David Garrett & Associates
Engineering and Geology

October 26, 2012

Permit No.	Date	Document ID No.
41-17	**October 31, 2012**	**17547**

Received via an e-mail
Date: **October 26, 2012**
Solid Waste Section
Raleigh Central Office

Mr. Ming-Tai Chou, PE
NC DENR Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

RE: Response to Comments for PTO Application
A-1 Sandrock C&D Landfill Phase 1C
Greensboro (Guilford County), NC
Solid Waste Permit No. 41-17

Dear Mr. Chou:

On October 5, 2012, you provided three comments pertaining to the application for a Permit to Operate for Phase 1C. The following responses include the requested data and calculations. For your convenience, each response is provided in italic type beneath your comment.

1. According to the drawings in the approved PTC applications, there are five soil borings located inside the Phase 1, Cell C – B19, B-20, B-21, B-27, and B-28. Did the boring B-28 converted into a piezometer and properly abandoned? If so, please provide the documentation and record to demonstrate the boring/piezometer has been properly abandoned.

   Based on the test boring log (discussed below), the boring B-28 was dry and not fitted with a piezometer. This boring was performed during the design hydrogeologic stage, in 2002, to confirm subsurface conditions at then-proposed base grades.

2. Please provide boring logs of borings B-19, B-20, B-21, B-27, & B-28 to demonstrate that soil types at the elevations - two feet below the landfill cell base meet the requirements stated in Rule .0540(2)(b). The data collected from the test pits didn't cover the entire Phase1, Cell C.

   The boring logs are attached. Each log has been amended with a notation of the completed base grade elevation. A few comments are in order:

   a) Boring logs B-19, B-20, B-21 and B-28 show adequate separation with ground water and bedrock; soils at base grade (and 2 feet below) are SM and ML.

   b) The log for B-27 shows the completed base grade below the auger refusal depth, below the depth of coring that seemed to indicate more competent rock. However, based on extensive experience with excavating diabase dikes throughout the piedmont, the dikes tend to consist of variably sized cobbles and boulders embedded in a matrix of saprolitic soil.

5105 Harbour Towne Drive • Raleigh • North Carolina • 27604
919-231-1818 (Office and Fax) • 919-418-4375 (Mobile) • E-mail: david@davidgarrettpe.com

c) *The boring indicated the variation of weathering and apparent particle size (lower RQD values indicate more highly weathered materials). The excavation machinery had no difficulty in removing the materials to the indicated depths, and the test pits confirm that the required four feet of vertical separation exists.*

3. Although the conclusion in the Application indicated that "the base grade deviation will not affect the overall disposal volume of Phase 1 or the landfill as a whole," A-1 Sandrock, Inc. needs to provide a revised total gross capacity for Phase 1, Cell C.

   Please refer to the attached volumetric analysis which compares the as-built base grades to those shown in the permit drawings. Volumes of under-excavated areas (shown in red) and over-excavated areas (shown in blue) were determined with an average end area projection, vertically stacked, for irregular "disks" formed by joining the elevation contours common to both surfaces. This analysis shows a gain of 5,684 cubic yards of airspace due to the over-excavation, but it also shows a loss of 7,608 cubic yards. This represents a net loss of 1,924 cubic yards, which over the projected total permitted volume of 223,644 cubic yards for Phase 1C, now reduced to 221,720, the change in airspace is approximately 1 percent.

On behalf of A-1 Sandrock, thank you for your comments, and I hope this information is helpful. Please contact me if I can provide any additional data.

Sincerely,

G. David Garrett, P.G., P.E.
Consulting Engineer

cc: Ronnie Petty, III – A-1 Sandrock, Inc.
Elizabeth Werner, SWS Hydrogeologist

David Garrett, P.G., P.E.

Engineering and Geology

Boring No. B-19

Client and Project	**A-1 Sandrock CDLF (Guilford County)**			Collar Elevation	**773.50**
Equipment	**Dietrich D50 ATV**	Drilling Method	**HSA/NQWL core**	Water Level, TOB	**35.9**
Date Started	**5/1/02**	Date Ended	**5/1/02**	Water Level, 24 Hr.	**36.6**
Drilling Firm	**Bore & Core (Seiler)**	Logged by	**David Garrett**	Stabilized Level	**36.5**
Comments	**Cleared access road through woods**	Total Depth	**65.5**	Date of Observation	**5/28/02**

All depths are given in feet and referenced b.g.s.

Depth and Elev.	SPT Value and Plot	Soil Description, OVA and USCS Symbol	Piezometer Constuction Data
0		SILTY SAND: Very dense, tan-brown, numerous hard quartz stringers, slightly moist, weathered sandrock, cobbles near surface	
2 / 772.00			
4 / 770.00	10 19 25	SM	
6 / 768.00			
8 / 766.00			
10 / 764.00	36 50/.3	SM	
12 / 762.00			
14 / 760.00	42 50/.4	FINISHED BASE GRADE EL. 558 SM	
16 / 758.00			Soil Backfill
18 / 756.00			
20 / 754.00	50/.3	SM	
22 / 752.00			
24 / 750.00	50/.5	SM	
26 / 748.00			
28 / 746.00			
30 / 744.00	50/.3	SM	
32 / 742.00			
34 / 740.00	50/.3	SM	
36 / 738.00			

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Engineering and Geology

Boring No. B-19

Client and Project	**A-1 Sandrock CDLF (Guilford County)**			Collar Elevation	**773.50**
Equipment	**Dietrich D50 ATV**	Drilling Method	**HSA/NQWL core**	Water Level, TOB	**35.9**
Date Started	**5/1/02**	Date Ended	**5/1/02**	Water Level, 24 Hr.	**36.6**
Drilling Firm	**Bore & Core (Seiler)**	Logged by	**David Garrett**	Stabilized Level	**36.5**
Comments	**Cleared access road through woods**	Total Depth	**65.5**	Date of Observation	**5/28/02**

All depths are given in feet and referenced b.g.s.

Depth and Elev.	SPT Value and Plot	Soil Description, OVA and USCS Symbol	Piezometer Constuction Data
38 / 736.00	50/.2	SM	Soil Backfill
40 / 734.00			
42 / 732.00			
44 / 730.00	50/.2	SM	
46 / 728.00			
48 / 726.00			
50 / 724.00	50/.1	SM	
52 / 722.00		SILT: Hard, blue-gray, sandy, dry, advanced with roller cone from 53.6 to 54.0 feet	Grout
54 / 720.00	50/.1		
56 / 718.00		GNEISS: Core Run #1: Blue-gray, REC = 74%, RQD = 12%	Bentonite Seal
58 / 716.00		GRANITE: Core Run #2: Hard, tan-white, mod. fractured, REC = 100%, RQD = 63%	Sand Pack
60 / 714.00			
62 / 712.00		GRANITE: Core Run #3: Same, fractured, REC = 96%, RQD = 58%	0.010" Slotted Screen
64 / 710.00			
708.00			

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Boring No. B-20

Client and Project	**A-1 Sandrock CDLF (Guilford County)**			Collar Elevation	**782.40**
Equipment	**Dietrich D50 ATV**	Drilling Method	**HSA**	Water Level, TOB	**Dry**
Date Started	**5/22/02**	Date Ended	**5/22/02**	Water Level, 24 Hr.	**Dry**
Drilling Firm	**Bore & Core (Seiler)**	Logged by	**David Garrett**	Stabilized Level	**34.9**
Comments	**Cleared access road through woods**	Total Depth	**35.0**	Date of Observation	**5/28/02**

All depths are given in feet and referenced b.g.s.

Depth and Elev.	SPT Value and Plot	Soil Description, OVA and USCS Symbol	Piezometer Constuction Data
0 / 782.00		SILTY CLAY: Stiff, brown	
2 / 780.00			
4 / 778.00		SILTY SAND: Dense, tan, weathered sandrock	
6 / 776.00			
8 / 774.00			
10 / 772.00			Soil Backfill
12 / 770.00			
14 / 768.00			
16 / 766.00			
18 / 764.00			
20 / 762.00			
22 / 760.00			
24 / 758.00			
26 / 756.00			Grout
28 / 754.00		FINISHED BASE GRADE EL. 754	Bentonite Seal
30 / 752.00			Sand Pack
32 / 750.00			
34 / 748.00			0.010" Slotted Screen

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Boring No. B-21

Client and Project	**A-1 Sandrock CDLF (Guilford County)**			Collar Elevation	**807.94**
Equipment	**Dietrich D50 ATV**	Drilling Method	**HSA**	Water Level, TOB	**51.1**
Date Started	**4/30/02**	Date Ended	**4/30/02**	Water Level, 24 Hr.	**42.1**
Drilling Firm	**Bore & Core (Seiler)**	Logged by	**David Garrett**	Stabilized Level	**42.0**
Comments	**Cleared access road through woods**	Total Depth	**60.4**	Date of Observation	**5/28/02**

All depths are given in feet and referenced b.g.s.

Depth and Elev.	SPT Value and Plot	Soil Description, OVA and USCS Symbol	Piezometer Constuction Data
0		SILTY SAND: Very dense, tan-yellow, gravelly	
2 — 806.00			
4 — 804.00	27, 41, 50/.4	SILT: Hard, tan-yellow, hard "slatey" layers, weathered granite — SM	
6 — 802.00			
8 — 800.00			
10 — 798.00	11, 15, 25	SM	Soil Backfill
12 — 796.00			
14 — 794.00	50/.4	SM	
16 — 792.00			
18 — 790.00			
20 — 788.00	28, 50/.3	SILTY SAND: Dense, tan, fine to coarse, quartz stringers — SM	
22 — 786.00			
24 — 784.00	50/.4	SM	
26 — 782.00		FINISHED BASE GRADES EL. 781	
28 — 780.00	50/.2	SM	
30 — 778.00			Soil Backfill
32 — 776.00			
34 — 774.00	50/.3	PWR: Very dense, weathered granite with numerous hard layers — SM	
36 — 772.00			

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Engineering and Geology

Boring No. B-21

Client and Project	**A-1 Sandrock CDLF (Guilford County)**			Collar Elevation	**807.94**
Equipment	**Dietrich D50 ATV**	Drilling Method	**HSA**	Water Level, TOB	**51.1**
Date Started	**4/30/02**	Date Ended	**4/30/02**	Water Level, 24 Hr.	**42.1**
Drilling Firm	**Bore & Core (Seiler)**	Logged by	**David Garrett**	Stabilized Level	**42.0**
Comments	**Cleared access road through woods**	Total Depth	**60.4**	Date of Observation	**5/28/02**

All depths are given in feet and referenced b.g.s.

Depth and Elev.	SPT Value and Plot	Soil Description, OVA and USCS Symbol	Piezometer Constuction Data
38 — 770.00	50/.1	SM	
40 — 768.00			Grout
42 — 766.00			Bentonite Seal
44 — 764.00	50/.3	SM	
46 — 762.00			
48 — 760.00	50/.3	SM	Sand Pack
50 — 758.00			
52 — 756.00			
54 — 754.00	50/.1	SM PWR: Very dense, difficult to penetrate with auger, refusal at 60.4 feet	
56 — 752.00			0.010" Slotted Screen
58 — 750.00	50/.1	SM	
60 — 748.00			

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Boring No. B-27

Client and Project	**A-1 Sandrock CDLF (Guilford County)**			Collar Elevation	**795.68**
Equipment	**Dietrich D50 ATV**	Drilling Method	**HSA/NQWL core**	Water Level, TOB	**Dry**
Date Started	**5/13/02**	Date Ended	**5/13/02**	Water Level, 24 Hr.	**Dry**
Drilling Firm	**Bore & Core (Seiler)**	Logged by	**David Garrett**	Stabilized Level	**Dry**
Comments	**Cleared access road through woods**	Total Depth	**29.0**	Date of Observation	**5/28/02**

All depths are given in feet and referenced b.g.s.

Depth and Elev.	SPT Value and Plot	Soil Description, OVA and USCS Symbol	Piezometer Constuction Data
0		SILTY CLAY: Hard, brown-orange, boulder and cobbles (weathered	
2 / 794.00			
4 / 792.00	28 50/.2	SILT: Hard, sandy, boulders, (advanced with roller bit) — ML-CL	
6 / 790.00			
8 / 788.00	50/.4	Core Run #2: REC = 80%, RQD =0% (see below) — ML	Soil Backfill
10 / 786.00			
12 / 784.00			
14 / 782.00	50/.3	ML	
16 / 780.00		DIABASE: Core Run #1: Gray, fine grained, highly weathered, REC = 22%, RQD = 0%	
18 / 778.00			Grout
20 / 776.00	50/.5	SILT: Hard, weathered rock, advanced with roller bit	Bentonite Seal
22 / 774.00			
24 / 772.00		DIABASE: Core Run #2	
26 / 770.00		DIABASE: Core Run #3: less weathered, REC = 92%, RQD = 31%	Sand Pack 0.010" Slotted Screen
28 / 768.00			

FINISHED BASE GRADE EL. 761

BORE & CORE, INC.

TEST BORING FIELD RECORD

PROJECT A-1 Sandrock PROJECT NO. _____ DATE 8/28/02

DRILLER Seiler CREW David WEATHER Sunny-Warm

GROUND SURFACE ELEVATION N/A DRILL RIG D-50 BORING NO. 29 El. 796

Soil Strata Depth From	Depth To	Soil Description and Remarks	Sampling / Blow Per Foot No	Depth From	Depth To	1st 6"	2nd 6"	3rd 6"	Rec
		TOP SOIL:							
11.0	16.0	Tan, Dry Sandrock Hard							
16.0	24.0	Bn. Tan Sandrock some Gravel							
24.0	25.0	Rock ledge							
25.0	B.T	Sandrock to Refusal (Dry)							
		B.T @ 26.0' left open							
		B-28 El. 780							
0.0	0.6	Topsoil							
0.6	5.2	Bn. Tan Dry Sandrock							
5.2	18.0	Green. Sandrock V. hard (DRY)							
		B.T @ 18.0 Auger Ref.							
		FINISHED BASE GRADE EL. 767 (13 FEET BELOW ORIGINAL GROUND)							

WATER LEVEL Dry at TOB
WATER LEVEL _____ at _____
WATER LEVEL _____ at 24 Hrs.
CAVE-IN DEPTH _____ at _____

WATER LOSSES,% _____ DEPTH _____

Of Bag Samples _____ # Of Undisturbed Samples _____
Special Tests (Explain) _____

METHOD OF DRILLING (check one)
AUGER ☒ SIZE 6" Solid MUD ___ SIZE _____
AIR ___ SIZE _____ / CORE ___ SIZE _____
TRICONE ___ SIZE _____ / CASING SIZE _____
LENGTH _____

DRILLING TIME (Hrs.):
Layout _____ /Moving _____ /Standby _____
Hauling Water _____ / Drilling _____

CUT & FILL VOLUMES BY AVERAGE AREA METHOD
BASED ON DEPTH CONTOURS (ISOPACHS)

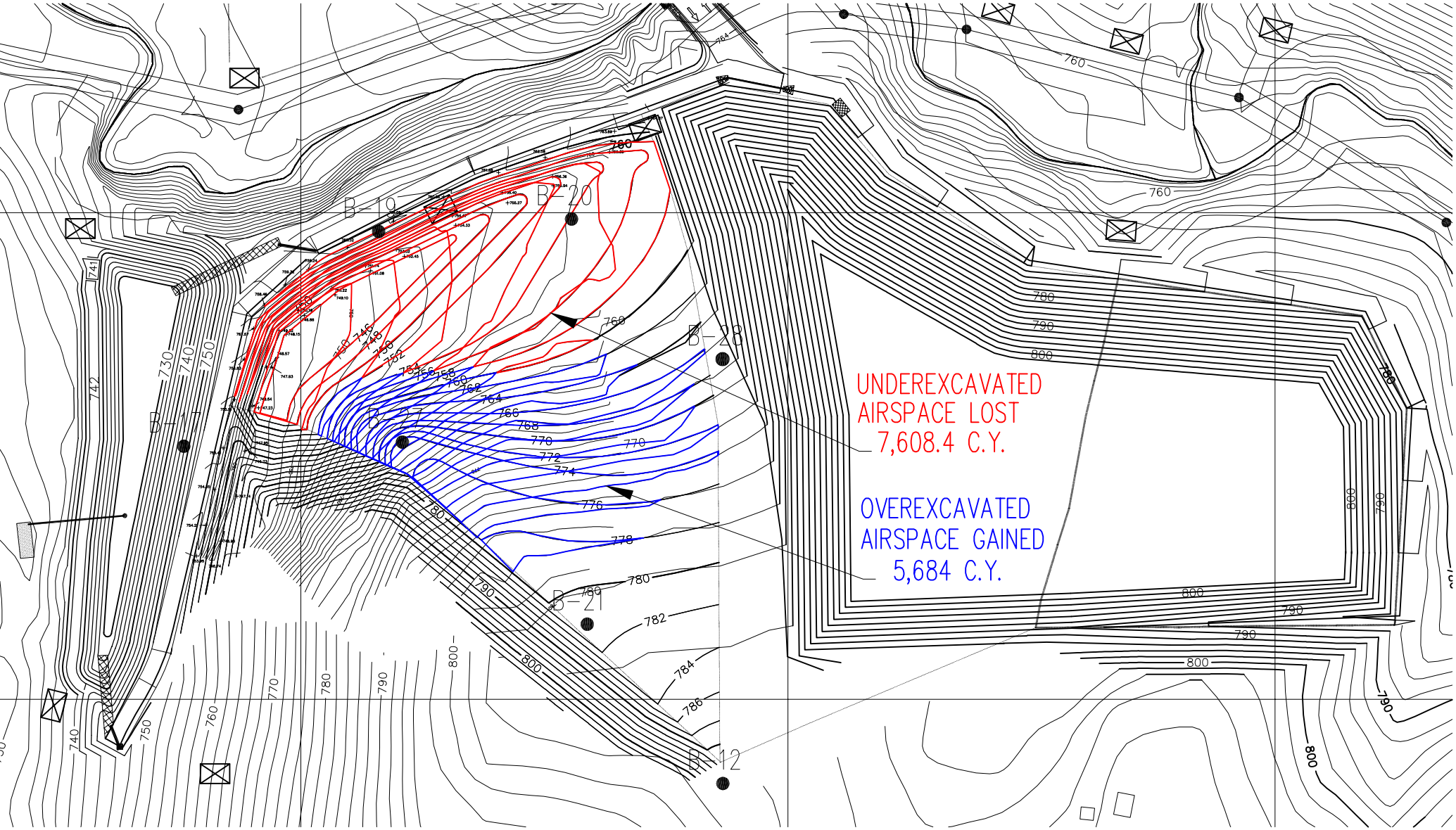
Contour interval (feet) = 2

AIRSPACE GAINED (BLUE CONTOURS ON MAP)

Cut Depth	Contour Area, sf	Contour Area, ac.	Increment Vol., cf	Accum. Vol., cf	Accum. Vol., cy
750	0.0	0.0	495.0	495.0	18.3
752	495.0	0.0	1,638.4	2,133.4	79.0
754	1,143.4	0.0	3,183.5	5,316.9	196.9
756	2,040.1	0.0	5,284.8	10,601.7	392.7
758	3,244.7	0.1	7,604.8	18,206.5	674.3
760	4,360.1	0.1	10,820.7	29,027.2	1,075.1
762	6,460.6	0.1	13,823.4	42,850.6	1,587.1
764	7,362.8	0.2	15,782.2	58,632.8	2,171.6
766	8,419.4	0.2	16,577.6	75,210.4	2,785.6
768	8,158.2	0.2	16,918.3	92,128.7	3,412.2
770	8,760.1	0.2	17,452.9	109,581.6	4,058.6
772	8,692.8	0.2	18,201.0	127,782.6	4,732.7
774	9,508.2	0.2	15,361.2	143,143.8	5,301.6
776	5,853.0	0.1	8,088.0	151,231.8	5,601.2
778	2,235.0	0.1	2,235.0	153,466.8	5,684.0
780	0.0	0.0	0.0	153,466.8	5,684.0
782	0.0	0.0	0.0	153,466.8	5,684.0

AIRSPACE LOST (RED CONTOURS ON MAP)

Cut Depth	Contour Area, sf	Contour Area, ac.	Increment Vol., cf	Accum. Vol., cf	Accum. Vol., cy
744	0.0	0.0	9,594.4	9,594.4	355.3
746	9,594.4	0.2	24,730.5	34,324.9	1,271.3
748	15,136.1	0.3	28,777.9	63,102.8	2,337.1
750	13,641.8	0.3	27,686.2	90,789.0	3,362.6
752	14,044.4	0.3	31,436.4	122,225.4	4,526.9
754	17,392.0	0.4	35,282.1	157,507.5	5,833.6
756	17,890.1	0.4	32,308.5	189,816.0	7,030.2
758	14,418.4	0.3	15,014.4	204,830.4	7,586.3
760	596.0	0.0	596.0	205,426.4	7,608.4
762	0.0	0.0	0.0	205,426.4	7,608.4
764	0.0	0.0	0.0	205,426.4	7,608.4


UNDEREXCAVATED
AIRSPACE LOST
7,608.4 C.Y.
OVEREXCAVATED
AIRSPACE GAINED
5,684 C.Y.
B-19
B-20
B-28
B-17
B-27
B-21
B-12