not within 3,000 feet of a Class I surface water.
62-701.300 (8)	Special Waste	None of the listed special wastes will be knowingly disposed in the landfill.
62-701.300 (9)	WTE	Not applicable.
62-701.300 (10)	Liquids	Non-containerized liquids will not be disposed in the landfill.
62-701.300 (11)	Oil	No used oil will be disposed in the landfill.

FDEP Statement 3 - 62-701.320(7)(c). The fee provided is adequate for construction only. Therefore, this review does not include operation or closure.

Response: Noted.

FDEP Statement 4 - 62-701.330(4)(a). Full-size aerial photograph with topographic information showing all required information.

Response: Attachment 2 presents a full-size aerial photograph with land use, water bodies, and roads within a one-mile radius of the site. In addition, Attachment 2 contains the topography adjacent to the site as depicted on the most recent USGS map.

FDEP Statement 5 - 62-701.330(4)(d). Cross-sections across Section 1 (north-south and east-west) are needed to show all liner and leachate collection system components, anchor trenches, underlying foundation preparation, containment berms, equipment, and controls.

Response: Attachment 3 presents cross-sections across Section 1. Details of liner and leachate collection system components are included. The site cross-sections were generated from the excavation plan (Drawing 6), the backfill (Drawing 7), the anchor trench detail (Drawing 15), and the containment berm (Drawing 8). Sump details showing equipment and controls are shown on Drawing 21 and 22.

FDEP Statement 6 - 62-701.400. Sheets 9A, 9B, and 9C not provided, sump connection to existing force main unclear, verification of geomembrane water vapor transmission rate not provided.

Response: The reference to Drawings 9A, 9B, and 9C in Section G.1 has been corrected to reference Drawings 10, 11, and 12. Attachment 4 contains the corrected page G-1.

The leachate discharge line from the leachate collection sump in Section 1 is connected directly to the existing main leachate pump station, as shown on Drawing 22. Tables 02776-1, 02776-2, and 02776-3 have been corrected to specify a water vapor transmission rate of less than 0.24 grams per square meter-day and are presented in Attachment 5. The specified values are based upon industry standards. Additional information pertaining to the geomembrane will be forwarded to the FDEP upon the construction.

FDEP Statement 7 - 62-701.400(3)(a). Calculations for the proposed disposal area sump to demonstrate that adequate capacity will be available to prevent overtopping containment berms in event of pump failure.

Response: Calculations demonstrating that the sump has adequate capacity in the event of a pump failure are presented in Attachment 6.

FDEP Statement 8 - 62-701.400(3)(d) and (e). Specifications for waste tire chips to demonstrate compliance with the maximum size requirement of four square inches and no protruding wires. Backfill requirement for less than 5% passing #200 sieve. Clarification for use and seaming textured and smooth liner materials, and use of geogrid. Minimum values for peel and shear and assurance that shear strength is at least 90 percent of the yield strength.

Response: Attachment 7 presents the revised specification section pertaining to chipped tires that require the nominal size of the processed tires to be four square inches (Section 02220-2.07). In addition, the visible wires after processing shall be limited in size as to not adversely impact the bottom liner system.

Specifications for the soil being used as backfilling have been revised and are presented in Attachment 7 (Section 02220-2.04). The backfill will be placed after the phosphatic waste clays are excavated and removed. The backfill will be compacted and tested in accordance with the specifications, which indicate the amount of testing that is required. The testing is conducted to provide verification that the foundation material will provide sufficient strength and will not have significant settlement.

Textured geomembrane is manufactured in a manner that eliminates the texturing along the edges. When being welded in the field, the panels can be welded in a similar manner to typical smooth geomembrane. During installation, if welding is required in an area where there is texturing, the texturing will be removed along the path where the welding will occur. The area for which the texturing will be removed will be limited to only where the weld will be placed.

Geogrid will not be used in the construction of Section 1. Attachment 8 contains revisions to page G-6 of the engineering report.

FDEP Statement 9 - 62-701.400(4). Assurance that tire chips will not intrude into sand drainage layer. Explanation or revisions for top holes in LCRS pipe and method to prevent intrusion into pipe, minimum LCRS pipe size to allow for video inspections and cleaning, and composite drainage layer on all slopes with anchoring.

Response: The tires will be processed in such a manner that their size will not adversely affect the function of the sand layer. Drainage will be maintained by the geocomposite.

The top holes of the perforated LCRS pipes have been removed. Attachment 9 presents the revised drawing.

The pipes in the LCRS are sufficiently sized to be tested to verify that the system is not clogged, as required by 62-701.400(4)4. Additionally, the stone surrounding the pipes and the geocomposite, will provide a method for conveying the leachate to the collection sump in the event of a pipe collapse. If necessary, companies such as CUES can provide a video camera that is capable of fitting in pipes as small as 2-inches in diameter for a distance of 400 feet.

The detection system will be operated as presented in Section K.8 of the Engineering Report.

FDEP Statement 10 - 62-701.400(5). Maximum amount of leachate that will be recirculated down into landfill and list of all methods of recirculation.

Response: The methods used for leachate recirculation at the existing SCLF include effluent spray evaporation and dust control evaporation at the active working face. Currently, Section 1 is not proposed to receive effluent spray evaporation. Historically, the HCSWMD recirculates approximately 12,200 gallons a month at the work face, and this is not anticipated to cause a significant impact to the head over liner in Section 1.

FDEP Statement 11 - 62-701.400(9). Approval of stormwater management system modifications. Please call Mr. Randy Cooper at (813) 744-6100, extension 470 to discuss these related modifications.

Response: The following information is provided as requested by Mr. Cooper during a telephone conversation on April 17, 2000.

1. Clarify drainage divides: Attachment 10 presents a revised post-development drainage map.

2. Clarify pond construction activities: Ponds C and D will not be modified during the construction of Section 1. However, prior to the construction of Section 8, the perimeter berm for Pond C will be raised in places to establish a common elevation of 132 NGVD. Since the time the banks for Pond C were constructed, settlement and erosion have caused minor saddles or low points near the top of the berms. For Pond C, the sheet titled "Pond C (proposed)" can be removed. For Pond D, the sheet titled "Pond D (existing)" can be removed, and the sheet titled "Basin D" had a typographical error for the area associated with elevation 116. The correct area for elevation 116 is 675,819 square feet, not 975,819 square feet. This revision does not impact the routing calculation, because the peak elevation in the pond only reached 109.59.

3. Provide information on structures: The stormwater routing program uses the structures in each pond, including the under-drain system, standpipe, and emergency overflow weir. The elevations and dimensions for each structure is contained on the sheets presented in Attachment 10.

4. Provide channel cross-section: Presented on Drawing 15, Detail C.

5. Revise road cross-section: Presented in Attachment 10, drawing 20, Detail 5.

FDEP Statement 12 - 62-701.400(9)(d). Method to prevent the mixing of stormwater with leachate to minimize leachate production, use of isolation berm with method to prevent seepage from filled area to the area with stormwater only.

Response: The initial location for waste placement will be the western half of Section 1, as shown on Drawing 10. The operational side of Section 1 will be isolated from the side that has not yet received waste by a lined separation berm, as shown in Drawing 8. The stormwater collected on the side that is not operational will be pumped into the stormwater management system. Attachment 11 presents a calculation demonstrating that the isolation berm is of sufficient height to adequately retain the anticipated volume of water from the 25-year, 24-hour storm event. In the event that the site experiences a storm event in excess of the design storm, runoff entering into the operational areas of the landfill will be treated as leachate.

FDEP Statement 13 - 62-701.410(2). Total settlement calculations to show the final elevation of the proposed liner system, that gravity drainage will be maintained, and

that no other component of the design will be adversely affected. The location and calculations for the lowest elevation after settlement in the proposed disposal area is requested. Assurance that localized settlement will not cause abrupt changes in subbase due to some waste clay not removed and no hardpan layer. Settlement plates are requested for Section 1.

Response: Table I-1 examined several points. The highest settlement is anticipated to occur under highest waste load. The grading plan for the LCRS was designed in a manner to account for the anticipated settlement, which in this landfill is calculated to be 7 inches. The gravity drainage will be maintained and no other component of the design will be adversely affected after settlement.

The location and elevation of lowest point after settlement is anticipated to be in the header trench, immediately prior to the sump area. The calculated elevation is 123.66 NGVD (construction elevation of 124.24 found on Drawing 8, minus the calculated settlement of 7 inches).

The cross-sections provided in Attachment 3 show that the design intent is to remove all phosphatic waste clay. Since the foundation of the landfill will be backfilled with suitable soils in lifts and compacted, no localized settlement is anticipated, and settlement plates are not required.

FDEP Statement 14 - Site plans revisions for clarification on the following items:

- **Sheet 6 - Removal of all waste clays down to elevation 118 and under berms not shown.**

  Response: The intent of the design is to remove all phosphatic waste clays beneath the landfill. Attachment 3 presents cross-sections indicating the approximate limits of the clay.

- **Sheet 7 - Limits of liner not shown.**

  Response: Drawing 7 shows the grading plan for the limits of backfill. At the time the backfill is completed, there is no geomembrane placed. The 6-inch lift of low permeability subgrade will be placed on top of the completed backfill. Attachment 3 presents cross-sections indicating the limits of geomembrane.

- **Sheet 8 - Leak detection pipes and pumps not shown, cleanouts not shown for each lateral and header, LCRS pipe along east side berm not shown.**

  Response: There are no pumps or pipes in the detection system. The leachate

generation analysis in Attachment G-3 of the engineering report indicates that the amount of leachate in the detection system will be negligible. The rock and geocomposite will be adequate to convey the flow to the leachate collection sump. As stated in Section K.8 of the engineering report, the detection system will be periodically inspected.

Attachment 12 presents revised Drawing 8 with cleanouts and pipes along the east side.

- **Sheets 10 - 12 - Not included in this permit.**

  Response: Noted. These drawings will be resubmitted to the FDEP at a future date upon the submittal of the operations permit.

- **Sheet 14 - Removal of all waste clays not shown.**

  Response: The intent of the design is to remove all phosphatic waste clays beneath the landfill. Attachment 3 presents cross-sections indicating the approximate limits of the clay.

- **Sheet 15 - Anchor trenches not identified, and geonet not anchored and not extended over side slopes.**

  Response: The design intention of the berms presented on Drawing 15 is to provide temporary separation between operational sections of the landfill. The waste will be placed at the toe of the berm, allowing the berm to be removed upon the development of the adjacent section. The geomembrane encapsulating the berm is a sacrificial piece that may be removed upon the construction of an adjacent section, and is not a part of the primary liner.

  In addition to the leachate collection pipes, the sand over the primary liner will provide sufficient capacity for the leachate to drain. No additional geonet is needed.

- **Sheet 17 - Perforations on top of pipe and 4-inch pipe may allow clogging and make maintenance difficult, geotextile not shown to prevent migration of tire chips into sand drainage layer, composite drainage layer not shown on side slopes.**

  Response: Please see response to Statement 9 above.

- **Sheet 18 - Video access may be prevented by 4-inch pipe and 45° bends, details A and B unclear, separation berm does not allow detection of overtopping by seepage.**

Response: Please see response to Statement 9 above.

- **Sheet 21 - Perforations on top of pipe, pumps may not fit level into pipes at base of sump, liner transition.**

  Response: The pipe perforations have been modified to eliminate the top hole, and the revised detail is presented in Attachment 9. The sump is designed to allow the inlet of the pump at the tip to lie horizontally, as recommended by the manufacturer.

FDEP Statement 15 - 62-701.510 – Groundwater monitoring plan and required supporting information in response to Mr. John Morris's April 13, 2000 memorandum.

H.1.b. -- Direction and Rate of Ground Water and Surface Water Flow

1. The potentiometric surface of the surficial aquifer is presented on Figures H-8 and H-9, which provide water elevations measured on June 13, 1997 and August 18, 1997, respectively. Please provide supplemental data to characterize seasonal fluctuation in ground water elevations and flow directions.

Response: The most recent ground water elevation data available was included in Attachment G-2, "Bottom Liner Placement Calculation." The most recent data available at the time of design was August, 1999. The data is tabulated below for your convenience.

TABLE 2. WATER LEVELS NEAR SECTION 1

	Location			
	P4D	P2D	P3D	Smith Lake
Date	ft, NGVD	ft, NGVD	ft, NGVD	ft, NGVD
August, 1997	120.02	121.84	123.61	121.31
February, 1998	122.52	123.63	125.42	122.31
August. 1998	120.70	121.47	123.21	121.14
February, 1999	120.36	120.96	123.19	121.53
August, 1999	118.53	118.73	120.83	120.35

2. Figure H-9 (August 18, 1997) shows a surface water feature located east and south of Section 1, and presents an elevation from SG-Smith Lake. Review of the contour lines appears to indicate that Section 1 straddles a ground water divide, with potential ground water flow to the northwest and southeast. please discuss the potential for ground water elevation data as requested in Comment No. 1 above.

Response: Without further data, it is inconclusive as to precisely where the groundwater flows locally toward the lake. It may be deduced from the data in Table 1 above that the effect of the lake on groundwater is limited to the area east of P3D. Generally, ground water flows to the west across Section 1.

The existing topography (Drawing 8) shows an elevation contour of 135 feet running nearly parallel to the eastern edge of Section 1, and a second contour of elevation 135 feet 100 feet closer to the lake. We conclude that the ground water "divide" is in this area and therefore, is located between these contours outside the limits of waste. Consequently, ground water within Section 1 flows toward the northwest.

3. The rate of ground water flow for the surficial aquifer is presented in table H-1, which refers to the Barnes, Ferland and Associates, Inc (BDA), Hydrogeological/ Geotechnical Investigation, September 1997, submitted as Volume 2 of 3 in the permit application. Please address the following comments regarding information provided in the BFA investigation:

a. Slug test data were presented to characterize horizontal hydraulic conductivity values for four piezometers completed in the silt sand sediments (stratum 2) and two piezometers completed in the sand tailings (stratum 1). The results of the slug tests are presented in Appendix B of the BFA investigation. Please provide all the values for all variables in the Bouwer and Rice method that were used to calculate horizontal hydraulic conductivity for each slug test.

Response: BFA utilized a computer model called Aquifer Test, by Waterloo Hydrologic, which provides for a "best-fit" line to the data points that is manipulated by programmer. Engineering judgement and interpretation was used to plot the line without the use of variable.

b. The raw data for water level and drawdown measurements that were recorded during the slug test, and of the values for residual head (H/H_0) were compared with the graphical presentation of each of the slug tests. The plots of residual head vs. time for five of the six slug tests were unclear. Please review the plots for P-1D (time scale is inconsistent), and P-2S/P-2D/P-4S/P-4D (calculated residual head values do not match the individual data points), and revise as necessary.

Response: The revised plot for P-1D is presented in Attachment 13. The y-axes in the computer program is comprised of the residual head divided by the original head value. The residual head value is not plotted directly. The plots are correct when dividing the residual head by the original head.

4. Table H-1 presents a value for estimated effective porosity of 0.30. Section 3.3 of the BFA investigation indicates the effective porosity may range between 0.10 and 0.30,

with an indication that a value of 0.20 is most representative of site conditions. Please indicate why the value of 0.30 was used for effective porosity in the calculation of ground water flow velocity.

Response: Based on our knowledge of the site, SCS believes that the value 0.30 is more representative of the soil types at the site.

5. Table H-1 presents a value for hydraulic gradient of 0.0038 feet/foot. This value for hydraulic gradient is presented in section 3.3 of the BFA investigation, and appears to be derived from the water elevations recorded on August 18, 1997. Please provide a range of hydraulic gradient values to represent seasonal fluctuations of ground water elevations for the data requested in Comment No. 1 above. Please also address the hydraulic gradient for the apparent southeastward ground water flow from Section 1 toward the surface water feature as requested in Comment no. 2 above.

Response: A hydraulic gradient of 0.0043 was used for calculations and was derived from the 1997-1999 seasonal high water elevations. The hydraulic gradient for the southeastward flow outside of Section 1 for August 1997 was 0.0038 feet/foot (ft/ft); for February 1998, 0.0052 ft/ft; for August 1998, 0.0035 ft/ft, and for February 1999, 0.0028 ft/ft. The hydraulic gradient for the apparent southeastward ground water flow using August 1999 data is 0.0008 feet/foot.

H.1.f. - Site Topography and Soil Characteristics

6. Table H-2 indicates the non-perched water table occurs in the silty sand sediments (Stratum 2), while figure H-6 shows the water table in the sand tailings (Stratum 1). Please address this apparent inconsistency and modify as appropriate.

Response: The date of the water table elevation on Figure H-6 should read February, 1998, which was an unusually high rainfall period, and not indicative of the normal patterns reflected in Table H-2.

H.1.g. - Well Inventory and Details

7. Please provide the locations for the public supply well located in Section 23, Township 31, Range 21, and the two public supply wells located in Section 23, Township 31, Range 21, as indicated on Table H-3. Section 3.4 of the BFA investigation references the prohibition that solid waste disposal shall not occur within 500 feet of an existing or approved potable water well (Rule 62-701.300(2)(c), F.A.C.), however the prohibition that solid waste disposal shall not occur within 1000 feet of an existing or approved potable water well serving a community water system is not addressed (Rule 62-701.300(2)(I), F.A.C.). Please provide supplemental data from the southwest Florida

Water Management District that is more current than November 29, 1998 to demonstrate that both these prohibitions are not violated.

Response: There are no potable water wells within the prohibited limits of Section 1 as per Rule 62-701.300(i), F.A.C. Table H-3, Summary of Well Construction Permit Data covered well construction permit data for the period of record from 1/1/1970 to 11/29/1999. Attachment 14 presents a revised Page H-5.

SECTION I - GEOTECHNICAL INVESTIGATION REQUIREMENTS

1.1.c - Estimated Average and Maximum High Water Table Elevation

8. It is indicated that the Hillsborough County Solid Waste Management Department will continue to father information form the piezometers to refine the potentiometric maps. Section 5.2 of the BFA investigation recommends that the County continue to monitor the piezometers at the subject property to obtain additional high water table data during wet periods. Please provide this supplemental data. this data will also be used to address Comment Nos. 1 and 5 above.

Response: Supplemental data is presented in Table 2.

TABLE 2. WATER LEVELS NEAR THE CAPACITY EXPANSION AREA

	August 1997	August 1999
Location	Water table, ft, NGVD	
TH-28	104.40	103.56
TH-30	104.47	104.12
TH-56	117.42	116.02
TH-32	115.13	114.00
TH-38	122.58	121.00
P-4D	120.02	118.53
P-2D	121.84	118.73
P-3D	123.61	120.83
P-6D	124.2	121.39
TH-36	121.05	119.98

SECTION L - WATE RQUALITY AND LEACHATE MONITORING REQUIREMENTS

L.1.c. - Ground Water Monitoring Requirements

9. The reference to the calculate ground water flow velocity in Table H-1 is subject to review/revision to reflect Comment Nos. 3, 4 and 5 above.

Response: Noted.

10. Please revise Figure L-2 as needed to address the potential southeastward ground water flow from Section 1 as presented in Comment No. 2 above.

Response: We conclude that the groundwater divide is at the same location as the topographic divide, east of Section 1. Therefore, no additional wells are proposed.

L.1.c.3 - Background Wells

11. Please indicate if the initial sampling has been previously conducted at proposed background well TH-36A (parameters listed in rule 62-701.510(8)(a) and (8)(d), F.A.C.). If so, please indicate the date when samples were collected from well TH-36A for analysis of these parameters.

Response: Monitor well TH36A has not been sampled for parameters in 62-701.510(8)(a) and (8)(d) because the well has not yet been activated.

L.1.c.6 - Well Screens

12. The text in this section indicates the proposed monitor wells shall be constructed with 10 feet of screen, placed so that approximately two feet of screen remains above the seasonal mean high water table. Figure L-3 identifies both the top and bottom of the screen at elevation 110 feet, and the approximate water surface at elevation 115 feet. Section I.1.c. indicates the average seasonal ground water surface ranges from elevation 118 to 121 feet. Please revise the text and figure as appropriate to allow review of proposed monitor well construction details.

Response: Figure L-3 has been revised to reflect the seasonal high water table of 125 feet NGVD and the text of Section I.1.c, Page I-7 has been revised (Attachment 15).

L.1.e. - Leachate Sampling Locations

13. Please indicate the feasibility of collecting the leachate sample from the temporary sump prior to the pumping of the leachate.

Response: Although it is not feasible to sample leachate directly from the temporary sump, samples from the collection forcemain can be taken before, during or after pumping operations. The sampling labcock is located in the discharge line at the point where the

discharge line clears the 18-inch diameter carrier pipe, as shown on Section A on Drawing 21. In addition, the detection system is available for sampling at any time via the 4-inch side-slope riser pipe.

L.1.f.3. - Detection Well Sampling and Analysis

14. Please note that the frequency of routine ground water sample collection will be determined after the ground water flow velocity had been determined.

Response: Noted.

L.1.h.1. - Semi-Annual Report Requirements

15. Please note that the frequency of reporting the results of routine ground water sample collection shall correspond to the frequency of routine ground water sample collection.

Response: Noted.

FDEP Statement 16 – **62-701.530– Financial assurance including cost estimates for closure and long-term care in response to Ms. Susan Pelz's April 11, 2000 letter.**

1. Please provide cost estimates which bear the original signature and seal of the professional engineer who prepared them.

Response: Revised sheets pertaining to financial matters are presented in Attachment 16.

2. The note for Cover Material (Item #3) indicates that 18 inches of protective soil is "available on site." Please be advised that the Department does not consider the availability of onsite soils in evaluating the financial assurance cost estimates. However, it appears that a cost was provided for this item. Please clarify if the $5.61/CY for "protective cover soil: is for onsite or offsite materials.

Response: Cover material (Item No. 3 in Closing Costs) has been revised to reflect offsite materials. Page Q-1 and calculation pages 6 and 7 of 21 have been revised (Attachment 16).

3. Quality Assurance. It appears that $5,000 has been included for testing in the Engineering costs (tem #10). Please verify if this cost includes all costs of QA testing (soils and geosynthetics) required by Rule 62-701.400, F.A.C. If not, please submit revised estimates which include these costs.

Response: Costs for soils and geosynthetics Quality Assurance testing were included in the closure cost estimate.

4. Site specific Costs. Please clarify if a cost for mobilization and de-mobilization has been included.

Response: Site specific costs only include construction of the access road. Mobilization and demobilization costs were not included.

5. Mowing. Please clarify the number of mowing events per year.

Response: Mowing was considered an annual event occurring at a rate of one acre each month and covering the approximately 12 acres of the site.

In addition to the above written comments, the following items were discussed at our meeting on April 24, 2000 regarding the engineering report.

Section G.1.b: The development of adjacent sections will involve the removal of temporary sumps upon the development of a replacement sump. The separation berms are designed to either remain or be removed upon developing the next section. Upon developing an adjacent section, the geomembrane placed over the berm can be cut without affecting the bottom liner system, which would remain in tact since the geocomposite and geomembrane were constructed beneath the berms.

Section G.2.a.2: The cross-sections provided in Attachment 3 show that the design intent is to remove all phosphatic waste clay. Since the foundation of the landfill will be backfilled in compacted lifts, the foundation will not fail due to settlement.

Section G.2.a.4: The sump area is designed to be backfilled with rock and soil. The sump is constructed so that the bottom of the liner system is not subject to fluctuations of the ground water so as to adversely impact the integrity of the liner system. In addition, it is designed to resist hydrostatic uplift. The sump area will not be covered with waste.

Section G.2.c: The sump includes the following components, starting from the bottom:

- 6-inch low permeability soil subgrade.
- Geosynthetic clay liner.
- 60 mil high density polyethylene geomembane.
- Geocomposite.
- 60 mil high density polyethylene geomembane.
- Geocomposite.
- Geotextile.

- Ballast rock.
- Protective soil layer.

The material used for the protective soil layer carried a permeability of 1.0×10^{-3} centimeters per second in the HELP model. This soil type is sufficient for maintaining a head over liner below the regulatory requirement of 12 inches.

Section G.2.c.4: The calculated head over liner for Section 1 is an average of 0.008 inches, with a peak of 2.0 inches, as modeled in the Open Cell scenario presented in Attachment G-3 of the engineering report.

Section G.2.d.2: Please see our above response to FDEP Statement No. 8.

Section G.3.a.3: Please delete the sentence "The chipped tires will also be surrounded by the same polypropylene woven geotextile product, which is designed to retain the fine particles of the protective layer." This applied to chipped tire trenches, which are no longer a component of the design.

Section 02776, Part 3.09: The words "all heavy equipment" has been added to this specification section, and is presented in Attachment 5. In addition, Attachment 5 contains revisions to Part 3.10 that excludes rigid object from within 12 inches of the geomembrane, and revisions to the geomembrane property table.

Section 15080, Part 3.04: The top perforation has been removed, and the revised specification section is presented in Attachment 17.

Attachment G-4: The pipe strength analysis has been revised to reflect 4-inch pipes for the collection laterals. These pipes were used in the leachate generation analysis and found to be sufficient. Attachment 18 presents the revised calculation.

CQA Plan, Page 16: Attachment 19 presents the revised pages of the CQA plan, including the inclusion of language for requiring startup tests, revising the word geonet to geocomposite, and adding a section for GCL's.

Section I.1.a: The Ardaman borings (Appendix A in Volume 2 of the engineering report), and the Jammal borings (Attachment I-5 in Volume 1 of the engineering report) does indicate that the presence of a hardpan soil layer is contiguous. The Ardaman soil definition No. 4, defined as hardpan, is labeled as being present in both SPT 3 and SPT 4. The only boring that does not include soil type 4 is SPT 2, which is beyond the limits of the landfill. In addition, the high blow count in the Jammal borings indicates the presence of the hardpan.

Section I.1.d.3.b: The limits of the liner have been revised to be 10 feet beyond the toe of the berm. The internal portion of the liner system remains smooth material, which is in full compliance with the design calculations. The cross-sections have been revised to identify the limits of textured geomembrane, as presented in Attachment 3.

Drawing Revisions: Attachment 21 contains the following revisions:

- Drawing 6 – section location lines.
- Drawing 7 – section location lines.
- Drawing 18, Detail C – upper layers of protective soil layer removed.
- Drawing 21, Detail C – top perforation eliminated.

Please do not hesitate to call if you have any questions.

Very truly yours,

Larry E. Ruiz, Assoc. AIA
Project Manager
SCS ENGINEERS

Robert B. Gardner, P.E., D.E.E.
Vice President
SCS ENGINEERS

LER/RBG:kas

cc: Patricia Berry, HCSWMD
Bob Butera, FDEP-Tampa
Paul Schipfer, EPC

LIST OF ATTACHMENTS

1 Proof of Publication
2 Aerial and USGS Map
3 Site Cross-Sections
4 Revised Page G-1
5 Revised Section 02776 Pages
6 Sump Volume Calculation
7 Revised Section 02220
8 Revised Page G-6
9 Revised Drawing 17
10 Revisions to Stormwater Calculations
11 Isolation Berm Calculation
12 Revised Drawing 8
13 Revised Plot
14 Revised Page H-5
15 Revised Figure L-3 and Page I-7
16 Revised Cost Sheets
17 Revised Page 15080-5
18 Revised Pipe Calculation
19 Revised CQA Plan Pages
20 Revised Page I-8
21 Miscellaneous Revised Drawings

ATTACHMENT 1

PROOF OF PUBLICATION

Hillsborough County
Florida

Office of the County Administrator
Daniel A. Kleman

May 1, 2000

Mr. Kim Ford, P.E.
Solid Waste Permitting
Florida Department of Environmental Protection
3804 Coconut Palm Drive
Tampa, Florida 33619

RE: Southeast County Landfill Capacity Expansion - Legal Advertisement Proof of Publication

Dear Mr. Ford:

In accordance with Section 403.815, Florida Statutes and Rule 62-103.150, F.A.C., the Hillsborough County Solid Waste Management Department (SWMD) is providing proof of publication of the legal advertisement for the Florida Department of Environmental Protection's (DEP) Notice of Application for the Section 1 Capacity Expansion of the Southeast County Landfill construction permit application.

The proof of publication was provided to the SWMD by the Tampa Tribune on April 28, 2000 and the legal ad ran on April 28, 2000.

Please advise should you have any questions concerning the information provided.

Sincerely,

Patricia V. Berry
Landfill Services Section Manager
Solid Waste Management Department

Attachment

xc: Larry Ruiz, SCS
Paul Schipfer, EPC

THE TAMPA TRIBUNE
Published Daily
Tampa, Hillsborough County, Florida

State of Florida }
County of Hillsborough } ss.

Before the undersigned authority personally appeared J. Rosenthal, who on oath says that she is Classified Billing Manager of The Tampa Tribune, a daily newspaper published at Tampa in Hillsborough County, Florida; that the attached copy of advertisement being a

LEGAL NOTICE

in the matter of

STATE OF FLORIDA

was published in said newspaper in the issues of

APRIL 28, 2000

Affiant further says that the said The Tampa Tribune is a newspaper published at Tampa in said Hillsborough County, Florida, and that the said newspaper has heretofore been continuously published in said Hillsborough County, Florida, each day and has been entered as second class mail matter at the post office in Tampa, in said Hillsborough County, Florida for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid nor promised any person, this advertisement for publication in the said newspaper.

J Rosenthal

Sworn to and subscribed by me, this 28 day of APRIL, A.D. 2000

Personally Known ✓ or Produced Identification _____
Type of Identification Produced _____

NOTARY PUBLIC STATE OF FLORIDA
OFFICIAL NOTARY SEAL
SUSIE LEE SLATON
COMMISSION NUMBER
CC639424
MY COMMISSION EXP.
APRIL 16, 2001

Susie Lee Slaton

State of Florida
Department of Environmental Protection
Notice of Application
The Department announces receipt of an application for permit from Mr. Daryl Smith of the Hillsborough County Solid Waste Management Department for a permit to construct a lined disposal unit, referred to as Section 1 of the Capacity Expansion for the existing Southeast County Landfill, subject to Department rules, located 9 miles east of U.S. Highway 301 along County Road 672, Hillsborough County, Florida.
This application is being processed and is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the Department of Environmental Protection, Southwest District Office, 3804 Coconut Palm Drive, Tampa, Florida 33619-8318.
2416 4/28/00

ATTACHMENT 2

AERIAL AND USGS MAP

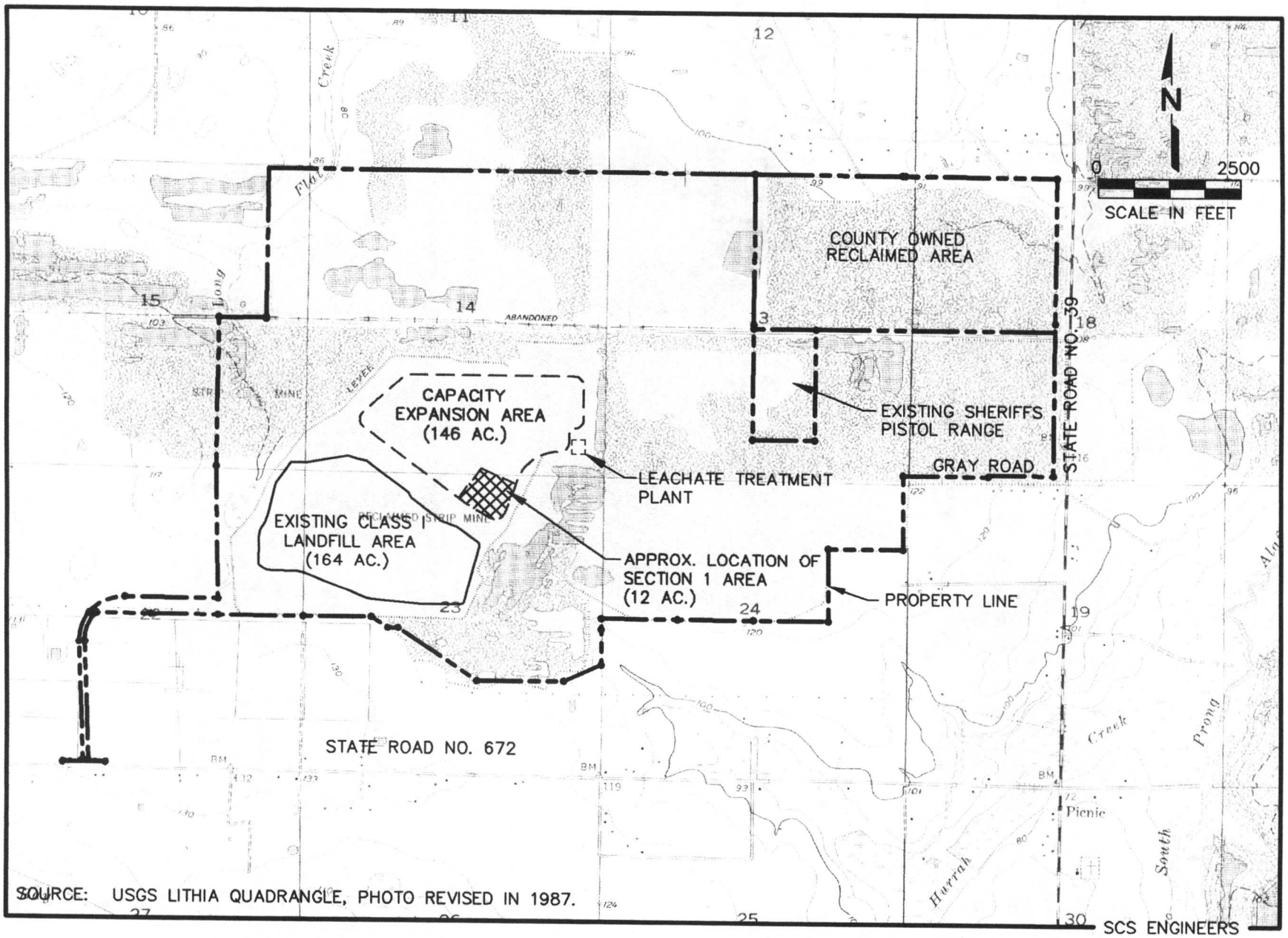
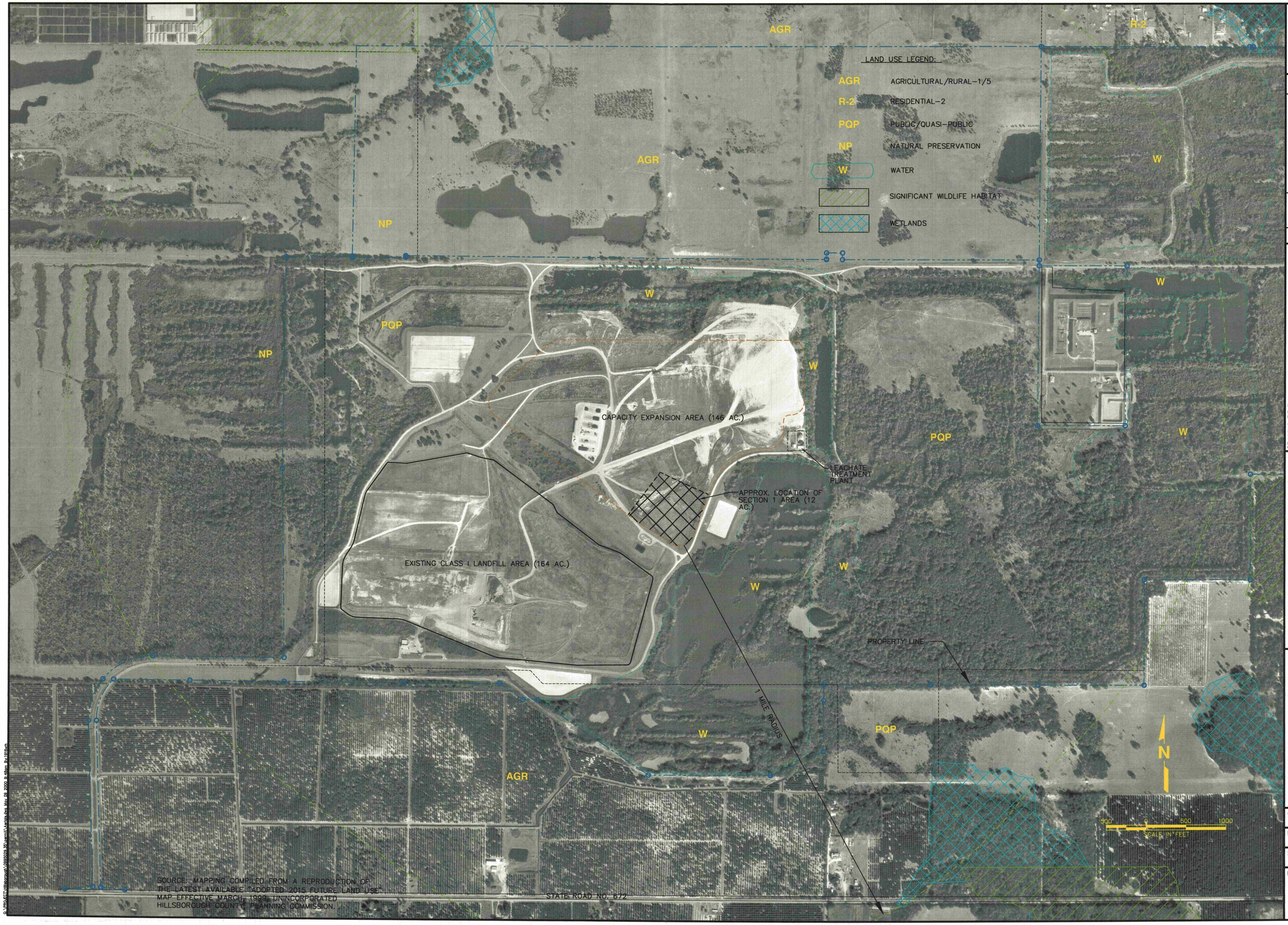


Figure 1. Quad Map, Southeast County Facility.

1565495



REV.	DATE	DESCRIPTION	CK. BY
△			
△			
△			
△			
△			
△			

DRAWING TITLE: **VICINITY AND LAND USE MAP SECTION 1**

PROJECT TITLE: **SOUTHEAST COUNTY LANDFILL CAPACITY EXPANSION**

CLIENT: **HILLSBOROUGH COUNTY SOLID WASTE MANAGEMENT DEPARTMENT**

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
3012 U.S. HWY. 301 NORTH, SUITE 700, TAMPA, FL 33619
PH (813) 621-0080 FAX NO. (813) 623-6757

PROJ. NO. 09195029.35	DWN. BY: XRH	Q/A RVW BY: KAS
DSN. BY: SCV	CHK. BY: KAS	APP. BY: RBG

CADD FILE: AERIALS

DATE: MAY 2000

SCALE: 1" = 500'

DRAWING NO. **1** of 1

#
1504827
710.

ATTACHMENT 3

SITE CROSS-SECTIONS

ATTACHMENT 4

REVISED PAGE G-1

SECTION G

LANDFILL CONSTRUCTION REQUIREMENTS

G.1 FILL SEQUENCE PLAN

Filling of the capacity expansion area will proceed in the order shown on Sheets 9, 10, 11, and 12 of the Drawings (Attachment G-1), beginning with Section 1 in the southeast corner and progressing in a clockwise direction. The planned fill pattern for Section 1 is shown on Sheet 9. Sections 2 through 10 will be filled similar to Section 1, and the detailed sequence plans for these sections will be submitted to FDEP when Hillsborough County Solid Waste Management Department (HCSWMD) applies for construction permits for these sections.

G.1.a Filling Sequence for Section 1

The proposed filling sequence for Section 1 is shown on Sheet 9 of the Drawings. Prior to initial waste placement, a 3-foot high isolation berm running in a southwest-to-northeast direction will be constructed down the middle of Section 1. This berm will separate Sections 1A and 1B, and facilitate collection and handling of stormwater from Section 1B during initial waste placement in Section 1A.

G.1.a.1 Section 1A Sequence--

In general, filling in Section 1A will begin in the southwest corner in Cell A and move north toward Cell E. A temporary haul road will be constructed leading from the existing paved road at the south of the expansion area to Cell A. Access roads leading to the actual working face will be temporary and will be modified as filling progresses. Initial waste placement in Section 1A will proceed in a generally east-to-west direction in Cell A, creating a mound with sideslopes no steeper than a slope of three feet horizontal run to one foot vertical rise (3H:1V). The working face will be approximately 150 feet wide, which will be adequate for the anticipated traffic maneuvering during refuse filling operations. Daily lifts of waste will be no taller than 8 to 10 feet, including cover soils as shown on Sheet 9. It is expected that two daily lifts will be placed before moving to fill other areas of the cell.

Waste placement will continue in a back-and-forth pattern in Cells A through E until the waste reaches 175 NGVD as shown on Sheet 9. Once Cell A has been filled to the maximum height possible while still maintaining 3H:1V sideslopes and a 150-foot wide working face, waste will be placed in Cell B. This cell will "piggyback" onto the northeastern slope of Cell A, and filling of Cell B will proceed in a west-to-east direction toward the isolation berm.

G.1.a.2 Section 1B Sequence--

Vehicle traffic will continue to access the landfill by the haul road used for Section 1A. Access roads leading to the working face will be temporary and will be modified as filling progresses. Waste will be placed first in Cell F in the northeast corner, moving from northwest to southeast. Waste will be piggybacked onto Section 1A as filling activities move south toward Cell J. The

ATTACHMENT 5

REVISED SECTION 02776 PAGES

A. All compound ingredients of geomembrane shall be randomly sampled on delivery to the manufacturing facility to ensure compliance with specifications. Tests will be conducted by the Manufacturer on density (ASTM D-1505) and melt index (ASTM D-1238, Condition E), with results submitted to the CQA Consultant.

B. Any geomembrane manufactured from resin not meeting the WORK specifications shall be rejected and shall not be delivered to the project.

2.02 GEOMEMBRANE SHEETS

A. Geomembrane shall be manufactured by Poly Flex, Inc., GSE Lining Company, Serrot International, Agru America, or approved equal.

B. The geomembrane materials shall conform to the physical properties requirements, at a minimum, as shown in Tables 02776-1, 02776-2, and 02776-3 as applicable. Textured geomembrane shall have smooth edges. Values presented in Table 02776-1 and 02776-2 are based upon the minimum standards established by the Geosynthetics Research Institute (GRI) for HDPE and modified by the COUNTY'S REPRESENTATIVE specifically for the WORK in this project.

C. The geomembrane shall be so produced as to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter. Any such defects shall be repaired using the extrusion fusion welding technique in accordance with the Manufacturer's recommendations.

D. The Manufacturer shall agree to allow the COUNTY and COUNTY'S REPRESENTATIVE to visit the manufacturing plant prior to or during the manufacturing of the geomembrane rolls for the WORK. The COUNTY'S REPRESENTATIVE will review the manufacturing process, quality control, laboratory facilities, and testing procedures, including:

1. Verification that properties for which guarantees have been provided by the Manufacturer meets all the specifications herein.

2. Verification that the measurements of properties are properly documented and test methods used are acceptable.

TABLE 02776-1. GEOMEMBRANE MATERIAL PROPERTIES - 60 MIL SMOOTH

PROPERTY	UNIT	TEST METHOD	VALUE	TEST FREQUENCY (MIN)	SUBMITTAL REQUIREMENT
Resin					
Density	g/cc	ASTM D1505	>0.932	1 per 180,000 lb	MQC Certificate, See Section 1.04
Sheet					
Thickness Min. Average	mil	ASTM D 5994	60	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Low Individual (any 10 values)	mil	ASTM D 5994	54	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Density	g/cc	ASTM D1505	>0.940	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Tensile Properties (Notes1,2)					
Strength @ Yield	lb/in width	ASTM 638	126	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Elongation @ Yield	Percent	TYPE IV DUMBBELL	12	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Strength @ Break	lb/in width	GAGE LENGTH Note 3	228	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Elongation @ Break	Percent	2.0 IN/MIN	700	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Stress Crack Resistance	Hr	ASTM 5397, Appendix	200	1 per lot	MQC Certificate, See Section 1.04
Carbon Black Content	Percent	ASTM D 1603	2.0-3.0	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Carbon Black Dispersion	Category	ASTM D 5596	1 or 2	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Oxidative Induction Time (OIT)					
Standard Or	Min	ASTM D 3895	100	1 per lot	MQC Certificate, See Section 1.04
High Pressure	Min	ASTM D 5885	400	1 per lot	MQC Certificate, See Section 1.04
Puncture	Lb	ASTM D 4833	108	1 per lot	Letter Certificate, See Section 1.04
Tear	Lb	ASTM D 1004	42	1 per lot	Letter Certificate, See Section 1.04
Dimensional Stability	Percent	ASTM D 1204	±3.0	1 per lot	Letter Certificate, See Section 1.04
Water Vapor Transmission	g/m^2 day	ASTM E 96	<0.24	1 per lot	Letter Certificate, See Section 1.04

Notes: 1) Tensile properties shall be tested and reported separately for the Machine Direction (MD) and the Cross Machine Direction (XMD).
2) Machine Direction (MD) and Cross Machine Direction (XMD) shall be average values on the basis of 5 test specimens each directions.
3) Yield Elongation Gage Length = 33 mm ; Break Elongation Gage Length = 50 mm.

TABLE 02776-2. GEOMEMBRANE MATERIAL PROPERTIES - 60 MIL TEXTURED

PROPERTY	UNIT	TEST METHOD	VALUE	TEST FREQUENCY (MIN)	SUBMITTAL REQUIREMENT
Resin					
Density	g/cc	ASTM D1505	>0.932	1 per 180,000 lb	MQC Certificate, See Section 1.04
Sheet					
Thickness Min. Average	mil	ASTM D 5994	60±5%	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Low Individual (any 10 values)	mil	ASTM D 5994	51	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Density	g/cc	ASTM D1505	>0.940	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Tensile Properties (Notes1,2)					
Strength @ Yield	lb/in width	ASTM 638	126	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Elongation @ Yield	Percent	TYPE IV DUMBBELL	12	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Strength @ Break	lb/in width	2.0" GAGE LENGTH	90	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Elongation @ Break	Percent	2.0 IN/MIN	200	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Stress Crack Resistance	Hr	ASTM 5397, Appendix	200	1 per lot	MQC Certificate, See Section 1.04
Carbon Black Content	Percent	ASTM D 1603	2.0-3.0	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Carbon Black Dispersion	Category	ASTM D 5596	1 or 2	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Oxidative Induction Time (OIT)					
Standard Or	Min	ASTM D 3895	100	1 per lot	MQC Certificate, See Section 1.04
High Pressure	Min	ASTM D 5885	400	1 per lot	MQC Certificate, See Section 1.04
Puncture	Lb	ASTM D 4833	90	1 per lot	Letter Certificate, See Section 1.04
Tear	Lb	ASTM D 1004	42	1 per lot	Letter Certificate, See Section 1.04
Dimensional Stability	Percent	ASTM D 1204	±3.0	1 per lot	Letter Certificate, See Section 1.04
Water Vapor Transmission	g/m^2 day	ASTM E 96	<0.24	1 per lot	Letter Certificate, See Section 1.04

Notes: 1) Tensile properties shall be tested and reported separately for the Machine Direction (MD) and the Cross Machine Direction (XMD).
2) Machine Direction (MD) and Cross Machine Direction (XMD) shall be average values on the basis of 5 test specimens each directions.
3) Yield Elongation Gage Length = 33 mm ; Break Elongation Gage Length = 50 mm.

Revised May 12, 2000

TABLE 02776-3. GEOMEMBRANE MATERIAL PROPERTIES - 80 MIL SMOOTH

PROPERTY	UNIT	TEST METHOD	VALUE	TEST FREQUENCY (MIN)	SUBMITTAL REQUIREMENT
Resin					
Density	g/cc	ASTM D1505	>0.932	1 per 180,000 lb	MQC Certificate, See Section 1.04
Sheet					
Thickness Min. Average	mil	ASTM D 5994	80±5%	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Low Individual (any 10 values)	mil	ASTM D 5994	72	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Density	g/cc	ASTM D1505	>0.940	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Tensile Properties (Notes1,2)					
Strength @ Yield	lb/in width	ASTM 638	126	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Elongation @ Yield	Percent	TYPE IV DUMBBELL	12	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Strength @ Break	lb/in width	2.0" GAGE LENGTH	90	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Elongation @ Break	Percent	2.0 IN/MIN	200	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Stress Crack Resistance	Hr	ASTM 5397, Appendix	200	1 per lot	MQC Certificate, See Section 1.04
Carbon Black Content	Percent	ASTM D 1603	2.0-3.0	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Carbon Black Dispersion	Category	ASTM D 5596	1 or 2	1 per 50,000 ft^2	MQC Certificate, See Section 1.04
Oxidative Induction Time (OIT)					
Standard Or	Min	ASTM D 3895	100	1 per lot	MQC Certificate, See Section 1.04
High Pressure	Min	ASTM D 5885	400	1 per lot	MQC Certificate, See Section 1.04
Puncture	Lb	ASTM D 4833	90	1 per lot	Letter Certificate, See Section 1.04
Tear	Lb	ASTM D 1004	42	1 per lot	Letter Certificate, See Section 1.04
Dimensional Stability	Percent	ASTM D 1204	±3.0	1 per lot	Letter Certificate, See Section 1.04
Water Vapor Transmission	g/m^2 day	ASTM E 96	<0.24	1 per lot	Letter Certificate, See Section 1.04

Notes: 1) Tensile properties shall be tested and reported separately for the Machine Direction (MD) and the Cross Machine Direction (XMD).
2) Machine Direction (MD) and Cross Machine Direction (XMD) shall be average values on the basis of 5 test specimens each directions.
3) Yield Elongation Gage Length = 33 mm ; Break Elongation Gage Length = 50 mm

Revised May 12, 2000

4. Sections of the seam with insufficient overlap or two distinct welds from the double fusion split wedge welding machine shall be cap stripped the entire length of seam lacking overlap or welds.

5. Butt seams shall be double fusion welded and air pressure tested the entire length of the seam. Small lengths, under 10 feet in total length, of butt seam between burnouts or T-welds may be vacuum box tested.

D. Restart/Reseaming Procedures

The welding process shall restart by grinding the existing seam and rewelding a new seam. Welding shall commence where the grinding started and must overlap the previous seam by at least 2 inches. Reseaming over an existing seam without regrinding shall not be permitted.

E. Verification of Repairs

Each repair shall be non-destructively tested, except when the CQA Consultant requires a destructive seam sample obtained from a repaired seam. Repairs that pass the non-destructive and/or destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved.

3.08 ANCHOR TRENCH

A. The anchor trench shall be excavated prior to geomembrane installation, and shall be as shown on the Drawings. No loose soil roots, rocks, or materials capable of damaging the geomembrane shall be allowed beneath the geomembrane. The anchor trench shall be backfilled and compacted as indicated on the Drawings, and in a manner which prevent any damage to the geomembrane. The geomembrane shall not have sharply folded corners when placed into the anchor trench. The geomembrane shall be welded the entire length of the panel, including through the entire dimension of the trench.

3.09 OVERLYING SOIL LAYER

A. Equipment used to place the soil layer above the installed geomembrane shall not be driven directly in contact with the exposed geosynthetics. A minimum thickness of 1 foot of soil is required between all heavy equipment and the geomembrane. The movement of the dozer shall be primarily forward and backwards, with no turning allowed unless a minimum of 2 feet of soil is between the equipment and the geomembrane. In areas of heavy traffic, a minimum of 3 feet of soil is required. Rubber tired vehicles require 3 feet (minimum) of soil over the

ATTACHMENT 6

SUMP VOLUME CALCULATION

CLIENT	PROJECT	JOB NO.
H BORO	CAPACITY EXPANSION	09195029.35
SUBJECT	BY	DATE
FDEP RESPONSE	Sheila	4-24-00
QUESTION 7	CHECKED KMS	DATE 5-10-00

TASK

USING SUMP CONFIGURATION FROM DRAWING 7 OF 22, CALCULATE ELEVATION LEACHATE WILL REACH IN 3 DAYS

KNOWN

- SUMP CONFIGURATION

  BOTTOM 4' x 5' AT ELEV 122
  3H:1V SIDE SLOPES ALL AROUND *
  * ACTUALLY THERE IS AN OPENING ON THE EAST SIDE, LEACHATE WILL BACK UP THE PIPE

- MAX LEACHATE FLOW FROM THE HELP MODEL FOR SECTION ONE = 19,969 GPD

CLIENT	PROJECT	JOB NO.
ABORO	CAPACITY EXPANSION	09195029.35
SUBJECT	BY	DATE
FDEP RESPONSE	Sheila	4-24-00
QUES 7	CHECKED	DATE
	LAS	5-10-00

VOL OF SUMP el 122 - el 128
= 6'

$$= \int_0^6 (4+6x)(5+6x)\,dx$$

$$= \int_0^6 (36x^2 + 54x + 20)\,dx$$

$$= \frac{36x^3}{3} + \frac{54x^2}{2} + 20x \Big|_0^6$$

$$= \frac{36(6)^3}{3} + \frac{54(6)^2}{2} + 20(6)$$

$$= 3684 \text{ FT}^3$$

$$3684 \text{ FT}^3 \left| \frac{7.48 \text{ gal}}{1 \text{ FT}^3} \right. = 27,556 \text{ gal}$$

$$\frac{27,556 \text{ gal}}{19969 \text{ gal}} \left| \frac{\text{day}}{} \right. = 1.4 \text{ days}$$

CLIENT H BORO	PROJECT CAPACITY EXPANSION	JOB NO. D9195029.35
SUBJECT FDEP RESPONSE	BY Sheila	DATE 4-24-00
QUES 7	CHECKED KMS	DATE 5-10-00

VOLUME OF SUMP el 122-132 = 10 FT

$$= \int_0^{10} (4+6x)(5+6x)\,dx$$

$$= \int_0^{10} (36x^2 + 54x + 20)\,dx$$

$$= \frac{36x^3}{3} + \frac{54x^2}{2} + 20x \Big|_0^4$$

$$= \frac{36(10)^3}{3} + \frac{54(10)^2}{2} + 20(10)$$

$$= 14{,}900\ FT^3$$

$$14{,}900\ FT^3 \left| \frac{7.48\ GAL}{1\ FT^3} \right. = 111{,}452\ GAL$$

$$111452\ gal \left| \frac{day}{19969\ gal} \right. = 5.6\ days$$

CLIENT	PROJECT	JOB NO.
H BORO	CAPACITY EXPANSION	099502935
SUBJECT	BY	DATE
FDEP RESPONSE	Sheila	4-24-00
QUES 7	CHECKED KDS	DATE 5-10-00

AT 8' DEPTH

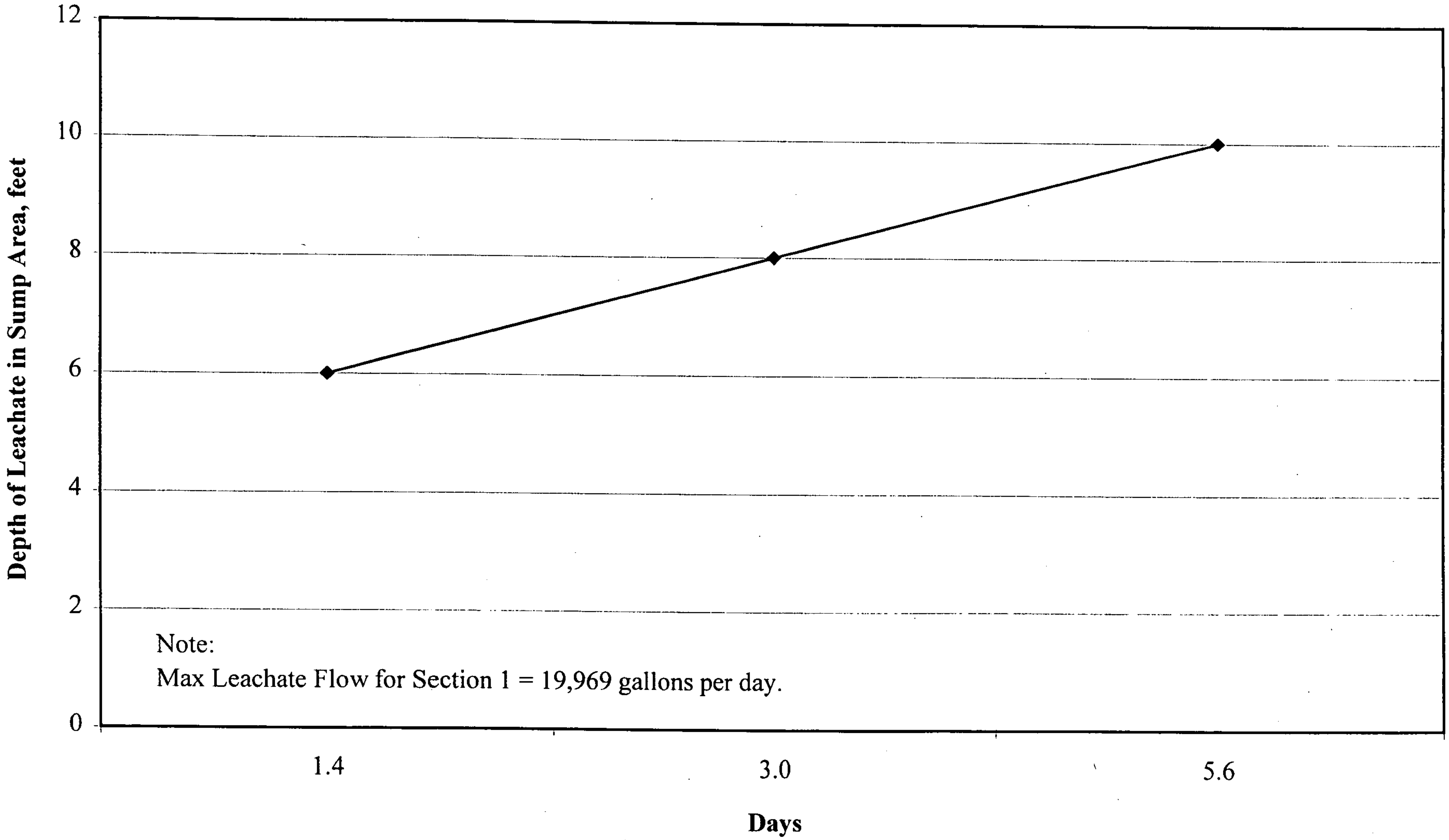
$$\frac{36(8)^3}{3} + \frac{54(8)^2}{2} + 20(8)$$

$$= \frac{8032\ FT^3}{1} \left| \frac{7.48\ gal}{1\ FT^3} \right. = 60,079\ gal$$

$$\frac{60079\ gal}{19969\ gal} \left| \frac{day}{} \right. = 3\ days$$

GRAPH, SHEET 5 OF 5

Sump Volume Storage



SHEET 3 OF 3
09195029.35

ATTACHMENT 7

REVISED SECTION 02220

SECTION 02220
EXCAVATION, BACKFILL, FILL AND GRADING

PART 1 - GENERAL

1.01 SUMMARY

A. The work specified in this section includes excavating, trenching, shoring, transporting, stockpiling, placing, backfilling, compacting, grading, disposing materials, field testing, and quality control/quality assurance laboratory services required for the construction as shown on the Drawings and in the Specifications.

B. Excavated fill that does not contain refuse, as determined by the COUNTY, may be used as general backfill if it meets the requirements of this Section. Excavated fill which contains waste shall be disposed of in the landfill as directed by the COUNTY.

1.02 DEFINITIONS

The following definitions apply only to the terms and conditions contained within this specification.

A. Suitable Soil: Soil that meets the requirements specified in Paragraph 2.01.

B. Backfill: The Suitable soil which is placed back into Section 1 of the Landfill Capacity Expansion and compacted after the Unsuitable soils are excavated and removed. The backfill shall be free of clays and compacted to meet the specified requirements contained within these specifications.

C. CQC Consultant: Independent geotechnical consultant retained by the Contractor to perform the Construction Quality Control (CQC). The CQC Consultant shall oversee all geotechnical activities and the quality control testing services as presented in these specifications.

D. Contractor: Contracting company retained by the County.

E. County: Hillsborough County Solid Waste Management Department.

F. Engineer: The professional independent engineering firm designated to be the ENGINEER on the project.

G. Unsuitable Soil: Soil which does not meet the requirements specified in Paragraph 2.01.

1.03 QUALITY CONTROL

A. Construction Quality Control (CQC) will be performed by an independent geotechnical consultant retained by the CONTRACTOR. The CQC consultant cannot be the same consultant retained by the COUNTY for Construction Quality Assurance (CQA). The CQC Consultant shall oversee all geotechnical activities and the quality control testing as specified herein. The CQC Consultant shall prepare a final report certifying the geotechnical activities performed on this project are in accordance with the Contract Documents. The final report shall be signed and sealed by a professional engineer licensed in the State of Florida.

1. Qualifications for the geotechnical CQC Consultant shall be submitted to the ENGINEER at least 7 calendar days prior to conducting any geotechnical laboratory or field testing related to the project. Information to be submitted is listed under Part 1.02 of this Section.

1.04 SUBMITTALS

A. Health and Safety Plan:

1. The CONTRACTOR shall submit to the ENGINEER for review a Health and Safety Plan. The Health and Safety Plan shall include descriptions of the methods, equipment, and safety procedures to be used during construction activities, including dewatering, excavating, backfilling, and compacting. The plan shall also include response procedures for emergencies.

   a. Excavation and backfilling is planned only for areas that are not known to have buried solid waste. However, the Health and Safety Plan must also reflect that there is the possibility that various materials (municipal solid waste (MSW), industrial waste, solvents, petroleum hydrocarbons, caustics, medical wastes, animal carcasses, asbestos, etc.) may be encountered while conducting all operations necessary to complete the work.

2. Activities related to excavating and backfilling shall be conducted in strict accordance with the approved Health and Safety Plan. Work shall be performed in compliance with all applicable Occupational Safety and Health Administration (OSHA) regulations.

3. The CONTRACTOR shall have a Health and Safety officer, with requisite qualifications and experience, on site during all construction activities. The Health and Safety officer shall be responsible for preventing accidents at the site and shall hold weekly site safety meetings for all on-site personnel.

4. The review of the Health and Safety Plan by the ENGINEER shall be for method only. The CONTRACTOR shall retain complete responsibility for the

application, adequacy and safety of the methods. However, construction shall not begin until the Health and Safety Plan has been submitted and reviewed by the ENGINEER.

B. Excavation Plan:

1. Prior to beginning work, the CONTRACTOR shall provide a detailed excavation plan for addressing excavation, backfilling, compacting, and grading construction.

2. Plan shall include methods of excavation, slope stabilization, shoring, dewatering, and backfilling techniques.

3. Plan shall address safety issues in consideration of OSHA, Federal, State, and local safety requirements.

4. Plan shall include temporary controls for stormwater runoff and erosion control in full conformance with all existing permits.

5. Plan shall be submitted to the ENGINEER for review and approval prior to starting construction activities.

C. For any off-site borrow sources, the CONTRACTOR shall notify the ENGINEER in writing of the material source for each soil type specified within Part 2 of this Section at least 14 calendar days prior to the date of anticipated use of such material. Notification shall include:

1. Supplier's name.

2. Borrow location.

3. Documentation confirming adequate quantities are available to complete the work.

4. A representative sample of the proposed material, consisting of one 5-gallon, sealed container from each borrow location.

5. Test results as required within Part 2 of this Section.

D. The Qualification of the geotechnical CQC Consultant shall be submitted to the ENGINEER at least 7 calendar days prior to conducting any geotechnical laboratory or field testing related to the project. The submittal shall include, at a minimum, the following information:

1. The resumes of key personnel involved in the geotechnical testing and observation activities. Key personnel shall include field personnel, laboratory personnel and immediate supervisors. The CQC Consultant shall have a minimum experience of 2 prior similar projects (landfills only) within the last 5 years.

2. Written confirmation that the project specifications have been received for the project and that work shall be performed in strict compliance with the project specifications.

3. Written confirmation that the CQC Consultant has sufficient personnel and equipment available to meet the project schedule.

E. The CONTRACTOR shall submit to the ENGINEER field and laboratory test data prior to incorporating any materials into the project. Materials shall not be incorporated into the project until approved by the ENGINEER.

1. General Fill Soil Materials - As described in Part 2.01, the CONTRACTOR shall submit the results of the following laboratory testing for at least two representative samples of the borrow soils to the ENGINEER at least 7 calendar days prior to beginning backfilling operations:

   a. Standard Proctor compaction test (ASTM D-698).
   b. Atterberg Limits Test (ASTM D-4318).
   c. Particle size (gradation) analysis (ASTM D-422, w/o hydrometer).

2. Subgrade Soil Materials - As described in Part 2.02, the CONTRACTOR shall submit the results of the following laboratory testing for at least two representative samples of the subgrade soils to the ENGINEER at least 7 calendar days prior to beginning backfilling operations:

   a. Standard Proctor compaction test (ASTM D-698).
   b. Atterberg Limits Test (ASTM D-4318).
   c. Particle size (gradation) analysis (ASTM D-422, w/o hydrometer).

1.05 NOTIFICATION

A. The CONTRACTOR shall notify the ENGINEER a minimum of 48 hours in advance of planned excavation of any encountered MSW. In the event MSW is inadvertently excavated or disturbed, the CONTRACTOR shall notify the ENGINEER immediately.

B. Upon identification, the CONTRACTOR shall notify the ENGINEER in writing if the site conditions encountered during construction differ from that indicated on the Drawings. Notification shall include an explicit description of the differences.

PART 2 - PRODUCTS

2.01 GENERAL FILL SOIL MATERIALS

A. Provide well-drained soil fill material reasonably free of sticks, roots, organic matter, and stones larger than 1-inch in any dimension. Remove material which cannot be made to compact readily and replace with suitable material. Soil shall be free of MSW, as determined by the ENGINEER.

B. General fill soils shall be well-graded sand (SW), silty-clayey sand (SM-SC), or clayey sand (SC) as classified by the Unified Soil Classification System, or other soil as approved by the ENGINEER.

C. Soil materials excessively wet or dry are considered unsuitable. Allow such material to dry, or moisten, as required, to bring material generally within 3 percent of optimum moisture content range for specified compaction.

D. Laboratory testing shall be performed on the borrow soils by the CONTRACTOR. The CONTRACTOR shall submit the results of the following laboratory testing for at least two representative samples of the borrow soils to the ENGINEER at least 7 calendar days prior to beginning backfilling:

1. Standard Proctor compaction test (ASTM D-698).
2. Atterberg Limits test (ASTM D-4318).
3. Particle size (gradation) analysis (ASTM D-422, w/o hydrometer).

2.02 SUBGRADE SOIL MATERIALS

A. Provide well-drained soil free of sticks, roots, organic matter, and stones larger than 1-inch in any dimension. Remove material which cannot be compacted and replace with Suitable backfill.

B. Backfill shall be well-graded sand (SW) or a poorly-graded sand (SP), as classified by the Unified Soil Classification System (ASTM D-2487). At the discretion of the County/Engineer, the backfill may be classified as SW-SM or SP-SM in accordance with ASTM D-2487.

C. Soil materials excessively wet or dry are considered unsuitable. Allow such material to dry, or moisten, as required, to bring material generally within 3 percent of optimum moisture content range for specified compaction.

2.03 SUB-BASE (See Section 02212)

2.04 DRAINAGE SAND SOIL MATERIALS

A. The Drainage Sand layer material shall be a sand with a minimum hydraulic conductivity of $1x10^{-3}$ cm/sec, when compacted to 95 percent of the Standard Proctor, and conform to the following gradation:

Sieve Size	Percent Passing
No. 10	100
No. 30	95
No. 50	65
No. 70	20
No. 200	0-5

2.05 ROADWAY BASE AND SUBGRADE SOIL MATERIALS (See Section 02800)

2.06 LEACHATE COLLECTION GRAVEL

A. The gravel backfill for the leachate collection system shall be quartz or granite-based rounded river stone, washed and free of deleterious material.

B. The gravel gradation shall comply with the requirements for No. 4 aggregate as specified in the Florida Department of Transportation's (FDOT), Standard Specifications for Road and Bridge Construction (1991), Section 901 or other materials as approved by the ENGINEER.

2.07 CHIPPED TIRES

A. The chipped tires for use as backfill over the drainage sand will be provided by the COUNTY and stockpiled at the on-site tire processing facility. The nominal chip size shall be four square inches, with no portruding wires that would adversely impact the bottom liner system.

2.08 TOPSOIL

A. Provide fertile, natural soil, typical of the locality, free from MSW, stones (exceeding 2-inch in any dimension) roots or sticks (exceeding 1/4-inch diameter), clay, and weeds, and obtained from naturally well drained areas. It shall not be excessively acid or alkaline nor contain material harmful to plant growth. Topsoil shall comply with the requirements of FDOT's Standard Specifications for Road and Bridge Construction (1991), Section 162.

B. Upon request by the ENGINEER, submit representative samples for use in sodding and seeding operations for analysis by a private laboratory to determine nutrient deficiencies at no additional cost to the COUNTY.

PART 3 - EXECUTION

3.01 EXCAVATION

A. The CONTRACTOR shall conduct excavation activities according to the requirements below:

1. Layout all excavations and establish grades as shown on the Drawings. Replace existing survey markers to original location if disturbed or destroyed. Layout work shall be performed by a licensed land surveyor registered in the State of Florida.

2. Excavation, backfilling, sampling, and testing shall be performed by the CONTRACTOR only when the ENGINEER is present. A minimum of 24-hours prior notice shall be given to the ENGINEER.

3. Provide drainage at all times during construction by shaping excavated areas and maintaining ditches and drains. Protect graded areas against action of elements. Re-establish grade where settlement, washouts, or erosion damage occurs. Damaged areas shall be repaired at no additional cost to the COUNTY.

4. When excavation has reached prescribed depths, the ENGINEER shall be notified that an inspection of the excavation may be performed.

5. If the bottom of any excavation is removed below the limits shown on the Drawings or as directed by the ENGINEER, it shall be backfilled at the CONTRACTOR'S expense with material approved by the ENGINEER.

6. The CONTRACTOR shall not leave any excavations, boreholes, or trenches open at the completion of work each day. All open holes shall be backfilled flush with existing grade or covered, at the ENGINEER's direction, with acceptable material prior to leaving the site.

7. All excavations shall conform to the Health and Safety Plan submitted under Part 1.02, of this Section.

3.02 STOCKPILE OF MATERIALS

A. Excavated materials shall be transported to the stockpile areas designated by the COUNTY. Excavated materials may be segregated during excavation and the COUNTY shall direct locations for segregated materials. The COUNTY shall identify materials that require segregated stockpiling.

B. The CONTRACTOR shall be responsible for vehicle traffic safety and shall coordinate with the COUNTY to determine site-specific safety concerns.

C. The CONTRACTOR shall sweep or wash paved roadways which become covered with soil. The CONTRACTOR shall provide all equipment, water, and personnel necessary to clear the paved roads. This activity shall be performed at a minimum of once per week or as the COUNTY directs.

3.03 PLACEMENT OF SOIL MATERIALS, GRADING IMPROVEMENTS, AND EMBANKMENTS

A. Place fill materials, perform grading improvements, and construct embankments to the lines and grades shown on Drawings.

B. Areas to be filled and graded shall be proof-rolled a minimum of 4 complete passes with a 10-ton vibratory steel drum roller or other equipment approved by the ENGINEER, prior to backfilling operations. The subgrade shall be compacted to a depth of 6-inches at the specified density. Proof-rolled area shall be accepted by the ENGINEER prior to beginning backfilling.

C. Place and compact soil fill and grading backfill in maximum 12-inch compacted lifts. Compaction level shall be in accordance with Part 3.04, this Section.

D. In cuts, all loose or protruding rocks on the excavated side-slopes shall be loosened and removed to line or finished grade of slope. All cut and fill slopes shall be as shown on the Drawings or as directed by the ENGINEER.

E. Maintain proper drainage during grading operations until final acceptance. Repair with acceptable material, any fill or grading materials which may be lost or displaced as a result of natural causes such as storms, squalls, etc., or as a result of movement, consolidation or settlement of the ground or foundation upon which embankment is placed.. Repair shall be performed at no additional cost to the COUNTY.

3.04 TESTING REQUIREMENTS

A. Subgrade soils shall be testing in accordance with Table 02220-1.

TABLE 02220-1: SUBGRADE TESTING DURING PLACEMENT

Test Description	ASTM	Frequency (compacted in-place)	Min. Value
Sieve Analysis with 200 Wash	D-422	1 per 2,000 CY	N/A
Density (Direct Cylinder Method)	D-2937	1 per 5 acres per lift	95%
Density (Nuclear Densiometer)	D-3017	2 per acre per lift	95%
Atterberg Limits	D-4318	1 per 2,000 CY	N/A
Triaxial Shear	D-4767	1 per 15,000 CY	$\varnothing=32^{o}$

B. Triaxial test shall be consolidated-undrained with back-pressure saturation and pore pressure reading in accordance with Part 1.04 (C)(3).

C. Prior to conducting the consolidated-undrained Triaxial test, the Contractor shall submit to the County/Engineer the testing parameters for the equipment being used

D. Nuclear determination of field density may be used only after correlation with Direct Cylinder Method has been established. In event of conflict, the Direct Cylinder Method results will govern.

3.05 PLACEMENT OF CHIPPED TIRES

A. The CONTRACTOR shall use care when retrieving chipped tires from stockpiles so that soil is not mixed with the chipped tires.

B. Place chipped tires to the depth shown in the Drawings.

3.06 COMPACTION REQUIREMENTS

A. The CONTRACTOR shall place backfill and fill materials to achieve an equal or "higher" degree of compaction than undisturbed materials adjacent to the work; however, in no case shall the degree of compaction fall below minimum compaction specified in Table 02220-2, of this Section.

B. Chipped tires shall not be compacted.

C. Location of field moisture-density tests shall be approved by the ENGINEER.

D. The CONTRACTOR shall comply with minimum compaction criteria as contained within Table 02220-2 of this Section.

3.07 FINAL GRADING

A. Grading in preparation of topsoil application shall be performed to the lines, grades, and elevations shown in the Drawings. All unacceptable material defined in Part 2, this Section, shall be removed and disposed of as directed by the ENGINEER.

B. All work on slopes shall be uniformly dressed to the grades shown on the Drawings.

C. The ENGINEER reserves the right to make adjustments or revisions to plans as the work progresses to achieve the intent of the design.

3.08 TOLERANCES

A. The CONTRACTOR shall bring final grading to within the tolerance specified in Section 01050.

3.09 SETTLEMENT

A. The CONTRACTOR shall anticipate subgrade settlements due to consolidation associated with construction activities. The CONTRACTOR shall provide survey documentation of the settlements, if significant, to quantify volumes. The additional documentation shall be at no additional cost to the COUNTY.

3.10 DUST CONTROL

A. The CONTRACTOR shall spray water over the construction area in order to limit airborne dust, or as directed by the ENGINEER.

TABLE 02220-2: COMPACTION CRITERIA

LOCATION	MINIMUM COMPACTION	MINIMUM TESTING FREQUENCY
1. General Fill	95% of maximum dry density within 3 percent of optimum moisture content (ASTM D 698)	2 test per acre / Lift (Lift=1 foot compacted thickness)
2. Subgrade	95% of maximum dry density within 3 percent of optimum moisture content (ASTM D 698)	2 test per acre / Lift (Lift = 1 foot compacted thickness)
3. Drainage Sand	No Requirement for placement	1 test per acre
4. Sub-Base	See Specification 02212	See Specification 02212
5. Graded Base	95% of maximum dry density (ASTM D 1557)	1 test per 250 lineal feet of road.
6. Leachate Collection Gravel	NONE REQUIRED	NONE

- END OF SECTION -

ATTACHMENT 8

REVISED PAGE G-6

protective layer will be sand, and the upper 12 inches will be tire chips. The sand and chipped tires each will have a hydraulic conductivity of at least $1x10^{-3}$ cm/sec.

G.2.d.3 First Layer of Waste--

Landfill personnel will take care when placing the first layer of waste over the 24-inch protective layer. This first layer of waste will consist of selected wastes containing no large, rigid objects that might damage the liner or LCRS. In order to minimize disturbance of the protective layer, traffic will be prohibited from travelling directly on top of the chipped tires. The first lift of waste will be deposited from the top of an adjacent working face, if possible, or otherwise from the end of a temporary dirt haul road.

G.2.e Geosynthetic Specifications

Technical specifications for all geosynthetics are provided in Attachment G-1. These include definitions and requirements for the manufacture, handling, installation, and quality assurance for geomembrane, geotextile, and geonet, as necessary.

G.2.f Soil Component Standards

See Attachment G-1 for soil specifications, including materials, excavation, backfill, and testing requirements.

G.3 LEACHATE COLLECTION AND REMOVAL SYSTEM

To calculate the maximum head above the geomembrane, water balance computations were calculated using the United States Environmental Protection Agency's (U.S. EPA) Hydrological Evaluation of Landfill Performance (HELP) computer model version 3.03 (Schroeder, Dozier, Zappi, Peyton, McEnroe, and Sjostrom, 1994). Precipitation falling on a landfill surface will run off, evaporate, evapotranspirate, or infiltrate. The percentage of precipitation falling on a landfill surface that will travel each of these paths can be estimated by use of water balance methods. Attachment G-3 contains the detail reports from the HELP model.

The HELP model uses various formulas based upon fundamental soil mechanics to simulate water percolation in a vertical and horizontal direction under many climatological, soil, and topographic conditions. The model estimates how much leachate and drainage is likely to occur after a certain period of time within a landfill profile.

G.3.a LCRS Components

Leachate collection will be accomplished through the use of sloped trenches that are backfilled with rock. The trenches will convey leachate, by gravity, to the leachate sump, where it will be pumped out and removed from the landfill.

G.3.a.1 Chemical Compatibility--

The LCRS components will be constructed of materials which are chemically resistant to the MSW and the leachate expected to be generated. The LCRS will include pipes and

ATTACHMENT 9

REVISED DRAWING 17

ATTACHMENT 10

REVISIONS TO STORMWATER CALCULATIONS

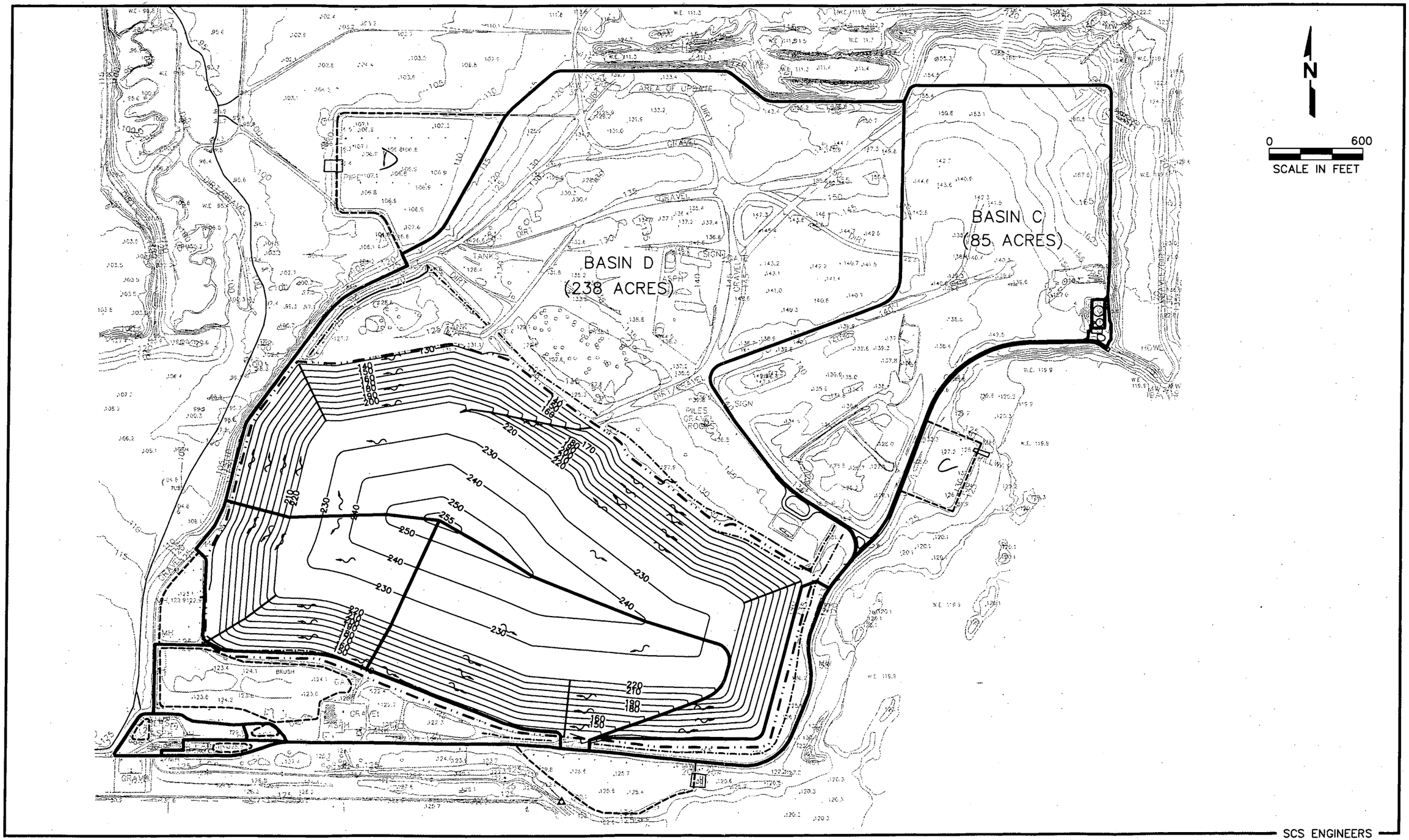


Figure 1. Pre–Development Drainage Basins.

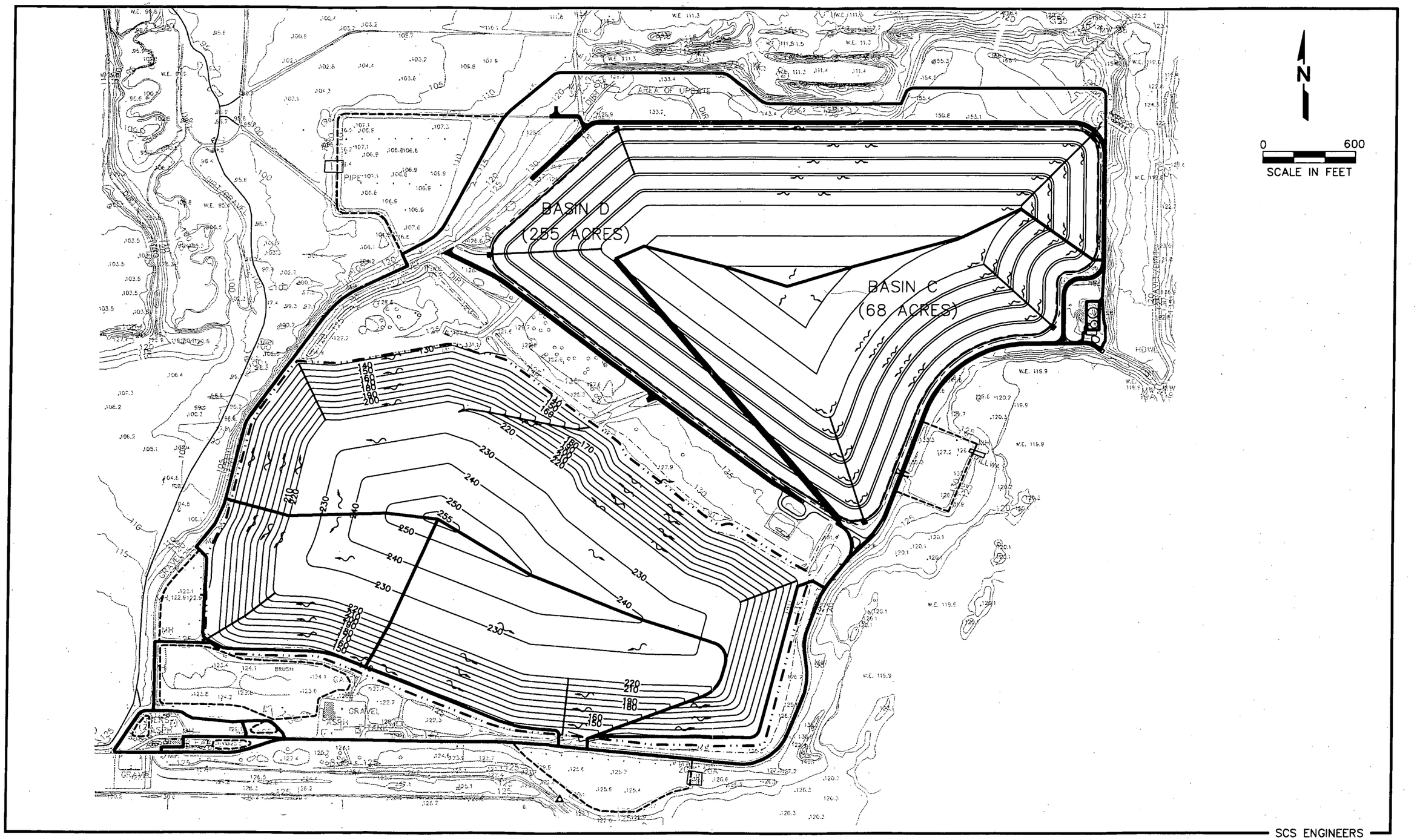


Figure 1. Post–Development Drainage Basins.

Outlet Structure File: BASIN-C .STR

POND-2 Version: 5.20 S/N: 1903052002
Date Executed: Time Executed:

>>>>>> Structure No. 2 <<<<<<
(Input Data)

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)?	128.5
E2 elev.(ft)?	~~132.001~~
Crest elev.(ft)?	128.5
Diameter (ft)?	3
Weir coefficient?	2.67
Orifice coefficient?	0.60
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: BASIN-C .STR

POND-2 Version: 5.20 S/N: 1903052002
Date Executed: Time Executed:

>>>>>> Structure No. 3 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)? 130.75
E2 elev.(ft)? 132.001
Weir coefficient? 3.33
Weir elev.(ft)? 130.75
Length (ft)? 20
Contracted/Suppressed (C/S)? C

Outlet Structure File: BASIN-C .STR

POND-2 Version: 5.20 S/N: 1903052002
Date Executed: Time Executed:

>>>>>> Structure No. 1 <<<<<<
(Input Data)

TABLE
Input your own rating table.
E1 (ft) = 127.5 E2 (ft) = 132.001

Constant (ft) added to each elevation was:

Elev. (ft)	Q (cfs)
127.5	3.81
128	4.76
128.5	5.72
129	6.67
129.5	7.62
130	8.58
130.5	9.53
131	10.48
131.5	11.43
132	12.39

Outlet Structure File: BASIN-D .STR

POND-2 Version: 5.20 S/N: 1903052002
Date Executed: Time Executed:

>>>>>> Structure No. 3 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)? 115
E2 elev.(ft)? 116.001
Weir coefficient? 3.33
Weir elev.(ft)? 115
Length (ft)? 80
Contracted/Suppressed (C/S)? C

Outlet Structure File: BASIN-D .STR

POND-2 Version: 5.20 S/N: 1903052002
Date Executed: Time Executed:

>>>>>> Structure No. 2 <<<<<<
(Input Data)

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)?	107.9
E2 elev.(ft)?	116.001
Crest elev.(ft)?	107.9
Diameter (ft)?	5
Weir coefficient?	2.67
Orifice coefficient?	0.60
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: BASIN-D .STR

POND-2 Version: 5.20 S/N: 1903052002
Date Executed: Time Executed:

>>>>>> Structure No. 1 <<<<<<
(Input Data)

TABLE
Input your own rating table.
E1 (ft) = 108 E2 (ft) = 116.001

Constant (ft) added to each elevation was:

Elev. (ft)	Q (cfs)
108	14.17
108.5	17.71
109	21.26
109.5	24.8
110	28.34
110.5	31.89
111	35.43
111.5	38.97
112	42.51
112.5	46.06
113	49.6
113.5	53.14
114	56.69
114.5	60.23
115	63.77
116	70.86

ATTACHMENT 11

ISOLATION BERM CALCULATION

SCS ENGINEERS

SHEET 1 OF 1

CLIENT	PROJECT	JOB NO.
HILLS CNTY	SECTION 1	09195029.55
SUBJECT	BY LKS	DATE 5-12-00
	CHECKED	DATE

OBJECTIVE: CALCULATE IF 2' TALL BERM IS OF SUFFICIENT HEIGHT TO RETAIN STORMWATER.

APPROACH: CALCULATE VOLUME OF RUNOFF FROM RAINFALL AND COMPARE TO BERM HEIGHT AND PUMP RATE

- DESIGN STORM = 8.4"
- AREA = 1/2 OF SECTION 1

$$\text{VOLUME} = \frac{12 \text{ ACRES}}{2} \times \frac{8.4''}{12''/\text{FT}} = 182,952 \text{ CF}$$

$$= 1,400,000 \text{ GALLONS}$$

PUMP RATE = 150 gallons / MINUTE

$$\text{TIME TO PUMP} = \frac{1.4 \text{ MGAL}}{150} = 155 \text{ HOURS}$$

$$= 6.5 \text{ days}$$

CONCLUSION: BERM HEIGHT IS SUFFICIENT.

- 8.4" < 2' STORAGE CAPACITY
- 1 WEEK SUFFICIENT TIME TO DRAIN DESIGN STORM of 25-YEAR/24 HOUR

ATTACHMENT 12

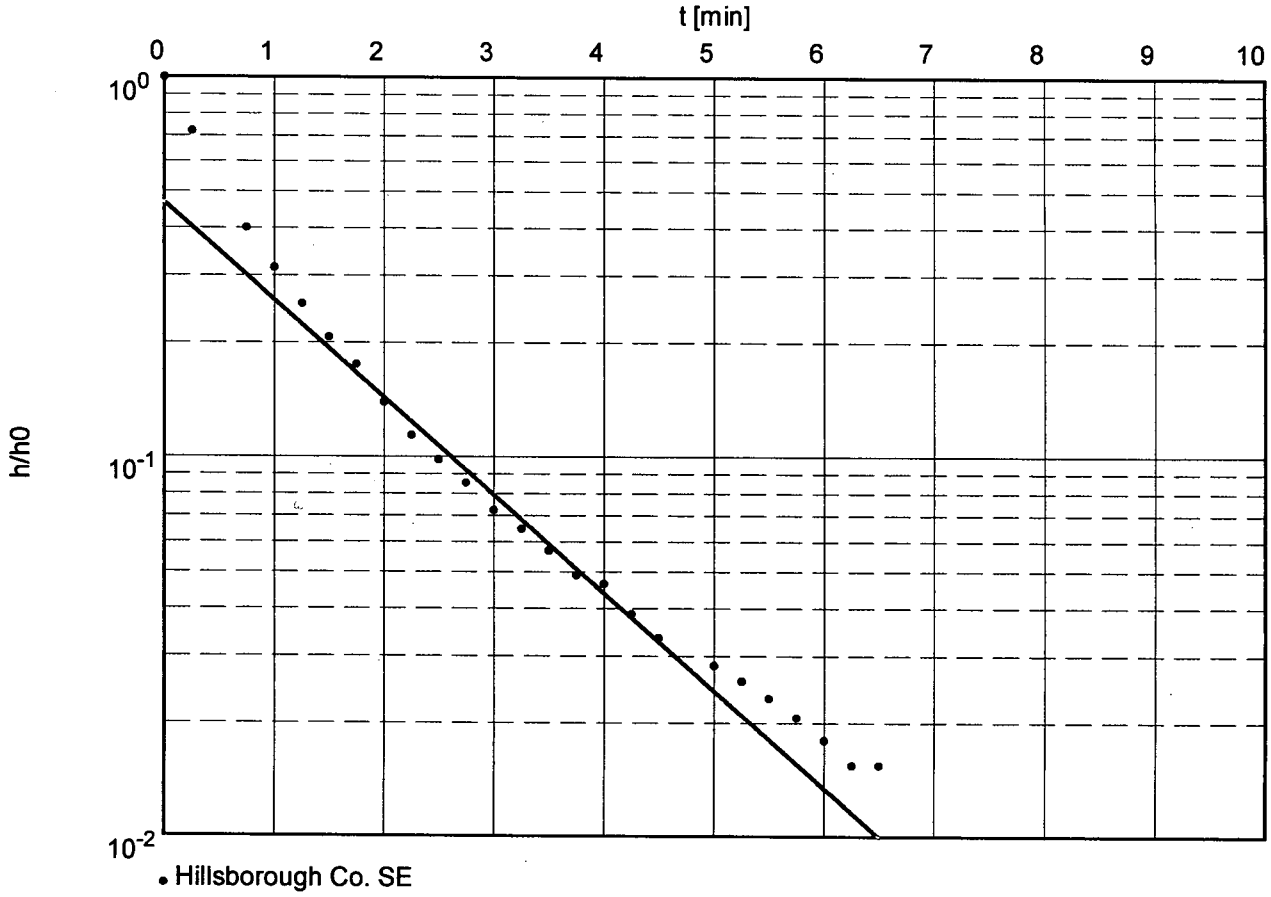
REVISED DRAWING 8

ATTACHMENT 13

REVISED PLOT

Barnes, Ferland & Associates 3655 Maguire Boulevard, Suite 150 Orlando, Florida 32803 ph.(407) 896-8608	slug/bail test analysis BOUWER-RICE's method	Page 1 Project: Hillsborough Co. SE Landfill Evaluated by: MM | Date: 6/4/97

Slug Test No. 2	Test conducted on: May 1, 1997
Well P-1D	



Hydraulic conductivity [ft/min]: 1.68×10^{-3}

Hydraulic conductivity (ft/day)= 2.25 ft/day

ATTACHMENT 14

REVISED PAGE H-5

H.1.g Well Inventory and Details

Figure H-3 shows monitoring wells (active and inactive) related to the SCF facility, including wells on and adjacent to Section 1. Table H-3 lists SWFWMD well construction permit data for 16 sections of land immediately surrounding Section 1 for the period of record from January 1, 1970 to November 29, 1999.

TABLE H-3. SUMMARY OF WELL CONSTRUCTION PERMIT DATA

S-T-R	Number of Wells by Types of Use							
	Irr.	Dom.	P.S.	Test	Obs.	LS	Repair	Total
10-31-21	7	1	1	0	0	0	0	9
11-31-21	0	0	0	0	0	0	0	0
12-31-21	0	15	0	0	0	0	0	15
13-31-21	1	4	0	1	0	0	0	6
14-31-21	0	0	0	7	8	0	0	15
15-31-21	0	1	0	1	0	0	0	2
22-31-21	1	0	1	8	13	0	0	23
23-31-21 Sec on-site	0	0	2	6	12	0	0	20
24-31-21	2	10	0	0	0	0	0	12
25-31-21	3	10	0	0	0	0	0	10
26-31-21	4	7	0	0	0	1	0	12
27-31-21	4	6	0	0	0	0	0	10
7-31-22	4	19	2	0	0	0	1	26
18-31-22	2	6	1	0	0	0	0	9
19-31-22	2	14	1	5	8	1	0	31
30-31-22	0	11	1	0	2	0	0	14
Total	30	101	9	28	43	2	1	214

Notes:
S-T-R: Section, Township South, Range East
Irr.: Irrigation.
Dom: Domestic
P.S.: Public Supply
Test: Test Well.
Obs.: Observation Well.
LS: Livestock Well.
Repair: Repaired well - unknown use.

H.1.h Topography, Soil Types and Surface Water Drainage Systems

Discussed in Sections H.1.f and H.1.b above.

H.1.i Well Inventory

Discussed in Section H.1.g above.

ATTACHMENT 15

REVISED FIGURE L-3 AND PAGE I-7

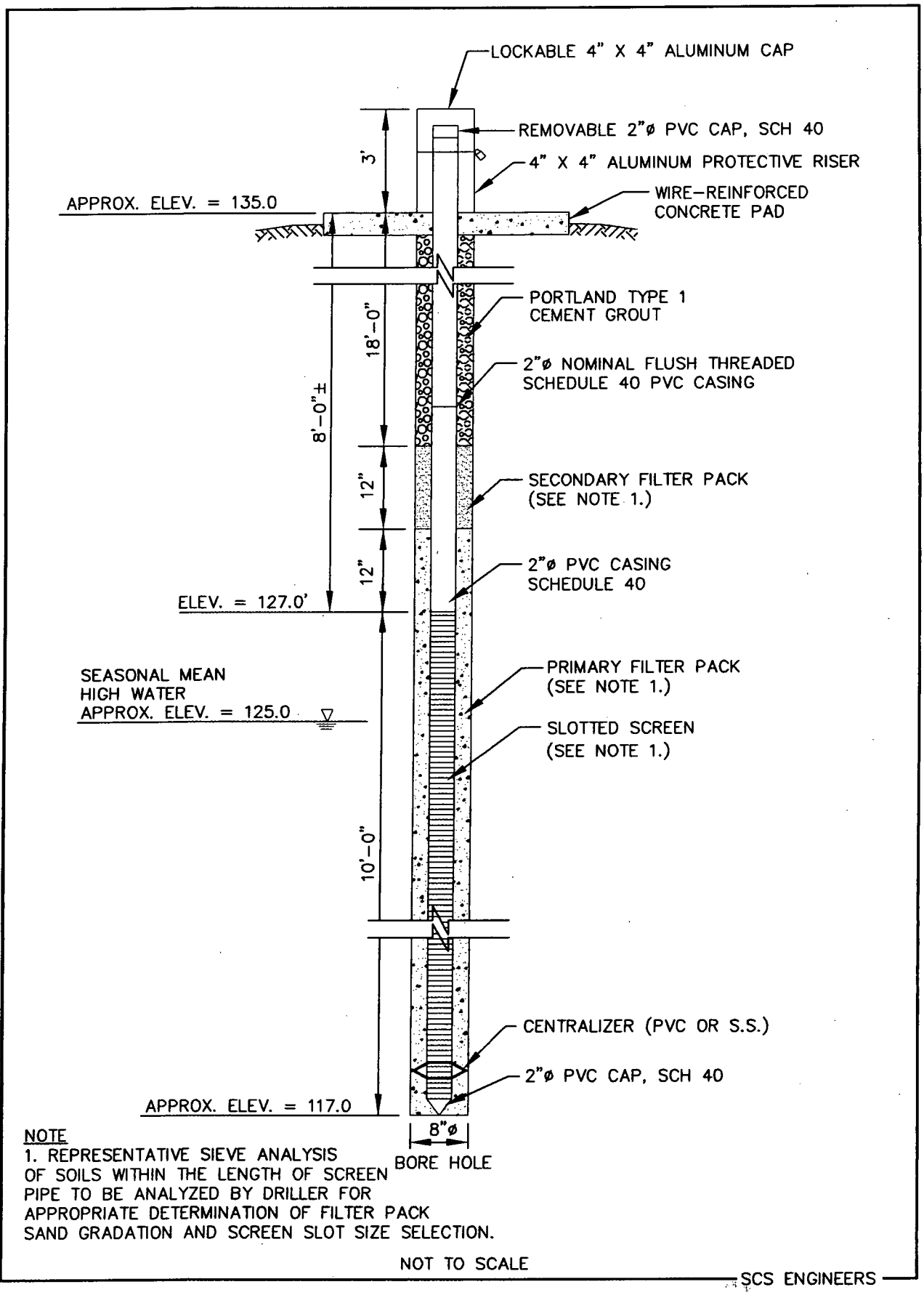


Figure L-3. Design of Groundwater Monitoring Well.

I.1.c Estimated Average and Maximum High Water Table Elevation

Due to mining activities, groundwater potentiometric elevations in the surficial aquifer are difficult to measure accurately. Placement of mixed clayey soils and lenses of phosphatic clay layers tend to form elevated or perched water elevations. BFA installed a series of piezometer, numbered P-1D through P-6D, to aid in the determination of the surface potentiometric elevations of the surficial aquifer across the Site. Piezometers P-1S through P-5S were installed to determine the depth of perched water above the phosphate clay layers. The location of the piezometers are shown in Section H, Figure H-8 and H-9, of this permit application. The Hillsborough County Solid Waste Management Department (HCSWMD) will continue to gather information from the piezometer to refine the potentiometric maps.

Based upon the information collected, the initial groundwater elevations estimates in the Section 1 area indicate a high potentiometric elevation varying from Elevation 124 NGVD on the eastern side of Section 1 to Elevation 122 NGVD on the western side of Section 1. Average seasonal elevations will be developed upon further collection of data from the piezometers. Data collected from 1997 through 1999 indicates seasonal high water as 125 NGVD.

I.1.d Foundation Analysis

I.1.d.1 Bearing Capacity--

Based upon the settlement and slope stability calculations, outlined below, performed on the foundation soils in the Section 1 area, the foundation soils beneath the Section 1 area have sufficient bearing capacity to adequately support the proposed landfill design.

I.1.d.2 Settlement--

Based upon soil boring information collected during previous Site investigations and soil borings conducted specifically for the Section 1 expansion area, settlement calculations were estimated for the Section 1 area and generally across the Site. Due to the slope stability concerns and the extended time required to consolidate the phosphatic clay layers, the phosphatic clay soils are to be removed from the Section 1 area. Settlement calculations within the Section 1 area and across the Site assume the removal of the upper phosphatic clay materials. Settlement upon removal of the phosphatic clays in Strata 1, as identified by BFA, will be minimized by compacting the backfill in lifts. Initial settlement calculations were computed by BFA assuming the lower two strata, specifically Strata 2 and Strata 3, were comprised of highly compressible clayey sands and clays. This resulted in a highly conservative estimate of consolidation settlement in the center of the Site. SCS reevaluated the settlement with greater refinement and took into account test results and a hardpan layer located at approximately Elevation 105 to Elevation 110. Strata 2 exhibits characteristics of silty sand and not the compressive clayey sand BFA had assumed. The silty sands dissipate pore water pressure rapidly and therefore settlement in this layer was computed using instantaneous calculations. The hardpan layer will not consolidate and will provide a stress dissipation layer for the underlying soils. The dissipated stress will therefore minimize

ATTACHMENT 16

REVISED COST SHEETS

9. Authorized agent/Consultant: SCS Engineers

Mailing address: 3012 U.S. Highway 301 North, Suite 700., Tampa, FL 33619
Street or P.O. Box City State Zip

Contact person: Robert B. Gardner, P.E. Telephone: (813) 621-0080

Title: Vice President

10. Landowner (if different than applicant): N/A

Mailing address: _____
Street or P.O. Box City State Zip

Contact person: _____ Telephone: ( )

11. Cities, towns and areas to be served: Tampa, Temple Terrace, Plant City, Hillsborough County

12. Population to be served:

Current: 939,670 Five-Year Projection: 995,000

13. Volume of solid waste to be received: 1,500 yds^3/day (tons/day) gallons/day

14. Date site will be ready to be inspected for completion: FDEP to be notified (see Attachment A-1)

15. Estimated life of facility: Section 1 = 3 years

16. Estimated costs:

Total Construction: $4,700,000 (See Attachment A-2) Closing Costs: $1,351,000 (See Attachment Q-1)

7. Anticipated construction starting and completion dates:

From: FDEP to be Notified To: FDEP to be Notified

SECTION Q

FINANCIAL RESPONSIBILITY

Q.1 COST ESTIMATES

The Hillsborough County Solid Waste Management Department (HCSWMD) is required by Rule 62-701.630, FAC, to provide FDEP a description of the financial mechanism that demonstrates proof of financial assurance for closure and long-term care of the facility.

Each year, closure and long-term care cost estimates will be prepared for the facility in accordance with Rule 62-701.630(3) and (4), FAC. In preparing the closure cost estimates, the following assumptions are to be made:

- The closure cost estimates include the permitted areas of the landfill.
- Construction of the closure will be performed under contract by a private contractor.
- The cost estimates are prepared for the time period during the landfill operation when the extent and manner of the landfill's operation make closing the most expensive.
- The closure cost estimate assumes a geomembrane cover system over the entire landfill.
- Long-term care costs include land surface care, landfill gas control, leachate control, groundwater and surface water monitoring, and administration.

The closure and long-term care cost estimate prepared by SCS Engineers is included in Attachment Q-1. Closure of Section 1 is estimated to cost $1,351,000. Long-term care is estimated to cost $63,100 per year or $1,893,000 for the 30-year care period required by Rule 62-701.630(3)(a), FAC.

Q.2 ANNUAL COST ESTIMATES

An annual cost adjustment statement will be provided to FDEP in accordance with Rule 62-701.630(4), FAC. The statement will address closure and long-term care costs.

Q.3 FUNDING MECHANISMS

The financial assurance statement for closure and long-term maintenance of Section 1 is included in Attachment Q-1.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

FINANCIAL ASSURANCE COST ESTIMATES

Date: May 10, 2000

Date of FDEP Approval: _____

I. GENERAL INFORMATION:

Facility Name: Southeast Landfill GMS No. 4029C30075

Permit No.: SC29-158540 Expiration Date: _____

Address (facility): 8.8 miles east of U.S. Hwy 301 on County Road 672

Address (mailing): P.O. Box 1110, Tampa, FL 33601

Permittee (operating authority): Hillsborough County Department of Solid Waste

Facility Lat. 27° 46' 35" N Long 82° 10' 38" W or UTM's _____

Description of the Solid Waste Disposal Units included: Section 1, Capacity Expansion

Landfill Acreage included in this Estimate: The Capacity Expansion footprint is 147 acres; the final closure area is 12 acres; 12.6 acres including the sideslopes. The estimate assumes that the closure will include Section 1 only.

Date Disposal Unit began Accepting Waste _____ Design Life of Disposal Unit _____

Type of Landfill: X Class I _____ Class III (C&DD)

____ Exempt; Type of Exemption: _____

Closure Plan Approved: Yes / (No)

II. TYPE OF FINANCIAL DOCUMENT SUBMITTED TO ENSURE FINANCIAL ASSURANCE:

____ Trust Fund Agreement

____ Letter of Credit

____ Insurance Certificate

____ Financial Guarantee Bond

____ Performance Bond (only for landfills with an approved closure plan)

____ Standby Trust Fund Agreement

X Escrow Account

X Other (Explain) Financial Test

III. ESTIMATED CLOSING COST

For the time period in the landfill operation when the extent and manner of its operation makes closing most expensive.

****Third Party Estimate/Quote must be provided for each item.**
****Costs must be for a third party providing all material and labor.**
****All totals rounded to nearest $1,000.**

All items must be addressed.

Attach a detailed explanation for all items marked not applicable (N/A).

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL**	
1. Monitoring Wells:	(2 wells active)				
Borehole Excavation	CY	0	0	0	
Backfill	CY	0	0	0	
Gravel Pack	CY	0	0	0	
Casing	LF	0	0	0	
Screen	EA	0	0	0	
Cap	EA	0	0	0	
			Subtotal Monitor Wells		0
2. Slope and Fill:					
Excavation (Regrading)	CY	29,294	2.04	60,000	
Place and Spread Fill	CY	324	5.49	2,000	
Compaction	CY	0	0	0	
Delivery-Off Site Material	CY	0	0	0	

Note: *Grades have been historically well-maintained at the existing site. Additional costs reflect regrading of temporary access road and temporary sideslope swales prior to placement of geomembrane.*

Subtotal Slope and Fill 62,000

3. Cover Material:				
40-mil Textured Geomembrane	SY	544,500	0.35	191,000
Double-sided Geocomposite	SY	544,500	0.45	245,000
Protective Cover Soil	CY	30,250	6.00	182,000

Note: *Both perimeter sideslope and top slope will be covered with a 40-mil textured geomembrane liner, double-sided geocomposite, and 24 inches of protective soil.*

Subtotal Cover Material 618,000

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL**	
4. Top Soil Cover:	(6", 12.5 acres, off-site source)				
On-Site Material	CY	0	0	0	
Off-Site Material	CY	10,083	5.49	55,000	
Delivery and Spreading	CY	10,083	4.51	45,000	
Compaction	CY	0	0	0	

Note: *All quantities include compaction.*

Subtotal Top Soil Cover 100,000

5. Stormwater Control:					
Excavation, Regrading	CY	0	0	0	
Stormwater Sideslope Conveyances	LF	0	0	0	
Downchute Construction	LF	360	61.00	22,000	
Drainage Toe Construction	CY	1,422	41.88	60,000	

Note: *The site has 8 existing stormwater basins which are maintained regularly. Therefore, new construction will not be required. Additional costs reflect removing temporary stormwater controls for permanent controls, and adding a rip-rap drainage toe.*

Subtotal Stormwater Control 82,000

6. Gas Migration Control:					
Perimeter Monitor Wells	LF	0	0	0	
Passive LFG Vents (1/ac)	EA	12	1000	12,000	

Note: *Two new perimeter wells were added during construction. Vent construction includes excavation, drilling, backfill, installation and fittings.*

Subtotal Gas Migration Control 12,000

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL**	
7. Revegetation:					
Sodding	SY	2,710	1.25	3,000	
Soil Preparation/Grading	SY	0	0	0	
Hydroseeding (including mulch & fertilizer)	AC	11.9	2,041	24,000	
		0	0	0	
Fertilizer	TN	0	0	0	
Note: *Sideslope swales will be sodded.* Mulch	AC	0	0	0	
			Subtotal Revegetation		27,000
8. Landscape Irrigation System:					
Pipe and Fittings	LF	0	0	0	
Pumps	EA	0	0	0	
Note: *Bahia grass mixture will germinate and remain established with the normal rainfall in this area. The County has constructed a treatment plant with an effluent irrigation system at the landfill. This system could be used for landscape irrigation and there will be no cost associated with this item during closure.*					
			Subtotal Landscape Irrigation System		0
9. Security System: (existing)					
Fencing	LF	0	0	0	
Gate	EA	0	0	0	
Signs	EA	0	0	0	
			Subtotal Security System		0
10. Engineering:					
Closure Plan Report	LS	1	60,000	60,000	
Certified Engineering Drawings (for construction)	LS	1	14,000	14,000	
Closure Permit	LS	1	7,500	7,500	
Other (Detail):		0	0	0	
Certified Drawings also include specifications.					
			Subtotal Engineering		82,000

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL**	
11. Benchmark					
Installation (existing benchmark)	EA	0	0	0	
Survey	LS	0	0	0	
			Subtotal Benchmark Installation		0
12. Certification of Closure	LS	1	66,000	66,000	
			Subtotal Certification of Closure		66,000
13. Administrative					
P.E. Supervisor	HR	82	119.00	10,000	
On-Site Engineer	HR	80	80.00	6,000	
Office Engineer	HR	560	68.00	38,000	
On-site Technician	HR	346	54	19,000	
Other - (Administrative Support)	HR	28	38	1,000	
Note: On site technician considered as Design/Drafting.					
			Subtotal Administrative		74,000
14. Quality Assurance					
P.E. Supervisor	HR	52	119.00	6,000	
On-Site Engineer	HR	685	68	47,000	
Office Engineer	HR	100	80.00	8,000	
On-Site Technician	HR	240	38.00	9,000	
Other - (Administrative costs)	LS	1	14,664	15,000	
Note: *The estimated construction time for Section 1 closure is 120 work days.*					
			Subtotal Quality Assurance		85,000
15. Site Specific Costs (explain):					
Access Road Construction	LS	1	20,244	20,000	
			Subtotal Site Specific Costs		20,000

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL**	
16. Contingency	10% of Total			123,000	
			TOTAL CLOSING COSTS	$1,351,000	

CERTIFICATION BY ENGINEER

This is to certify that the Financial Assurance Cost Estimates pertaining to the engineering features of this solid waste management facility have been examined by me and found to conform to engineering principals applicable to such facilities. In my professional judgement, the Cost Estimates are a true, correct and complete representation of the financial liabilities for closing and long-term care of the facility, and comply with the requirements of Florida Administrative Code (FAC), Rule 62-701.630 and all other Department of Environmental Protection rules, and statutes of the State of Florida. It is understood that the Financial Assurance Cost Estimates shall be revised and submitted to the Department annually as required by FAC 62-701.630(4).

Signature

SCS Engineers, 3012 U.S. Hwy 301 N., Ste. 700
Mailing Address

Robert B. Gardner, P.E., Vice President
Name and Title (please type)

Tampa, FL 33619
City, State, Zip Code

39233
Florida Registration Number (please affix seal)

(813) 621-0080
Telephone Number

Date: May 10, 2000

IV. ANNUAL COST FOR LONG-TERM CARE

(for 20 or (30) yrs., see 62-701.600(1)a.1.
(circle one)

****Third Party Estimate/Quote must be provided for each item.**
****Costs must be for a third party providing material and labor.**
****All Annual Costs rounded to nearest $1,000.**

All items must be addressed. Attach a detailed explanation for all items marked not applicable (N/A).

DESCRIPTION	UNIT (A)	QUANTITY (B)	UNIT COST (C)	ANNUAL COST** (D)=(A)x(B)x(C)	

1. Groundwater Monitoring 62-701.510(6), (8)(a)	Sampling frequency events/yr	# of wells	$/well/event	$/yr
Monthly	0	0	0	0
Quarterly	0	0	0	0
Semi-Annual	2	2	1,429	6,000
Annual	0	0	0	0

Subtotal Groundwater Monitoring 6,000

2. Gas Monitoring 62-701.400(10)	Sampling frequency events/yr	# of locations	$/location/ event	$/yr
Monthly	0	0	0	0
Quarterly	4	2	250	2,000
Semi-Annual	2	0	0	0
Annual	0	0	0	0

Subtotal Gas Migration Monitoring 2,000

3. Leachate Monitoring 62-701.510(6)(b)1 62-701.510(8)(c),(d)	Sampling frequency events/yr	# of locations	$/location/ event	$/yr
Weekly	52	0	0	0
Monthly	12	0	0	0
Quarterly	4	0	0	0
Semi-Annual	2	1	439	1,000
Annual	1	1	5,385	5,000

Subtotal Leachate Monitoring 6,000

DESCRIPTION	UNIT (A)	QUANTITY (B)	UNIT COST (C)	ANNUAL COST** (D)=(A)x(B)x(C)	

4. Surface Water Monitoring 62-701.510(4),(8)(b)	Sampling frequency events/yr	# of locations	$/location/ event	$/yr
Monthly	0	0	0	0
Quarterly	0	0	0	0
Semi-Annual	0	0	0	0
Annual	0	0	0	0

Note: *Five locations are monitored under the existing permit.*

Subtotal Surface Water Monitoring 0

5. Maintenance of Leachate Collection/Treatment Systems				
Collection Pipes	LF	3,400	1.03	4,000
Sumps, Traps	EA	1	1,077	1,000
Lift Stations	EA	0	0	0
Impoundments-				
Liner Repair	SF	0	0	0
Sludge Removal	DAY	0	0	0
Aeration Systems-				
Floating Aerator	EA	0	0	0
Spray Aerator	EA	0	0	0
Off-Site Disposal	1,000 gal	0	0	0
On-Site Pretreatment System Maint.	LS	0	0	0

Note: *The leachate treatment and reclamation facility is covered under the existing permit.*

Description: Leachate treatment O&M Cost (includes maintenance supplies, chemicals, sludge removal, electricity and miscellaneous).

Subtotal Leachate Collection/Treatment System Maintenance 5,000

DESCRIPTION	UNIT (A)	QUANTITY (B)	UNIT COST (C)	ANNUAL COST** (D)=(A)x(B)x(C)	
6. Maintenance of Groundwater Monitoring Wells	LF	21	4.20	100	
			Subtotal Groundwater Monitoring Well Maintenance		100
7. Maintenance of Gas Migration System					
Vents	LF	120	6.00	1,000	
Wells	LF	168	6.00	1,000	
Blowers	EA	0	0	0	
Flaring Units	EA	0	0	0	
Meters, Valves	EA	0	0	0	
Note: *Passive system designed for closure.*					
			Subtotal Gas Migration System Maintenance		2,000
8. Landscape Maintenance					
Mowing	AC	12.5	323.20	4,000	
Fertilizer	AC	0	0	0	
Irrigation	AC	0	0	0	
			Subtotal Landscape Maintenance		4,000
9. Benchmark Maintenance	LS	0		0	
Note: *Benchmark maintenance included under the existing permit.*					
			Subtotal Benchmark Maintenance		0
10. Administrative/Overhead					
P.E. Supervisor	HR	0	0	0	
On-Site Engineer	HR	0	0	0	
(1) Equip. Operator	HR	416	26.79	11,000	
On-Site Technician	HR	416	23.69	10,000	
Other (explain):					
(2) Laborers	HR	832	6.00	5,000	
Electricity-include: Leachate Pumps, Blowers, Lighting, etc.	LS	0	0	0	
Note: *P.E. supervisor, on-site engineer, and electricity are on site and covered under the existing permit.*					
			Subtotal Administrative		26,000

DESCRIPTION	UNIT (A)	QUANTITY (B)	UNIT COST (C)	ANNUAL COST** (D)=(A)x(B)x(C)	
11. Maintenance of Cover					
Sodding, Soil	LS	1	1,000	1,000	
Regrading	AC	0	0	0	
Liner Repair-Synthetic	SY	0	0	0	
Clay	CY	0	0	0	

Note: *Regrading is included in sodding/soil costs. Geosynthetics are covered by protective cover soil and vegetation.*

Subtotal Cover Integrity Maintenance 1,000

12. Surface Water Drainage Maintenance				
Ditch Cleaning	EA	0	0	0
Stormwater Conveyance Maint.	CY	0	0	0

Note: *Surface water drainage maintenance is covered under the existing permit.*

Subtotal Drainage Maintenance 0

13. Security System Maintenance				
Fences	LF	0	0	0
Gate(s)	EA	0	0	0
Sign(s)	EA	0	0	0

Note: *Security system maintenance is covered under the existing permit.*

Subtotal Security System Maintenance 0

14. Remedial Actions	LS	1	5,000	5,000

Subtotal Remedial Actions 5,000

15. Site Specific Costs (explain)				
Fleet Maintenance	LS	0	0	0

Note: *Fleet maintenance is covered under the existing permit*

Contingency @ 10% (Items 1 through 15) 5,710

Subtotal Site Specific Costs 6,000

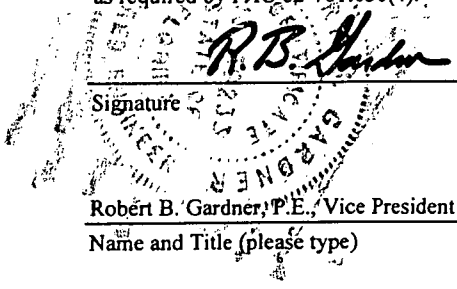
LONG-TERM CARE COSTS ($/yr) 63,100

TOTAL LONG-TERM CARE COSTS($) 1,893,000

Long-Term Care Costs = ($/yr x 30)

CERTIFICATION BY ENGINEER

This is to certify that the Financial Assurance Cost Estimates pertaining to the engineering features of this solid waste management facility have been examined by me and found to conform to engineering principals applicable to such facilities. In my professional judgement, the Cost Estimates are a true, correct and complete representation of the financial liabilities for closing and long-term care of the facility, and comply with the requirements of Florida Administrative Code (FAC), Rule 62-701.630 and all other Department of Environmental Protection rules, and statutes of the State of Florida. It is understood that the Financial Assurance Cost Estimates shall be revised and submitted to the Department annually as required by FAC 62-701.630(4).



Signature

SCS Engineers, 3012 U.S. Hwy 301 N., Ste.700
Mailing Address

Robert B. Gardner, P.E., Vice President
Name and Title (please type)

Tampa, FL 33619
City, State, Zip Code

39233
Florida Registration Number (please affix

(813) 621-0080
Telephone Number

Date: May 10, 2000

CLIENT Hondo	PROJECT Capacity Expansion	JOB NO. 09195029.35
SUBJECT Closure Cost Estimate	BY Sheila	DATE 12-1-99
Section 1	CHECKED Ken	DATE 2-15-00

REVISED SCW 5-3-00

KAS 5-3-00

3. COVER MATERIAL

- 40 MIL GEOMEMBRANE, 12.5 ac

$$\frac{12.5\ ac}{} \left| \frac{43560\ FT^2}{ac} \right. = 544,500\ FT^2$$

GEOMEMBRANE UNIT COST = 0.35 / FT²

- DOUBLE SIDED GEOCOMPOSITE
  UNIT COST = 0.45 / FT²

GEOMEMBRANE + GEOCOMPOSITE COST
= (0.35 + 0.45) / FT² INSTALLED
= 0.80 / FT²

$$\frac{544,500\ FT^2}{} \left| \frac{0.80}{FT^2} \right. = \$435,600$$

18" PROTECTIVE COVER SOIL (PCS)

$$\frac{18''}{} \left| \frac{1\ FT}{12''} \right| \frac{12.5\ ac}{} \left| \frac{43,560\ FT^2}{ac} \right| \frac{(1\ YD)^3}{(3\ FT)^3}$$

= 30,250 cy

OFFSITE SOIL @ $6.00 / cy (ESTIMATE)

$$\frac{30,250\ cy}{} \left| \frac{\$6.00}{cy} \right. = \$181,500$$

CLIENT Hdoro	PROJECT Capacity Expansion	JOB NO. 09195029.35
SUBJECT Closure Cost Estimate Section 1	BY Sheila	DATE 12-1-99
	CHECKED Kms	DATE 2-15-00

Revised SCW 5-3-00 Kms 5/

3. SUBTOTAL COVER MATERIAL

$435,600
181,500
$617,100

4. TOP SOIL COVER

6" OFF SITE SOURCE

$$\frac{6''}{12''} \left| \frac{1\,FT}{} \right| \frac{12.5\,ac}{} \left| \frac{43560\,FT^2}{ac} \right| \frac{(1\,YD)^3}{(3\,FT)^3}$$

= 10,083 cy

UNIT COST FROM 1999 SCLF FINASS
= $5.49 / cy MATERIAL - OFF SITE SOURCE

$$\frac{10,083\,cy}{} \left| \frac{\$5.49}{cy} \right. = \$55,356$$

UNIT COST FROM 1999 SCLF FINASS
DELIVERY & SPREADING
$3.33 + 1.18
= $4.51 / cy

$$\frac{10083\,cy}{} \left| \frac{\$4.51}{cy} \right. = \$45,474$$

ATTACHMENT 17

REVISED PAGE 15080-5

3.04 PERFORATIONS

A. Horizontal Access Pipe: Where indicated on the Drawings, perforations shall be 120 degrees apart on the bottom of the pipe, 0.5 inches in diameter and spaced every 6 inches along the length of the pipe.

B. Leachate Collection Pipe and Drain Pipe: Where indicated on the Drawings, perforations shall be 120 degrees apart on the bottom of the pipe, 0.5 inches in diameter, and spaced a every 6 inches along the length of the pipe.

3.05 CERTIFICATION OF COMPLETION

A. Upon completion of the covering operation over the pipe, the CONTRACTOR shall certify the following to the COUNTY:

1. The piping system has been constructed in accordance with the approved project plans and specifications.

2. The piping system has not been damaged during construction or the backfilling operation.

- END OF SECTION -

ATTACHMENT 18

REVISED PIPE CALCULATION

SCS ENGINEERS

Client	Project	Job No.
Hillsborough County	Southeast County Landfill	0995029.35

Subject	By	Date
Landfill Expansion Design Calculations	D. Penoyer	Nov. 22, 1999
Pipe Strength Analysis	Checked JAS	Date 5-15-00

Objective:

Verify that the leachate collection system pipe has adequate strength.

Approach:

1. Check Wall Crushing
2. Check Wall Buckling
3. Check Ring Deflection

Assumptions and Givens:

Drainage Sand Density (γ_s) =	110 lb/ft^3	
Drainage Sand Thickness (d_s) =	24 inches	
Waste Density (γ_w) =	74 lb/ft^3	(i.e., Ash = 2,000 lb/yd^3)
Waste Depth (d_w) =	168 ft	**(see below)**
Compactor weight (W_c) =	76,760 lb	
Compactor wheel width (w_c) =	47 inches	
Compactor wheel length (l_c) =	60 inches	
Compactor wheelbase (WB_c) =	150 inches	
Pipe Nominal Diameter =	4 inches → DID NOT	
Standard Dimension Ratio (SDR) =	17 CHANGE ANY	
Pipe Inner Diameter (ID) =	5.845 inches OTHER VALUES.	
Pipe wall thickness (t) =	0.390 inches	
Pipe Outer Diameter (OD) =	6.625 inches	

** Max. Landfill elev. = 307 ft (Sheet 3 of 22), avg base elev = 140 ft (Sheet 5 of 22)

Solution:

Note: Based on experience, the maximum stress on pipes in a landfill occur at the maximum waste thickness.

1. Wall Crushing Analysis
   - Follows Driscopipe Design Manual calculations.

Total Pipe Pressure (P_T) = static (P_s) + Live (P_L) + Internal (P_I)

P_s = Overburden pressures from soil, waste, equipment
P_L = Due to dynamic loads
P_I = Due to vacuum or pressure inside pipe.

P_L = 0 psi because waste thickness is so great
P_I = 0 psi because non-vacuum, non-pressure application
P_s = pressure(soil) + pressure(waste) + pressure(equipment)
= $\gamma_s(d_s) + \gamma_w(d_w) + 0$ (equipment negligible due to waste thickness)
= 220 + 12,432 + 0
= 12,652 lb/ft^2
P_s = 88 psi

Therefore,

P_T = 88 psi

ATTACHMENT 19

REVISED CQA PLAN PAGES

As indicated in the Specifications, welding shall not occur when ambient air temperatures measured one-foot above the geomembrane are below 32-degrees F or above 104-degrees F and as noted in the Specifications. Preheating of the seams may be used if trial seams have been performed using the same preheating method(s) and meet all criteria for acceptance. Wind conditions shall also be considered in determination of acceptable ambient conditions.

General Seaming Procedures--During seaming, the CQA Consultant shall verify the following conditions:

- Seaming shall extend to the outside edge of panels placed within the anchor trench.
- A firm substrate shall be provided using a flat board or similar hard surface directly under the seam overlap to achieve proper support, if necessary.
- "Fishmouths" or wrinkles at the seam overlap shall be cut along the ridge in order to achieve a flat overlap. The cut "fishmouth" or wrinkle shall be seamed and any portion where the overlap is inadequate shall be patched with an oval or round geomembrane patch that extends a minimum of 6 inches beyond the cut in all directions.
- Adequate lighting shall be provided if seaming operations are performed at night or during periods of diminished natural light.
- Startup testing is conducted and recorded prior to initiating welding.

Nondestructive Testing of Field Seams--The Installer shall nondestructively test all field seams over their full length using a vacuum test unit, air pressure test (double fusion seams only), or other approved method. The purpose of this testing is to determine the continuity of the seams only. Nondestructive testing shall be performed as work progresses, not at completion.

The CQA Consultant shall observe nondestructive testing procedures and inform the Installer and Owner of required repairs. The CQA Consultant shall record the location, date, name, and outcome of all testing.

The Installer shall complete required repairs in accordance with the Specifications. The CQA Consultant shall observe the repair and testing of the repair, document the repair and test results, and mark on the geomembrane that the repair has been completed. All repairs shall be shown on the record Drawings, or if this is not practical, noted in repair logs and on daily reports.

Vacuum testing equipment and methods are discussed in the Specifications.

Air pressure testing procedures are applicable to fusion-welding that produces a double seam with an enclosed air channel. The equipment and methods are discussed in the Specifications.

Placement of Soil Materials--

The Earthwork Contractor or Installer shall place all soil materials on top of a geotextile in such a manner as to minimize:

- Damage to the geotextile.
- Slippage of the geotextile on underlying layers.
- Excess tensile stresses in the geotextile.

Any noncompliance shall be noted by the CQA Consultant and reported to the Installer and Owner.

Geocomposite (Geonet)

Quality Control Documentation--

This quality assurance testing program has been established to verify that specified geonets are manufactured, installed and tested according to Specifications.

The geonet manufacturer shall provide the CQA Consultant with a list of guaranteed properties for the type of geonet to be supplied, with a written certification signed by an officer or the Quality Control Manager that the geonets delivered have properties which meet or exceed the guaranteed properties.

The CQA Consultant shall examine all manufacturer's certifications to verify that the property values listed on the certifications meet or exceed those specified. Any deviations shall be reported to the Owner and Manufacturer.

The geonet manufacturer shall identify all rolls of geonets with the following:

- Manufacturer's name.
- Product identification.
- Lot number.
- Roll number.
- Roll dimensions.

The CQA Consultant shall examine rolls upon delivery and any deviation from the above requirements shall be reported to the Owner and Manufacturer.

- In the presence of wind, all geonets shall be weighed with sandbags or the equivalent. Such sandbags shall be placed during placement and shall remain until replaced with cover material.

- The Installer shall take necessary precautions to prevent damage to underlying layers during placement of the geonet.

The CQA Consultant shall note any noncompliance and report it to the Owner.

Repair--

Holes or tears in the geonet shall be repaired by placing a patch extending 2 feet beyond the edges of the hole or tear. The patch shall be secured to the original geonet by spot welding or tying every 6 inches.

Geocomposite Clay Liners

This quality assurance testing program has been established to verify that specified the geosynthetic clay liner (GCL) is manufactured, installed and tested according to project Specifications.

Manufacturer Quality Control Documentation--

The GCL Manufacturer shall provide the CQA Consultant with the following information prior to the installation of the GCL:

- A list of materials Specification for the GCL which includes all properties contained in the project Specifications measured using the appropriate test methods.

- Written certification that the minimum average roll values given in the Specification are guaranteed by the Manufacturer.

- Written certification that the Manufacturer has continuously inspected the geotextile component for the presence of needles and found the geotextile to be needle free.

- Quality control certifications, which shall include roll identification numbers, sampling procedures, and quality control test results signed by a responsible party employed by the Manufacturer. At a minimum, results shall be given for:

    1. Mass per unit area (ASTM D 5993).
    2. Grab Strength (ASTM D 4632).
    3. Permeability (ASTM D 5084).

- Results of quality control tests conducted by the Manufacturer to verify the GCL meets the project Specifications.

Quality control tests shall be performed in accordance with test methods and frequencies required by the project Specifications.

All rolls of GCL shall be identified by the Manufacturer with the following:

- Manufacturer's Name.
- Roll Number.
- Product Identification.
- Roll Dimensions.

The CQA Consultant shall review these documents to verify that:

- Property values certified by the Manufacturer meet all Specifications listed in the Specifications.
- The Manufacturer's measurements of properties are properly documented and test methods used acceptable.
- Rolls are properly labeled.
- Project Specifications shall be met with the certified minimum average roll properties.
- Quality control certificates have been provided at the specified frequency for all rolls.

Any discrepancies shall be reported to the Owner and Manufacturer.

Conformance Sampling and Testing--

The CQA Consultant shall verify that conformance test samples are obtained for the GCL upon delivery to the site. At a minimum, GCL conformance tests performed are as follows:

- Mass per unit area (ASTM D 5993).
- Grab Strength (ASTM D 4632).
- Permeability (ASTM D 5084).

The CQA Consultant shall select the rolls to be tested. Samples shall be three feet long by the width of the roll, and shall not include the first complete revolution of the roll. Samples shall not include any portion of a roll which has been subjected to excess pressure or stretching. All lots of material and the particular test sample that represents each lot shall be defined before the samples are taken.

Samples shall be taken at a rate of one per lot, but not less than one conformance test per 100,000 square feet of GCL or portion thereof.

The CQA Consultant shall review all conformance test results and accept or reject the roll prior to deployment. All nonconforming test results shall be reported to the Owner and Installer. The CQA Consultant is responsible for reviewing test results to verify that the property values meet or exceed values listed in the project Specifications.

If any failing test results may be the result of the CQA Geosynthetics Laboratory incorrectly conducting the test, the Manufacturer may request a retest to be conducted at the CQA Geosynthetics Laboratory in the presence of a representative of the Manufacturer.

All material from a lot represented by a failing test should be rejected or additional conformance test samples may be taken to isolate the portion of the lot not meeting Specifications. (This procedure is only valid when rolls in a lot are consecutively produced and numbered from one manufacturing line). Additional samples shall be taken from rolls either side of the failing roll, until passing test results are achieved, to establish the range of failure within the lot. All rolls lying within this range of failure shall be rejected.

Storage, Handling and Placement--

GCL shall be protected from ultraviolet light exposure, precipitation, mud, puncture, cutting, or other deleterious conditions during shipment, handling and storage. Rolls shall be shipped and stored in relatively opaque and watertight wrapping which shall be removed shortly before deployment.

The Installer shall handle all GCL in such a manner as to minimize damage, and the following shall be complied with:

- The entire surface of the GCL shall be visually inspected to ensure that no potentially harmful foreign objects are present.
- The Installer shall take any necessary precautions to prevent damage to subgrade during placement of the GCL.
- Care shall be taken not to entrap stones, excessive dust, or moisture within the GCL that could cause or clogging to other geosynthetics.

- After installation, a visual examination of the GCL shall be carried out over the entire surface, to verify that no potentially harmful foreign objects, such as needles or staples, are present.

Seaming Procedures--

The GCL shall be overlapped in accordance with the requirements of the Specifications. In general, no horizontal seams shall be allowed on side slopes, except as part of a patch.

Sufficient loose bentonite shall be used at the seams to provide for a seal, in accordance with manufacturer recommendations.

Defects and Repairs--

Holes or tears in the GCL shall be repaired with a patch of the same GCL. Should any tear exceed ten percent of the width of the roll, that roll shall be removed and replaced. Soil or other material which may have penetrated the torn area.

The CQA Consultant shall observe any repairs and report any noncompliance to the Owner.

Placement of Overlying Materials--

The Installer shall place all remaining geosynthetic materials on top of a GCL in such a manner as to minimize:

- Damage to the GCL.
- Slippage of the GCL.
- Excess tensile stresses in the GCL.

Any noncompliance shall be noted by the CQA Consultant and reported to the Installer and Owner.

DOCUMENTATION

An effective CQA Program depends largely on recognition of all construction activities that shall be monitored, and on assigning responsibilities for the monitoring of each activity. This is most effectively accomplished and verified by the documentation of quality assurance activities. The CQA Consultant shall document that quality assurance requirements have been addressed and satisfied.

The CQA Consultant shall maintain at the site a complete file of design plans, project Specifications, test procedures, daily logs, and other pertinent documents.

Reports

Standard reporting procedures shall include preparation of a daily report which, at a minimum, shall consist of:

- A daily summary report including memoranda of meetings and discussions with the Owner and/or site contractors.

- Observation logs detailing construction activities for the day, and test results, as appropriate.

Other forms of daily recordkeeping to be used as appropriate include construction problem and solution data sheets and photographic reporting data sheets. This information shall be regularly submitted to and reviewed by the Owner.

Daily Logs and Summary Reports--The CQA Consultant shall prepare daily logs and summary reports which shall include the following information:

- An identifying report number for cross referencing and document control.

- Date, project name, location, and other identification.

- Data on weather conditions.

- Information on meetings held or discussions which took place:

    1. Names of parties to discussion.
    2. Relevant subject matter or issues.
    3. Decisions reached.
    4. Activities and their schedule.

- A reduced-scale site plan or sketch showing work areas and test locations.

- Descriptions and locations of ongoing construction.

- Descriptions and specific locations of areas, or units, of work being tested and/or observed and documented.

- Locations where tests and samples were taken or reference to specific observation logs and/or test data sheets where such information can be found.

- A summary of field/laboratory test results or reference to specific observation logs and/or test data sheets.

- Calibrations of test equipment.
- Off-site materials received, including quality verification documentation.
- Decisions made regarding acceptance of units of work, and/or corrective actions to be taken in instances of substandard quality.
- The CQA Consultant's signature.

Observation and Testing Reports--The CQA Consultant shall record observations of construction and CQA-related activities on project specific observation and testing reports. At a minimum, the observation and testing reports shall include the following information:

- An identifying sheet numbered for cross referencing and document control.
- Date, project name, location, and other identification.
- Description or title of activity monitored.
- Location of activity and locations of samples collected.
- Locations of field tests performed and their results.
- Results of laboratory tests received.
- Results of monitoring activity in comparison to Specifications.
- The CQA Consultant's signature.

Reports describing problem identification, corrective measures reports or special construction situations shall be prepared by the CQA Consultant and cross-referenced to specific observation and testing reports. These reports shall include the following information:

- An identifying sheet number for cross-referencing and document control.
- A detailed description of the situation or deficiency.
- The location and probable cause of the situation or deficiency.
- How and when the situation or deficiency was found or located.
- Documentation of the response to the situation or deficiency.
- Final results of any responses.

- Any measures taken to prevent a similar situation from occurring in the future.

- The signature of the CQA Consultant and the signature of the Owner or Owner's representative indicating concurrence.

The Owner shall be made aware of any significant recurring nonconformance with the project Specifications. The Owner shall then determine the cause of the nonconformance and recommend appropriate changes in procedures or Specifications. These changes will be submitted to the Design Engineer for approval. When this type of evaluation is made, the results shall be documented, and any revision to procedures or project Specifications will be approved by the Owner, Design Engineer, and, if necessary, the Permitting Agency.

Photodocumentation and Reporting Data Sheets

Photodocumentation and reporting data sheets shall be cross-referenced with observation and test reports and/or problem identification and corrective measure reports.

These photographs will serve as a pictorial record of work progress, problems, and mitigation activities. The basic file shall contain color prints; negatives shall be stored in a separate file in chronological order. These records will be presented to the Owner upon completion of the project.

In support of photographic documentation, videotaping may be used to record work progress, problems, and mitigation activities.

Design and/or Specification Changes

Design and/or project Specification changes may be required during construction. In such cases, the CQA Consultant shall notify the Owner and the Design Engineer. The Owner shall then notify the Permitting Agency if necessary.

Design and/or project Specification changes shall be made only with the written agreement of the Owner and the Design Engineer, and shall take the form of an Addendum to the project Specifications.

Progress Reports

The CQA Consultant shall prepare a progress report at time intervals established at the Pre-construction meeting and submit to the Owner. At a minimum, this report shall include the following information:

- An identifying sheet numbered for cross referencing and document control.

- Date, project name, location, and other identification.
- A summary of work activities during the progress reporting period.
- A summary of construction situations, deficiencies, and/or defects occurring during the progress reporting period.
- A summary of test results, failures, and retests.
- The signature of the CQA Consultant.

The Owner shall distribute copies of the Progress Reports to the Permitting Agency and, upon request, Geosynthetics Installer and Earthwork Contractor or as decided at the Pre-construction Meeting.

Record Drawings

Record Drawings shall include, but are not limited to the following:

- Scale plans depicting the location of construction.
- Details pertaining to the extent of construction (e.g., depths, plan dimensions, elevations, soil component thicknesses, over excavation, etc.).
- Base maps required for the development of the record plans shall be done by a qualified land surveyor.
- Each layer of geomembrane identifying panels with appropriate numbers, destructive seam samples locations, patches, and repairs locations.
- Pertinent details.
- Changes from the construction Drawings.

Final Documentation Report and Certification

At the completion of the work, the CQA Consultant shall submit to the Owner the signed Final Documentation Report. At a minimum, the Final Documentation Report shall include:

- Summaries of all construction activities.
- Observation logs and test data sheets including sample location plans and supporting field and laboratory test results.

- Construction problems and solutions reports.
- Changes from design and material specifications.
- Record Drawings.
- If required by the regulatory agency, a summary statement sealed and signed by a professional engineer registered in the state that the construction has been completed in substantial conformance with project Specifications and design plans.

ATTACHMENT 20

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consolidation in Strata 2 and 3. The geotechnical characteristics of the subsurface across the Site are assumed to be relatively consistent with the results obtained in Section 1 area. This assumption is evident in borings conducted in previous investigations. Prior to the development of future landfill sections, a more detailed investigation of areas outside of the Section 1 area for specific subsurface conditions is recommended. Settlement calculations are contained in Attachment I-2. The estimated settlement of the foundation at specific locations in Section 1 area and across the Site is shown in Table I-1.

TABLE I-1. ESTIMATED SETTLEMENT

Location	Estimated Instantaneous (in)	Estimated Consolidation (in)	Total Estimated Settlement (in)
Center of the Site	2.2	13.0	15.2 (15 in)
Center of Section 1	0.9	8.6	9.5 (10 in)
S.W. Perimeter of Section 1	0.5	6.2	6.7 (7 in)
N.E. Perimeter of Section 1	0.5	6.2	6.7(7 in)
N.E. Perimeter of the Site	0.6	6.2	6.8 (7 in)
N.W. Perimeter of the Site	0.6	6.3	6.9 (7 in)
S.W. Perimeter of the Site	0.6	6.3	6.9 (7 in)

Note: Site refers to the entire 147 acres proposed Capacity Expansion area; Section 1 refers to the 12-acre expansion area.

I.1.d.3 Slope Stability--

In general a Factor of Safety (F.S.) from 1.3 to 1.5 was deemed acceptable for both wedge and rotational failures of the surface analyzed. Rotational failures generally follow a circular failure pattern through the slope. Rotational failures can model deep foundation movement or shallow toe of slope movement. Wedge failures are generally failures that extend to predetermined depth and the failure planes model interface or sliding conditions in the soil matrix.

I.1.d.3.a Excavation - Due to the extended time needed to consolidate and strengthen the phosphatic clays, removal of the phosphatic clay soil lenses will be accomplished by excavation. Excavation of the phosphatic clays will continue until no further visual phosphatic clay deposits are noted. Phosphatic clays generally have a light brown to greenish color and can be easily formed into thin cylindrical rolls. A geotechnical engineer will provide identification assistance to the excavation crews. The excavation will, based upon preliminary piezometer reading, extend below the perched and surficial water tables. A slope stability analysis was performed on the perimeters to check the stability of berms due to the infiltration of water

ATTACHMENT 21

MISCELLANEOUS REVISED DRAWINGS