



Department of Energy

**Ohio Field Office
Fernald Area Office**

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2776



FEB 02 2000

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V, SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0376-00

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

**TRANSMITTAL OF RESPONSES TO THE OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENTS ON THE DRAFT ON-SITE DISPOSAL FACILITY BORROW AREA STRATEGY
REPORT**

Reference: Letter, T. Schneider to J. Reising, "OSDF Borrow Area Strategy Report,"
dated December 29, 1999

Enclosed for your review and comment are responses to the Ohio Environmental Protection Agency (OEPA) comments on the draft On-Site Disposal Facility (OSDF) Borrow Area Strategy Report. Upon concurrence, this report will be revised and submitted for approval. The concepts presented in the Borrow Area Strategy Report (and in accordance with the comment responses) are being used to update the Borrow Area Management Plan, as well as the construction drawings and technical specifications for OSDF Phase III.

Mr. James A. Saric
Mr. Tom Schneider

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If you have any questions regarding these comment responses or need further information, please contact Jay Jalovec at (513) 648-3122.

Sincerely,



Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Jalovec

Enclosures

cc w/enclosures:

N. Hallein, EM-42/CLOV
R. J. Janke, OH/FEMP
G. Jablonowski, USEPA-V, SRF-5J
T. Schneider, OEPA-Dayton (three copies of enclosures)
F. Bell, ATSDR
M. Schupe, HSI GeoTrans
R. Vandegrift, ODH
F. Barker, Tetra-Tech
AR Coordinator, FDF/78

cc w/o enclosures:

J. Jalovec, OH/FEMP
J. Reising, OH/FEMP
J. Burnett, GeoSyntec
D. Carr, FDF/2
J. Chiou, FDF/52-0
T. Hagen, FDF/65-2
J. Harmon, FDF/90
S. Hinnefeld, FDF/31
M. Jewett, FDF/52-2
A. Klimek, FDF/64
U. Kumthekar, FDF/64
C. Van Arsdale, FDF/64
T. Walsh, FDF/65-2
ECDC, FDF/52-7

RESPONSES TO OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS
ON THE DRAFT ON-SITE DISPOSAL FACILITY BORROW AREA STRATEGY REPORT
(20100-RP-0009, REVISION B)

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Commenting Organization: Ohio EPA

Commentor: OFFO

Section #: 3.2

Pg. #: 3-2

Line #: 2-7

Code: C

Original Comment #: 1

Comment: The Shrinkage/Bulking Factor being used is based on the estimates made before cell construction. With the information available from the construction of the first three cells, have any calculations been performed to confirm the continued use of this estimate? Please provide details.

Response: The original Shrinkage/Bulking Factor (SBF) is still acceptable based on data collected from completed borrow area excavation and subsequent clay liner construction in the On-Site Disposal Facility (OSDF). Calculations supporting this conclusion are attached and are described below. The SBF will be periodically reevaluated as more data becomes available in the future.

The SBF for the brown till was calculated to be 0.955 cubic yards (i.e., 0.955 cubic yards of brown till material is required to place 1.0 cubic yards of compacted material in the OSDF). The calculations for this factor were made during the original OSDF design and are presented in Section 15 of Volume IV of the OSDF Final Calculation Package. This SBF is the volume weighted average of the estimated in-place density (as a percentage of standard proctor compaction density) of the clay liner and cap, vegetative soil, and compacted fill in the OSDF. The estimated in-place densities of these OSDF components were based on the following estimated compaction:

- Clay liner and cap – 97 percent
- Vegetative soil – 90 percent
- Compacted fill – 95 percent

The SBF of 95.5 percent is the weighted average of the *in situ* borrow material and the estimated in-place density of each of the above components of the OSDF. The OSDF Borrow Area was used to provide most of the material for the clay liner for Cell 2 and all of the material for the clay liner in Cell 3. To date, no material from the OSDF Borrow Area has been used for vegetative soil or compacted fill. Therefore, no actual field data regarding compacted fill and vegetative layer material from the Borrow Area are available to calculate the average component density and compare it to the original calculation.

The average dry density of the clay liner in Cell 3 is 119.1 lbs/cf; the average dry density of brown till in the borrow area is 122.0 lbs/cf. Based on these averages, the clay liner in Cell 3 is compacted to an average of 97.6 percent of the *in situ* density in the OSDF Borrow Area. These calculations are attached. This is consistent with the estimated compaction of 97 percent for clay liner and cap component presented in the original calculations.

Action: The SBF will remain at 0.955. The text of the Borrow Area Strategy Report will be revised to indicate that the SBF for the Borrow Area will be reviewed periodically and revised if appropriate. The calculations referenced above will be added to the report and discussed in the text.

Commenting Organization: Ohio EPA
Section #: 4.1 Pg. #: 4-1 Line #: 3 Commentator: OFFO
Original Comment #: 2 Code: C
Comment: Insert "restoration" following "...interim."

Response: Agree.

Action: The text will be revised.

Commenting Organization: Ohio EPA
Section #: 5 Pg. #: 5-1 Line #: 12 Commentator: OFFO
Original Comment #: 3 Code: C
Comment: Replace "very" with "vary."

Response: Agree.

Action: The text will be revised.

Commenting Organization: Ohio EPA
Section #: Figure A-5 Pg. #: Line #: Commentator: OFFO
Original Comment #: 4 Code: C

Comment: This figure differs from that developed during the October meetings regarding the Borrow Area strategy. During those discussion, Ohio EPA expressed a desire to excavate the areas currently excavated as soon as possible in order to initiate restoration/stabilization. Figure A-5 leaves some currently excavated areas unaddressed until Subarea 8. Additionally, it would appear that excavated material from Subarea 2 will need to be hauled through the restored Subarea 1. DOE should provide additional basis for the revised Subareas and discuss how Subareas 1 and 2 will be developed/restored.

Response: Sequencing of the Borrow Area excavation will be revised as shown on the attached Figure A-5 (Revision B). As shown on that figure, the initial borrow area excavation will include the same footprint as the 1999 Borrow Area excavation (Subarea 1). Some of the sideslopes in the current area (area disturbed in 1999) may be temporarily seeded and not distributed until Subarea 1. Subarea 1 excavation may continue from the base of these slopes. These sideslope areas will then be disturbed and revegetated with Subareas 6, 7, and 8. However the base of the 1999 excavation area will be disturbed and restored with Subarea 2. Subarea 1 excavation will be followed by excavation to the north (Subarea 2), located south of the OSDF Sedimentation Basin. Conceptually, a drainage channel will be cut to drain Subarea 1 into the OSDF Sedimentation Basin.

In addition, two haul road corridors and haul road access points from each subarea are also shown on revised Figure A-5.

Action: The changes described above and those shown on the revised figure will be incorporated into the Borrow Area Strategy Report.

SHRINKAGE/BULKING FACTOR

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Compare in-place density of *in situ* brown till in OSDF Borrow Area to density of the Clay Liner in Cell 3.

OSDF Borrow Area – Estimate *in situ* density;

Reference: "Geotechnical Data and Evaluation Report for East and South Field Borrow Areas," June 1996 (Parsons)

Estimate *in situ* density of Clay in Borrow Area (see attached Figure 2-3 and Table 4-3).

Boring No.	Sample No.	Depth (ft)	Wet Density (lbs/cf)	Dry Density (lbs/cf)
148	410573	7.5/9.5	135.7	114.8
152	410282	12.5/14.5	146.3	131.2
153	410287	5.0/7.0	143.6	127.0
1745	3250-(Ave)	6.0/9.0	137.6	119.2
1748	3251-(Ave)	9.0/12.0	142.7	129.4
201	(Ave)62-201/4/2	7.5/9.5 2.5/4.5	130.0	111.2
202	62-202/4 (Ave)	7.5/9.5	141.0	123.6
203	62-203/8	17.5/19.5	138.6	118.8
204	62-204/4	7.5/9.5	139.2	122.0
205	62-205/2	2.5/4.5	138.3	124.2
206	(Ave) 62-206 2/4/6	2.5/14.5	135.8	121.0
Σ =			1528.8	1342.4
Ave =			139.0 lbs/ft ³	122.0 lbs/cf

Ave = Density of clay liner in Cell 3 – 136.2 lbs/cf (wet) - 98%
 119.1 lbs/cf (dry) - 97.6%

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borw_loc1.m po154erma@ws415. Mon Jun 10 10:30:15 CDT 1996

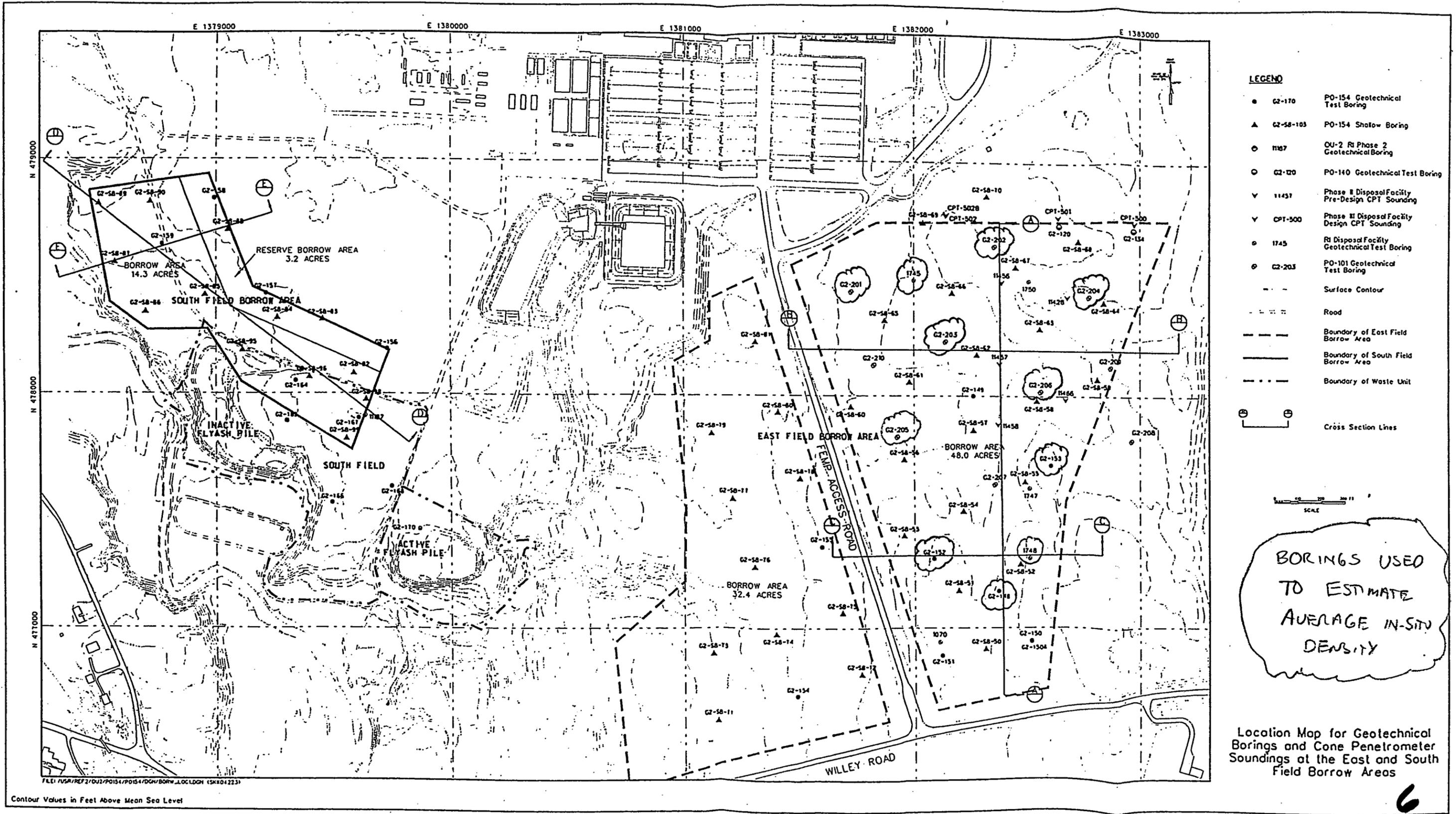


Figure 2-3 - Location Map for Geotechnical Test Boring and Cone Penetration Soundings at East and South Field Borrow Areas

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Table 4-3 - Summary of Unit Weight and Percent Saturation, Undisturbed Samples

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On-Site Location	Boring No.	Sample No.	Sample Type	Top Depth (feet)	Bottom Depth (feet)	Color (from field log)	General Stratum	USCS Group Name	USCS Group Symbol	Specimen ID	Test Type	Moisture Content		Wet Density		Dry Density		Percent Saturation		Specific Gravity	Data Source
												Specimen (%)	Average (%)	Specimen (pcf)	Average (pcf)	Specimen (pcf)	Average (pcf)	Specimen (%)	Average (%)		
EFBA	G2-148	410573	DEN	7.5	9.5	Yellowish Brown	Brown Till	Lean Clay with Sand	CL	410573A Stage 1	CU-Stg	18.2	135.7	114.8	100	100	2.75	PO 154			
EFBA	G2-150A	410256	DEN	15.0	17.0	Gray	Gray Till	Sandy Lean Clay	CL	410256 A	UU	14.7	142.7	124.4	100	100	2.65	PO 154			
EFBA	G2-152	410282	ST	12.5	14.5	Olive Brown	Brown Till	Silty, Clayey Sand with Gravel	SC-SM	410282A Stage 1	CU-Stg	11.5	146.3	131.2	100	100	2.73	PO 154			
EFBA	G2-153	410287	ST	5.0	7.0	Light Olive Brown	Brown Till	Sandy Lean Clay	CL	410287	UU	13.1	143.6	127.0	100	100	2.74	PO 154			
EFBA	G2-154	410171	ST	10.0	12.0	Brown / Greenish Gray	Gray Till	Sandy Lean Clay	CL	410171 B	UU	11.4	142.5	128.0	99	100	2.72	PO 154			
EFBA	G2-155	410175	ST	7.5	9.5	Light Olive Brown	Brown Till	Sandy Lean Clay	CL	410175 A	UU	12.2	143.5	127.8	100	100	2.73	PO 154			
SFBA	G2-156	410131	ST	7.5	9.5	Yellowish Brown	Brown Till	Lean Clay	CL	410131 A	CU	21.8	132.3	108.8	100	100	2.72	PO 154			
										410131 B	CU	23.1	130.9	106.4	100	100	2.72	PO 154			
										410131 C	CU	24.6	128.7	103.3	100	100	2.72	PO 154			
SFBA	G2-157	410140	ST	7.5	9.5	Greenish Gray	Gray Till	Lean Clay	CL	410140	UU	23.5	133.0	107.7	106.2	100	100	2.69	Average PO 154		
EFBA	1745	3250	ST	6.0	9.0	Yellowish Brown	Brown Till	Silty Clay with Sand	CL-ML		CU	17.9	138.3	117.3	100	100	2.80	Nutting			
											CU	14.4	140.8	123.1	100	100	2.80	Nutting			
											CU	14.1	143.4	125.7	100	100	2.80	Nutting			
											CON _s	15.8	134.3	116.0	87	87	2.80	Nutting			
											P _c	15.1	131.0	113.8	86	86	2.80	Nutting			
EFBA	1748	3251	ST	9.0	12.0	Brown	Brown Till	Clayey Gravel with Sand	GC		CU	9.7	143.6	134.9	119.2	95	95	2.80	Average Nutting		
											CU	11.2	146.2	131.5	100	100	2.79	Nutting			
											CU	12.0	144.6	129.1	100	100	2.79	Nutting			
											CON _s	11.1	136.8	123.1	75	75	2.79	Nutting			
											P _c	11.1	142.4	128.2	96	96	2.79	Nutting			
EFBA	1747	3252	ST	12.0	14.5	Yellowish Brown	Gray Till	Clayey Gravel with Sand	GC		CU	13.4	142.2	125.4	100	100	2.74	Average Nutting			
											CU	13.6	143.5	126.3	100	100	2.74	Nutting			
											CU	12.4	143.9	128.0	100	100	2.74	Nutting			
											CON _s	13.7	134.5	118.3	84	84	2.74	Nutting			
											P _c	21.4	138.8	114.3	100	100	2.74	Nutting			
EFBA	G2-201	G2-201 / 4	ST	7.5	9.5	Yellowish Brown	Brown Till	Lean Clay	CL	4A	UW	15.5	136.5	118.2	122.5	97	97	2.73	Average PO 101		
EFBA	G2-201	G2-201 / 2	ST	2.5	4.5	Dark Yellowish Brown	Brown Till	Lean Clay	CL	2A	CU	20.4	130.2	108.5	99	99	2.70	PO 101			
										2B	CU	17.7	120.9	102.8	75	75	2.70	PO 101			
										2C	CU	18.2	119.4	101.1	74	74	2.70	PO 101			
EFBA	G2-201	G2-201 / 10	ST	22.5	24.5	Dark Gray	Gray Till	Sandy Lean Clay	CL	10A	CU	12.6	143.7	127.6	104.1	83	83	2.75	Average PO 101		
										10B	CU	13.0	143.4	126.9	100	100	2.75	PO 101			
										10C	CU	13.8	142.4	125.2	100	100	2.75	PO 101			
EFBA	G2-202	G2-202 / 4	ST	7.5	9.5	Yellowish Brown	Brown Till	Sandy Lean Clay	CL	4A	CU	14.2	139.6	122.3	126.8	100	100	2.81	Average PO 101		
										4B	CU	14.1	142.4	124.8	98	98	2.81	PO 101			
EFBA	G2-203	G2-203 / 8	ST	17.5	19.5	Yellowish Brown	Brown Till	Sandy Lean Clay	CL	8B	P	16.7	138.6	118.8	123.6	95	95	2.74	Average PO 101		
EFBA	G2-203	G2-203 / 10	ST	22.5	24.5	Dark Gray	Gray Till	Sandy Lean Clay	CL	10A	CON _s	14.0	139.5	122.4	93	93	2.79	PO 101			
EFBA	G2-204	G2-204 / 4	ST	7.5	9.5	Yellowish Brown	Brown Till	Sandy Lean Clay	CL	4A	CON _s	14.2	139.2	122.0	96	96	2.74	PO 101			
EFBA	G2-204	G2-204 / 6	ST	12.5	14.5	Dark Gray	Gray Till	Lean Clay with Sand	CL	6C	CU	12.5	142.9	127.0	100	100	2.76	PO 101			
										6B	CU	12.9	144.0	127.6	100	100	2.76	PO 101			
										6A	CU	12.7	145.9	129.5	97	97	2.76	PO 101			
EFBA	G2-204	G2-204 / 10	ST	22.5	24.5	Dark Gray	Gray Till	Sandy Lean Clay	CL	10B	P	12.1	144.3	128.7	128.0	99	99	2.78	Average PO 101		
EFBA	G2-205	G2-205 / 2	ST	2.5	4.5	Dark Yellowish Brown	Brown Till	Lean Clay	CL	2B	P	11.3	138.3	124.2	87	87	2.68	PO 101			
EFBA	G2-205	G2-205 / 8	ST	17.5	19.5	Dark Gray	Gray Till	Sandy Lean Clay	CL	8A	CU	12.6	144.4	128.2	100	100	2.77	PO 101			
										8B	CU	13.0	143.1	126.6	99	99	2.77	PO 101			
										8C	CU	12.2	143.3	127.7	95	95	2.77	PO 101			
EFBA	G2-206	G2-206 / 2	ST	2.5	4.5	Yellowish Brown	Brown Till	Lean Clay with Sand	CL	2A	CON _s	11.4	122.8	110.2	58	58	2.76	Average PO 101			
EFBA	G2-206	G2-206 / 4	ST	7.5	9.5	Yellowish Brown	Brown Till	Sandy Lean Clay	CL	4A	P	13.7	138.5	121.8	92	92	2.75	PO 101			
EFBA	G2-206	G2-206 / 6	ST	12.5	14.5	Yellowish Brown	Brown Till	Lean Clay with Sand	CL	6A	UW	11.5	146.0	130.9	100	100	2.76	PO 101			
EFBA	G2-206	G2-206 / 10	ST	22.5	24.5	Dark Gray	Gray Till	Sandy Lean Clay	CL	10A	CU	12.7	144.4	128.1	100	100	2.73	PO 101			
EFBA	G2-134	405140	DEN	12.0	14.0	Dark Greenish Gray	Gray Till	Sandy Lean Clay	CL	405140A	UU	12.8	143.7	127.6	100	100	2.72	PO 140			

Notes:

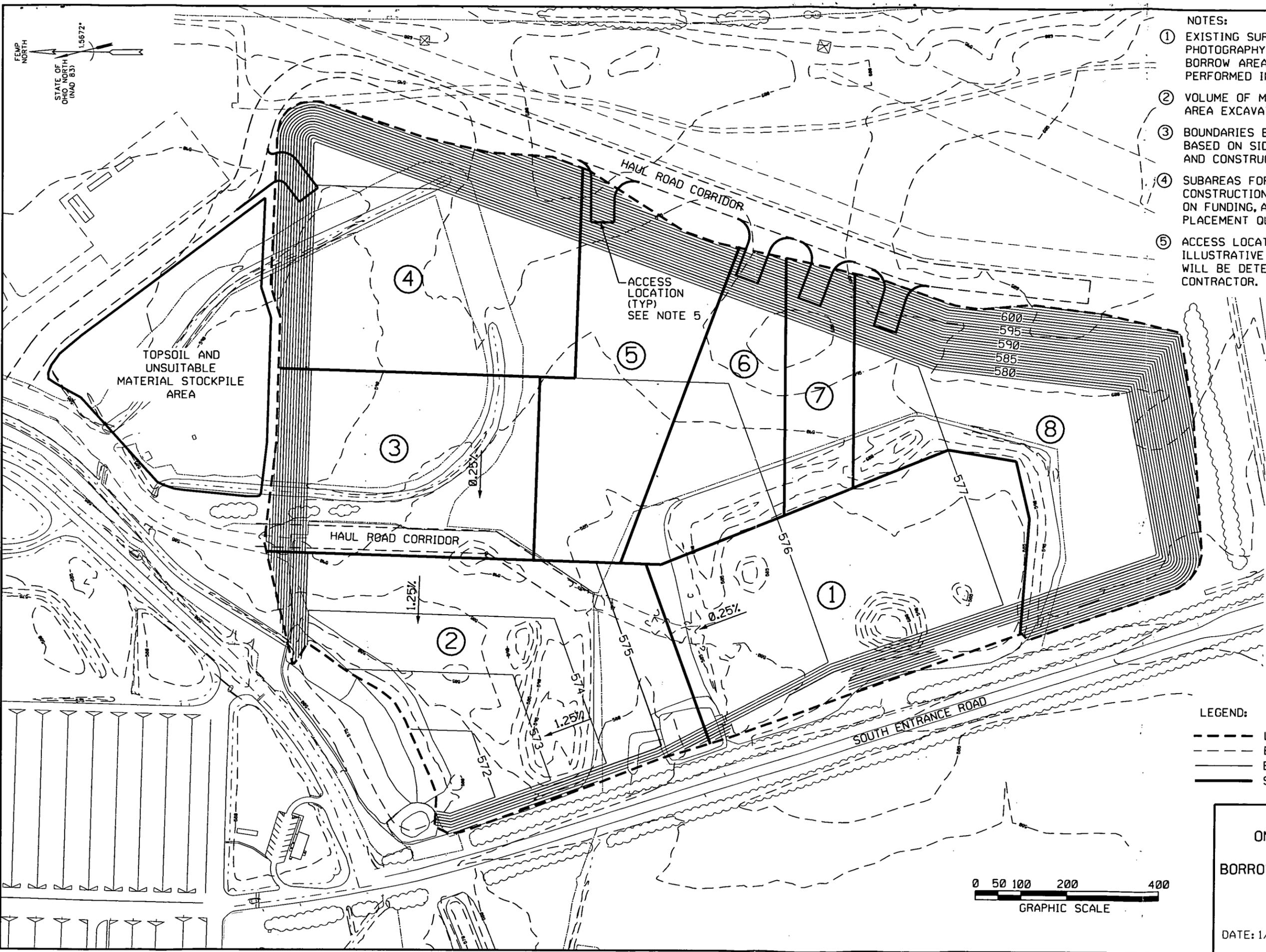
- On-Site Location: EFBA East Field Borrow Area
SFBA South Field Borrow Area
- Sample Type: ST Shelby Tube Sample (ASTM D 1587)
DEN Denison Core Barrel Sample
- Test Type: CON_s Consolidation with time readings, (ASTM D 2435), specimen at saturated conditions
CU Triaxial Shear, Consolidated, Undrained with Pore Pressure Measurements (ASTM D 4767), Three Points
CU-Stg Triaxial Shear, Consolidated, Undrained with Pore Pressure Measurements (ASTM D 4767), Staged Test
P Triaxial, Back-Pressure, Permeability (ASTM D 5084)
P_c Rigid Wall, Constant Head Permeability (ASTM D 2434)
UU Triaxial Shear, Unconsolidated, Undrained ASTM D 2850
UW Unit Weight (ASTM D 2937)
- Data Source: Nutting H.C. Nutting Technical Report 5.1A, Engineering Evaluation Report for On-Site Disposal, U.S. DOE Fernald Field Office, June 1993 (H.C. Nutting Laboratory Data).
PO 101 On-Site Disposal Cell Pre-Design Activities Engineering Report, PARSONS Project Order 101, April 1994.
PO 140 Geotechnical Investigation On-Site Disposal Facility, Soil Investigation Data Report, PARSONS Project Order 140, December 1995.
PO 154 East and South Field Borrow Areas Geotechnical Investigation, Geotechnical Laboratory Data Report, PARSONS Project Order 154, March, 1996.

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NOTES:

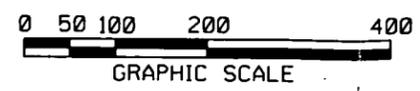
- ① EXISTING SURFACE CONTOURS FROM AERIAL PHOTOGRAPHY FLOWN APRIL, 1997. AREAS WITHIN BORROW AREA UPGRADED BASED ON FIELD SURVEYS PERFORMED IN SEPTEMBER AND NOVEMBER 1999.
- ② VOLUME OF MATERIAL WITHIN LIMIT OF BORROW AREA EXCAVATION IS APPROXIMATELY 917,000 CY.
- ③ BOUNDARIES BETWEEN SUBAREAS WILL VARY BASED ON SIDE SLOPES, ACTUAL FIELD CONDITIONS, AND CONSTRUCTION SCHEDULE.
- ④ SUBAREAS FOR EXCAVATION BASED ON PRELIMINARY CONSTRUCTION SCHEDULE AND MAY CHANGE BASED ON FUNDING, AND ACTUAL IMPACTED MATERIAL PLACEMENT QUANTITIES.
- ⑤ ACCESS LOCATIONS ARE SHOWN FOR GENERAL ILLUSTRATIVE PURPOSES ONLY. ACTUAL LOCATIONS WILL BE DETERMINED IN THE FIELD BY THE CONTRACTOR.



SUBAREA	APPROX. VOLUME (BCY)
1	89,000
2	130,000
3	120,000
4	165,000
5	105,000
6	75,000
7	45,000
8	188,000
TOTAL	917,000

LEGEND:

- LIMIT OF BORROW AREA
- - - EXISTING SURFACE CONTOURS
- BORROW AREA EXCAVATION CONTOURS
- SUBAREA BOUNDARY



ON-SITE DISPOSAL FACILITY
 FIGURE A-5
 BORROW AREA EXCAVATION SUBAREAS

DATE: 1/10/2000

8 REV: B
 figa5.dgn