132056

North Base Landfill Wells

HTW DRILLING LOG

HOLE NO. NBL-ERM 11S

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA-Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig. 6 1/4" I.D. Augers 2" O.D. S.S. Split Spoons 300 lb hammer 6" Roller Bit	8. HOLE LOCATION: See Sheet #2.	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-22-94	11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: ~~14.5~~ ~~25.0~~ >25.5	15. DEPTH GROUNDWATER ENCOUNTERED: ∑ 18.0'	
13. DEPTH DRILLED INTO ROCK: ~~10.5~~ (WE) 11.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: ~~25.0~~ (WE) 25.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
None						%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well Installed, ERM-11S		X		Warren M. Zapp

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS c.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Split Spoon 0.0' to 2.0'					OL-OH
		Top soil, Very organic - rooted	0ppm PID	NS	NS	1, 1, 4, 5	2.0' recovery
	1.0'	Silt w/ trace f. Sand - subrounded	No Odor				2.5YR 3/1, very dark Gray 5 YR 4/3 reddish brown
							ML
	1.5'	C-grain sand subangular,	—	—	—	—	
	2.0'	(trace of gravel ≤ 15%) w/ light/white mottling. loose, dry poorly graded uniform	"	NBL-ERM 11S(2.0-4.0)	NS	14, 15, 16, 11	SP 10R 3/4 dusky red. 2' recovery
	4.0'	"Same (Note - collected as above" Five, 2.0', split spoons continuous to 10.0')	"	NS	NS	10, 5, 8, 11	2.0' recovery. SP
	6.0'	Clay lense (6.0' to 7.0')	"	NS	NS	25, 22, 31, 35	CL 2.5YR 3/4 dusky red. 1.8' recovery.
	7.0'	Same Sand as above!					
	8.0'	Sand with silt ≥ 15% tight, dry, clay mottling, poorly graded f-grain sand, subangular trace of gravel subround	"	NS	NS	11, 15, 21, 25	2' recovery 2.5YR 3/3 dusky red SP-SM
	10.0						

PROJECT: HIA-Middletown

HOLE NO. NBL-ERM11S

HTW DRILLING LOG

HOLE NO. NBL-ERM11S

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

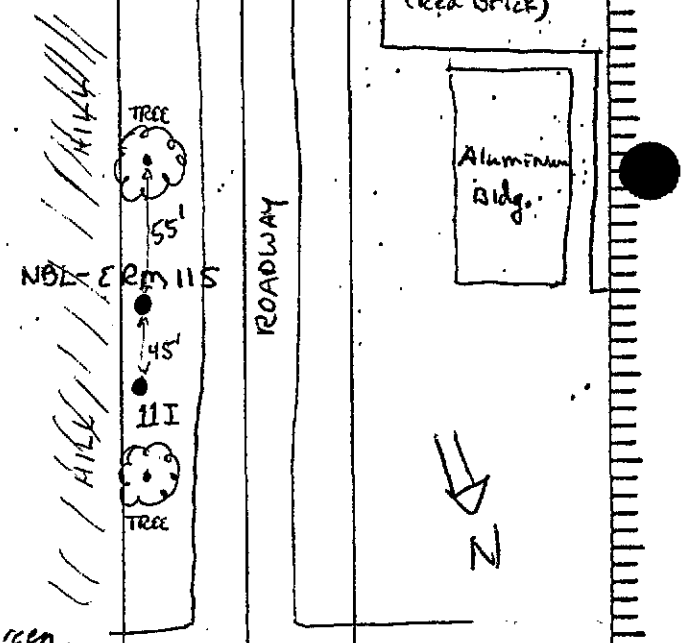
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	10.0'	Augered 10.0 to 13.0' Intend Split spoon 13.0' to 14.5'	NA	NS	NS	NA	Augered to 13.0
	13.0'	Silt very tight w/ white clay and black mottling dry poorly graded	0ppm PID, No Odor.	NBL-ERM 11S(13.0-14.5)	NS	22 32 100/.5	1.5' recovery, ML 2.5YR 3/4 dusky red
	14.5'	Augered to 25.0' bottom of borehole material as above.					

ERM-11S

Steel (protective Flush mount)
Compression Cap / with lock
Ground Surface
0.0'
0.20 PVC
8" DIA BOREHOLE
Cement / Bentonite Grout
5.0'
2" PVC RISER SCH 40
10.0'
11.0' BGS
Bentonite Pellets
13.0' BGS
15.0'
15.0' BGS
Morie #0 Sand Pack
20.0'
2" Continuous slit / wrap 0.010 PVC screen Sch 40.
25.0'
25.0' BGS - bottom of well screen.
25.5' BGS
Bottom of Borehole

Material Used
- 3 1/2 bags Morie #0 Sand (100 lbs/bag)
- 6 5lbs Bentonite Pellets 3/8" Dia
- 3.0 bags Portland Cement (94 lbs/bag) w/ 3% Bentonite.

Note: Not to Scale
BGS = Below Ground Surface



PROJECT: HIA - Middletown | HOLE NO.: NBL-ERM11S

HTW DRILLING LOG

HOLE NO. 11I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydro group
3. PROJECT: HTW Middletown	4. LOCATION: Middletown - PA
5. NAME OF DRILLER: Jessie Arnett	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber rig
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 11.5" Air hammer bit; 8" Air hammer bit; Dual rotary drilling	8. HOLE LOCATION: North Base Landfill - Penn State Campus
	9. SURFACE ELEVATION: Not Surveyed
	10. DATE STARTED: 7/27/94 (10-25-94) 11. DATE COMPLETED: 8/2/94
12. OVERBURDEN THICKNESS: ≈20'	15. DEPTH GROUNDWATER ENCOUNTERED: Unknown
13. DEPTH DRILLED INTO ROCK: ≈81'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 101'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	—		None

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
NO						— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well ERM-11I Installed		X		Bill Godbout

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	DARK reddish brown SILT, poorly sorted, with abundant clay Sand and gravel (sub rounded) moist					5yr 3/3 (CL)
		Reddish brown SILTY CLAY poorly sorted with gravel + sand / gravel to 1.5" Subrounded to sub angular	← (wet - drillers begin water injection)				5yr 4/3 (CH) some 7.5YR 4/6
	5	Poorly sorted gravel, coarse with rounded SICTSTONE Clasts to 0.5" - decomposed, and sand	subrounded to angular 0.0 ppm				Gravel clear to tan to grey (GM)
		Poorly Sorted gravel fine to coarse grained subrounded, with som rounded siltstone clasts					Gravel clear, tan grey (GM)
	10	Poorly sorted gravel, fine to coarse grained, subrounded, with less rounded siltstone Clasts, manganese (black) staining on gravel + siltstone, trace calcite Fracture-fill	10-20 ppm @ 10'				(GM)
	15	Well sorted coarse sand, Subrounded to angular, trace red sandstone	0.0 ppm				(SW)
		BEDROCK ≈20'					
	20	Dusky red sandstone, very soft highly weathered, trace coarse sand Trace mica, cuttings rounded to blocky fine-grained.					2.5yr 3/3
	25						

HTW DRILLING LOG

HOLE NO. 11I

PROJECT: HIA Middletown | INSPECTOR: Bill Gordon | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25	Dusky red brown SILTSTONE, soft moderately weathered, sandy micaceous, cuttings rounded to blocky					2.5yr 3/3
	30	Dusky red siltstone, soft moderately weathered, shaley micaceous, trace Fine Sandstone cuttings blocky to platey					2.5yr 3/3
	35	Dusky red SILTSTONE, soft slightly weathered sandy micaceous	0.0 @ 35'	Total Depth for "pipe" = 37'			2.5yr 3/3
		Dusky red SILTSTONE, soft, moderately weathered, sandy, micaceous	1.3-1.5 @ 37'				2.5yr 3/3
	40	Dusky red Sandstone, soft moderately weathered Fine grained to coarse grained, poorly sorted, qtz clasts are angular to sub angular					2.5yr 3/3
	45	Interbedded dusky red Sandstone and SILTSTONE/SANDSTONE SOFT, highly weathered, sub rounded to angular poorly sorted, weakly cemented, med. grained to coarse grained / SILTSTONE soft moderately weathered, micaceous, small platey cuttings	0.0 ppm @ 45'				2.5yr 3/3
	50	dusky red Sandstone, soft, highly weathered, medium grained, poorly sorted, micaceous, trace subrounded to angular coarse qtz. clasts.	0.0 ppm @ 50'				2.5yr 2.5/3
	55	Dusky red Sandstone, soft highly weathered, micaceous, med. grained poorly sorted, shale	0.0 ppm @ 55'	Dusky red SILTSTONE, mod hard slightly weathered, sandy, micaceous trace calcite, platy cuttings @ 1.5'			2.5yr 3/3
	60	Dusky red SILTSTONE, soft, moderately slightly weathered, Sandy, micaceous smaller platy cuttings	0.0 ppm @ 60'				2.5yr 3/3
	65	Dusky red Sandstone, soft slightly weathered, silty, micaceous, fine grained, blocky cuttings .5 to 1" trace calcite	0.0 ppm @ 65'				2.5yr 3/3
	70	OVER FOR 70'					

PROJECT: HIA - Middletown | HOLE NO. ERM-11I

HTW DRILLING LOG

HOLE NO. 11I

PROJECT: HIA Middletown | INSPECTOR: Bill Gordon | SHEET 3 OF 4 SHEETS

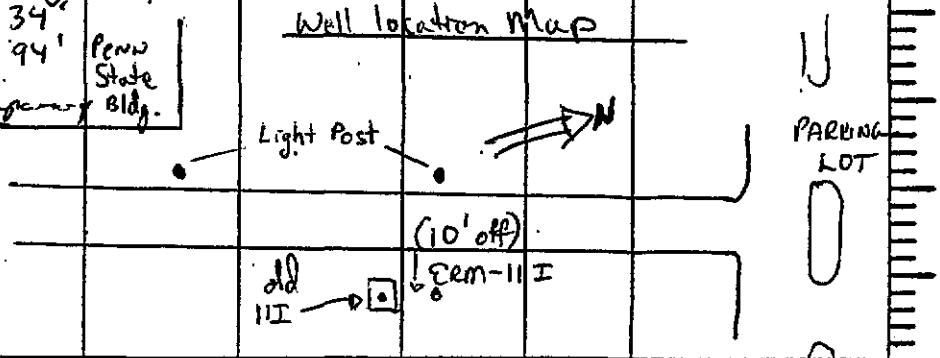
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	70	Dusky red sandstone, moderately hard, slightly weathered, medium to coarse grained - conglomeritic manganese staining (black) trace calcite Rounded qtz pebbles to 3/4"	0.0 ppm @ 70'	68-70' - large cuttings - poss fracture.			2.5yr 3/3
	75	Dusky red sandstone, soft to moderately hard, slightly weathered, fine to medium grained, poorly sorted					2.5yr 3/3
	80	Dusky red sandstone, moderately hard, slightly weathered, calcite fracfill on large 2" cuttings Fine grained, moderately well sorted	0.0 ppm @ 80' 0.0 @ 82'	LARGE FRACTURE 80-82' → WATER ←			2.5yr 3/3
	85	Dusky red SILTSTONE, soft slightly weathered, sandy trace qtz, ± 30% Dusky red sandstone fine grained hard slightly weathered, some larger cuttings to 2"	0.0 ppm @ 86' 0.0 ppm @ 88'	SMALLER Fracture more water			2.5yr 3/3
	90	Dusky red siltstone soft slightly to unweathered slightly sandy, micaceous slightly shaley, trace calcite, some manganese (black) staining	0.0 ppm @ 92'				2.5yr 3/3
				8-INCH CASING TO 94'			
	95	Dusky red Sandy SILTSTONE, soft slightly weathered, micaceous Sandy layers are poorly sorted red fine to fine grained	0.0 ppm @ 96'				2.5yr 3/3
	100		0.0 ppm @ 101'				
		Total Depth of hole = 101'					

* see well completion diagram

NOTE hole was completely dry at open interval 101'-94' but when casing was pulled back to 92' - water filled hole.

12" casing advanced to 34'
8" casing advanced to 94'
All casings were temporary (DH)

Well location Map



Note: Not to Scale

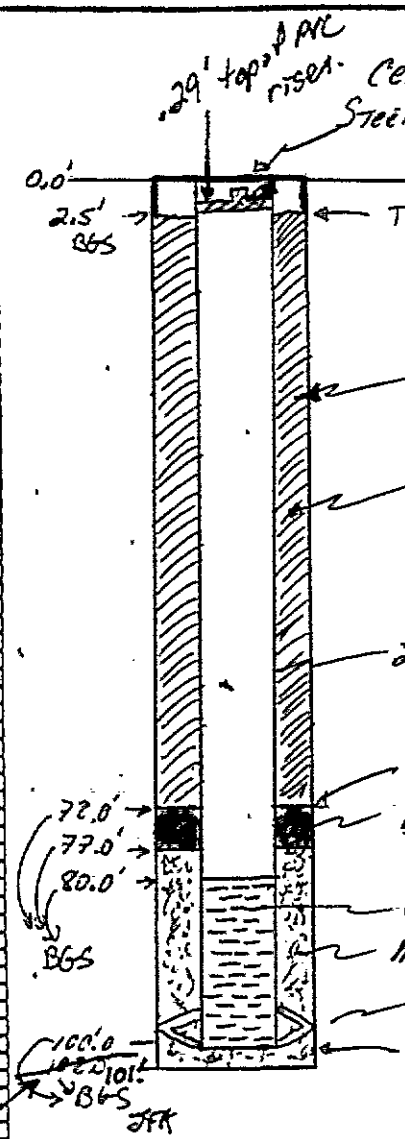
PROJECT: HIA - Middletown | HOLE NO. ECM-11I

HTW DRILLING LOG

HOLE NO. ERM-11I

PROJECT HIA - Middletown | INSPECTOR Warren Fox | SHEET 4 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



ERM-11I

Reconstruction Diagram

(10-26-94)

Initial well construction failed. That well was abandoned. This is a redrilled repacement well. JFK 7/26/95

102' BGS Bottom of borehole (cont. 10-26-94)

* Note that drilling log shows TD of borehole at 101'

Note: Not to Scale

BGS = Below Ground Surface - all measurements

* - does not include cement-flush pad.

* Materials Used in Construction

14 bags Morie #1 Sand, 50 lbs/bag

1 1/2 buckets bentonite pellets 3/8" Dia. 5 gal/bucket.

23 1/2 bags Portland Cement 94 lbs/bag.

≅ 66 lbs of bentonite Powder 50 lbs/bag.

PROJECT HIA - Middletown | HOLE NO. ERM-11I

HTW DRILLING LOG

HOLE NO. NBL-ERM125

1. COMPANY NAME: ERM - PADC
2. DRILLING SUBCONTRACTOR: ADT - MA
SHEET 1 OF 2 SHEETS
3. PROJECT: HA - Middletown
4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Troy Brown
6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 2" O.D. S.S. split spoon; 6 1/4" I.D. Augers; 6" roller bit; 300lb hammer
8. HOLE LOCATION: See Sheet #2
9. SURFACE ELEVATION: Not Surveyed
10. DATE STARTED: 8-23-94
11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: ≅2.0'
13. DEPTH DRILLED INTO ROCK: 20.0'
14. TOTAL DEPTH OF HOLE: 22.0'
15. DEPTH GROUNDWATER ENCOUNTERED: ≅11.0'
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
18. GEOTECHNICAL SAMPLES: 1 Sample — DISTURBED ✓ — UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES: NA
20. SAMPLES FOR CHEMICAL ANALYSIS: None — VOC — METALS — OTHER (SPECIFY) — OTHER (SPECIFY) — OTHER (SPECIFY)
21. TOTAL CORE RECOVERY: — %
22. DISPOSITION OF HOLE: Well ERM-12S Installed — BACKFILLED — MONITORING WELL: X — OTHER (SPECIFY)
23. SIGNATURE OF INSPECTOR: Dana N. Fay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS c.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS
		Split Spoon 0.0' to 2.0'					1.8' recovery
	0.0	Top 2" Top Soil organic rich Silt dry (black mottling top 6") very tight poorly graded trace of sand, (<15%) f. grain. subangular.	0ppm PID No Odor	NBL-ERM 125(0.0-2.0)	NS	4, 34, 78 100/5	10YR 3/3 dark brown OL/OH 2.5YR 4/4 dusky red. ML
	2.0'	Split spoon refusal at 2.0' roller bit drill 2.0' to saturated at 11.0'	0ppm, No odor	NS	NS	NA	Augered Interval
		Bottom of borehole at 22.0' (WNF) 8-23-94 material from roller bit drilling, from 2.0' to 22.0', not logged. used air compressor, cutting were dusky red 2.5YR 3/4. Siltstone. weathered uniform.					ERM-12S

PROJECT: HA- Middletown
HOLE NO.: NBL-ERM12S

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	NBL-ERM12S	2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.

ERM-12S

0.0'

Steel flush mount in cement pad w/ compression cap and lock.

Ground Surface

0.22 PVC Cement/Bentonite Grout

2" PVC RISER SCH 40

5.0'

7.0' BGS

Bentonite Pellet Plug

9.0' BGS

10.0'

11.0' BGS

Morie #0 Sand Pack

15.0'

8" Borehole

2" Continuous slit/wrap. 0.010 Slot PVC Screen, SCH 40.

20.0'

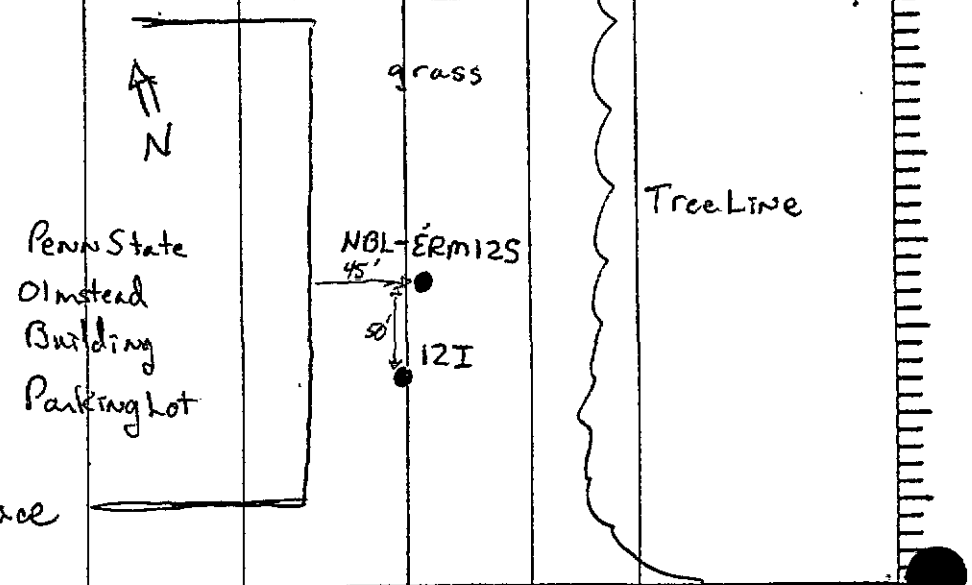
21.0' BGS Bottom of Screen

22.0' BGS Bottom of Borehole

Materials Used

- 2 bags Morie #0 Sand (100lb/bag)
- 25 lbs bentonite Pellets 3/8" Dia.
- 2 bags Portland Cement w/ 3% Bentonite

Well Location



Note: Not to Scale

BGS = Below Ground Surface

PROJECT	HOLE NO.
HIA - Middletown	NBL-ERM12S

HTW DRILLING LOG

HOLE NO. ERM-12I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 OF 4 SHEETS
3. PROJECT: HIA Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Jesse Arnett	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 11.5" Air hammer; 11.75" I.D., 12.75" O.D. Casing; 7.5" bit; 7.75" I.D. Casing; Casings were temporary	8. HOLE LOCATION: Penn State	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 8/9/94	11. DATE COMPLETED: 8/16/94
12. OVERBURDEN THICKNESS: ≈ 5-9'	15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered while drilling	
13. DEPTH DRILLED INTO ROCK: ≈93-97'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 14.56' (20 minutes after well completion)	
14. TOTAL DEPTH OF HOLE: Boring = 102' Bottom of screen = 100'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
No			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
No						%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-12I		X		David A. Haller

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Dusky red lean CLAY w/Sand Sand % > Gravel % Low Plasticity (Saprolite?)	Lith. Sample ① ≈4' 0.9ppm				2.5YR, 4/4 CL
	5	Weak red calcareous or dolomitic fine to medium grained SANDSTONE Hard, slightly to moderately weathered. Cuttings are Subangular/Subrounded - Some small fine gravel sized quartz clasts.	Lith. Sample ② ≈9' 4.7ppm				2.5YR, 5/3 Cuttings → 1-25mm (Larger chips are mostly quartz clasts.)
	10	Weak red calcareous or dolomitic medium to coarse grained SANDSTONE Hard to very hard, Slightly weathered. Cuttings are Subangular to Subrounded. Trace gravel sized quartz clasts → 5-15mm (round)	Lith. Sample ③ ≈14' 6.0ppm				2.5YR, 6/2 Cuttings → 1-25mm (Larger chips are mostly quartz clasts.)
	15	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE Hard, Slightly weathered. Cuttings are subrounded. Trace fine gravel sized subrounded quartz clasts.	Lith. Sample ④ ≈17' 4.5ppm				2.5YR, 3/3 Cuttings → 1-10mm
	20	Dusky red fine to medium grained SANDSTONE. Moderately hard, slightly weathered. Cuttings are subangular/subrounded. No notable larger quartz clasts like above	Lith. Sample ⑤ ≈24' 671ppm				2.5YR, 4/2 Cuttings → 1-27mm
	25						

PROJECT: HIA Middletown

HOLE NO. ERM-12I

HTW DRILLING LOG

HOLE NO. ERM-12I

PROJECT HIA Middletown | **INSPECTOR** D. Haller | **SHEET** 2 **OF** 4 **SHEETS**

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25 30 35	Weak red calcareous or dolomitic medium to course grained SANDSTONE. Hard to very hard. (Seems to be an increase in the quartz content.) - Slightly weathered - Cuttings are subangular to subrounded. - No large quartz clasts like above 20'. - Grain size seems to increase slightly w/depth. - Noted some small green-gray clasts which we have seen other places on the site, more than likely weathered dolomite. It reacts w/10% HCl when powdered.	Lith. Sample @ ≈29' 20ppm Lith. Sample @ ≈33' 13ppm Lith. Sample @ ≈37' 7.1ppm				(2.5YR, 5/3) Cuttings are 1→35mm throughout interval (29', 33', and 37') 35-37' ↑ in fracturing of rock ↳ feed rate ↑ ↳ chip size ↑ Trace Fe^{3+} (?) staining on some mineral grains w/in 25-40' interval
	40	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE. Hard. Slightly weathered. Cuttings are subangular/subrounded. No fine gravel sized quartz clasts. Apparent 1-3mm dolomite clasts. Trace siltstone ~~textured~~ chips → fine interbedded layers ?					(2.5YR, 4/3) cuttings → 1-20mm (similar to 15-20' but no quartz (larger) clasts.)
	45 50 55	- Same as 25-40' except: - small 1-10mm quartz clasts - green-gray dolomite clasts seem to be less weathered and less frequent w/depth.	Lith. Sample @ ≈49' 1.8ppm Lith. Sample @ ≈54' 0.0ppm Lith. Sample @ ≈57' 0.0ppm				(2.5YR, 5/3) cuttings → 1-20mm cuttings → 1-20mm cuttings → 1-40mm (More fractured?)
	60 65 70	Dusky red calcarious or dolomitic SILTSTONE. - Moderately hard - Slightly weathered (dolomitic clasts are stained) - dolomite clasts are notably smaller than above, - Cuttings are angular - Sand < 25% - No particles/clasts larger than silt sized except dolomite clasts	Lith. Sample @ ≈63' 0.0ppm Lith. Sample @ ≈69' 24ppm				(2.5YR, 4/4) cuttings → 0-3mm cuttings → 1-35mm
		over for 70+ log.					

PROJECT HIA Middletown **HOLE NO.** ERM-12I

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	D. Heller	ERM-12I	3 of 4 SHEETS

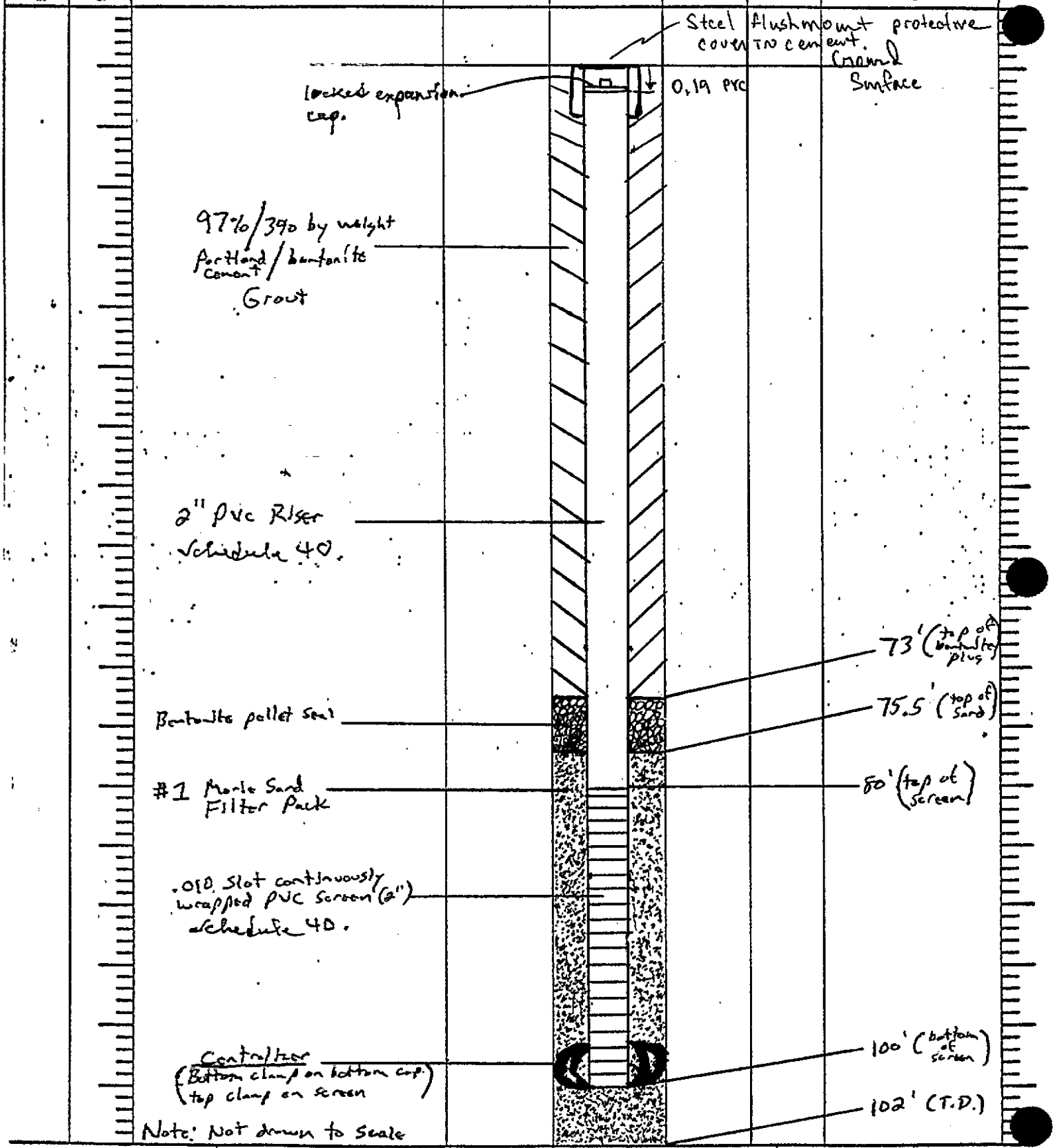
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	75	Same as 45-60 only increase in size of dolomite clasts.	Lith. Sample ⑤ ≈74' 26 ppm				(2.5YR, 4/3) cuttings → 1-20mm
		-Also weathering/discoloration of dolomite clasts is more apparent.	Lith. Sample ⑥ ≈77' 17.5ppm				cuttings → 1-30mm
	80		Lith. Sample ⑦ ≈83' 68ppm				(2.5YR, 3/4) cuttings → 1-25mm
	85	↓					
		material as above	Lith. Sample ⑧ ≈87' 310ppm				cuttings → 1-50mm (More fractured)? (corresponds w/ PID reading ?)
	90	↓					
			Lith. Sample ⑨ ≈93' 132ppm				cuttings → 1-30mm
	95		Lith. Sample ⑩ ≈97' 104ppm				cuttings → 1-35mm
	100						
		Boring terminated @ 102' ≈ total of injection water used = 1000 gallons -12" casing advanced to 16' -8" casing advanced to 95' -See pg. 4 of this log for Well Construction. -Note! All casings were temporary					

HTW DRILLING LOG

HOLE NO. ERM-12I

PROJECT H1A Middletown | INSPECTOR D. Haller | SHEET 4 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



PROJECT H1A Middletown | HOLE NO. ERM-12I

HTW DRILLING LOG

HOLE NO. ERM-13S

1. COMPANY NAME: ERM - DMC	2. DRILLING SUBCONTRACTOR: ADT	SHEET 1 OF 4 SHEETS
3. PROJECT: H/A - MIDDLETOWN	4. LOCATION: MIDDLETOWN, PA	
5. NAME OF DRILLER: TROY BROWN	6. MANUFACTURER'S DESIGNATION OF DRILL: MOBILE B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" SPLIT SPOON (4); 140 LB HAMMER; 6" ROLLER BIT TO 33.5' W/ air	8. HOLE LOCATION: FRUEHAUF	
	9. SURFACE ELEVATION: NOT SURVEYED	
	10. DATE STARTED: 3/28/95	11. DATE COMPLETED: 3/28/95
12. OVERBURDEN THICKNESS: 8'	13. DEPTH GROUNDWATER ENCOUNTERED: ~31'	
13. DEPTH DRILLED INTO ROCK: 25.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 12.67', 4 DAYS	
14. TOTAL DEPTH OF HOLE: 33.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	
18. GEOTECHNICAL SAMPLES: 1 — DISTURBED ✓ — UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC ✓ — METALS ✓ — OTHER (SPECIFY) — OTHER (SPECIFY) — OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
22. DISPOSITION OF HOLE: Built well ERM-13S	BACKFILLED — MONITORING WELL ✓ — OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR: Derek Evans

ELEV. a.	DEPTH b (FT)	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	GRAVEL AND SAND FILL					
	1	SANDY SILT (ML) FINE SAND, TRACE MEDIUM TO COARSE FEW FINE, SUBROUNDED GRAVEL TRACE CLAY, DRY	1.5 PPM	NS	NS	27, 28, 30, 46	ASSORTED COLORS YELLOW, GRAY, BROWN MAINLY 7.5YR 4/6; 10R 3/4 21" REC
	2						
	3	SILTY SAND (SM) FINE SAND, SOME MEDIUM, TRACE COARSE TRACE FINE, SUBROUNDED GRAVEL MEDIUM DENSE TO DENSE FRIABLE DRY	1.6 PPM	NBL-ERM 13S	NS	28, 46, 42, 43	10R 3/4; 7.5 YR 4/6 17" REC
	4						
	5	SANDY SILT (ML) FINE SAND, TRACE MEDIUM TO COARSE FEW FINE, SUBROUNDED GRAVEL TRACE CLAY DRY SOME BLACK STAINING (Mn?)	1.3 PPM	NS	NS	33, 32, 30, 45	7.5YR 4/6; 16" REC
	6						
	7	SANDY SILT (ML) SAME AS ABOVE BUT CHANGE IN COLOR	0.9 PPM	NS	NS	4, 20, 100/3" (REFUSAL)	2.5YR 3/4; 2.5 YR 3/4 11" REC
	8						
	9	DUSKY RED SANDY SILTSTONE FINE SAND (40%), TRACE MEDIUM HIGHLY WEATHERED SOFT, FRIABLE ABUNDANT MICA, BLACK STAINING					
	10						

PROJECT: H/A - MIDDLETOWN — HOLE NO. ERM-13S

HTW DRILLING LOG

HOLE NO. ERM-135

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET 2 OF 4 SHEETS

REV. b	DEPTH (Ft)	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	10	DUSKY RED SANDY SILTSTONE					
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19	↑ 2.					
	20	CUTTINGS IN FORM					
	21	OF ROCK CHIPS					
		(COMPETENT BRX)					
	22	AS ABOVE					
	23						
	24						
	25						
	26						
	27	FRACTURE					
	28	CUTTINGS BALLING UP					
	29						

PROJECT HIA - MIDDLETOWN | HOLE NO. ERM - 135

HTW DRILLING LOG

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | HOLE NO. ERM-135 | SHEET 3 OF 4 SHEETS

ELEV. (FT) b	DEPTH (FT)	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	29						
	30						
	31	WATER PRODUCED AFTER DRILLERS ADD ROD AND BEGIN DRILLING AGAIN					
	32						
	33	material as above sandy siltstone					
	34	BOTTOM OF BOREHOLE = 33.5'					

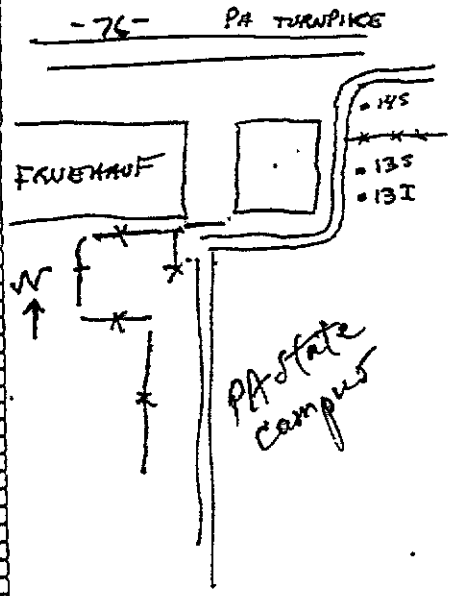
HTW DRILLING LOG

HOLE NO. ERM - 135

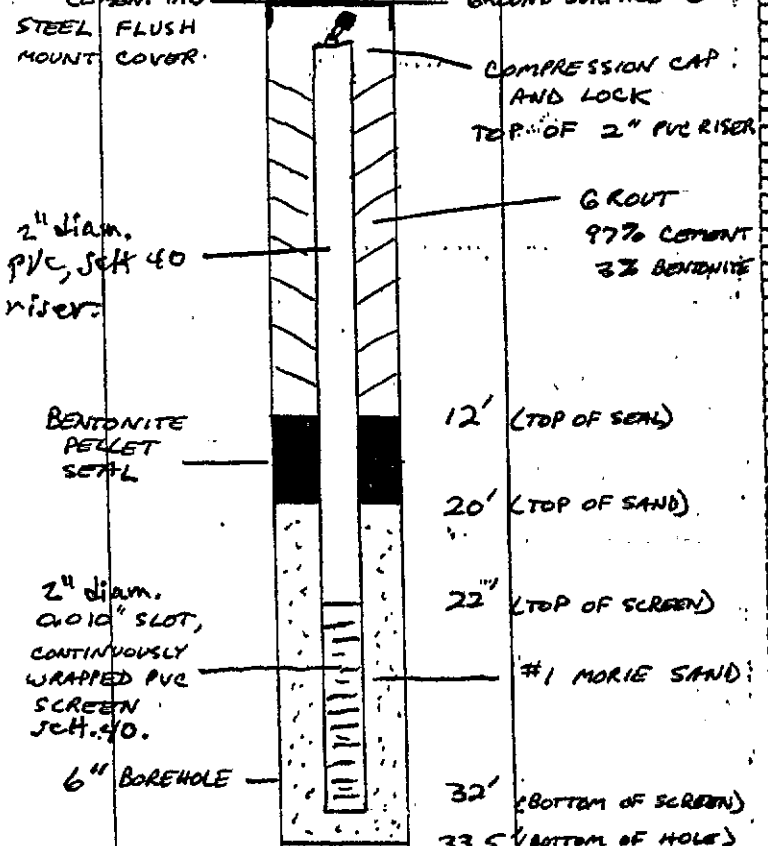
PROJECT: H1A - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET 4 OF 4 SHEETS

ELEV. b	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

LOCATION



WELL CONSTRUCTION



WELL MATERIALS

10' 10 SLOT CONTINUOUSLY WRAPPED 2" PVC SCREEN

22' PVC RISER - SCHEDULE 40

SAND: 2 BAGS

BENTONITE PELLETS: 1 BUCKETS

CEMENT: 2 BAGS

BENTONITE (GRANULAR): 1/10 BAG

NOTE: NOT TO SCALE
ALL MEASUREMENTS FROM GROUND SURFACE

PROJECT: H1A - MIDDLETOWN | HOLE NO. ERM - 135

HTW DRILLING LOG

HOLE NO. ERM-13I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 of 4 SHEETS
3. PROJECT: HIA Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: J. Arnett	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 12" casing + bit; 8" casing + bit; casings were temporary; Dual Rotary Drilling.	8. HOLE LOCATION: Fruehauf	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 8/17/94	11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: 9-14'	15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered during drilling.	
13. DEPTH DRILLED INTO ROCK: 88-93'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ≈19' BGS in 8" casing / 1.5 hrs.	
14. TOTAL DEPTH OF HOLE: Boring → 102', well → 100'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-13I				D. Faber

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Strong brown lean clay w/gravel - Gravel % > Sand % - Gravel is course to very course and well rounded.	Lith. Sample ⑤ ≈4' PID → NA				7.5YR, 5/6 CL (Fill?)
	5	Strong brown Sandy lean Clay w/gravel. - Sand % > Gravel % - Course Sand to fine gravel - Sand+Gravel are well rounded	Lith. Sample ⑥ ≈9' PID → NA				7.5YR, 5/6 CL (Fill?)
	10	Dusky red SILTSTONE. very little fine sand. Soft to moderately hard. Slightly to moderately weathered. cuttings are subangular.	Lith. Sample ⑦ ≈14' PID → NA				2.5YR, 3/3 cuttings: 3-25mm
	15	Dusky red calcareous or dolomitic fine grained SANDSTONE. Moderately hard. Slightly to moderately weathered. Trace fine gravel sized quartz clasts. Cuttings are sub-angular to Subrounded	Lith. Sample ⑧ ≈17' PID → NA				2.5YR, 3/4 cuttings: 1-20mm
	20	Dusky red fine to medium grained SANDSTONE. Moderately hard. Slightly weathered. Cuttings: Subangular (No gravel sized quartz clasts)	Lith. Sample ⑨ ≈24' 160 ppm				2.5YR, 4/4 cuttings: 1-25mm
	25						

PROJECT: HIA Middletown

HOLE NO.: ERM-13I

HTW DRILLING LOG

PROJECT: HIA Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-13I | SHEET 2 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25	Dusky red calcareous or dolomitic SILTSTONE. Very little fine sand. Soft to moderately hard. Slightly weathered. Cuttings: Angular to Subangular	Lith. Sample ⑤ ≈29' 480 ppm				2.5YR, 3/3 cuttings: 1-35mm
	30	Dusky red SILTSTONE. Very little sand. Soft to moderately hard. Slightly weathered. Cuttings: Angular/Subangular	Lith. Sample ⑥ ≈34' 120 ppm				2.5YR, 3/3 cuttings: 1-20mm
	35	Dusky red fine grained SANDSTONE. Moderately hard to hard, but very brittle. Slightly weathered. Some 1-20mm quartz clasts. Cuttings are subrounded.	Lith. Sample ⑦ ≈39' 1,170 ppm				2.5YR, 3/3 cuttings: 1-20 mm
	40	Dusky red calcareous or dolomitic SILTSTONE. Very little sand. Moderately hard to hard. Slightly weathered. Trace dolomite clasts. Trace fine SAND, D.U. slishy. Cuttings are subangular	Lith. Sample ⑧ ≈44' 320 ppm				2.5YR, 3/3 cuttings: 1-15mm
	45		Lith. Sample ⑨ ≈49' 380 ppm				2.5YR, 3/4 cuttings: 1-25mm
	50	Dusky red fine grained SANDSTONE. Moderately hard to hard. Slightly weathered. -No noticable quartz clasts >1-3mm -cuttings are subrounded.	Lith. Sample ⑩ ≈54' PID → NA				2.5YR, 3/3 cuttings: 1-30 mm
	55	Dusky red calcareous or dolomitic SILTSTONE. -Soft to moderately hard. -Slightly weathered (discoloration of dolomite clasts) -dolomite clasts ≥ 1-5mm -Cuttings are subrounded	Lith. Sample ⑪ ≈59' 280 ppm				2.5YR, 3/3 Cuttings: 1-35mm
	60		Lith. Sample ⑫ ≈64' 121 ppm				cuttings: 1-60 mm
	65	Dusky red calcareous or dolomitic fine grained SANDSTONE. -Soft to moderately hard -Slightly weathered (dolomite discoloration) -1-7mm dolomite clasts -Cuttings: Subrounded	Lith. Sample ⑬ ≈69' 302 ppm				2.5YR, 3/3 cuttings: 1-35mm
	70	See next pg.					

HTW DRILLING LOG

HOLE NO. ERM-13I

PROJECT: HIA Middletown | INSPECTOR: D. Heller | SHEET 3 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	70	Dusky red calcareous or dolomitic SILTSTONE. Moderately hard. Slightly weathered. 1-30 mm dolomite clasts. Increase in dolomite content. Rock is speckled w/dolomite. Cuttings: Subround-round	Lith. Sample @ ≈74' 103 ppm				2.5YR, 3/3 cuttings: 1-30mm
	75	Weak red calcareous or dolomitic fine grained SANDSTONE. - Moderately hard. Slightly weathered - No apparent dolomite clasts - Cuttings: subrounded	Lith Sample @ ≈79' 240 ppm				2.5YR, 5/3 cuttings: 1-30mm
	80	Weak to dusky red calcareous or dolomitic SILTSTONE. - Moderately hard - Slightly weathered - Trace small dolomite clasts - cuttings: subrounded	Lith. Sample @ ≈84' 125 ppm				2.5YR, 5/3 cuttings: 1-40mm
	85		Lith. Sample @ ≈89' 172 ppm				2.5YR, 4/3 cuttings: 1-60mm
	90	Dusky red calcareous or dolomitic fine grained SANDSTONE. - Moderately hard. Slightly weathered - No longer quartz clasts - Cuttings: subrounded.	Lith. Sample @ ≈94' 167 ppm				2.5YR, 4/3 cuttings: 1-30mm
	95	Dusky red calcareous or dolomitic SILTSTONE. Moderately hard. Slightly weathered. - 1-3 mm dolomite clasts - cuttings: subrounded	122 ppm Lith. Sample @ ≈99'				2.5YR, 4/3 cuttings: 1-35mm
	100	Dusky red fine to medium SANDSTONE. Hard, unweathered-slightly weathered cuttings: subrounded to rounded.	Lith. Sample @ ≈102' 130 ppm				2.5YR, 4/2 cuttings: 0-10mm
		Boring terminated @ 102' ≈ total of injection water used = 900 gallons - 10" casing advanced to 18' - 8" casing advanced to 95' - see pg. 4 of this log for well construction. - All casings were temporary	Fruehauf Bldg		Garage/shack ERM-13I		NBL

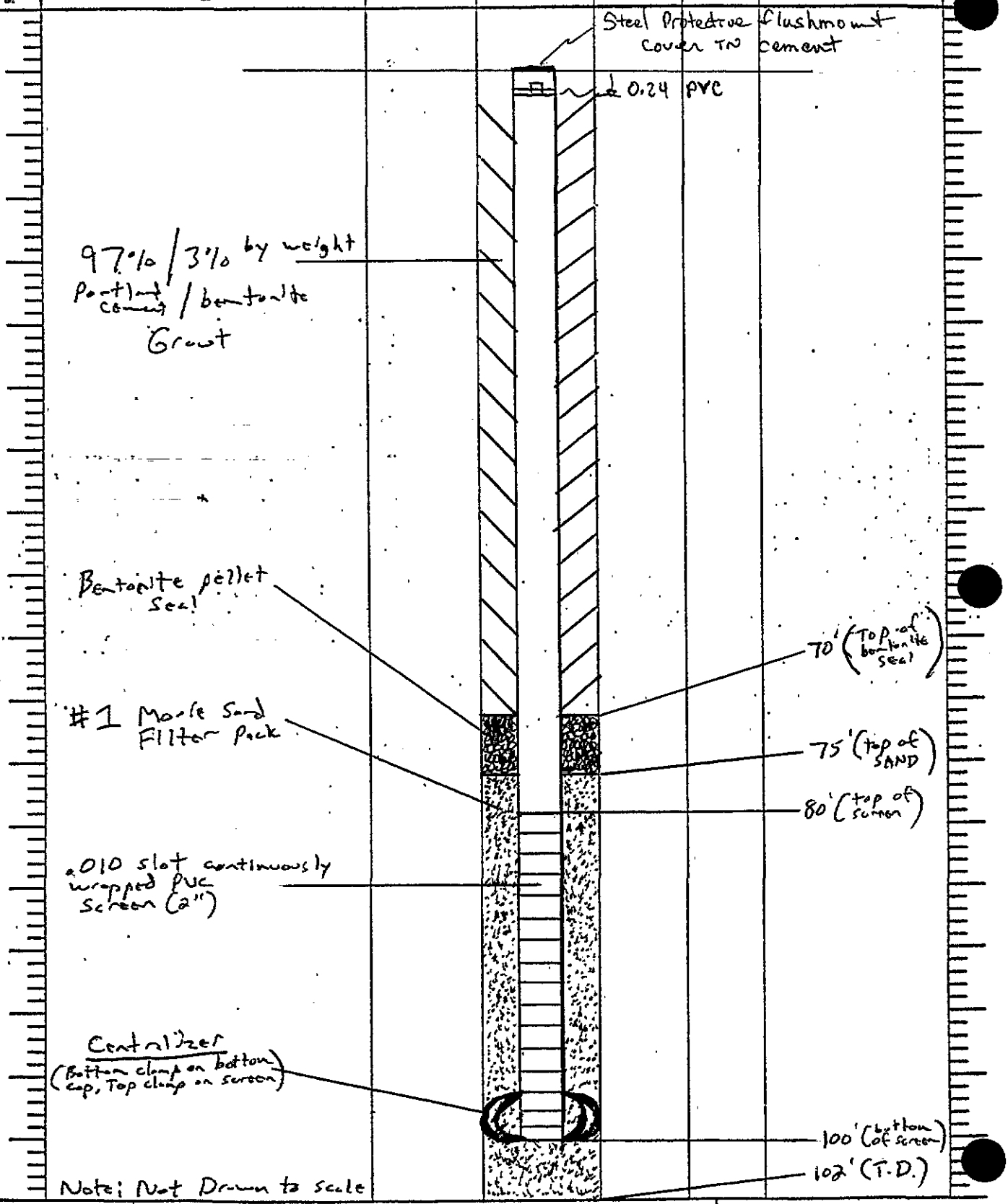
PROJECT: HIA Middletown | HOLE NO.: ERM-13I

HTW DRILLING LOG

HOLE NO. ERM-13I

PROJECT HIA Middletown | INSPECTOR D. Haller | SHEET 4 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



Note: Not Drawn to scale

PROJECT HIA Middletown | HOLE NO. ERM-13I

HTW DRILLING LOG

HOLE NO. ERM-14S

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT	SHEET 1 OF 4 SHEETS
3. PROJECT: HIA - MIDDLETOWN	4. LOCATION: MIDDLETOWN, PA	
5. NAME OF DRILLER: TROY BROWN	6. MANUFACTURER'S DESIGNATION OF DRILL: MOBILE B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" SPLIT SPOON (3); 140 LB HAMMER; 6" ROLLER BIT TO 34.5'	8. HOLE LOCATION: FRUEHAUF PARKING LOT	
	9. SURFACE ELEVATION: NOT SURVEYED	
	10. DATE STARTED: 3/27/95	11. DATE COMPLETED: 3/28/95
12. OVERBURDEN THICKNESS: ~7'	13. DEPTH GROUNDWATER ENCOUNTERED: ~30'	
14. DEPTH DRILLED INTO ROCK: ~27.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 23.92', 3 DAYS	
15. TOTAL DEPTH OF HOLE: 34.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1	✓		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built Well ERM-14S		✓		Derek Evans

ELEV. a.	DEPTH b. (FT)	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	SLOW COUNTS g.	REMARKS h.
	0	3" ASPHALT OVER SILTY SAND WITH GRAVEL					
	1						
	2	SILTY SAND WITH GRAVEL (SM) FINE TO COARSE SAND FINE, ANGULAR TO SUBROUNDED GRAVEL LOOSE TO MEDIUM DENSE, DRY	0.0 PPM	NS	NS	12, 7, 5, 5	5 YR 3/3 REC 18"
	3	ELASTIC SILT WITH SAND FINE SAND, TRACE MEDIUM TO COARSE SOME CLAY TRACE FINE, SUBANGULAR GRAVEL DRY (MH)	0.0 PPM	NBL - ERM 14S (3.0-5.0)	NS	5, 5, 7, 13	5 YR 3/3 7.5 YR 4/6 REC 18"
	4						
	5						
	6	SILTY SAND (SM) FINE TO COARSE SAND MEDIUM DENSE TO V. DENSE FRIABLE DRY	0.0 PPM	NS	NS	20, 40, 56, 100/4" (REFUSAL)	2.5 YR 3/4 REC 23"
	7	WEATHERED BEDROCK DUSKY RED SILTY FINE TO COARSE-GRAINED SANDSTONE (WACKE)					
	8						
	9	LOTS OF DUST					
	10						

PROJECT: HIA - MIDDLETOWN

HOLE NO. ERM-14S

HTW DRILLING LOG

HOLE NO. ERM-145

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET 2 OF 4 SHEETS

ELEV. b	DEPTH a (FT)	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	10	CUTTINGS:					
	11	DUSKY RED SILTY FINE TO MEDIUM TO COARSE - GRAINED SANDSTONE (WACKE)					
	12						
	13	LOTS OF DUST					
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23	Roller bit interval					
	24						
	25	materials as above.					
	26						
	27						
	28						
	29	MOIST CUTTINGS					

HTW DRILLING LOG

HOLE NO. ERM-14S

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET 3 OF 4 SHEETS

ELEV. (FT) a	DEPTH (FT) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	29						
	30						
	31						
	32	CUTTINGS DRY & DUSTY AGAIN					
	33	MATERIAL AS ABOVE					
	34						
	35	BOTTOM OF BOREHOLE = 34.5'					

HTW DRILLING LOG

HOLE NO. ERM-14S

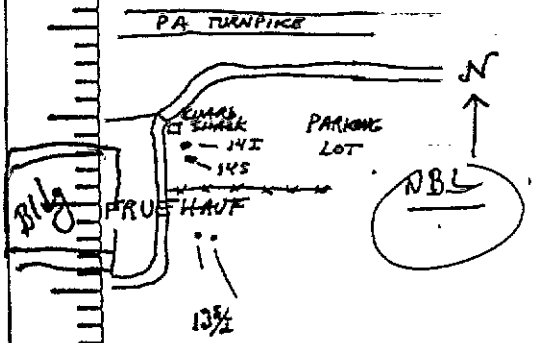
PROJECT: H1A - MIDDLETOWN

INSPECTOR: D. EVANS

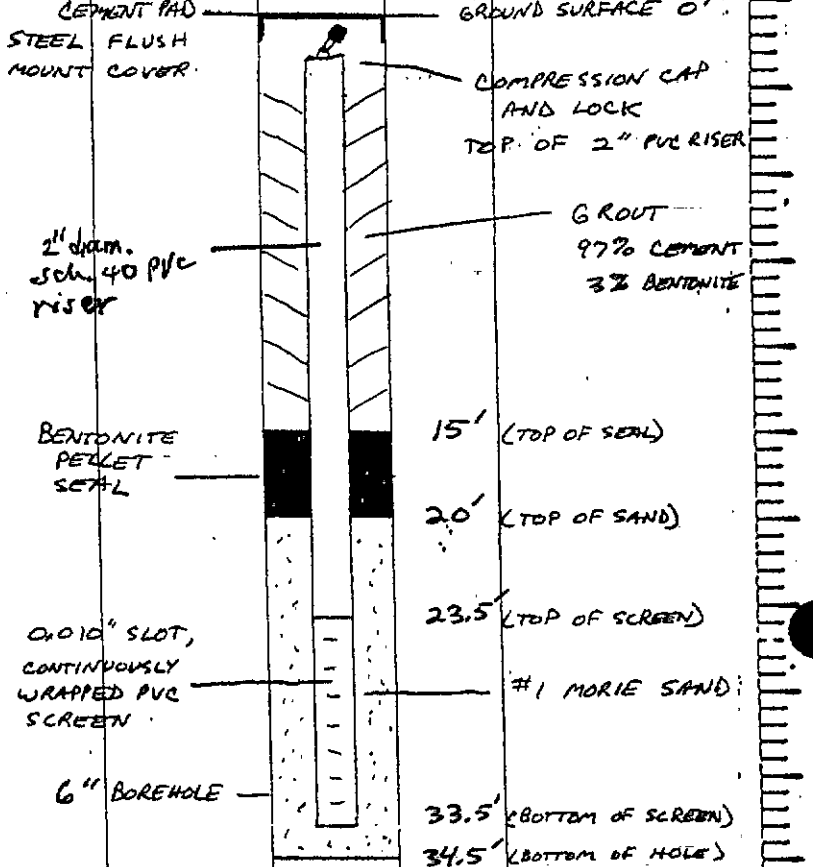
SHEET 4 OF 4 SHEETS

REV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h

LOCATION



ERM-14S WELL CONSTRUCTION



WELL MATERIALS

10' 10 SLOT CONTINUOUSLY WRAPPED 2" PVC SCREEN

23.5' PVC RISER - SCHEDULE 40

SAND: 2¼ BAGS

BENTONITE PELLETS: 1 BUCKETS

BENTONITE (GRANULAR): ½ BAG

CEMENT: 1 BAG

NOTE: NOT TO SCALE
ALL MEASUREMENTS FROM GROUND SURFACE

PROJECT: H1A - MIDDLETOWN

HOLE NO. ERM-14S

HTW DRILLING LOG

HOLE NO. ERM-14I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 OF 4 SHEETS
3. PROJECT: HIA Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Jesse Arnett	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 11.5" Air hammer; 11.75" I.D., 12.75" O.D. Casing; 7.5" air hammer; 7.75" I.D. Casing	8. HOLE LOCATION: Fruehauf	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 8/22/94	11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: 4-9'	15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered during drilling	
13. DEPTH DRILLED INTO ROCK: 93-98'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ≈13.15' BGS / ≈ 7 hrs	
14. TOTAL DEPTH OF HOLE: 102'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-14I		X		D. Heller

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Black well graded gravel - No soil - cuttings/Gravel is 5-35mm - Angular - Fill (3-6' - casing advanced very quickly)	0.0 ppm @ ≈4'				10YR, 2/1 GW
	5	Dusky red fine grained SANDSTONE - Very soft - Moderately weathered - Cuttings are subangular to subrounded.	0.0 ppm @ ≈9'				2.5YR, 3/3 cuttings: 1-10mm
	10	Dusky red fine to medium grained SANDSTONE. - Moderately hard to hard - Slightly weathered - cuttings are subround to round	0.0 ppm @ ≈14'				2.5YR, 4/3 cuttings: 1-5mm
	15	Dusky red medium to coarse grained SANDSTONE. - Hard - Slightly weathered - Cuttings are subround to round - Clast supported	52 ppm @ ≈18'				2.5YR, 4/3 cuttings: 1-8mm
	20	Dusky red coarse to very coarse SANDSTONE. Some fine gravel (5-10mm). - Hard to very hard (lots of quartz) - Slightly weathered - Subrounded to round. Clast supported	0.0 ppm @ ≈24'				2.5YR, 3/2 cuttings: 0-10mm
	25						

PROJECT: HIA Middletown

HOLE NO. ERM-14I

HTW DRILLING LOG

HOLE NO. ERM-14I

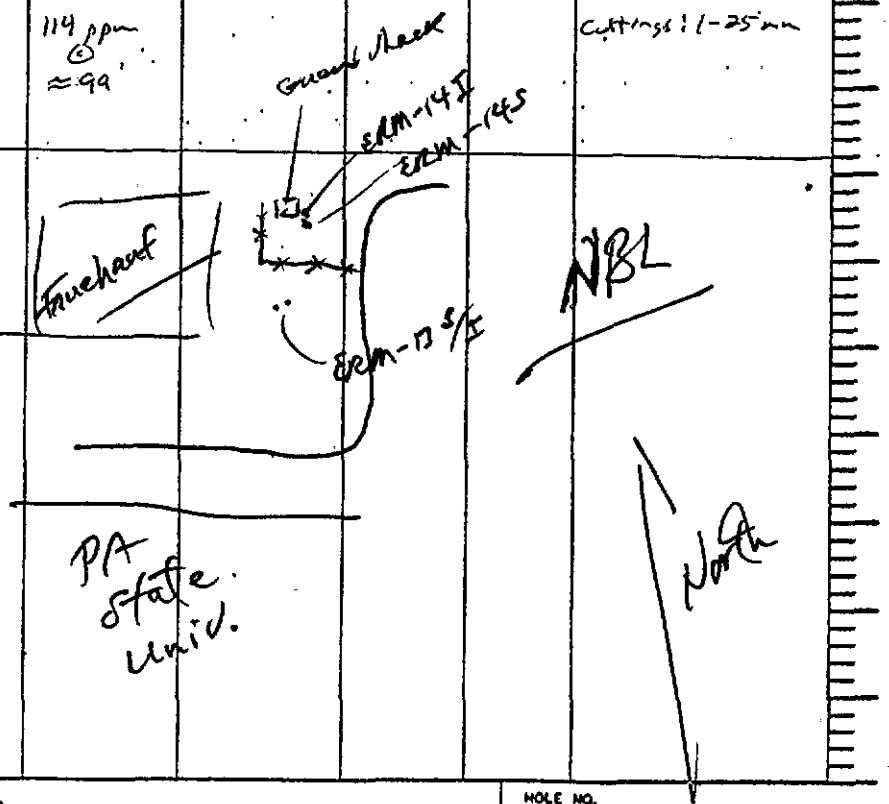
PROJECT: HIA Middletown | INSPECTOR: D. Heller | SHEET 2 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25	Dusky red calcareous or dolomitic SILTSTONE. Trace 1-5mm quartz clasts but is characterized by many dolomite clasts which give it a "speckled" look similar to CERM-13I, 70-75')	167 ppm @ ≈29'				2.5YR, 3/3 cuttings: 1-30mm
	30	- Very soft to soft - Slightly - moderately weathered - Some yellowish staining on some dolomite grains - Cuttings are subangular / subround	641 ppm @ ≈33'				cuttings: 1-30mm
	35	Dusky red calcareous or dolomitic Fine SANDSTONE. Some coarse sand to fine gravel sized quartz clasts. - No notable dolomite like above - Very soft → soft. Slightly → moderately weathered. Subangular / subround	1,721 ppm @ ≈37'	Note: 40-43 seemed pretty fractured - feed rate jumped up	(feldspar?)		2.5YR, 4/3 cuttings: 1-25mm (trace yellow staining on ? clasts)
	40	Dusky red calcareous or dolomitic SILTSTONE. Very low carbonate content → sandy flazes. - Soft → moderately hard - Slightly weathered. No notable dolomite clasts. Trace fine quartz - Subrounded cuttings	502 ppm @ ≈42'				2.5YR, 4/3 cuttings: 5-50mm
	45	Dusky red medium to coarse grained calcareous or dolomitic SANDSTONE. - Clast supported. - Moderately hard to hard. - Slightly weathered - discoloration on some clasts (feldspar?) - No notable dolomite - Cuttings are subrounded to round	112 ppm @ ≈47'				2.5YR, 3/3 cuttings: 1-20mm
	50		108 ppm @ ≈52'				cuttings: 1-20mm
	55		482 ppm @ ≈57'				cuttings: 1-20mm
	60	Dusky red calcareous or dolomitic SILTSTONE. Trace fine sand. - Soft. - Slightly weathered - Cuttings are subangular - No notable dolomite clasts	456 ppm @ ≈63'				2.5YR, 4/3 cuttings: 1-25mm
	65	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE - Hard to very hard - unweathered to slightly weathered - No notable dolomite clasts - Some coarse sand → fine gravel sized quartz clasts. - Cuttings are Subrounded	347 ppm @ ≈68'				2.5YR, 4/3 cuttings: 1-50mm
	70						

HTW DRILLING LOG

PROJECT: HIA Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-14I | SHEET 3 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
			236 ppm @ ≈ 74'				cuttings: 1-50mm
	75	weak red calcareous or dolomitic fine grained SANDSTONE					2.5YR, 5/3
		- Moderately hard					
		- Slightly weathered	34 ppm @ ≈ 79'				cuttings: 1-10mm
	80	- TRACE medium-course grained quartz clasts.					
		- Trace, very small dolomite clasts (≤1mm)					
		- cuttings are subrounded	124 ppm @ ≈ 84'				cuttings: 1-10mm
	85						
			60 ppm @ ≈ 89'				cuttings: 1-10mm
	90	Dusky red calcareous or dolomitic medium to coarse grained SANDSTONE					2.5YR, 3/3
		- very hard					
		- slightly weathered - discoloration (yellow staining) on some 1-5mm dolomite clasts	111 ppm @ ≈ 94'				cuttings: 1-25mm
	95	- Dolomite clasts are more frequent and slightly larger					
		- cuttings are subround					
		- Some fine grained sized quartz clasts	114 ppm @ ≈ 99'				cuttings: 1-25mm
	100						
		- Boring terminated @ 102'					
		- 12" casing advanced to 18'					
		- 8" casing advanced to 75'					
		- total volume of injection water used during drilling was ≈ 700 gallons.					
		- All casing was temporary					



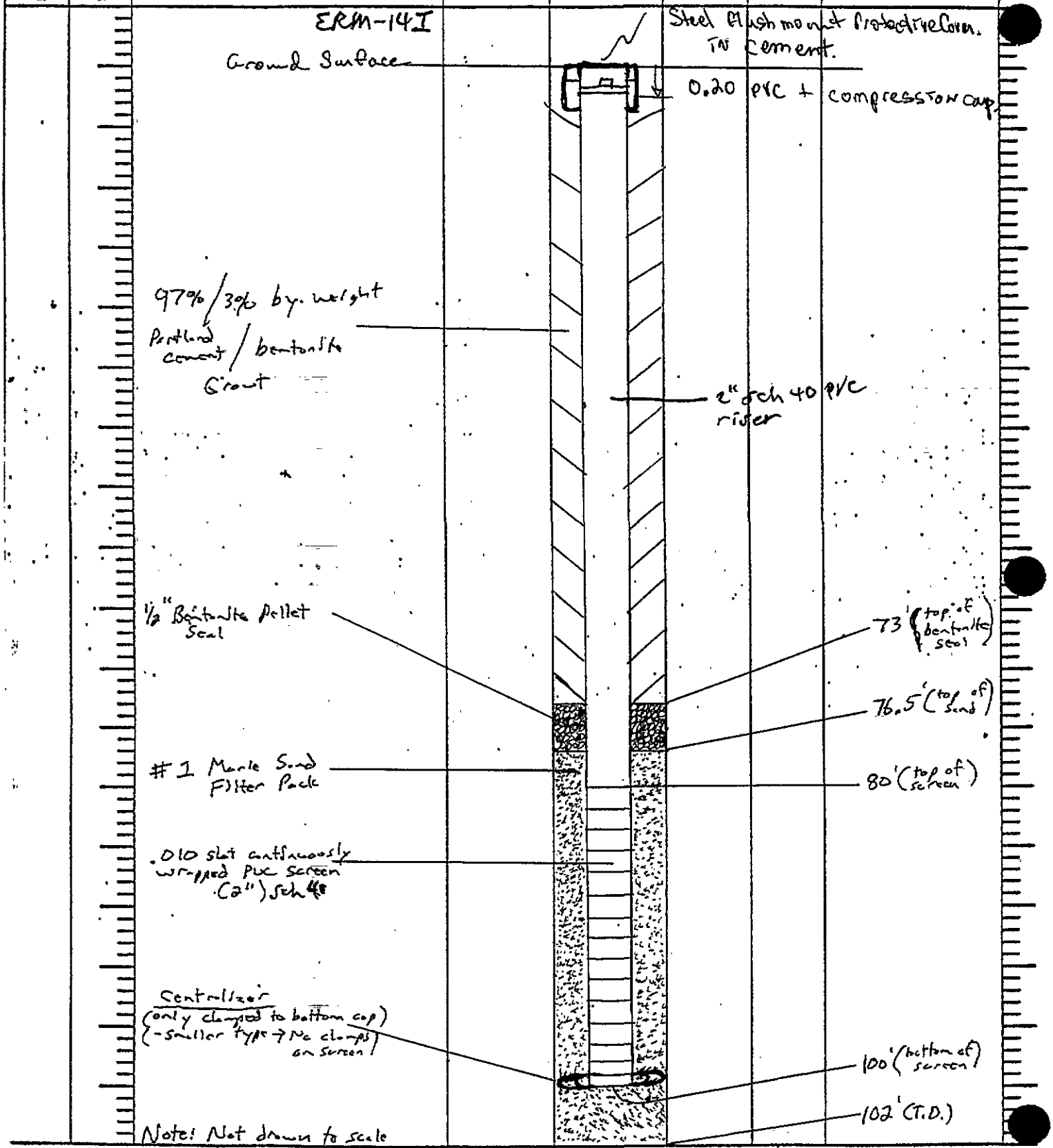
PROJECT: HIA Middletown | HOLE NO.: ERM-14I

HTW DRILLING LOG

HOLE NO. ERM-14I

PROJECT: HIA Middletown | INSPECTOR: D. Haller | SHEET 4 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



PROJECT: HIA Middletown | HOLE NO. ERM-14I

HTW DRILLING LOG

HOLE NO. ERM-15I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 OF 4 SHEETS
3. PROJECT: HIA Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Jesse Arnett	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 11.5" air hammer bit; 11.75" I.D., 12.75" O.D. Casing; 7.5" bit; 7.75" I.D. Casing	8. HOLE LOCATION: Middletown High School	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 8/3/94	11. DATE COMPLETED
12. OVERBURDEN THICKNESS: ≈20'	15. DEPTH GROUNDWATER ENCOUNTERED: >70' during drilling, ≈5-7' after weekend (in borehole)	
13. DEPTH DRILLED INTO ROCK: ≈82'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: immediately / ≈2.5 days	
14. TOTAL DEPTH OF HOLE: 102' during / bottom of screen @ 100'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-15I		X		D. Gfeller

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Brown Sandy Fat Clay w/gravel Sand is fine grained. Gravel is medium to coarse subangular to angular.	0.0 ppm @ ≈2.5'				7.5 YR, 4/3 (CH)
	5	Dusky red Fat Clay w/Sand (fine) Sand + Gravel ≤ 30% Gravel is fine to medium and subrounded	0.0 ppm @ ≈7.5'				2.5YR, 4/4 (CH)
	10	Dusky red elastic silt w/Sand (fine) Sand + Gravel ≤ 30% Gravel is fine to coarse an is subangular	0.0 ppm @ ≈12.5'				2.5YR, 4/4 (MH)
	15	Dusky red Poorly graded Coarse sand. Gravel ≤ 15% and is fine grained and subrounded.	- NA (see notebook) Lith. Sample @ ≈19'				2.5YR, 4/4 (SP)
	20	- Reddish brown to Reddish Gray fine to medium grained calcareous or dolomitic SANDSTONE - Moderately hard to hard. - Moderately weathered. - Cuttings → 5-20 mm → Subrounded	- NA Lith Sample @ ≈24'				D.H. 5YR, 4/4 to 5YR, 5/4
	25						

PROJECT: HIA - Middletown

HOLE NO. ERM-15I

HTW DRILLING LOG

HOLE NO. ERM-15I

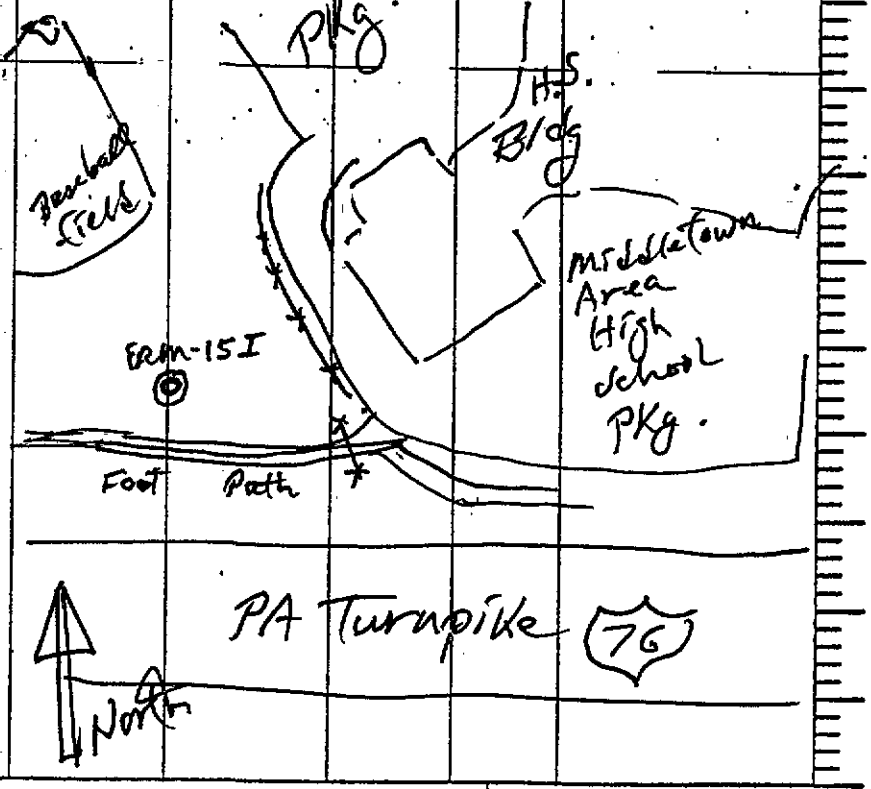
PROJECT: HIA Middletown | INSPECTOR: D. Haller | SHEET 2 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE.	- NA - Lith. Sample ④ ≈ 28'				(2.5YR, 3/4) 28' cuttings → 1-10min
		- Moderately Hard					
	30	- Slightly weathered	- NA				
		- Cuttings are subangular to subrounded.	- Lith. Sample ⑤ ≈ 33'				33' cuttings → 1-10min
		- Cuttings size varies, See Remarks column.					
	35						
			- NA - Lith. Sample ⑥ ≈ 39'				39' cuttings → 5-30min
	40						
			- NA - Lith. Sample ⑦ ≈ 43'				43' cuttings → 3-15min
	45						
		Dusky red fine to medium grained SANDSTONE.					(2.5YR, 3/4)
		- Moderately hard (more brittle than above)	- NA - Lith. Sample ⑧ ≈ 49'				49' cuttings → 3-20min
	50	- Hardness + brittleness seem to increase w/depth. (chip size ↓)					
		- Slightly weathered to unweathered	- NA				
		- Cuttings are subangular to subround.	- Lith. Sample ⑨ ≈ 54'				54' cuttings → 1-10min
		- Trace gravel size quartz clasts					
	55						
		- Dusky red medium to coarse grained SANDSTONE.					(2.5YR, 4/3)
		- Hard to very hard. (Cuttings look like sand. Air hammer is really breaking it up.)	- NA - Lith. Sample ⑩ ≈ 59'				59' cuttings → 1-5min
	60	- Unweathered					
		- Cuttings are mostly subrounded to rounded. (Some are angular)	- NA - Lith. Sample ⑪ ≈ 63'				63' cuttings → 1-5min
	65						
		- Trace gravel sized clasts (Mostly quartz)	- NA - Lith. Sample ⑫ ≈ 67'				67' cuttings → 1-5min
	70						
			- NA - Lith. Sample ⑬ ≈ 73'				73' cuttings → 1-5min

HTW DRILLING LOG

PROJECT: HIA Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-15I | SHEET 3 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	75	Texture change to fine to medium SANDSTONE (otherwise same as above)	-NA Lith. Sample @ ≈ 77'				77' cuttings → 1-20mm (some large chips mixed in w/sand)
	80	Dusky red Calcarious or dolomitic coarse SANDSTONE. -Hard to very hard. Unweathered except trace grains which may have been along a fracture(?) -cuttings look like sand and are subrounded. Trace gravel sized clasts (Mostly quartz)	-NA Lith. Sample @ ≈ 83'				2.5 YR 4/3 83' cuttings → 1-30mm
	85	Dusky red coarse SANDSTONE -Hard to very hard, Unweathered except in trace clasts which may be from along fracture planes(?) -Trace gravel sized clasts (Mostly quartz)	-NA. Lith. Sample @ ≈ 87'				2.5YR, 4/3 87' cuttings → 1-30mm
	90	Dusky red Calcarious or dolomitic coarse SANDSTONE. -Hard to very hard. Unweathered except in trace clasts which may be from along fracture planes. (?) -Cuttings look like sand and are subrounded. -Trace gravel sized clasts (Mostly quartz)	-NA Lith. Sample @ ≈ 93' -NA Lith. Sample @ ≈ 98'				2.5YR; 4/3 93' cuttings → 1-30mm 98' cuttings → 1-30mm
	100	-Boring terminated @ 102' -See pg. 4 of this log for well construction -Note; total volume of water injected during drilling was ≈ 800 gallons -12" casing advanced to 39' -8" casing advanced to ~~T.D.~~ H ≈ 95' -All casing is temporary					



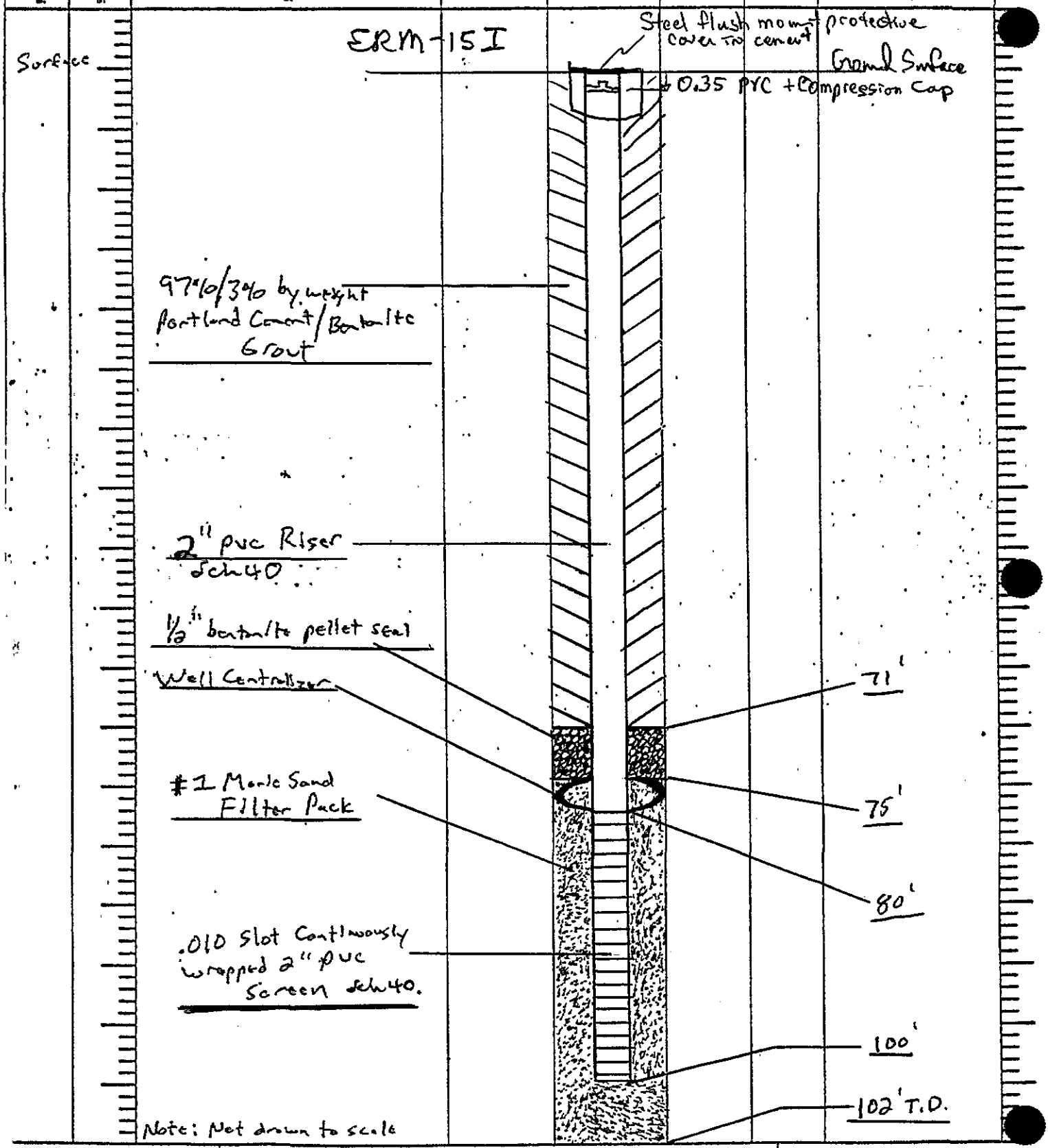
PROJECT: HIA Middletown | HOLE NO.: ERM-15I

HTW DRILLING LOG

HOLE NO. ERM-15I

PROJECT HIA Middletown | INSPECTOR D. Haller | SHEET 4 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



Note: Not drawn to scale

PROJECT HIA Middletown | HOLE NO. ERM-15I

HTW DRILLING LOG

HOLE NO. ERM-16S

1. COMPANY NAME: ERM-PMC
2. DRILLING SUBCONTRACTOR: ADT
SHEET 1 OF 4 SHEETS
3. PROJECT: HIA-MIDDLETOWN
4. LOCATION: MIDDLETOWN, PA
5. NAME OF DRILLER: T. BROWN
6. MANUFACTURER'S DESIGNATION OF DRILL: MOBILE B-59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" SPLIT SPOON (5); 140 LB HAMMER; 6" ROLLER BIT TO 46'; 6 5/8" ID HOLLOW STEM AUGER TO 13'
8. HOLE LOCATION: FRUEHAUF PARKING LOT
9. SURFACE ELEVATION: NOT SURVEYED
10. DATE STARTED: 3/23/95
11. DATE COMPLETED: 3/24/95 — FLUSH MOUNT INSTALLED
12. OVERBURDEN THICKNESS: ~ 11'
13. DEPTH GROUNDWATER ENCOUNTERED: ~ 9'
14. DEPTH DRILLED INTO ROCK: ~ 36'
15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.78' 4 DAYS
16. TOTAL DEPTH OF HOLE: 46'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):
18. GEOTECHNICAL SAMPLES: 1 — DISTURBED ✓ — UNDISTURBED — 19. TOTAL NUMBER OF CORE BOXES:
20. SAMPLES FOR CHEMICAL ANALYSIS: VOC / METALS / OTHER (SPECIFY) / OTHER (SPECIFY) / OTHER (SPECIFY) — 21. TOTAL CORE RECOVERY %
22. DISPOSITION OF HOLE: Built well ERM-16S — BACKFILLED — MONITORING WELL ✓ — OTHER (SPECIFY)
23. SIGNATURE OF INSPECTOR: Derek Evans

ELEV. a.	DEPTH b. (FT)	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS e.	GEOTECH SAMPLE OR CORE BOX NO. g.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	2" ASPHALT OVER SILT					
	1	SILT WITH SAND (ML) FINE SAND TRACE MEDIUM TO COARSE SAND TRACE FINE GRAVEL AND CLAY DRY	0.0 PPM	NS	NS	5, 6, 12, 16	7.5 YR 4/6 20" REC
	2						
	3	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) FINE TO MEDIUM SAND, TRACE COARSE FINE TO COARSE, ANGULAR TO SUBROUNDED GRAVEL MEDIUM DENSE TO DENSE DRY, FRIABLE	0.4 PPM	NS	NS	21, 25, 33, 24	DARK BROWN LIGHT BROWN RED, YELLOW 10YR 5/6 20" REC
	4						
	5						
	6	SAME AS ABOVE SLIGHTLY MOIST MEDIUM DENSE	0.0 PPM	NBL-ERM 16S (5.0-7.0)	NS	11, 23, 21, 17	SAME AS ABOVE 21" REC
	7						
	8	SILT WITH SAND (ML) FINE SAND, TRACE MED. SAND TRACE FINE, ANGULAR TO SUBROUNDED GRAVEL WET	0.0 PPM	NS	NS	20, 37, 50, 57	7.5 YR 5/6 2" REC
	9						
	10						

HTW DRILLING LOG

HOLE NO. ERM-16S

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET 2 OF 4 SHEETS

ELEV. (FT)	DEPTH (FT)	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
	10						
	11	HIT WEATHERED BEDROCK AT ~11'					
	12	CUTTINGS: DUSKY RED SILT WITH SAND RESEMBLES WEATHERED BEDROCK					
	13	SILT WITH SAND					2.5 YR 3/4
	14	FINE TO MED. SAND ABUNDANT MICA (ML) DRY SOME BLACK STAINING NO ROCK STRUCTURE	0.5 PPM	NS	NS	26, 100/3" (REFUSAL)	19" REC 2" SLUFF
	15						
	16	CUTTINGS: SILTY SAND FINE TO MEDIUM SAND					
	17	SOME COARSE AND FINE GRAVEL DRY VERY DENSE NO ROCK STRUCTURE SOME FRIABLE ROUND BALLS					
	18						
	19						
	20						
	21	CUTTINGS GETTING MOIST					
	22						
	23						
	24						
	25						
	26	CUTTINGS DRY AGAIN					
	27	material as above					
	28						
	29						

NOTE:

THE DESCRIPTION IS A PHYSICAL ONE. WHAT IT REPRESENTS IS BEDROCK THAT IS VERY WEATHERED

HIGHLY WEATHERED SANDY SILTSTONE

FINE TO MED. SAND
SOFT
ABUNDANT MICA

HTW DRILLING LOG

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | HOLE NO.: ERM - 165 | SHEET 3 OF 4 SHEETS

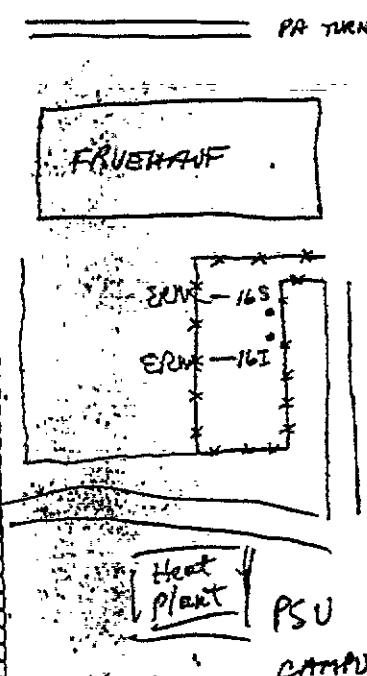
ELEV. b	DEPTH a (FT)	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	29	CUTTINGS MOIST					
	30						
	31						
	32						
	33						
	34	← HIT COMPETENT ROCK					
		CUTTINGS:					
	35	RED SILTY SANDSTONE					
		FINE TO MEDIUM SAND					
	36	MODERATELY HARD					
		ABUNDANT MICA					
	37	SLIGHTLY WEATHERED					
	38						
	39						
	40						
	41						
	42						
	43						
	44						
	45						
	46	BOTTOM OF BOREHOLE = 46'					

HTW DRILLING LOG

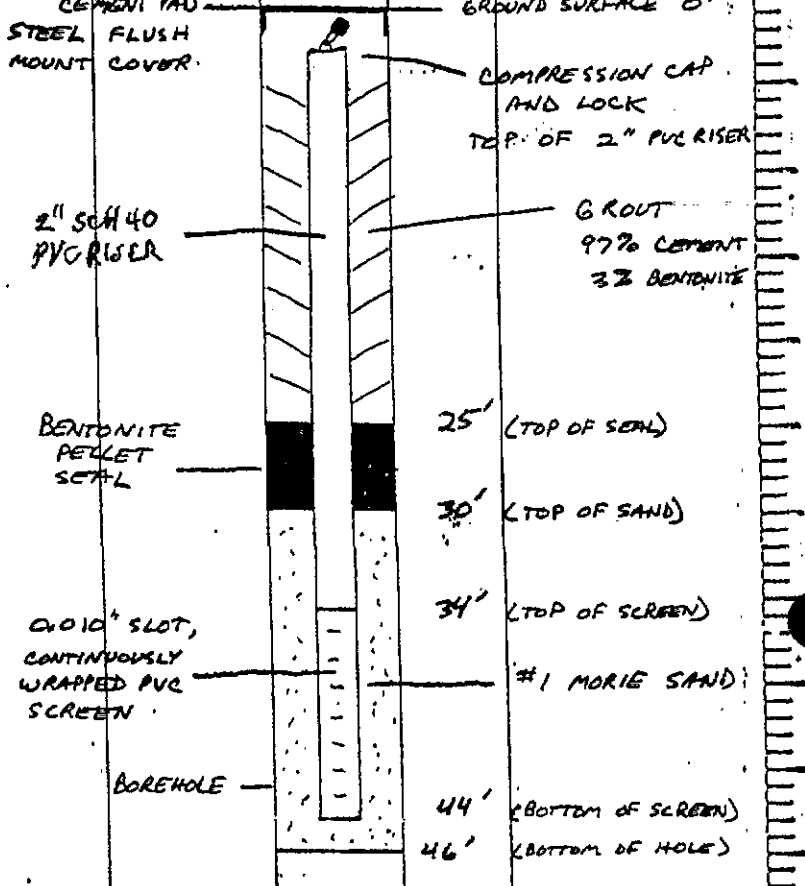
CCI	H1A - MIDDLETOWN	INSPECTOR D. EVANS	HOLE NO. ERM - 16S SHEET 4 OF 4 SHEETS

EL. ft	DEPTH ft	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ENVIRONMENTAL SAMPLE NO.	BLOW COUNTS	REMARKS

LOCATION



ERM-16S WELL CONSTRUCTION



NOTE: NOT TO SCALE
ALL MEASUREMENTS FROM GROUND SURFACE

WELL MATERIALS

10' 10 SLOT CONTINUOUSLY WRAPPED 2" PVC SCREEN

34' PVC RISER - SCHEDULE 40

SAND: 2 1/4 BAGS

BENTONITE PELLETS: 1 BUCKETS

BENTONITE (GRANULAR): 3/4 BAG

CEMENT: 5 BAGS

PROJECT	HOLE NO.
H1A - MIDDLETOWN	ERM - 16S

HTW DRILLING LOG

HOLE NO. ERM-16I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 OF 4 SHEETS
3. PROJECT: HIA Middletown	4. LOCATION: Middletown, MA	
5. NAME OF DRILLER: J. Arnett	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Dual Rotary Drilling — 11.5" Air hammer; 11.75" I.D., 12.75" O.D. Casing; 7.5" Air hammer; 7.75" I.D. casing; All casings were temporary.	8. HOLE LOCATION: Fruehauf	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 8/24/94	11. DATE COMPLETED
12. OVERBURDEN THICKNESS: ≈20'	15. DEPTH GROUNDWATER ENCOUNTERED: ≈82' during drilling	
13. DEPTH DRILLED INTO ROCK: ≈82'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ≈12.41' BGS / ≈3.5 hrs	
14. TOTAL DEPTH OF HOLE: 102'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
						%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-16I		X		D. Heller

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Dark yellowish brown Gravelly Silt - Sand + Gravel > 30% - Gravel is Coarse grained and angular - (Fill)	136 ppm @ ≈4'				10YR, 4/4 ML - gravel color varies (Grey to black)
	5	Brownish yellow Silt w/Sand, Sand % ≥ Gravel % Sand + Gravel ≤ 30% Sand is fine to coarse Gravel is fine and angular - (Fill)	139 ppm @ ≈8'				10YR, 6/6 ML - gravel color varies (Grey to black)
	10	Dusky red Elastic silt w/gravel. - Gravel % > Sand % Sand + Gravel ≤ 30% - Sand is fine - Gravel is fine to Coarse and well rounded. - Gravel is mostly quartz - very trace bedrock. (Must be close to contact between overburden + rock)	171 ppm @ ≈13' 58 ppm @ ≈17'				2.5YR, 3/4 MH
	20	Dusky red SILTSTONE - Soft to very soft - Highly weathered - decomposed - Saprolite(?) - Cuttings are Subrounded	51 ppm @ ≈24'				2.5YR, 3/4 cuttings: 0-20mm
	25						

PROJECT: HIA Middletown

HOLE NO. ERM-16I

HTW DRILLING LOG

HOLE NO. ERM-16I

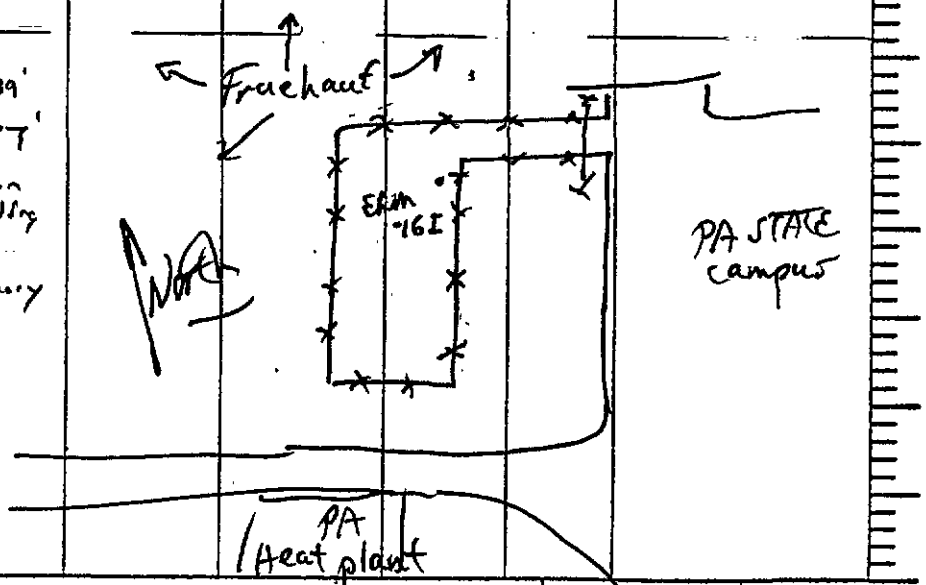
PROJECT: HIA Middletown | INSPECTOR: D. Heller | SHEET 2 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		(Cot sample only 5-10% was rock chips. Mostly silt.)	33 ppm @ ≈29'				cuttings: 0-20
	30	Dusky red SILTSTONE - very soft - soft - Moderately weathered - Black (Mn?) staining on some chip surfaces - Cuttings are subangular - Trace quartz clasts (coarse sand to fine gravel sized. (seem to become less frequent w/depth	110 ppm @ ≈34'				(2.5 4R, 3/4) cuttings: 1-25
	35						
	40		211 ppm @ ≈39'				Cuttings: 1-25
			0.0 ppm @ ≈44'				
	45	Dusky red fine to medium grained SANDSTONE. Some coarse sand sized quartz clasts. Very soft to very hard (soft grained vs. quartz clasts) - Slightly weathered - Cuttings are subangular to subrounded	0.0 ppm @ ≈49'				(2.5 4R, 3/4) cuttings: 1-20
	50	Dusky red SILTSTONE - very soft - soft - Slightly weathered - Cuttings are subangular - No black (Mn?) staining like above. No quartz clasts (sand sized)	0.0 ppm @ ≈54'				(2.5 4R, 3/3) cuttings: 1-30
	55		0.0 ppm @ ≈59'				
	60	Dusky red Medium to coarse grained SANDSTONE. - Slightly weathered - Moderately - very hard - Cuttings are subrounded to rounded.	0.0 ppm @ ≈64½'				(2.5 4R, 4/4) cuttings: 1-10
	65	Dusky red SILTSTONE. Trace fine grained sand - Soft to moderately hard - Slightly weathered - Cuttings are subangular to subrounded - Trace black (Mn?) staining	0.0 ppm @ ≈69'				(2.5 4R, 4/4) cuttings: 1-40
	70	over					

HTW DRILLING LOG

PROJECT: HIA Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-16I | SHEET 3 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	70	Weak red medium to coarse grained SANDSTONE.					(2.5 YR, 5/3)
		- Moderately hard to very hard - Slightly weathered - Trace black (Mn?) staining - cuttings are subrounded to rounded.	0.0 ppm @ ≈ 73'				cuttings: 1-20 mm
	75						
			0.0 ppm @ ≈ 77'				cuttings: 1-20 mm
	80						
			(0.0 ppm @ ≈ 84' ?)	PID was off. could not get accurate reading by the time PID warmed up.			cuttings: 1-15 mm
	85	Dusky red calcareous or dolomitic medium to coarse grained SANDSTONE					(2.5 YR, 3/4)
		- Moderately hard to very hard. - Slightly weathered. - No black (Mn?) staining - cuttings are subrounded to rounded. - No notable dolomite clasts (very fine grained)	0.0 ppm @ ≈ 89'				cuttings: 1-20 mm
	90						
			0.0 ppm @ ≈ 94'				cuttings: 1-20 mm
	95	Dusky red medium to coarse grained SANDSTONE.					(2.5 YR, 4/3)
		- Moderately hard to very hard - Slightly weathered - cuttings are subrounded to rounded.	0.0 ppm @ ≈ 98'				cuttings: 1-15 mm
	100						
		Boring terminated @ 102' - 12" casing advanced to 39' - 8" casing advanced to 77' - total volume of injection water used during drilling was ≈ 700 gallons. - All casing was temporary					



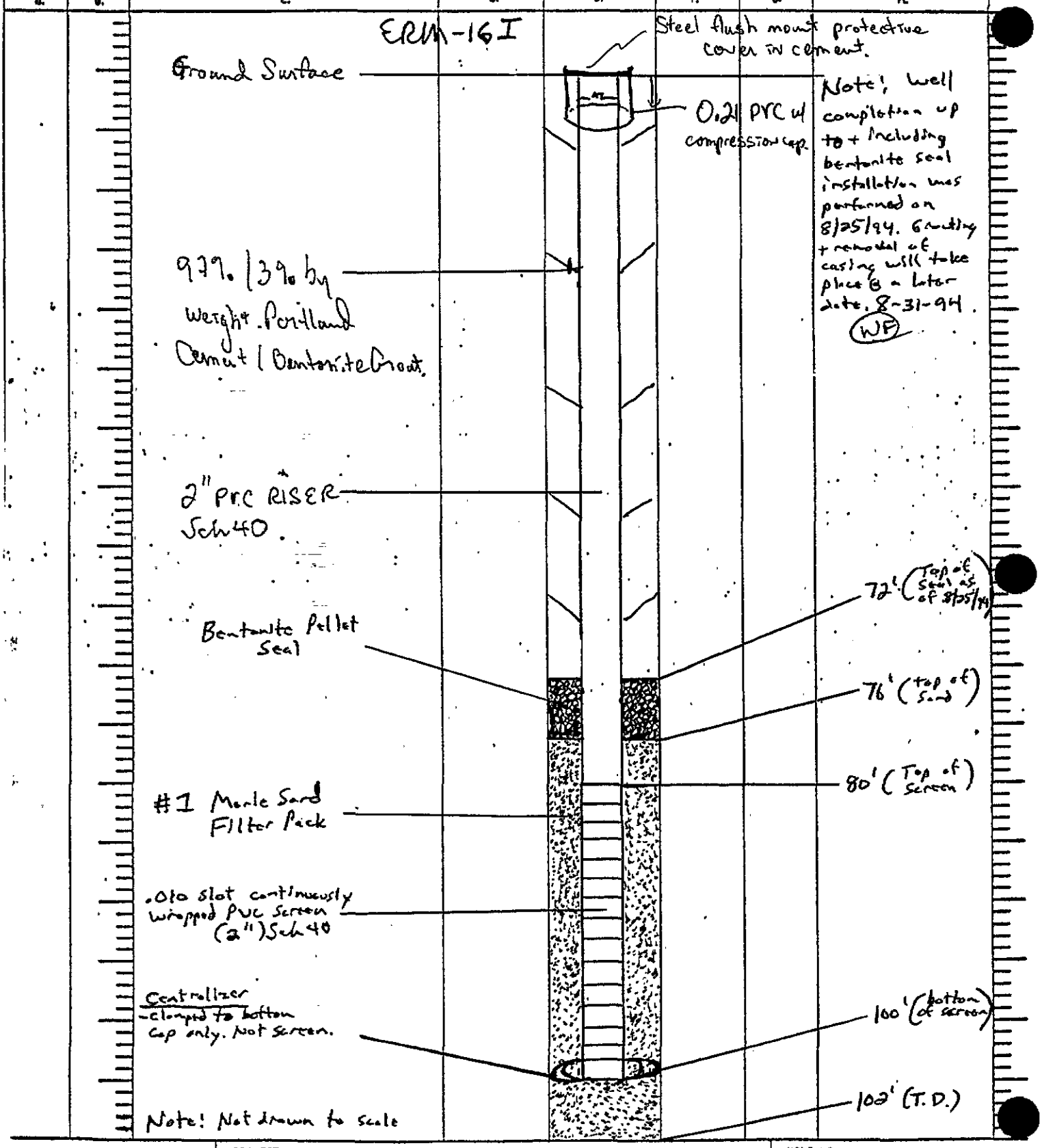
PROJECT: HIA Middletown | HOLE NO.: ERM-16I

HTW DRILLING LOG

HOLE NO. ERM-16I

PROJECT HIA Middletown | INSPECTOR D. Heller | SHEET 4 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



PROJECT HIA Middletown | HOLE NO. ERM-16I

HTW DRILLING LOG

HOLE NO. ERM-17S

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT	SHEET 1 OF 4 SHEETS
3. PROJECT: HIA - MIDDLETOWN	4. LOCATION: MIDDLETOWN, PA	
5. NAME OF DRILLER: T. BROWN	6. MANUFACTURER'S DESIGNATION OF DRILL: MOBILE	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" SPLIT SPOON (5); 140 LB HAMMER; 6" ROLLER BIT TO 46'	8. HOLE LOCATION: FAUEHAUF PARKING LOT	
	9. SURFACE ELEVATION: NOT SURVEYED	
	10. DATE STARTED: 3/22/95	11. DATE COMPLETED: 3/22/95
12. OVERBURDEN THICKNESS: ~ 10-11'	15. DEPTH GROUNDWATER ENCOUNTERED: ~ 40'	
13. DEPTH DRILLED INTO ROCK: ~ 36'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 23.38' ↓ 1 DAY	
14. TOTAL DEPTH OF HOLE: 46'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1	✓		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-17S		✓		Derek Evans

ELEV. a.	DEPTH b. (FT)	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS c.	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS g.	REMARKS h.
	0	2" ASPHALT OVER WELL GRADED GRAVEL FILL					
	1	(MH) ELASTIC SILT WITH GRAVEL FINE TO COARSE, ANGULAR TO SUBROUNDED GRAVEL, LITTLE CLAY, TRACE SAND, DRY, SMOOTH	4.0 PPM	NS	NS	6, 20, 25, 31	DARK BROWN LIGHT BROWN OLIVE 10YR 5/6 19" REC
	2	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) FINE TO COARSE, ANGULAR TO SUBROUNDED GRAVEL; FINE TO MEDIUM SAND, TRACE COARSE DRY; FRIABLE; LOOSE TO DENSE					
	3						
	4	SAME AS ABOVE BUT MEDIUM DENSE TO DENSE	5.3 PPM	NBL - ERM 17S (3.0-5.0)	NS	21, 27, 34, 33	SAME AS ABOVE WITH ORANGE-RED NEAR TOP 7.5 YR 6/8 20" REC
	5						
	6	SAME AS ABOVE WITH HIGHER % OF SILT	2.6 PPM	NS	NS	26, 36, 24, 33	SAME AS ABOVE BUT DARK BROWN MORE PROMINENT 7.5 YR 5/6 14" REC
	7						
	8	SAME AS ABOVE	2.9 PPM	NS	NS	24, 26, 26, 31	SAME AS ABOVE 11" REC
	9						
	10						

PROJECT: HIA - MIDDLETOWN | HOLE NO. ERM-17S

HTW DRILLING LOG

HOLE NO. ERM-175

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET #2 OF 4 SHEETS

ELEV. b	DEPTH b (FT)	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	10	HIT WEATHERED BEDROCK AT ~10-11'					
	11	CUTTINGS TURN DUSKY RED SILTY FINE-GRAINED SAND NO ROCK STRUCTURE SOME ROUND BALLS THAT CRUMBLE EASILY (FRIABLE)					
	12						
	13						
	14						
	15						
	16	SILTY SAND (SM) FINE SAND - SOME MEDIUM DRY VERY DENSE	0.0 PPM	NS	NS	50, 100/5" (REFUSAL)	2.5YR 3/4 REC 12"
	17						
	18	NOTE: DESCRIPTION IS PHYSICAL REPRESENTS BEDROCK - VERY WEATHERED					
	19	(BE) ~~SHOT~~ SILTY FINE TO MEDIUM-GRAINED SANDSTONE (WACKE)					
	20	HIGHLY WEATHERED 50 FT					
	21						
	22						
	23						
	24						
	25						
	26						
	27	AS ABOVE					
	28						
	29						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - MIDDLETOWN	D. EVANS	ERM-17S	3 of 4 SHEETS

ELEV. L	DEPTH B(FT)	DESCRIPTION OF MATERIALS C	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	30						
	31						
	32						
	33	AS ABOVE.					
	34						
	35						
	36						
	37						
	38	CUTTINGS: START GETTING COMPETENT ROCK CUTTINGS WET SILTY SANDSTONE (WACKE) FINE TO MED. SAND MOD. HARD					
	39						
	40	ENCOUNTER WATER					
	41						
	42						
	43						
	44						
	45	material as above					
	46						
		BOTTOM OF BOREHOLE = 46'					

HTW DRILLING LOG

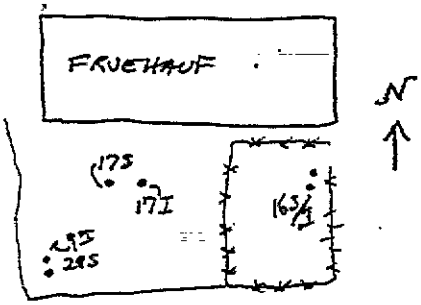
HOLE NO. ERM-175

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET 4 OF 4 SHEETS

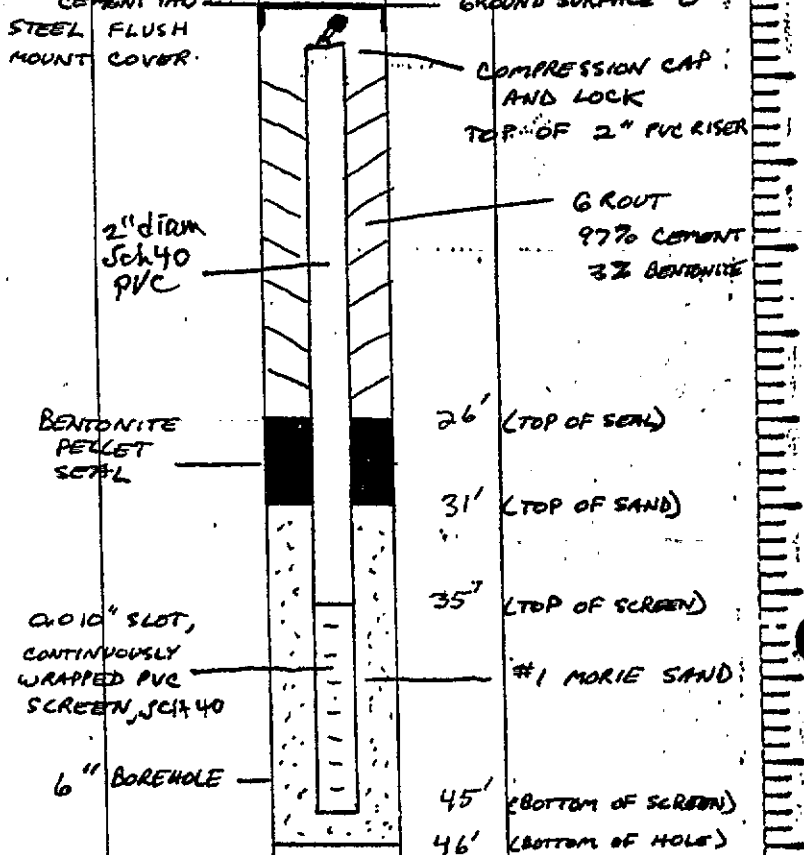
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

LOCATION

-76- PA TURNPIKE



ERM-175 WELL CONSTRUCTION



WELL MATERIALS

10' 10 SLOT CONTINUOUSLY WRAPPED 2" PVC SCREEN

35' PVC RISER - SCHEDULE 40

SAND: 2 1/2 BAGS

BENTONITE PELLETS: 1 BUCKETS

BENTONITE (GRANULAR): 1/10 BAG

CEMENT: 3 BAGS

NOTE: NOT TO SCALE
ALL MEASUREMENTS FROM GROUND SURFACE

PROJECT: HIA - MIDDLETOWN | HOLE NO. ERM-175

HTW DRILLING LOG

HOLE NO. ERM-17I

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: Hydrocap	SHEET 1 of 4 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown PA	
5. NAME OF DRILLER: Steve	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Dual Rotary Drilling. 8-25-94 — DR12 Barber Rig. (H) - 13¼" Steel casing I.D. (W) - 9⅝" Steel casing I.D. 12" temporary Casing to 37' 8" temp. Casing to 76' Open hole to 102'	8. HOLE LOCATION: Behind Fonehaut	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-25-94	11. DATE COMPLETED: 8-30-94
12. OVERBURDEN THICKNESS: ≈17.5'	13. DEPTH GROUNDWATER ENCOUNTERED: Unknown	
13. DEPTH DRILLED INTO ROCK: 84.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 102.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
None						%

22. DISPOSITION OF HOLE: ERM-17I Well Installed	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		✓		Warren N. Fay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Gravel w/ silt (≥15%) subrounded Dry loose poorly graded	10 ppm PID, Fuel odor	NS	NS	NA	10YR 5/3 brown chips 0.0 to 2.5 cm mm size
	5.0'	Same gravel as above.	9 ppm PID No Odor.	NS	NS	NA	2.5Y 5/4 light olive brown chips 0.0 to 3.0 cm mm size
	10.0'	Sand f grain, rounded w/ gravel (≤15%) loose, wet	2 ppm PID, No Odor.	NS	NS	NA	5YR 4/6 yellowish red. chips 0.0 to 2.0 cm mm
	15.0'	Sandstone f.g rain. Subrounded m. hard weathered	2 ppm PID No Odor	NS	NS	NA	5YR 4/4 reddish brown 0.04 to 1.0 cm mm
	20.0'	Siltstone (Trace of fine sand) subrounded m. hard weathered trace gravel sub angular	0 ppm PID, No Odor	NS	NS	NA	5YR 3/4 dark reddish brown to 1.0 mm to 2.0 cm (NF)
	25.0'						

PROJECT: HIA - Middletown

HOLE NO. ERM-17I 8-25-94

HTW DRILLING LOG

HOLE NO. ERM-17I

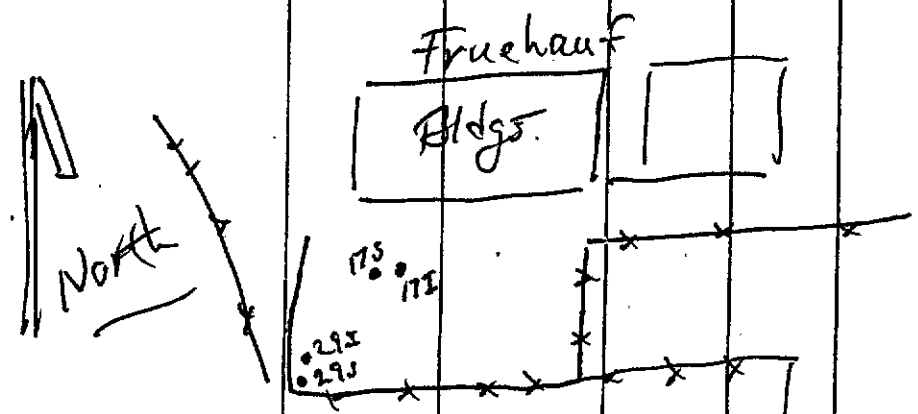
PROJECT HIA - Middletown | INSPECTOR Warren Fop | SHEET 2 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25.0'	Siltstone harder than last interval Quartz gravel (white) weathered Subrounded	0ppm PID No Odor	NS	NS	NA	5YR4/4 reddish brown. 1.0 to 2.5 mm.
	30.0'	Siltstone m. hard trace of harder gravel (black) Subangular weathered	10 ppm PID No Odor	NS	NS	NA	2.5YR 3/3 dusky red. 1.0mm to 30 mm
	35.0'	Siltstone. M. hard weathered Subrounded	0ppm PID. No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 15 mm
	40.0'	Sandstone fgrain Subrounded weathered, m. hard Quartz clasts 1.0 to 5.0mm	40 ppm PID No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 20 mm
	45.0'	Similar to above	30 ppm PID No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 5 mm.
	50'	Sandstone/silt Subangular weathered hard Quartz clasts (1mm to 10mm) (water bearing zone)	10 ppm PID No odor.	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 25 mm
	55.0'	Siltstone. hard weathered. Subround. Traces of quartz (<5%) Subangular	60 ppm PID No Odor.	NS	NS	NA	2.5YR 3/4 dusky red 1.0 to 12 mm
	60.0'	Siltstone v. hard weathered Subangular no quartz	8ppm PID No Odor.	NS	NS	NA	2.5YR 3/6 dark red. 1.0 mm to 14 mm
	65.0'	Siltstone (Traces of sand) v.f. grain Same as above	26 ppm PID No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 mm to 18 mm
	70.0'						

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | HOLE NO.: ERM - 17I | SHEET 3 of 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	70.0	Siltstone hard weathered subangular no trace of sand	30 ppm PID, No Odor	NS	NS	NA	2.5YR 3/3 dusky red 1.0 to 10mm
	75.0	Siltstone v. hard. weathered uniform subangular	6 ppm PID, No Odor	NS	NS	NA	2.5YR 3/6 dark red 1.0 to 10mm
	80.0	Sandstone speckled. colors. v. hard. weathered sub angular Quartz clasts (≤ 10mm)	10 ppm PID, No Odor.	NS	NS	NA	2.5YR 3/3 dusky red 1.0 to 8.0mm
	85.0	Some material NO clasts	22 ppm PID, No Odor	NS	NS	NA	2.5YR 3/4 dark red 1.0 to 3mm
	90.0	Sandstone v. hard sub angular weathered Quartz and (Dolomite) clasts	6 ppm PID, No Odor	NS	NS	NA	2.5YR 4/4 dusky red. 1.0 min to 20mm
	95.0	Siltstone w/ Quartz clasts (trace < 5%) v. hard. Subangular / subround weathered. (Water zone) Subangular	10 ppm PID, No Odor	NS	NS	NA	2.5 YR 3/4 dark red. 1.0mm to 20 mm
	100.0	102' Bottom of borehole (WNF) 8-26-94					



PROJECT: HIA - Middletown | HOLE NO.: ERM - 17I

HTW DRILLING LOG

HOLE NO. ERM-17I

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 4 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.

ERM-17I

Flush mount Steel cover in cement w/ compression cap and lock.

Ground Surface

± 0.22 PVC

Materials Used

- 12 bags Morie #1 Sand (100.1 lbs/bag)
- 2 buckets 3/8" Dia. bentonite Pellets (50 lbs/bk)
- 42 bags Portland Cement (94 lbs/bag) w/ 3% bentonite

500 gallons of water used during dual rotary Drilling

Note: Not to scale

All depths are related to ground surface.

ie) (Below Ground Surface)

Cement/Bentonite Grout (97% / 3%)

2" PVC RISER Sch 40.

8" BOREHOLE

Bentonite Pellets

74.0'

72.0'

80.0' (Top of Screen)

Morie #1 Sand filter Pack.

2" PVC continuous wrap 0.010 slot Sch 40 Screen

100' Bottom of screen

102.0' Bottom of Borehole

8-26-94 WNF

2" Stainless Steel Stabilizer of Sand pack below screen bottom

Centralizer

PROJECT: HIA - Middletown | HOLE NO. ERM-17I

HTW DRILLING LOG

HOLE NO. ERM-295

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT	SHEET 1 OF SHEETS
3. PROJECT: HIA - MIDDLETOWN	4. LOCATION: MIDDLETOWN, PA	
5. NAME OF DRILLER: T. BROWN	6. MANUFACTURER'S DESIGNATION OF DRILL: MOBILE	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" SPLIT SPOON (9); 140. LB HAMMER; 6" ROLLER BIT TO 46'; HSA + air rotary	8. HOLE LOCATION: FRUEHAUF PARKING LOT	
	9. SURFACE ELEVATION: NOT SURVEYED	
	10. DATE STARTED: 3/21/95	11. DATE COMPLETED: 3/24/95
12. OVERBURDEN THICKNESS: ~29.5'	13. DEPTH GROUNDWATER ENCOUNTERED: ~34'	
14. DEPTH DRILLED INTO ROCK: 16.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 30.47', 2 DAYS	
15. TOTAL DEPTH OF HOLE: 46'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1	✓		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-295		✓		Derek Evans

ELEV. a.	DEPTH b. (FT)	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	0.-2" ASPHALT OVER SILTY CLAY (LEAN CLAY)					
	1	SILT WITH GRAVEL (ML) FINE, ANGULAR GRAVEL SOME CLAY, LITTLE SAND (FINE TO MEDIUM) SOFT, SMOOTH SLIGHTLY MOIST - DUE TO RECENT RAIN	0.0 PPM	NS	NS	4, 10, 10, 13	10YR 5/6 10YR 4/1 2.5YR 4/3 15" REC
	2						
	3	INTERSTRATIFIED MIX OF SILT AND SANDY SILT (ML) FINE TO MEDIUM SAND SILT HAS FEW MOTTLES SLIGHTLY MOIST (RECENT RAIN)	0.0 PPM	NS	NS	23, 21, 23, 25	10 YR. 6/6 2.5YR 4/3 13" REC
	4						
	5						
	6	SILT WITH SAND (ML) FINE TO MEDIUM SAND FEW, FINE, ANGULAR GRAVEL SOME MOTTLING SLIGHTLY MOIST (RECENT RAIN)	0.0 PPM	NBL-ERM295 (5.0-7.0)	NS	23, 20, 17, 21	7.5 YR 4/4 22" REC
	7						
	8	SILT WITH GRAVEL (ML) FINE TO COARSE, ANGULAR TO SUBROUNDED GRAVEL TRACE FINE TO MED SAND SLIGHTLY MOIST (RECENT from RAIN) ?	0.0 PPM	NS	NS	6, 9, 12, 12	7.5YR 4/4 2.5YR 4/4 24" REC
	9						
	10						

PROJECT: HIA - MIDDLETOWN | HOLE NO. ERM - 295

HTW DRILLING LOG

HOLE NO. ERM-295

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET 2 OF SHEETS

ELEV. (FT)	DEPTH (FT)	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
	10	CUTTINGS: YELLOW - RED SILT WITH SAND TRACE CLAY AND GRAVEL SLIGHTLY MOIST					
	11						
	12						
	13						
	14						
	15						
	16	SILT WITH SAND (ML) FINE SAND, TRACE MED. TO COARSE TRACE GRAVEL - FINE TO COARSE, ANGULAR TO SUBROUNDED SOME BLACK STAINING DRY	0.0 PPM	NS	NS	20, 17, 27, 31	2.5YR 3/4 REC 24"
	17						
	18	CUTTINGS: RED - BROWN WELL GRADED SAND WITH GRAVEL SUBROUNDED, FINE TO COARSE GRAVEL DRY					
	19						
	20						
	21	SANDY SILT WITH GRAVEL (ML) FINE SAND, TRACE MED. TO COARSE FINE TO COARSE, SUBROUNDED GRAVEL DRY	0.0 PPM	NS	NS	12, 19, 39, 32	5YR 3/3 REC 17"
	22						
	23						
	24						
	25						
	26	SANDY SILT WITH GRAVEL FINE SAND, TRACE MED. TO COARSE FINE TO COARSE, SUBROUNDED TO ANGULAR GRAVEL SLIGHTLY MOIST (ML)	0.0 PPM	NS	NS	6, 11, 75, 100/3" (REFUSAL)	10YR 3/2 REFUSAL CAUSED BY LARGE QUARTZ COBBLE REC 22"
	27						
	28						
	29						

HTW DRILLING LOG

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | HOLE NO. ERM-29S | SHEET 3 OF SHEETS

ELEV. b	DEPTH (FT)	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	29	WEATHERED BEDROCK AT ~29.5'					
	30	RED SILTY FINE-GRAINED SANDSTONE (WACKE) HIGHLY WEATHERED SOFT DRY	0.0 PPM	NS	NS	100/ REFUSAL	2.5 YR 3/3 5" REC
	32	CUTTINGS: VERY SOFT DO NOT RETAIN ROCK STRUCTURE					
	33	BRIEF SPURT OF WATER AT ~34'					
	35	SAME AS ABOVE WET	0.0 PPM			100/4" (REFUSAL)	2.5 YR 3/3 8" REC
	36						
	37						
	38						
	39	NO RETURN ON CUTTINGS - JUST MUD					
	40	Too difficult to evaluate cuttings. JAK					
	41	assumed material was as above. JAK					
	42						
	43						
	44						
	45						
	46	BOTTOM OF BORE HOLE = 46'					

HTW DRILLING LOG

HOLE NO. ERM - 29S

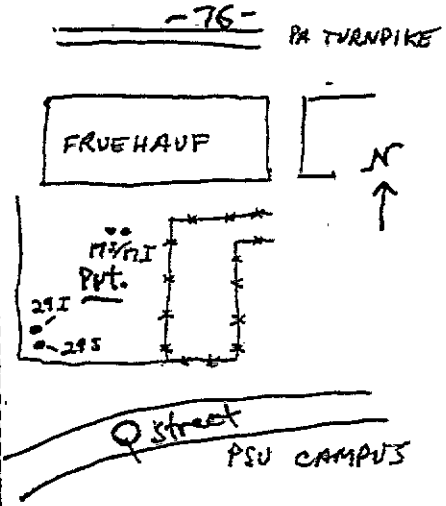
PROJECT: HIA - MIDDLETOWN

INSPECTOR: D. EVANS

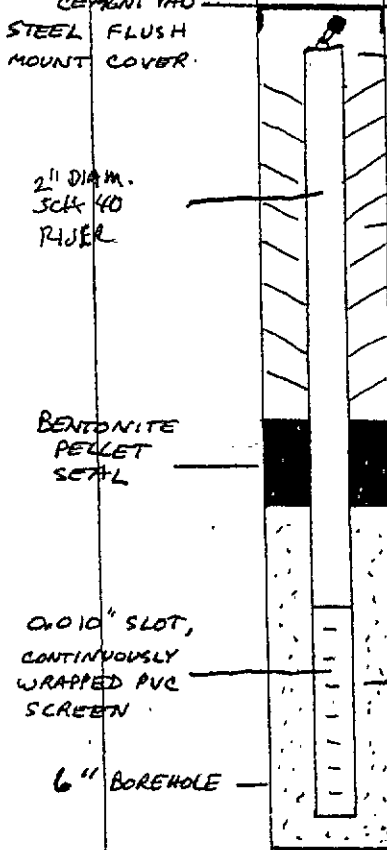
SHEET 4 OF 4 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

LOCATION



WELL CONSTRUCTION



WELL MATERIALS

10' 10 SLOT CONTINUOUSLY WRAPPED 2" PVC SCREEN

34.5' PVC RISER - SCHEDULE 40

SAND: 2 BAGS

BENTONITE PELLETS: 1 BUCKETS

GRANULAR BENTONITE: 1/2 BAG

CEMENT: 3 BAGS

NOTE: NOT TO SCALE
ALL MEASUREMENTS FROM GROUND SURFACE

HTW DRILLING LOG

HOLE NO. ERM-29I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 of 4 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Steve Blair	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Dual Rotary Drilling — 12" bit + Casing to 39' BGS. 8" Casing to 80' BGS 5" hammer to 102' BGS all casings were temporary	8. HOLE LOCATION: Fruehauf	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 3/14/95	11. DATE COMPLETED: 3/17/95
12. OVERBURDEN THICKNESS: ≈ 33	13. DEPTH GROUNDWATER ENCOUNTERED: (≈21') see below	
14. DEPTH DRILLED INTO ROCK: ≈ 69'	15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ≈21' (Measured from unfinished stick-up/Un-surveyed)	
16. TOTAL DEPTH OF HOLE: 102'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE: ERM — Built well 29I	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR: D. Haller
		X		

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	0 - 1.5' - Asphalt/fill then: Light brown Elastic Silt w/Sand Sand % > Gravel % 15% ≥ Sand+Gravel < 30%	0.0 ppm @ ≈4'				7.5YR, 6/4 (MH)
	5	Brown Elastic Silt Sand + Gravel < 15% Micaceous Trace gravel (1-2%)	2.1 ppm @ ≈8				7.5YR2, 5/4 (MH)
	10		1.3 ppm @ ≈13				
	15	Dusky red Elastic Silt w/Gravel - Gravel % > Sand % Sand + Gravel < 10% - Gravel is well graded and subrounded - only trace sand.	0.0 ppm @ ≈18'				2.5YR, 3/4 (MH)
	20		0.9 ppm @ ≈23'				
	25						

PROJECT: HIA - Middletown

HOLE NO. ERM-29I

HTW DRILLING LOG

HOLE NO. ERM-29I

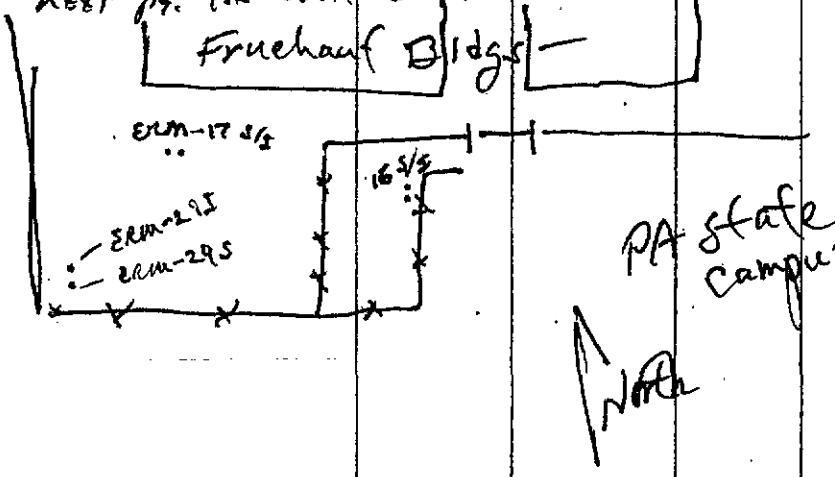
PROJECT: HIA - Middletown | INSPECTOR: D. Haller | SHEET 2 OF 4 SHEETS

CV. L	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	25	Reddish brown well Graded gravel w/silt and Sand. Sand ≥ 15%, is coarse and subrounded. - Gravel is subangular and is mostly quartz	0.5 ppm @ ≈28'				5YR, 4/4; 6W - 6M
	30	Dusky red SILTSTONE Very Soft Moderately weathered cuttings: Subrounded	0.0 ppm @ ≈33'				2.5YR, 3/3; cuttings: 1-20mm
	35	Trace ~~fine~~ coarse sand sized subangular quartz clasts (quartz clasts seem a little weathered)	0.0 ppm @ ≈38'	(12" casing advanced to 39')			cuttings: 1-20mm
	40	(weathering ↓ w/depth)	5.6 ppm @ ≈44'				cuttings: 1-20mm
	45		0.9 ppm @ ≈48'				cuttings: 1-40mm
	50		0.0 ppm @ ≈53'				cuttings: 1-20mm
	55	Weak red SANDY BRECCIA - Hard. Unweathered. - matrix: fine sand - clasts: Subangular fine gravel + some coarse sand. cuttings: Subangular (matrix supported)	0.0 ppm @ ≈58'				2.5YR, 5/3; cuttings: 1-8mm
	60	Dusky red calcareous/dolomitic SILTSTONE. (some chips fizz when hit w/HCl, some have to be powdered.) - Soft-moderately hard - Unweathered - cuttings: Subangular/subround	0.5 ppm @ ≈63'				2.5YR, 4/3; cuttings: 1-8mm
	65						
	70		0.0 ppm @ ≈68'				cuttings: 1-30mm

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-29I | SHEET 3 OF 4 SHEETS

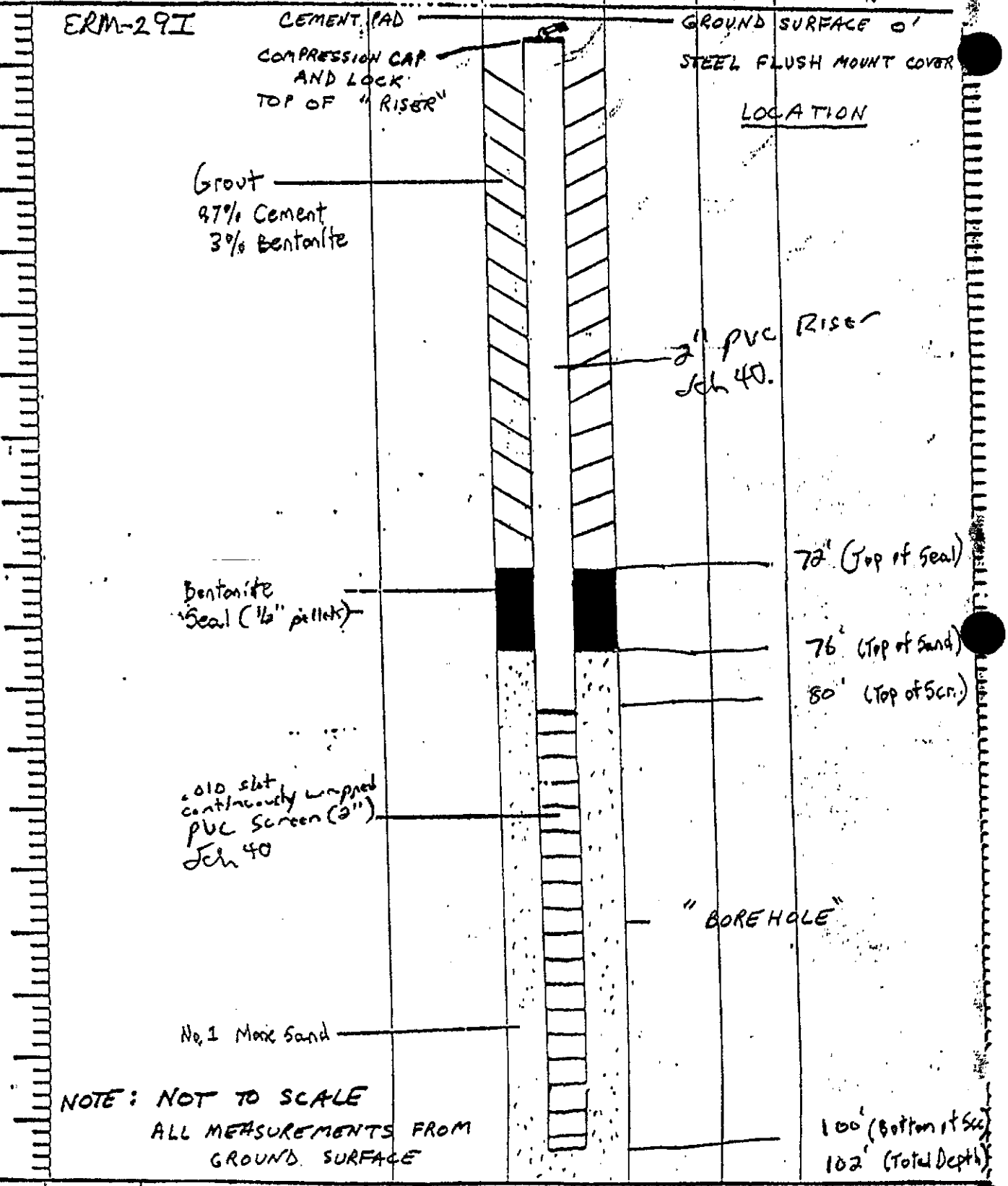
EV. L	DEPTH B	DESCRIPTION OF MATERIALS C	FIELD SCREENING RESULTS D	GEOTECH SAMPLE OR CORE BOX NO E	ANALYTICAL SAMPLE NO. F	BLOW COUNTS G	REMARKS H
	75	SAME AS ABOVE (SILTSTONE)	0.0 ppm @ ≈73'				cuttings: 1-20mm
			0.0 ppm @ ≈78'				cuttings: 1-10mm
	80			(8" casing stopped @ 80' BGS)			
		Dusky red fine grained SANDSTONE (WACKE) - moderately hard - unweathered - cuttings: Subangular/subround	0.5 ppm @ ≈83'				2.5YR, 4/3 cuttings: 1-10mm
	85	weak red SANDY BRECCIA (clast supported) matrix: fine sand clasts: Coarse Sand/fine Gravel Both subangular - more gravel than Sand	0.0 ppm @ ≈88'				2.5YR, 5/3 cuttings: 1-10 mm
	90	roughly (80% gravel / 20% Sand) Hard - Very hard Unweathered Cuttings: Subangular	0.0 ppm @ ≈93'				cuttings: 1-10 mm
	95		0.0 ppm @ ≈98'				cuttings: 1-10 mm
	100	T.D. = 102' BGS					
		Injection water total ≈ 700 gallons					
	105	See next pg. for well construction					



PROJECT: HIA - Middletown | HOLE NO.: ERM-29I

PROJECT HIA, Middletown | INSPECTOR D. Heller | ERM-29I | SHEET 4 OF 4 SHEETS

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	SOIL/ROCK SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS



PROJECT HIA, Middletown | WELL NO. ERM-29I

HTW DRILLING LOG

HOLE NO. ERM-305

1. COMPANY NAME: ERM - PMC
2. DRILLING SUBCONTRACTOR: ADT-MA
SHEET 1 OF SHEETS
3. PROJECT: HIA - MIDDLETOWN
4. LOCATION: MIDDLETOWN, PA
5. NAME OF DRILLER: TROY BROWN
6. MANUFACTURER'S DESIGNATION OF DRILL: MOBILE B-59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" SPLIT SPOON (3); 140 LB HAMMER; 6" ROLLER BIT TO 21.5'
8. HOLE LOCATION: PENN STATE
9. SURFACE ELEVATION: NOT SURVEYED
10. DATE STARTED: 3/29/95
11. DATE COMPLETED: 3/21/95
12. OVERBURDEN THICKNESS: ~5'
13. DEPTH GROUNDWATER ENCOUNTERED: ~20'
14. DEPTH DRILLED INTO ROCK: ~16.5'
15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 10.23', 1 DAY
16. TOTAL DEPTH OF HOLE: 21.5'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
18. GEOTECHNICAL SAMPLES: 1 — DISTURBED ✓ — UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES
20. SAMPLES FOR CHEMICAL ANALYSIS: VOC / METALS / OTHER (SPECIFY) / OTHER (SPECIFY) / OTHER (SPECIFY)
21. TOTAL CORE RECOVERY: %
22. DISPOSITION OF HOLE: Built well ERM-305 — BACKFILLED / MONITORING WELL ✓ / OTHER (SPECIFY)
23. SIGNATURE OF INSPECTOR: Derek Evans

ELEV. a	DEPTH b (FT)	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	SILT (ML) FEW FINE SAND, TRACE MEDIUM TO COARSE FEW FINE, SUBROUNDED GRAVEL TRACE CLAY, SOME ROOTS DRY, SMOOTH	0.8 PPM	NS	NS	3, 13, 20, 29	10YR 4/3; 25YR 4/6; 16" REC
	2	SILT (ML) TRACE SAND AND CLAY ABUNDANT MICA FLAKES SOME BLACK STAINING (Mn?) SMOOTH DRY TO SLIGHTLY MOIST	0.4 PPM	NBL - ERM 305 (2.0-4.0)	NS	20, 34, 61, 14	2.5YR 4/6; 22" REC
	4	↓ INCREASINGLY FIRM AND DRY					
	5	DUSKY RED WEATHERED BEDROCK	0.0 PPM	NS	NS	48, 67, 100/5" (REFUSAL)	2.5 YR ~~4/6~~ (DB) 3/4; 21" REC
	6						
	7	CUTTINGS: DUSKY RED SANDY SILTSTONE HIGHLY WEATHERED - SEMI-COMPETENT (FRIABLE) SOFT ABUNDANT MICA					2.5 YR 3/4
	8						
	9						
	10	SLIGHTLY MOIST - BALLING UP					

HTW DRILLING LOG

HOLE NO. ERM-305

PROJECT: HIA - MIDDLETOWN

INSPECTOR: D. EVANS

SHEET 2 OF SHEETS

ELEV.	DEPTH (FT)	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
	10	CUTTINGS:					
	11	DUSKY RED SANDY SILTSTONE					
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20	MATERIAL AS ABOVE					
	21	WATER PRODUCED					
	22	TD / BOTTOM OF BOREHOLE = 21.5'					

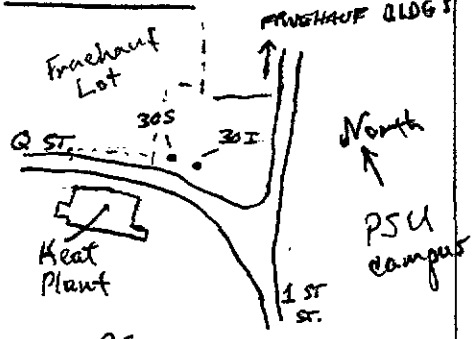
HTW DRILLING LOG

HOLE NO. ERM-305

PROJECT: HIA - MIDDLETOWN | INSPECTOR: D. EVANS | SHEET 3 OF SHEETS

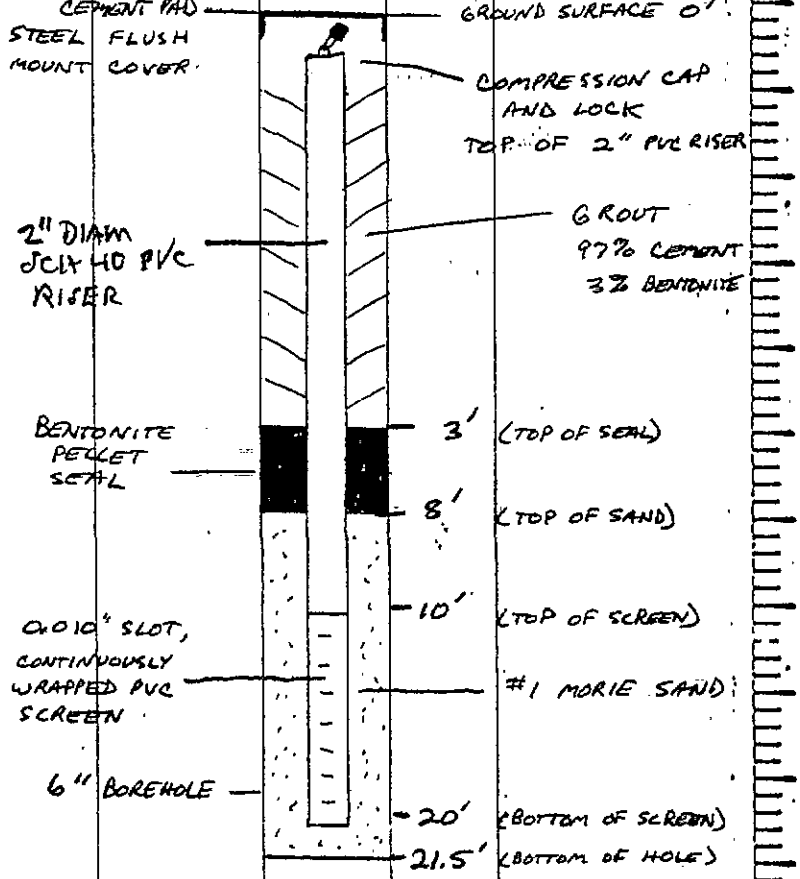
ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS

LOCATION



PSU CAMPUS

ERM-305 WELL CONSTRUCTION



WELL MATERIALS

10' 10 SLOT CONTINUOUSLY WRAPPED 2" PVC SCREEN

10' PVC RISER - SCHEDULE 40

SAND: 2 BAGS

BENTONITE PELLETS: 1 BUCKETS

NOTE: NOT TO SCALE
ALL MEASUREMENTS FROM GROUND SURFACE

HTW DRILLING LOG

HOLE NO. ERM-30I

1. COMPANY NAME: ERM
2. DRILLING SUBCONTRACTOR: Hydrogroup
SHEET 1 OF 4 SHEETS
3. PROJECT: HIA - Middletown
4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Steve Blair
6. MANUFACTURER'S DESIGNATION OF DRILL: Barber
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Dual Rotary Drilling
12" bit + casing to 38' BGS
8" bit + casing to 80' BGS
8" hammer to 102' BGS.
casings were temporary
8. HOLE LOCATION: PSU - Middletown Campus
9. SURFACE ELEVATION:
10. DATE STARTED: 3/17/95
11. DATE COMPLETED: 3/22/95
12. OVERBURDEN THICKNESS: ≈ 20'
13. DEPTH DRILLED INTO ROCK: ≈ 80'
14. TOTAL DEPTH OF HOLE: 102'
15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 20'
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ≈ 6.6' / 18hrs (High due to use of water while drilling Sand ?)
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
18. GEOTECHNICAL SAMPLES: DISTURBED / UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES
20. SAMPLES FOR CHEMICAL ANALYSIS: VOC / METALS / OTHER (SPECIFY) / OTHER (SPECIFY) / OTHER (SPECIFY)
21. TOTAL CORE RECOVERY: %
22. DISPOSITION OF HOLE: Built well ERM-30I — BACKFILLED / MONITORING WELL (X) / OTHER (SPECIFY)
23. SIGNATURE OF INSPECTOR: D. O'Hallen

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Dusky red Silty Sand Silt + clay + organics ≥ 15% Silt > clay, (SM) gravel (trace) loose, except for little silt balls which are compacted/cohesive - Dry. (Some organics)	0.0 ppm @ 1' ≈3'				2.5YR, 3/4 (SM)
	5	Reddish brown SILT Sand + Gravel < 15% Soft. Soil is very dry and friable - Little clumps breakup w/the softest touch.	0.0 ppm @ ≈7'				5YR, 5/3 (ML)
	10		0.0 ppm @ ≈13'				
	15	Dark reddish brown SILT - Same as 5-15' only w/a very notable color change	0.0 ppm @ ≈18'				5YR, 3/4 (ML)
	20	Dusky red SILTSTONE very soft to soft Moderately weathered Micaceous cuttings: Subangular/subround	0.0 ppm @ ≈23'	Hit weathered bedrock @ ≈22'			2.5YR, 4/4 cuttings: 1-20mm
	25						

PROJECT: HIA - Middletown
HOLE NO.: ERM-30I

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Heller | HOLE NO.: ERM-30I | SHEET: 2 OF 4 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNTS (g)	REMARKS (h)
	25	Trace subangular fine gravel throughout. Frequency of gravel ↑ around 33'	0.0 ppm @ ≈28'				cuttings: 1-10mm
	30	(weathering ↓ w/depth; Not noticeable past 35')	0.0 ppm @ ≈33'				cuttings: 1-30mm
	35		0.0 ppm @ ≈38'				cuttings: 1-20mm
	40		0.0 ppm @ ≈44'				cuttings: 1-20mm
	45		0.0 ppm @ ≈48'				cuttings: 1-35mm
	50	Dusky red fine to medium grained SANDSTONE (WACKE) - Hard - Unweathered - Sand is subangular/subround - Trace subangular fine gravel by mostly quartz clasts. - cuttings: Subangular/subround	0.0 ppm @ ≈53'				2.5YR, 3/3 cuttings: 1-20mm
	55		0.0 ppm @ ≈58'				cuttings: 1-40mm
	60	Dusky red calcareous/dolomitic SANDY SILTSTONE. Trace 1-3mm dolomite clasts throughout. No notable calcite clasts > silt sized	0.0 ppm @ ≈63'				cuttings: 1-40mm 2.5YR, 4/3
	65	- Hard - Unweathered - cuttings: Subangular/subround - Very trace subangular fine gravel.	0.0 ppm @ ≈68'				cuttings: 1-35mm
	70	- Unit has thin beds of fine sand in it. (There are trace chips of fine sand in all of my samples)	0.0 ppm @ ≈73'				cuttings: 1-20mm

HTW DRILLING LOG

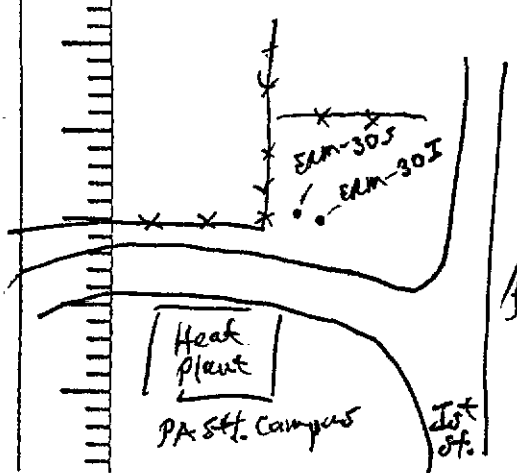
PROJECT: HIA - Middletown | INSPECTOR: D. Heller | HOLE NO.: ERM-30I | SHEET: 3 of 4 SHEETS

ELEV. L	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	75	SAME AS ABOVE (SANDY SILTSTONE)					
				0.0 ppm @ ≈78'			cuttings; 1-20 mm
	80	(1-5 mm dolomite clasts in 83' sample)		0.0 ppm @ ≈83'			cuttings; 1-15 mm
	85			0.0 ppm @ ≈88'			cuttings; 1-10 mm
	90			0.0 ppm @ ≈93'			cuttings; 1-15 mm
	95			0.0 ppm @ ≈98'			cuttings; 1-15 mm
	100	TD					

T.D. = 102' BGS

Injection water total ≈500 gallons

See next pg. for well construction.

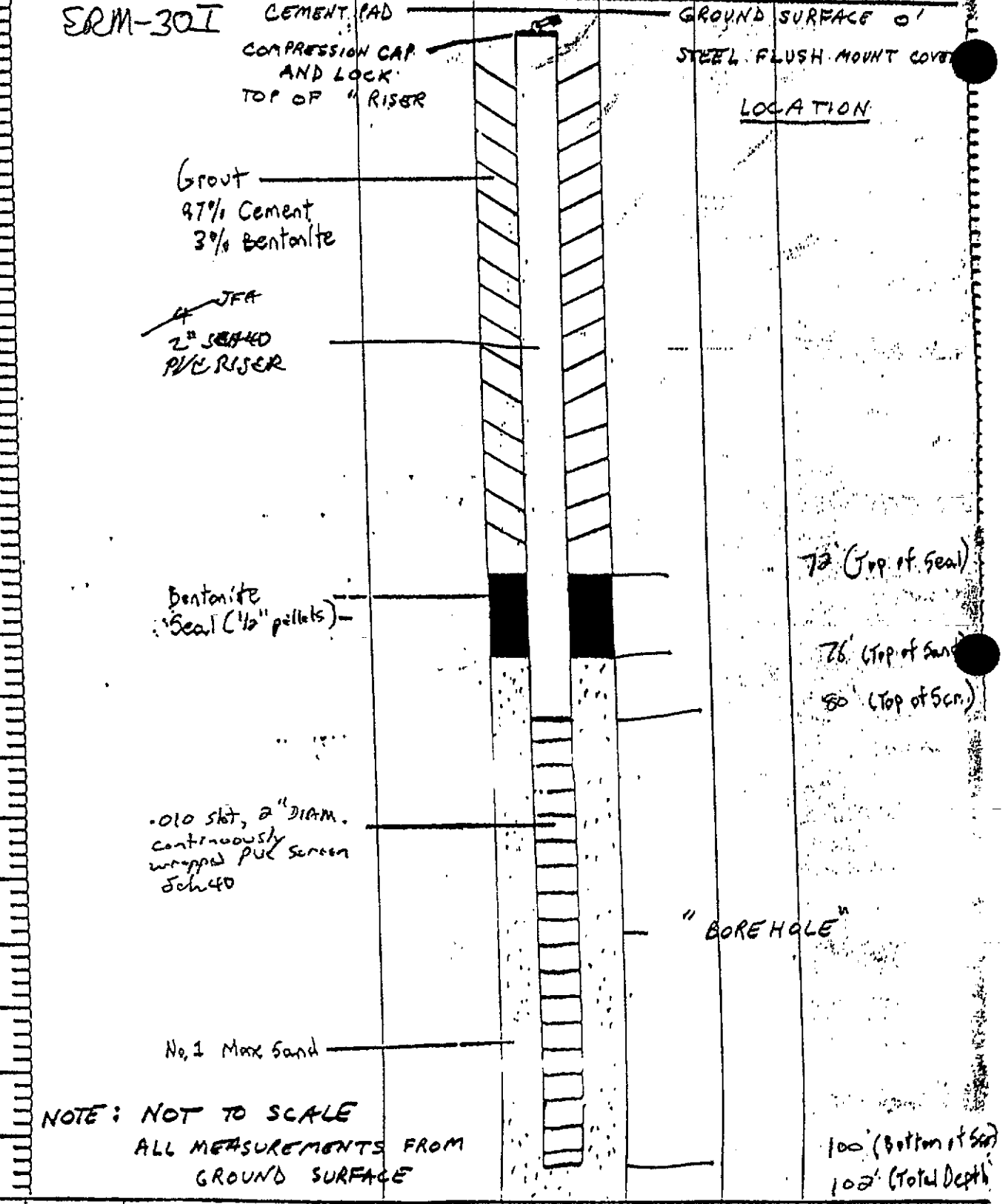


PROJECT: HIA - Middletown | HOLE NO.: ERM-30I

PROJECT: HIA, Middletown | INSPECTOR: D. Haller | ERM-30I | SHEET 4 OF 4 SHEETS

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOLOGIC SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS

ERM-30I



PROJECT: HIA, Middletown | WELL NO.: ERM-30I

HTW DRILLING LOG

HOLE NO. ERM-31I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 OF 6 SHEETS
3. PROJECT: HIA- Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Steve Blair	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 12" bit + casing to 18' BGS. 8" bit + Casing to 180 8" bit to 202 casings were temporary. Barber Rig - Dual Rotary	8. HOLE LOCATION: PSU	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 3/30/95	11. DATE COMPLETED: 4/5/95
12. OVERBURDEN THICKNESS: ≈5'	13. DEPTH GROUNDWATER ENCOUNTERED: ≈15'	
14. DEPTH DRILLED INTO ROCK: ≈198'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
15. TOTAL DEPTH OF HOLE: 202'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-31I		X		D. Hall

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Well graded gray to black gravel w/clay Gravel is angular (Fill layed down beneath the asphalt.) Clay is likely from highly weathered bedrock (Saprolite) directly over bedrock. Sand < 15%. Clay has low plasticity. cuttings: Angular (Gravel)	Lith. Sample ⑤ ≈2' 0.0 ppm				2.5YR, 4/4 - clay GW-GC
	5	Dusky red dolomitic medium to coarse grained SANDSTONE (WACKE). Hard but friable. Slightly to moderately weathered - trace 1-5 mm dolomite clasts. - trace 5-6 mm quartz clasts - cuttings; Subangular/sub round	Lith. Sample ⑥ ≈7' 0.0 ppm	Note: Although all samples showed 0.0 ppm when screened, a slight oily odor was observed during the drilling of the 0-18' run.			2.5YR, 3/3 cuttings: 1-40 mm
	10	Dusky red fine to medium SANDSTONE (WACKE). Moderately hard but friable. - Slightly to moderately weathered - trace 1-4 mm dolomite clasts. - cuttings; Subangular/Subround	Lith. Sample ⑦ ≈13' 0.0 ppm	Also PID readings inside the cutoff were in the 16-17 ppm range. Worker B.Z. was 0.0 ppm.			2.5YR, 3/3 cuttings: 1-30 mm
	15	Dusky red dolomitic fine to medium grained SANDSTONE (WACKE). Sample has ≈ 10% dolomite clasts (1-10 mm in size) - Rock is "speckled" w/dolomite clasts - Hard, but friable - Slightly weathered - cuttings; Subangular/Subround	Lith. Sample ⑧ ≈18' 0.0 ppm				2.5YR, 3/3 cuttings: 1-15 mm
	20	Weak red dolomitic matrix supported SANDY BRECCIA - Hard - Unweathered - Clasts; Subangular/subround fine gravel	Lith. Sample ⑨ ≈23' 27 ppm				2.5YR, 5/3 cuttings; 1-20 mm
	25						

HTW DRILLING LOG

HOLE NO. ERM-31I

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | SHEET 2 OF 6 SHEETS

ELEV. L	DEPTH B	DESCRIPTION OF MATERIALS C	FIELD SCREENING RESULTS D	GEOTECH SAMPLE OR CORE BOX NO E	ANALYTICAL SAMPLE NO. F	BLOW COUNTS G	REMARKS H
	25	matrix: fine - medium grained SANDSTONE (WACKE) Dolomite in matrix only. (No notable clasts.)	Lith. Sample @ ≈28' (29ppm)				cuttings: 1-20mm
	30	Dusky red dolomitic fine to medium grained SANDSTONE. (WACKE) - Carbonates in matrix only. - Unweathered. Hard. - Trace subangular fine gravel - Cuttings: Subangular/subround	Lith. Sample @ ≈ 33' (123 ppm)				2.5YR, 3/3 cuttings: 1-45mm
	35	weak red dolomitic SILTSTONE - No apparent carbonates > silt sized. - Moderately hard to hard - Unweathered - cuttings: Subangular	Lith. Sample @ ≈38' (287 ppm)				2.5YR, 5/3 cuttings: 1-35mm
	40		Lith. Sample @ ≈43' (48 ppm)				cuttings: 1-45mm
	45		Lith. Sample @ ≈47' (0.0ppm)				cuttings: 1-30mm
	50		Lith. Sample @ ≈53' (5.7 ppm)				cuttings: 1-25mm
	55		Lith. Sample @ ≈57' (11.7ppm)				cuttings: 1-20mm
	60	weak red dolomitic fine SANDSTONE (WACKE) - 1-15 mm dolomite clasts throughout. - Hard - Unweathered except yellow staining/discoloration on some dolomite clasts	Lith. Sample @ ≈63' (4.8ppm)				2.5YR, 5/3 cuttings: 1-25mm
	65		Lith. Sample @ ≈68' (0.0ppm)				cuttings: 1-20 mm
	70	See below					

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
H1A - Middletown	D. Haller	ERM-31I	3 of 6 SHEETS

EV. L	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	75	Dusky red dolomite SANDY SILTSTONE - trace 1-3 mm dolomite clasts throughout - some fine sand (≤10%) - trace coarse sand - subangular - Hard - Unweathered except slight discoloration on some dolomite clasts, - cuttings: Subangular	Lith. Sample @ ≈73' (No reading taken)				2.5YR, 4/3 cuttings: 1-40mm
			Lith. Sample @ ≈77' (No reading taken				cuttings: 1-30mm
	80		Lith. Sample @ ≈83' (10.7ppm)				cuttings; 1-25mm
	85		Lith Sample @ ≈87' (No reading taken				cuttings: 1-30mm
	90	Weak red dolomitic medium to coarse grained SANDSTONE (WACKE) - Hard - Unweathered - Trace 1-7mm dolomite clasts - Trace subangular fine gravel (mostly quartz clasts) - cuttings: Subangular/subrounded	Lith Sample @ ≈93' (4,8 ppm)				2.5YR, 5/3 cuttings: 1-20mm
			Lith. Sample @ ≈97' (4.7ppm)				cuttings: 1-45mm
	100		Lith Sample @ ≈103' (8,7ppm)				cuttings: 1-40mm
	105		Lith. Sample @ ≈107' (2.8ppm)				cuttings: 1-25mm
	110	Weak red matrix supported SANDY BRECCIA - Hard - Unweathered - dolomite: 1-4mm dolomite clasts in matrix - matrix: fine to medium subrounded sand - clasts: Very coarse sand/fine gravel subangular - cuttings; subangular/subrounded	Lith. Sample @ ≈113' (4,0ppm)				2.5YR, 5/3 cuttings: 1-30mm
			Lith. Sample @ ≈117' (5.8ppm				cuttings: 1-25mm
	120						

1000 - 3000 gallons / 20' interval of drilling

HTW DRILLING LOG

HOLE NO. ERM-3LI

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | SHEET 4 OF 6 SHEETS

ELEV. L	DEPTH B	DESCRIPTION OF MATERIALS C	FIELD SCREENING RESULTS D	GEOTECH SAMPLE OR CORE BOX NO E	ANALYTICAL SAMPLE NO. Y	BLOW COUNTS G	REMARKS H
	120	(SAME AS ABOVE) SANDY BRECCIA	4.6 ppm @ ≈ 123'				cuttings; 1-25mm
	125		4.9 ppm @ ≈ 128'				cuttings; 1-20mm
	130	Dusky red dolomitic SILTSTONE -Trace 1-4 mm dolomite clasts -Trace Fine-Medium subangular gravel → mostly quartz clasts -Moderately Hard, Micaceous -Unweathered -cuttings; Subangular	8.1 ppm @ ≈ 134'				2.5YR, 4/3 cuttings; 1-50mm
	135	Weak red dolomitic medium to coarse grained SANDSTONE (WACKE) -trace 1-8mm dolomite clasts -Hard -Unweathered -cuttings; Subangular/subrounded.	2.8 ppm @ ≈ 138'				2.5YR, 5/3 cuttings; 1-45mm
	140	-trace subangular fine gravel -Rock seems to become increasingly dolomitic w/depth. - Some mica, but hard to see w/all of the quartz grains in the rock	2.7 ppm ≈ 143'				cuttings; 1-40mm
	145	- Samples from 147, 153, 157 have significant amounts of dolomite in them → 15 ± 10% w/some chips containing up to 50-60%	2.4 ppm @ ≈ 147'				cuttings; 1-35mm
	150		0.0 ppm @ ≈ 153'				cuttings; 1-35mm
	155		0.8 ppm @ ≈ 157'				cuttings; 1-35mm
	160	Weak red Dolomitic fine to medium grained SANDSTONE (WACKE) -Abundant Dolomite clasts (1-20mm) throughout samples (similar to above interval) -Hard -Unweathered	0.0 ppm @ ≈ 163'				cuttings; 1-40mm 2.5YR, 5/3
	165	-cuttings; Subangular/subround	0.0 ppm @ ≈ 167'				cuttings; 1-35mm

1 - 3,000 gallons / 20' interval of Drilling

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
H1A - Middletown	D. Haller	ERM-31I	5 OF 6 SHEETS

ELEV. L	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	170	SAME AS ABOVE (Fine - Medium Grained SANDSTONE (WACKE)	0.0 ppm @ ≈173'	1-3,000 gallons / 20' Interval of drilling			cuttings: 1-30mm
	175	Weak red dolomitic medium to course grained SANDSTONE (WACKE) - trace dolomite → much less than above intervals (<5%). - Hard - Unweathered - Trace Subangular Fine gravel → Mostly quartz clasts. - cuttings: subangular/subrounded	0.0 ppm @ ≈177'				(2.5YR, 5/3) cuttings: 1-25mm
	180		0.0 ppm @ ≈183'				cuttings: 1-20mm
	185	Weak red dolomitic Course grained SANDSTONE (WACKE) - No apparent dolomite clasts - Hard - Unweathered - cuttings: Subangular/subrounded	0.0 ppm @ ≈187'				(2.5YR, 5/3) cuttings: 1-10mm
	190	Weak red dolomitic Fine grained SANDSTONE (WACKE) - Trace 1-3 mm dolomite clasts - Hard - Unweathered - cuttings Subangular/subrounded	0.0 ppm @ ≈193'				(0.5YR, 5/3) cuttings: 1-10mm
	195		0.0 ppm @ ≈197'				cuttings: 1-10mm
	200	Total Depth = 202' Injection water total ≈ 900 gallons See pg. 6 for well construction					

Figure 4-1 (Continued)

HTW DRILLING LOG.

PROJECT	INSPECTOR	HOLE NO.
HIA, Middletown	D. Haller	ERM-31I
		SHEET 6 OF 6 SHEETS

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE & CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS

ERM-31I

CEMENT PAD — GROUND SURFACE 0'

COMPRESSION CAP AND LOCK TOP OF " RISER

STEEL FLUSH MOUNT COVER

Grout
97% Cement
3% Bentonite

2" DIAM SCH 40 PVC RISER

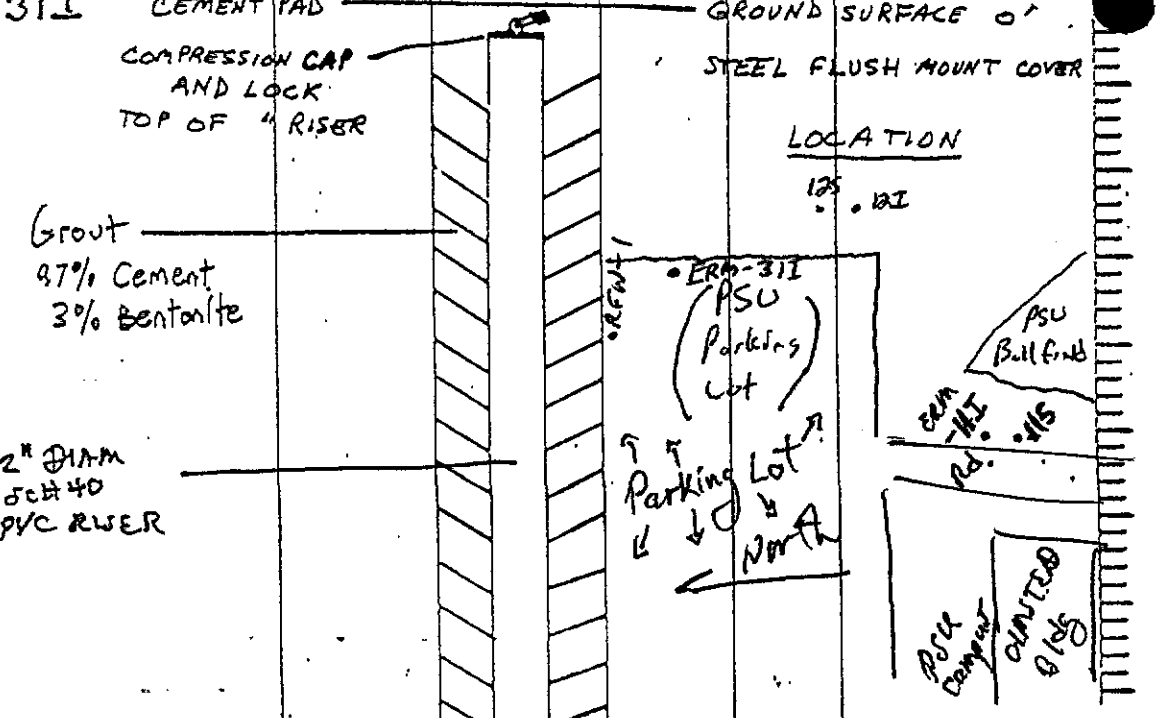
Bentonite Seal

0.010" slot, continuous wrapped PVC Screen (2") SCH 40.

" BOREHOLE

No. 1 Morie Sand

NOTE: NOT TO SCALE
ALL MEASUREMENTS FROM GROUND SURFACE



171' (Top of Seal)

176.5' (Top of Sand)

180' (Top of Scr.)

200' (Bottom of Scr.)

202' (Total Depth)

PROJECT HIA, Middletown

HOLE NO. ERM-31I

Sentinel Wells

HTW DRILLING LOG

HOLE NO. ERM-7S

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: Hydro Group	SHEET 1 OF 5 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Steve Blair / Bernie Connor	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber Rig, DR-12	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Dual Rotary Barber Rig 8" and 12" casing and hammer temporary 12" casing to 38' 8" casing to 150'	8. HOLE LOCATION: See Sheet # 4	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 10-6-94	11. DATE COMPLETED: 10-11-94
12. OVERBURDEN THICKNESS: ~~≅ 20.0'~~ (132' competent) 20.0	15. DEPTH GROUNDWATER ENCOUNTERED: Unknown (≅ 20' ? BGS)	
13. DEPTH DRILLED INTO ROCK: 132.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A	
14. TOTAL DEPTH OF HOLE: 152.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	X		None

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
None						— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well Installed				Warren N. Taf

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Silt poorly graded w/ gravel (subangular) dry ~~firm~~ (M) <1/4" Dia. weak, weathered	0 ppm PID, No Odor	NS	NS	NA	10R 4/6 red GW-GC
	5.0'	Same as Above gravel <1/2" Dia.	0 ppm PID, No Odor	NS	NS	NA	10R 4/6 red GW-GC
	10.0'	Siltstone w/ sand coarse grained. subangular weak, weathered (-) HCl - no fizz	0 ppm PID, No Odor	NS	NS	NA	2.5YR 3/4 dusky red
	15.0'	Same as above Weathered Ref.	0 ppm PID No Odor	NS	NS	NA	2.5YR 3/4 dusky red
	20.0'	Siltstone (sandy) subangular w/ rounded pebbles 1/8 to 1/4" Dia. conglomeritic weak, weathered (-) HCL	(med. grain) 0 ppm PID, No Odor	NS	NS	NA	2.5YR 3/4 dusky red.
	25.0'						

HTW DRILLING LOG

HOLE NO. ERM-75

PROJECT: HIA - Middletown | INSPECTOR: Warren For | SHEET 2 OF 5 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
25 to 30'	0 to 5	~~Silt~~ Same as above; competent bedrock @ 32'	Oppm PID No Odor	NS	NS	NA	2.5YR 4/3 dusky red.
	30-35	Frente clasts in a siltstone matrix rounded 2.5YR 3/4 dusky red no fizz	Oppm PID, No Odor				Chips 3/8 to 3/4"
C.S W.F.	40.0'	" " "					
		Siltstone weathered med. hard calcareous dolomitic	Oppm OVA No Odor.	NS	NS	NA	2.5YR 3/4 dusky red,
	45.0'						1.0 to 35 mm dia.
		Siltstone clasts less calcareous / dolomitic not as reactive w/ HCl	Oppm OVA No Odor.	NS	NS	NA	2.5YR 3/3 dusky red
	50.0		OVA				1.0 to 20mm
		Siltstone weathered m. hard. calcareous / dolomitic + HCl	Oppm ~~OVA~~ (NR) NO odor	NS	NS	NA	2.5YR 3/4 dusky red (getting smaller chips)
	55.0'						1.0 to 15 mm
		Siltstone weathered m. hard NO HCl. (Subround) Trace Sand med. grain.	Oppm OVA No Odor	NS	NS	NA	2.5YR 3/3 dusky red. (large chips)
	60.0'						1.0 to 50mm
		Same as above	Oppm OVA No Odor	NS	NS	NA	2.5YR 3/3 dusky red.
	65.0'						1.0 to 45 mm
		Same as above w/ f. sand ≤ 15% rounded	Oppm OVA No Odor	NS	NS	NA	2.5YR 3/3 dusky red (small % fault)
	70.0'						LO to 30 mm
		Sandstone w/ Silt V. weathered m. hard. (No + HCl) f-gray - subround w/ Quartz clasts 1.0 to 8mm	Oppm OVA No Odor Length (angular)	NS	NS	NA	2.5 YR 3/3 dusky red LO to 18.0 mm
	75.0'	Siltstone weathered m. hard - slight calcareous / dolomitic Quartz clast (subrounded) ≤ 8 mm dia	Oppm OVA No Odor	NS	NS	NA	2.5 YR 3/4 dusky red 1.0 to 30.0 mm
	80.0'						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	ERM-7S	3 of 5 SHEETS

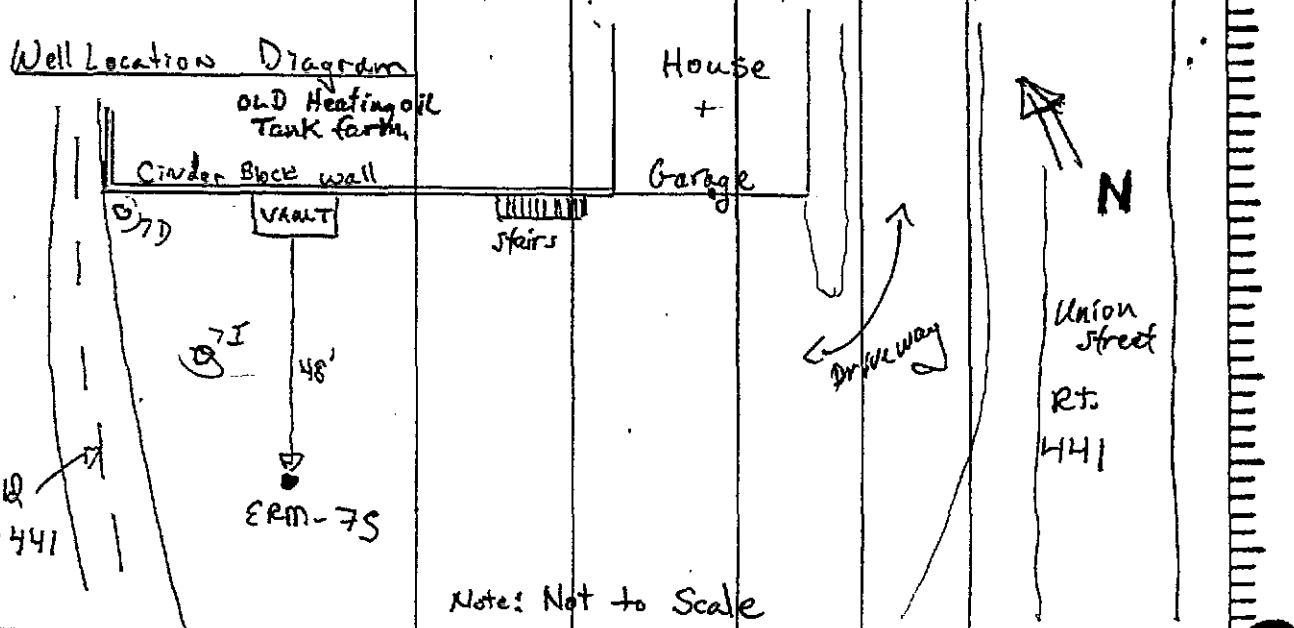
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	80	Siltstone calcarious/dolomite + HCl m. hard weathered f grains subrounded	0 ppm OVA No Odor	NS	NS	NA	2.5YR 3/2 dusky red. (mostly small) 1.0 to 25 mm dia.
water	85.0'	Mix of sandstone with sltst calcarous/dolomitic hard s. weathered White Quartz clasts < 5mm Angular	0 ppm OVA No Odor.	NS Driller says interval is making water.	NS	NA	2.5YR 3/3 dusky red. (Sub angular) 1.0 to 30 mm
	90.0'	Same as above	0 ppm OVA No Odor	NS	NS	NA	2.5YR 2.5/2 very dusky red.
	95.0'	Qtz clasts are subrounded Siltstone w/ sand f grain subrounded dolomitic v. hard Mod. weathered, trace of qtz clasts < 2mm dia.	0 ppm OVA No Odor	NS	NS	NA	1.0 to 22.0 mm 2.5YR 3/4 dusky red 1.0 to 25 mm
	100.0'	Argillaceous siltstone Sandy (wacke) m. weathered v. hard, dolomitic Quartz clasts white to pink 1 to 20 mm dia.	0 ppm OVA No Odor	NS	NS	NA	2.5YR 3/2 dusky red. 1.0 to 30.0 mm
	105.0'	Sandstone w/ silt Subround f to m. grains. v. hard, m. weathered dolomitic Qtz clasts < 4mm	0 ppm OVA No Odor	NS	NS	NA	5YR 3/3 dark reddish brown 1.0 to 4.0 mm
	110.0'	Siltstone w/ sand subangular f to m grain m. hard m. weathered quartz clasts < 4mm dia w/ silt as mottled w/ dolomite	0 ppm OVA No Odor	NS	NS	NA	2.5YR 3/2 dusky red 1.0 to 15 mm
	115.0'	Same as above lots of dolomite (silt) clips. (clast)	0 ppm OVA No Odor	NS	NS	NA	2.5YR 3/2 dusky red. 1.0 to 43 mm
	120.0'	Sandstone w/ silt f. to m. grain. subrounded v. hard m. weathered mottled with dolomite (+HCl) Quartz clasts, Subangular	0 ppm OVA No Odor 1 to 3 mm dia.	NS	NS	NA	2.5YR 3/2 dusky red. 1.0 to 22 mm
	125.0'						

RI/FI DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | HOLE NO.: ERM-75 | SHEET 4 OF 5 SHEETS

ELEV. a.	DEPTH a.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	125.0'	Sandstone w/ silt f. to m. grain. sub rounded V. hard, m. weathered. mottled w/ dol. calcareous + HCl Quartz clasts throughout 1.0 to 8 mm dia. subangular	0 ppm OVA No Odor	NS	NS	NA	2.5YR 3/2 dusky red.
	130.0'	Same as Above	0 ppm OVA No Odor	NS	NS	NA	1.0 to 25 mm dia. 2.5YR 3/2 dusky red
	135.0'	Quartz clasts are white and some rosey ≤ 3 mm dia.					1.0 to 15 mm
		Siltstone with Sand Vs. hard. m. weathered, dolomitic. trace of white quartz clasts sub rounded ≤ 2mm gr. size.	0 ppm OVA No Odor	NS	NS	NA	2.5YR 3/2 dusky red
	140.0'	Siltstone with sand like above	0 ppm OVA No Odor	NS	NS	NA	1.0 to 20 mm 2.5YR 2.5/2 very dusky red
		(No quartz clasts however)					
	145.0'	Sandstone with silt V. hard m. weathered large amount of quartz clasts ≤ 10mm rounded calcitic & dolomitic.	0 ppm OVA No Odor	NS	NS	NA	1.0 to 24 mm 2.5YR 3/2 dusky Red.
	150.0'						
		152.0' Bottom of borehole WNF 10-11-94					1.0 to 26 mm

Well Location Diagram



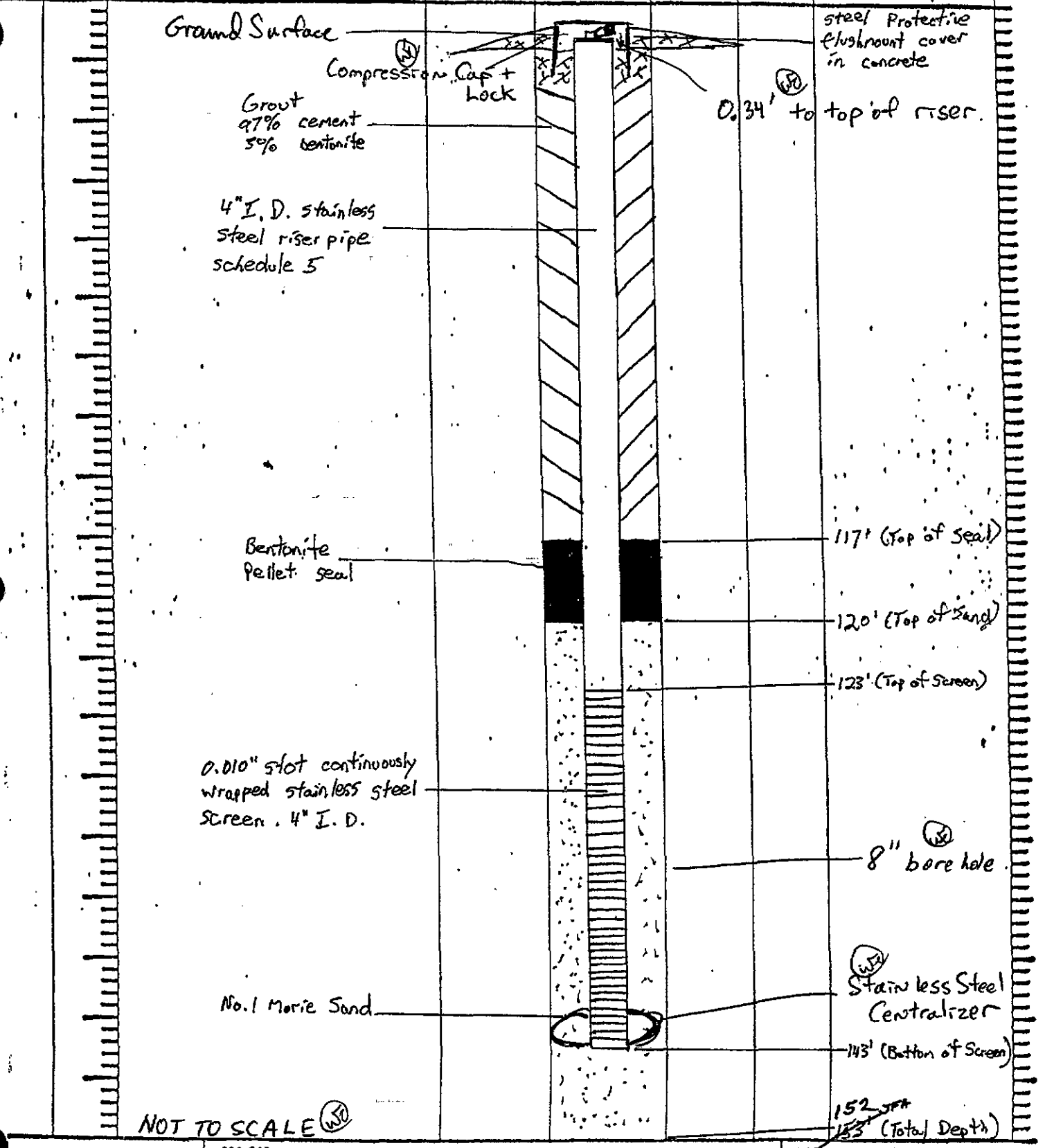
Note: Not to Scale

PROJECT: HIA - Middletown | HOLE NO.: ERM-75

HTW DRILLING LOG

OJECT	INSPECTOR	HOLE NO.
HIA Middletown	C. Salomon	ERM-7S
		SHEET 5 OF 5 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



PROJECT HIA Middletown

HOLE NO. ERM-7S

HTW DRILLING LOG

HOLE NO. ERM-7I

1. COMPANY NAME: ERM
2. DRILLING SUBCONTRACTOR: Hydro Group
SHEET 1 OF 10 SHEETS
3. PROJECT: HTA-Middletown
4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Steve Blair / Bernie Connor
6. MANUFACTURER'S DESIGNATION OF DRILL: Barber Rig DR-12
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Dual Rotary Rig w/ 8" and 12" tools. Temp. casing 15' to 98'. Temp. casing 8" to 350'
8. HOLE LOCATION: See Sheet # 9
9. SURFACE ELEVATION: Not Surveyed
10. DATE STARTED: 1-12-95
11. DATE COMPLETED: Borehole 1-19-95
12. OVERBURDEN THICKNESS: 10.0' Bedrock (15.0' Consolidated)
13. DEPTH DRILLED INTO ROCK: 341.0'
14. TOTAL DEPTH OF HOLE: 352.0'
15. DEPTH GROUNDWATER ENCOUNTERED: Unknown
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
18. GEOTECHNICAL SAMPLES: None — DISTURBED: — UNDISTURBED: —
19. TOTAL NUMBER OF CORE BOXES: None
20. SAMPLES FOR CHEMICAL ANALYSIS: None — VOC: — METALS: — OTHER (SPECIFY): — OTHER (SPECIFY): — OTHER (SPECIFY): —
21. TOTAL CORE RECOVERY: — %
22. DISPOSITION OF HOLE: Well ERM-7I Installed — BACKFILLED: — MONITORING WELL: X — OTHER (SPECIFY): —
23. SIGNATURE OF INSPECTOR: Warren N. Taff

TRACE = (< 10%)

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Cuttings Size
	0.0	Gravel and Silt well graded (WE) loose dry angular to sub angular poorly sorted medium plasticity.	0 ppm, No Odor.	NS	NS	NA	5YR 4/4 reddish brown GW-GM (WE) 5.0 to 40 mm
	5.0	Sand with Silt + Gravel f. to med. grain - ≤5% Sub rounded. loose, dry poorly sorted well graded (WE)	0 ppm, No Odor.	"	"	"	5YR 3/4 dark reddish brown SW-SM (WE) 4 mm to 20 mm
	10.0	Siltstone Soft dry (WE) weathered Quartz clasts - subrounded (1-5mm) HCL(-) No reaction - NoCO3	0 ppm, No Odor	"	"	"	2.5YR 3/4 dusky red 3mm to 18mm
	15.0	Siltstone soft weathered. No clasts HCR(-)	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 15mm
	20.0	Same Material	0 ppm, No Odor	"	"	"	2.5YR 3/4 dusky red 1.0 to 25mm
	25.0						

reviewed 2/8/95 WNTaff

PROJECT: HTA-Middletown — HOLE NO. ERM-7I

HTW DRILLING LOG

HOLE NO. ERM-7E

PROJECT: HIA-Middletown | INSPECTOR: Warren Fop | SHEET: 2 OF 18 SHEETS

ELEV. a	DEPTH b	TRACE (≤10%) DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS PID d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS Color / Coating g
	25.0'	Siltstone with med. sand grains - subangular soft weathered with mica flakes	0ppm, No Odor	NS	NS	NA	2.5YR 3/4 dusky red
							1.0 to 25mm
	30.0'	Siltstone soft weathered mottled with gray/white silt (≤3mm)	0ppm, No Odor.	"	"	"	2.5YR 3/3 dusky red
							1.0 to 10mm
	35.0'	Similar Material mottled silt ≤ 10mm	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	40.0'						1.0 to 16mm
		Similar Material	0ppm, No Odor	"	"	"	2.5YR 3/4 dusky red
	45.0'						1.0 to 25mm
		Siltstone m. soft weathered No clasts HCL(-), no mottling	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	50.0'						1.0 to 35mm
		Siltstone/trace fine sand. subrounded. m. soft weathered No clasts No Dol. Cementation	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	55.0'						1.0 to 18mm
		Siltstone m. soft weathered Qtz clasts - subrounded Black mottling - traces.	1.0ppm, No Odor. (≤2%).	"	"	"	2.5YR 3/3 dusky red
	60.0'						1.0 to 35mm
		Siltstone m. soft to m. hard weathered No clasts, HCL(-)	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	65.0'						1.0 to 30mm
		Siltstone m. hard. weathered quartz clasts, subrounded ≤5mm Dol. Cementation trace of black mottling	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	70.0'						no to 20mm

SOFT

PROJECT: HIA - Middletown | HOLE NO. ERM-7E

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	ERM-7I	3 OF 10 SHEETS

TRACE (<10%)

EV. b	DEPTH (ft)	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS PID d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS Color / Cuttings
	90.0	Siltstone m.hard weathered (WF) (angular) clasts of white siltstone + mottled with black/white spots	0ppm, No Odor	NS	NS	NA	2.5YR 3/2 dusky red
	95.0						1.0 to 20mm
		Same Material	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
	100.0'						1.0 to 15mm
		Siltstone trace of fine sand (subrounded) m.hard weathered No clasts, HCL+	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	105.0						1.0 to 30mm
		Similar Material w/ clasts of subangular Quartz ≤ 8mm	0ppm, No Odor	"	"	"	2.5YR 3/4 dusky red
	110.0'						1.0 to 20mm
		Siltstone m.hard m.weathered No clasts Dolomitic Cementation	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
Layer of water	115.0'						1.0 to 45mm
		Same material m.hard.	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
Softer rock	120.0'						1.0 to 40mm
121.5 Fracture		Siltstone m.hard m.weathered clasts of quarto-angular ≤ 3mm Dol. Cementation.	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red.
122.5 hard organic	125.0'						1.0 to 40mm
		Siltstone m.hard to hard m.weathered clasts of dolomite (brown/yellow - subrounded, weathered) Dol. Cementation	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red.
Fracture	130.0'						1.0 to 20mm
		Same Material	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	135.0' X						1.0 to 40mm

HTW DRILLING LOG

HOLE NO. ERM-7I

PROJECT: HAA - Middletown | INSPECTOR: Warren Fox | SHEET 4 of 10 SHEETS

TRACE (<10%)

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS (PID)	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS (Color / Cuttings)
	115'	Siltstone, hard, m. weathered, lg. amt ≤30% quartz clasts - subangular ≤5mm; Dol. clasts, weathered subrounded. Dol. Cementation (Poss. Feldspar)	0ppm, No Odor	NS	NS	NA	2.5YR 3/3 dusky red; 5 pieces ≤40mm; 1.0 to 5mm
very soft	120'	Siltstone, soft, weathered, quartz clasts ≤3mm, subangular. Dol. cementation.	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red; 1.0 to 40mm
	125'	Similar Siltstone w/ brownish yellow angular clasts ≤5mm (5%) of Dolomite (subangular)	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red; 1.0 to 10mm
	130'	Same material. ≤10% clasts.	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red; 1.0 to 20mm
	135'	~~Sandy~~ Silty Sandstone with Silt/Wacke, m. hard, m. weathered, med. grain - sub rounded, clasts of quartz + dolomite subrounded ≤5mm.	0ppm, No Odor	"	"	"	2.5YR 2.5/2 very dusky red; 1.0 to 20mm
	140'	Silty sandstone/Wacke, m. hard, m. weathered, clasts of Qtz + dolomite - subangular. m. grain - subangular grains, Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red; 1.0 to 40 mm
	145'	Similar Material, clasts are subrounded	0 ppm, No Odor	"	"	"	2.5YR 2.5/2 very dusky red; 1.0 to 15 mm
	150'	Sandy siltstone, fg grains subrounded, hard, s. weathered, trace of Dol. clasts, weathered subrounded ≤5mm	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red; 1.0 to 23 mm
	155'	Same Material, trace of square calcite	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red; 1.0 to 15 mm
	160' X						

PROJECT: HAA - Middletown | HOLE NO. ERM-7I

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	ERM-II	5 OF 10 SHEETS

ELEV. ft	DEPTH ft	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS PID	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS Color / Cuttings
	160'	TRACE (<10%)					
		Siltstone m. hard s. weathered clasts of qtz (trace) subangular ≤ 5mm Dol. Cementation	0 ppm, No Odor	NS	NS	NA	2.5YR 3/2 dusky red 1.0 to 25 mm
	165'	Sandy Siltstone (w/sand) m-grain, subrounded hard s. weathered trace of qtz clasts, subangular ≤ 3mm	0 ppm, No Odor	NS	"	"	2.5YR 3/2 dusky red 1.0 to 23 mm
	170'	Siltstone hard s. weathered. large amt of qtz clasts - subangular ≤ 4mm (≤ 20%) Dolomitic Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 28 mm
	175'	Similar Material (Fewer % of Qtz ≤ 5%)	0 ppm, No Odor	"	"	"	2.5YR 3/3 Dusky red. 1.0 to 10 mm
	180'	Siltstone hard s. weathered. trace of angular qtz ≤ 2mm Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 15 mm
	185'	Same Material	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 23 mm
	190'	Siltstone v. hard s. weathered clasts of Qtz - Subrounded ≤ 4mm Dolomite mottling (green - weathered) Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 1.0 to 30 mm
	195'	Siltstone v. hard s. weathered No Clasts Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/2 1.0 to 10 mm
	200'	Sandy Siltstone (m.g.) V. hard s. weathered clasts of quartz m.grain - s.c. rounded. Dol. Cementation	ppm, Odor	"	"	"	2.5YR 2.5/2 very dusky red 1.0 to 1.4 mm
	205'						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	ERM-7I	6 of 10 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c TRACE (<10%)	FIELD SCREENING RESULTS d PID	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS Color/Cuttings
	205'	Silty sandstone/Wacke v.hard s.weathered, f.grain subrounded high amt of clasts Qtz ≤50% ≤3-5mm subrounded. Dol. Cementation	0 ppm, No Odor	NS	NS	NA	2.5YR 3/3 dusky red 1.0 to 12 mm
	210'	Same material	0 ppm, No Odor	"	"	"	2.5YR 2.5/2 very dusky red 1.0 to 10 mm
	215'	Similar material (sand is fine to v.fine grained)	0 ppm, No Odor	"	"	"	2.5YR 2.5/2 very dusky red 1.0 to 22 mm
	220'	Siltstone (trace v.fine sand) subrounded? v.hard s.weathered No clasts Dol Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 30 mm
	225'	Silty Sandstone/Wacke v.hard s.weathering m to f grain sand (subrounded) Clasts of Qtz ≤3mm Dol Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 14 mm
	230'	Similar Material. (also contained greenish gray carbonate clasts) WF	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 20 mm
	235'	Sandy Siltstone (wacke) f. to c. grain subrounded v.hard s.weathered. Clasts of Qtz ≤5mm subangular Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 18 mm
	240'	Same Material.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 28 mm
	245'	Same Material (sand ≤ 10%)	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 30 mm
	250' X						

HTW DRILLING LOG

HOLE NO. ERM - 7I

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 3 OF 10 SHEETS

ELEV. a.	DEPTH b.	TRACE (<10%) DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Cuttings
	250	Sandy siltstone f-g rock subrounded v. hard s. weathered clasts Qtz, subangular ≤5mm Dol. Cementation.	0 ppm, No Odor	NS	NS	NA	2.5YR 3/2 dusky red
							1.0 to 10 mm
	255	Silty Sandstone/Wacke v. hard, m to c grain (subrounded) s. weathered Qtz clasts ≤4mm, subangular Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
							1.0 to 25 mm
	260	Similar Material with clasts of green/gray carbonate (weathered ≤4mm)	0 ppm. No Odor	"	"	"	2.5YR 3/3 dusky red
							1.0 to 14mm
	265	Sandy Siltstone f-g subr. v. hard s. weathered Qtz clasts ≤4mm, subrounded trace of carbonate clasts weathered ≤3mm Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
							1.0 to 35mm
	270	Siltstone v. hard s. weathered No clasts Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
							1.0 to 22 mm
	275	Silty Sandstone/Wacke v. hard m grain-subrounded s. weathered Qtz clasts, angular, ≤5mm trace of carbonate (g rounded gray/weathered	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
		Dol. Cementation.					1.0 to 8.0 mm
	280	Same Material. (No carbonate clasts)	0 ppm, No Odor	"	"	"	2.5YR 3/3 3/2 dusky red
							1.0 to 14mm
	285	Silty Sandstone/Wacke m.g. subr. v. hard, s. weathered lg. amt. of quartz clasts subangular ≤10 mm also limestone clasts - angular Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
							1.0 to 20 mm
	290	Sandy siltstone f.g. subr. v. hard, weathered Clasts of qtz and carbonate chips ≤5mm, angular Dol. cementation & Mottling in chips (carbonate)	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
							1.0 to 35 mm
	295						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.
HIA- Middletown	Warren Fox	ERM-7I SHEET 8 of 10 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c. TRACE (< 10%)	FIELD SCREENING RESULTS d. PID	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Cuttings
	295	Sandy Siltstone f.g. subr. v.hard, s. weathered Trace of Qtz and carbonate clasts - Subangular ≤ 3mm Trace of mottling (gray/green) Dol. Cementation	0 ppm, No Odor	NS	NS	NA	2.5YR 3/2 dusky red 1.0 to 20 mm
	300'	Same Material carbonate clasts = 15mm diam (very large)	0 ppm, No Odor	"	"	"	2.5YR3/2 dusky red. 1.0 to 24 mm
Slightly SOFTER	305'	Silty Sandstone / Wacke v.hard / s.weathered f.g. subr. Qtz clasts subround ≤ 5mm Traces of weathered carbonate clasts Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 35 mm
	310'	Sandy Siltstone v.f.g. gray subr v.hard / s. weathered Qtz clasts subangular ≤ 3mm Traces of Limestone and calcite (chips) Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 21 mm
	315'	Similar material	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 20 mm
	320'	Siltstone w/ traces of med. sand subrounded v.hard s weathered Clasts of Qtz subrounded ≤ 3mm Dol. Cementation, trace of grey mottling	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 28 mm
	325'	Silty Sandstone / Wacke v.hard, s. weathered subrounded clasts of Qtz and carbonates ≤ 4mm m to f. grain subround sand. Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 16 mm
	330'	Same Material	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 25 mm
	335'	Similar material (also had clasts of that were calcite/limestone banded ~~pieces~~) angular, 10mm.	ppm, Odor	"	"	"	2.5YR 3/3 dusky red. 1.0 to 28 mm
	340' X						

PROJECT HIA- Middletown HOLE NO. ERM-7I

HTW DRILLING LOG

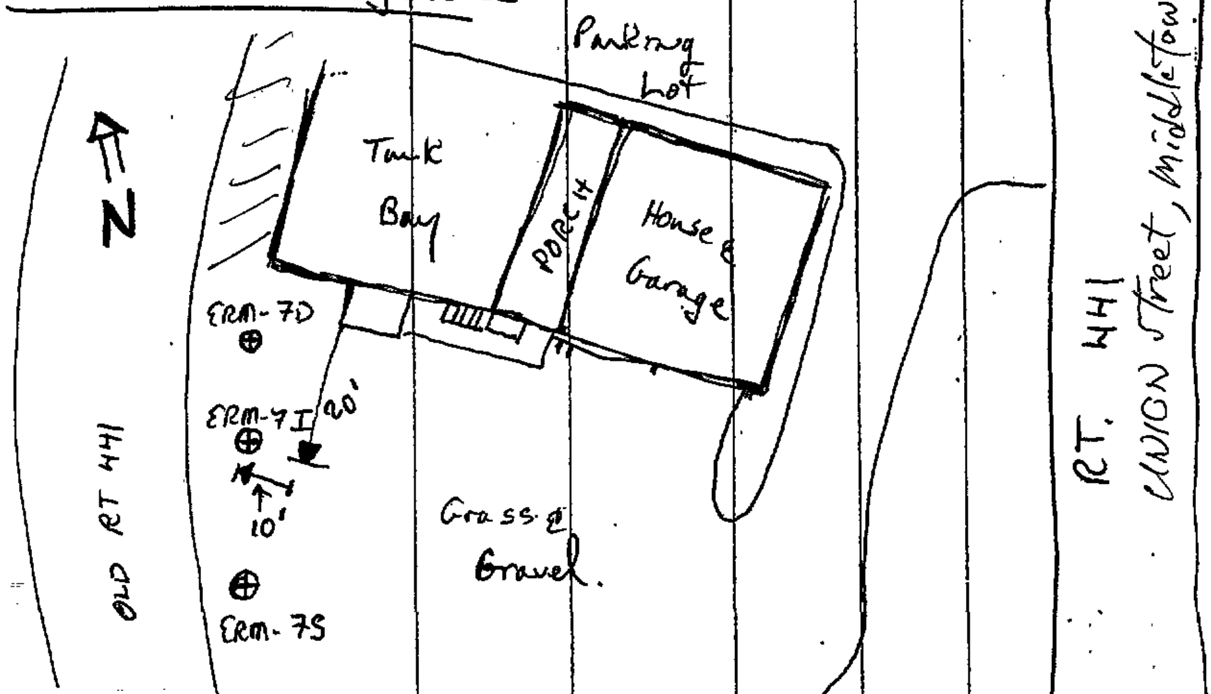
PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	ERM-7I	9 of 10 SHEETS

ELEV.	DEPTH	TRACE (<10%) DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS PID	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS Color / Cuttings
	340	Sandy Siltstone ~~f-grained~~ sub. f-grain, subrounded v. hard, s. weathered No Clasts Dol. Cementation	0 ppm, No Odor	NS	NS	NA	2.5YR 3/3 dusky red 1.0 to 24 mm
	345'	Same material (cuttings were rounded)	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 15 mm
	350'						

352' Bottom of borehole
1-18-95 (WNF)

Well was not installed. Well construction and diagram will follow after borehole is videologged and packer tested (WNF) 1-18-95

Borehole Location Diagram



PROJECT	HOLE NO.
HIA - Middletown	ERM-7I

Figure 4-1 (Continued)

HTW DRILLING LOG

PROJECT: HIA, Middletown	INSPECTOR: D. Menzie	HOLE NO.: ERM-7-I-Sent.	SHEET: 10 OF 10 SHEETS

ELEV. ft	DEPTH ft	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOLOGIC SAMPLE or CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS

GROUND SURFACE

COMPRESSION CAP AND LOCK

CEMENT PAD WITH FLUSH MOUNT AND COVER.

0' - GROUND SURF. Top of Riser

Grout
97% Cement
3% Bentonite

294' of SCH 10 (4" dia) STAINLESS STEEL CASING

283' (Top of Seal)

Bentonite Pellet Seal 2 five-gal. buckets

288' (Top of Sand)

294' (Top of Scr.)

40' of 0.010" slot, continuously wrapped stainless extra strength steel screen Sch 10 ~~schedule~~ JOK

No. 1 ~~No. 2~~ OK Maxie Sand

334' (Bottom of Scr.)

352' (Total Depth)

PROJECT: HIA, Middletown

HOLE NO.: ERM-7-I-Sent.

HTW DRILLING LOG

HOLE NO. ERM-7D(SENT)

1. COMPANY NAME	2. DRILLING SUBCONTRACTOR: HYDROGROUP
SHEET 1 OF 16 SHEETS	
3. PROJECT: HIA - MIDDLETOWN	4. LOCATION: MIDDLETOWN PA
5. NAME OF DRILLER: JESSE ARNETT	6. MANUFACTURER'S DESIGNATION OF DRILL: BARBER
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Dual Rotary drilling — 16" Casing + bit (to 20'); 12" Casing + bit (to 198'); 8" Casing + bit (to 546'); all casing were temporary.	8. HOLE LOCATION: West of Union St, South PA. Tpk. 76, East of N.B. Landfill
	9. SURFACE ELEVATION
	10. DATE STARTED: AUGUST 94 — 11. DATE COMPLETED
12. OVERBURDEN THICKNESS: ≈ 10'	15. DEPTH GROUNDWATER ENCOUNTERED
13. DEPTH DRILLED INTO ROCK: ≈ 668.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE: 678.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: 0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE: Built well ERM-7D(SENT)	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Silt w/ gravel and sand. poorly graded gravel and sand subangular f. grain sand. gravel ≤ 5mm Dia.	0ppm PID, No Odor.	NS	NS	NA	5YR 4/4 reddish brown. 1.0mm to 5mm.
	5.0'	Sand f. grain (subrounded) w/ silt ≤ 15% poss. clay.	0ppm PID, No Odor	NS	NS	NA	5YR 4/4 reddish brown. less than 1.0mm
	13'	Siltstone with calcite rock fragments weathered (≤ 10.0mm Dia. m. hard. Subrounded — Bedrock ≈ 13.0'	0ppm PID, No odor.	NS	NS.	NA	5YR 4/4 reddish brown. 1.0 chips to 10.0mm
	15.0'	Sandstone (f. grain). weathered subangular to subround. v. hard traces of Dolomite (2mm)	0ppm PID, No Odor	NS	NS	NA	5YR 3/3 dark reddish brown. 1.0mm to 10mm
	20.0'	Dusky red calcareous or dolomitic SILTSTONE, Some quartz clasts present (fine gravel sized) - very soft - soft - slightly - moderately weathered - cuttings: subangular	0.0 ppm ≈ 24'				(2.5YR, 3/3) cuttings: 1-20mm
	25.0						

PROJECT: HIA - MIDDLETOWN

HOLE NO. ERM-7D (SENT)

HTW DRILLING LOG

HOLE NO. ERM-7D(cont)

PROJECT: HIA Middletown | INSPECTOR: D. Hallen | SHEET 2 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25	Same as 20-25'	0.0 ppm ⊙ ≈ 29'				
	30	Dusky red calcareous or dolomitic SILTSTONE. No apparent quartz clasts like above. -No notable clasts larger than the small % of fine sand..	0.0 ppm ⊙ ≈ 34'				2.5YR, 3/4 cuttings: 1-15mm
	35	-grey green dolomite clasts (1-5mm) - Slightly weathered, soft to moderately hard. -cuttings: subangular	0.0 ppm ⊙ ≈ 38'				cuttings: 1-20mm
	40	-Dusky red SILTSTONE -NO apparent quartz or other >.5ft. sized clasts -Soft to moderately hard -Slightly weathered -cuttings: Subrounded to rounded.	No PID ⊙ ≈ 44' (Rain)				2.5YR, 3/3 cuttings: 1-25mm
	45	-Slightly darker dusky red ⊙ ≈ 49'	No PID ⊙ ≈ 49' (Rain)				cuttings: 1-25mm
	50	-Trace 1-5mm buff colored clasts ⊙ ≈ 54' (Not dolomite or calcite. clasts are weathered and very soft.)	No PID ⊙ ≈ 54' (Rain)				2.5YR, 2.5/3 cuttings: 1-25mm
	55		No PID ⊙ ≈ 58' (Rain)				cuttings: 1-20mm
	60	weak red calcareous or dolomitic SILTSTONE -Trace fine quartz -Moderately hard to hard -Unweathered - slightly weathered -Cuttings: Angular/Subangular	0.0 ppm ⊙ ≈ 64'				2.5YR, 5/3 cuttings: 1-35mm
	65	Dusky red SILTSTONE. -Trace fine quartz -Moderately hard - hard -unweathered - slightly weathered (slight discoloration) -Cuttings: Subangular/Subround.	0.0 ppm ⊙ ≈ 69'				2.5YR, 3/4 cuttings: 1-50mm
	70	over					

HTW DRILLING LOG

PROJECT: HIA Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-7D(Sent.) | SHEET 3 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	75	Dusky red calcareous or dolomitic very fine grained SANDSTONE. Hard, unweathered. cuttings: Subangular/subround.	0.0 ppm @ ≈74'				2.5YR, 3/3 cuttings: 1-35mm
		Weak red calcareous or dolomitic SILTSTONE. Trace fine quartz - Moderately hard to hard - unweathered - cuttings: subangular/subround. - Trace fine dolomite clasts near bottom.	0.0 ppm @ ≈78'				2.5YR, 5/3 cuttings: 1-30mm
	80		0.0 ppm @ ≈84'				cuttings: 1-50mm
	85		0.0 ppm @ ≈89'				cuttings: 1-30mm
	90	Weak red calcareous or dolomitic fine grained SANDSTONE (Conglomeratic?) - Hard - unweathered - cuttings are Subrounded to well rounded. ↳ clasts ≈ 20-40mm (fine sandstone) Subround-round ↳ 1-15mm fine SS. + quartz clasts.	0.0 ppm @ ≈94'	Note: 97-98' makes good water, Hole really started producing.			2.5YR, 5/3 cuttings: 1-40mm
	95		0.0 ppm @ ≈98'	Note: Roundness of cuttings suggests that this interval is conglomeratic. (clast supported? Polymodal)			cuttings: 1-95mm
	100	Weak red calcareous or dolomitic fine to medium grained SANDSTONE. Hard. Unweathered. - No notable quartz clasts > medium sand sized. - Cuttings: Subangular/subrounded	0.0 ppm @ ≈104'				2.5YR, 5/3 cuttings: 1-35mm
	105	Weak red calcareous or dolomitic SILTSTONE. Trace fine sand. - Moderately hard to hard - unweathered - Cuttings: Subangular to subrounded.	0.0 ppm @ ≈109				2.5YR, 5/4 cuttings: 1-40mm
	110		0.0 ppm @ ≈114'				cuttings: 1-25mm
	115		0.0 ppm @ ≈118'				cuttings: 1-20mm
	120						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	D. Haller	ERM-7D(Sent)	4 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	180	Weak red calcareous or dolomitic fine to medium grained SANDSTONE.	0.0 ppm @ ≈124'				(2.5Y 4/2, 5/3) cuttings: 1-30mm
	185	- Hard to very hard. - Unweathered except on localized surfaces/grains.					
		- Cuttings are subangular to subrounded.	0.0 ppm @ ≈129'				cuttings: 1-40mm
	190	- Trace fine to coarse gravel sized quartz clasts throughout.					
		- Trace 1-5mm dolomite clasts throughout, but seem to be concentrated around 143-148'.	0.0 ppm @ ≈134'				cuttings: 1-30mm
	195	- Some (5-30%) coarse sand throughout.	0.0 ppm @ ≈138'				cuttings: 1-40mm
		↓					
	200	↓	0.0 ppm @ ≈143'				cuttings: 1-45mm
		↓ material as above	0.0 ppm @ ≈148'				cuttings: 1-35mm
	205	↓	0.0 ppm @ ≈153'				cuttings: 1-45mm
		↓	0.0 ppm @ ≈158'				cuttings: 1-25mm
	210	↓ as above	0.0 ppm @ ≈164'				cuttings: 1-25mm
	215						

HTW DRILLING LOG

PROJECT: HIA Middletown | INSPECTOR: D. Heller | HOLE NO.: ERM-7D(Sent) | SHEET 5 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	170	SAME AS ABOVE	0.0 ppm @ ≈168'				cuttings; 1-50mm
			0.0 ppm @ ≈173'				cuttings: 1-35mm
	175	(Very Hard Slow Drilling)	0.0 ppm @ ≈178'				cuttings: 1-40mm
	180		0.0 ppm @ ≈183'				cuttings: 1-30mm
	185		0.0 ppm @ ≈188'				cuttings: 1-20mm
	190		0.0 ppm @ ≈193'				cuttings; 1-35mm
	195	Dark reddish brown calcareous or dolomitic SILTSTONE - Moderately hard to hard. - Unweathered, except trace discoloration - Cuttings are Subrounded, Trace fine sand	0.0 ppm @ ≈198'				5YR, 3/2 cuttings: 1-10mm
	200	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE Hard to very hard - Unweathered except trace discoloration - cuttings are subrounded - Trace dolomite clasts 1-4mm throughout	0.0 ppm @ ≈204'				2.5YR, 4/3 cuttings; 1-20mm
	205						
	210		0.0 ppm @ ≈208'				cuttings: 1-25mm
	215		0.0 ppm @ ≈214'				cuttings; 1-15m

HTW DRILLING LOG

HOLE NO. ERM-7D(Sand)

PROJECT: HIA Middletown | INSPECTOR: D. Haller | SHEET 6 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	215	Dusky red calcareous or dolomitic fine SANDSTONE. - Moderately Hard to hard - unweathered. Cuttings are subrounded. - Trace fine gravel sized quartz	0.0 ppm @ ≈218'				2.5YR, 3/3 cuttings: 1-25%
	220	Dusky red calcareous or dolomitic Sandy Breccia - Sand is fine to medium but rock cuttings > 25% gravel - Hard to very hard - unweathered - cuttings: Subangular/subround.	0.0 ppm @ ≈224'				2.5YR, 4/3 cuttings: 1-15%
	225	Weak red calcareous or dolomitic fine grained SANDSTONE - Hard to very hard. Unweathered. - Trace dolomite + feldspar clasts (<3mm) - Cuttings are subrounded.	0.0 ppm @ ≈228'				2.5YR, 5/2 cuttings: 1-15%
	230	Weak red coarse grained SANDSTONE (close to being an arenite → lots of quartz) - unweathered. Very hard - trace dolomite (trace fizz) - cuttings are subround to round	0.0 ppm @ ≈233'				2.5YR, 6/2 cuttings: 1-15%
	235	Dusky red calcareous or dolomitic fine grained SANDSTONE. - Moderately hard to hard. - Unweathered - trace dolomite 2-6mm - Subrounded.	0.0 ppm @ ≈238'				2.5YR, 3/4 cuttings: 1-25%
	240	Dusky red calcareous or dolomitic coarse grained SANDSTONE. - Hard to very hard - unweathered - Subround (cuttings)	0.0 ppm @ ≈244'				2.5YR, 4/3 cuttings: 1-10%
	245	Weak red calcareous or dolomitic fine to medium grained SANDSTONE - Hard to very hard - Unweathered - Trace gravel sized quartz clasts (seem to increase in frequency w/depth)	0.0 ppm @ ≈248'				2.5YR, 5/3 cuttings: 1-15%
	250		0.0 ppm @ ≈254'				cuttings: 1-20%
	255	cuttings are subrounded.	0.0 ppm @ ≈258'				cuttings: 1-15%
	260	Dusky red calcareous or dolomitic SILTSTONE. - Moderately hard					2.5YR, 3/3 cuttings: 1-45%

HTW DRILLING LOG

HOLE NO. ERM-7D(cont)

PROJECT: HIA Middletown | INSPECTOR: D. Haller | SHEET 7 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		unweathered -cuttings: Subrounded	0.0 ppm @ ≈264'				
	265	Dusky red calcareous or dolomitic medium to coarse grained SANDSTONE - unweathered - Hard - trace dolomite clasts (1-3 mm)	0.0 ppm @ ≈268'				2.5YR, 4/3 cuttings: 1-25 mm
	270		0.0 ppm @ ≈273'				cuttings: 1-20 mm
	275	- trace flint gravel sized clasts. -cuttings: Subrounded.	0.0 ppm @ ≈277'				cuttings: 1-15 mm
	280	Dusky red calcareous or dolomitic SILTSTONE -Hard - unweathered -trace fine sand -cuttings: subrounded	0.0 ppm @ ≈283'				2.5YR, 3/2 cuttings 1-35 mm
	285		0.0 ppm @ ≈289'				cuttings: 1-25 mm
	290		0.0 ppm @ ≈294'				cuttings: 1-25 mm
	295	Dusky red (to grey) coarse SANDSTONE (close to being an arenite → lots of quartz) Hard-very hard. Unweathered cuttings: Rounded.	0.0 ppm @ ≈297'				2.5YR, 5/4 cuttings: 1-5 mm
	300	Dusky red medium to coarse grained (calcareous or dolomitic) SANDSTONE Hard to very hard. - Unweathered - cuttings are subrounded - Trace 1-5 mm dolomite clasts	0.0 ppm @ ≈303'				2.5YR, 3/3 cuttings: 1-15 mm
	305		0.0 ppm @ ≈308'				cuttings: 1-15 mm
	310						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	D. Haller	ERM-7D(cont)	8 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	310		0.0 ppm @ ≈313'				cuttings: 1-15mm
	315	↓	0.0 ppm @ ≈317'				cuttings: 1-15mm
	320	material as above	0.0 ppm @ ≈323'				cuttings: 1-35mm
	325	↓	0.0 ppm @ ≈328'				cuttings: 1-35mm
	330	↓	0.0 ppm @ ≈334'				cuttings: 1-15mm
	335	Dusky red medium to coarse SANDSTONE. Unweathered. Hard to very hard. - cuttings are subangular to subrounded.	0.0 ppm @ ≈337'				2.5YR, 3/2 cuttings: 1-30mm
	340	Dusky red medium to coarse (calcareous or dolomitic) SANDSTONE - Unweathered - Hard to very hard. - cuttings are subangular/subround	0.0 ppm @ ≈343'				2.5YR, 3/2 cuttings: 1-30mm
	345	Dusky red calcareous or dolomitic SILTSTONE. Rock is speckled w/ 1-8 mm dolomite clasts - Hard - Unweathered - cuttings are subround	0.0 ppm @ ≈348'				2.5YR, 3/3 cuttings: 1-30mm
	350	Dusky red calcareous or dolomitic medium to coarse grained SANDSTONE, some dolomite (1-6mm) clasts or finer grained clasts. - Hard - Unweathered. Subround.	0.0 ppm @ ≈354'				2.5YR, 3/3 cuttings: 1-25mm
	355						

HTW DRILLING LOG

PROJECT: HIA Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-7D(Sout) | SHEET 9 OF SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	360		0.0 ppm @ ≈359'				cuttings: 1-20mm
		Dusky red calcareous or dolomitic fine grained SANDSTONE					(2.5YR, 4/3)
		- Hard to very hard - Unweathered - cuttings are sub round	0.0 ppm @ ≈364'				cuttings: 1-25mm
	365	- Trace (1-3mm) dolomite clasts	0.0 ppm @ ≈368'				cuttings: 1-25mm
	370	Dusky red calcareous or dolomitic SILTSTONE - Moderately hard - hard - unweathered	0.0 ppm @ ≈373'				(2.5YR, 4/3) cuttings: 1-20mm
	375	- cuttings are subrounded. - no notable dolomite or calcite clasts (only present in matrix)	0.0 ppm @ ≈378'				cuttings: 1-15mm
	380	Weak red calcareous or dolomitic fine grained SANDSTONE: - Moderately hard - hard - Unweathered - No notable dolomite or calcite clasts (only present in matrix)	0.0 ppm @ ≈384'				(2.5YR, 5/3) cuttings: 1-30mm
	385	- cuttings are subrounded.	0.0 ppm @ ≈388'				cuttings: 1-25mm
	390		0.0 ppm @ ≈394'				cuttings: 1-15mm
	395	Dusky red calcareous or dolomitic SILTSTONE - Hard - Unweathered - cuttings: sub round.	0.0 ppm @ ≈397'				(2.5YR, 3/3) cuttings: 1-10mm
	400	Reddish brown calcareous or dolomitic fine grained SANDSTONE. Hard - very hard Unweathered	0.0 ppm @ ≈403'				(5YR, 5/3) cuttings: 1-25mm
	405						

PROJECT: HIA Middletown | HOLE NO.: ERM-7D(Sout)

HTW DRILLING LOG

HOLE NO. ERM-7D(cont)

PROJECT: HIA Middletown | INSPECTOR: D. Haller | SHEET 10 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	405	cuttings are sub rounded -Trace (1-10 mm) dolomite clasts.	0.0 ppm @ ≈408'				cuttings: 1-35 mm
	410		0.0 ppm @ ≈414'				cuttings: 1-35 mm
	415	Reddish brown calcareous or dolomitic medium to coarse grained SANDSTONE -Hard - very hard -Unweathered -cuttings are sub rounded.	0.0 ppm @ ≈417'				(5YR, 4/3) cuttings: 1-8 mm
	420	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE -Hard. -Unweathered -cuttings: sub round -trace (1-4 mm) dolomite clasts	0.0 ppm @ ≈424'				(2.5YR, 4/2) cuttings: 1-20 mm
	425		0.0 ppm @ ≈428'				cuttings: 1-25 mm
	430	Dusky red (to grey) medium to course (calcareous or dolomite) SANDSTONE (lots of quartz) -Hard to very hard -Unweathered, subrounded	0.0 ppm @ ≈434'				(2.5YR, 4/2) cuttings: 1-15 mm
	435		0.0 ppm @ ≈439'				cuttings: 1-15 mm
	440	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE. (Calcite or dolomite in matrix only - no identifiable clasts) -Hard to very hard -Unweathered -cuttings are sub rounded	0.0 ppm @ ≈443'				(2.5YR, 4/2) cuttings: 1-25 mm
	445		0.0 ppm @ ≈449'				cuttings: 1-10 mm
	450						

HTW DRILLING LOG

HOLE NO. ERM-7D (Sent)

PROJECT: HIA Middletown | INSPECTOR: D. Heller | SHEET 1 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	455		0.0 ppm @ ≈454				cuttings: 1-20mm
		Weak red fine SANDSTONE - Hard to very hard - Unweathered - cuttings: Subrounded	0.0 ppm @ ≈457'				2.5YR, 5/3 cuttings: 1-10mm
	460						
			0.0 ppm @ ≈464'				cuttings: 1-15mm
	465						
		weak red calcareous or dolomitic fine grained SANDSTONE - Hard to very hard - unweathered - cuttings; subrounded.	0.0 ppm @ ≈468'				2.5YR, 5/3 cuttings: 1-20mm
	470						
		Dusky red calcareous or dolomitic SILTSTONE - Hard - unweathered - cuttings; subangular/subround.	0.0 ppm @ ≈474'				2.5YR, 3/3 cuttings: 1-20mm
	475						
		Dusky red calcareous or dolomitic SILTSTONE. Rock is "speckled" w/ 1-8 mm dolomite clasts - Moderately hard to hard - unweathered - cuttings are subangular/subround.	0.0 ppm @ ≈477'				2.5YR, 3/3 cuttings: 1-70mm
	480						
		Dusky red calcareous or dolomitic SILTSTONE; No notable dolomite clasts. Trace fine gravel sized quartz Hard, unweathered cuttings; Subangular/Subrounded	0.0 ppm @ ≈483'				2.5YR, 4/4 cuttings; 1-25mm
	485						
		Dusky red calcareous or dolomitic SILTSTONE. No notable clasts > silt sized - Hard - unweathered - cuttings are subangular to subrounded.	0.0 ppm @ ≈489				2.5YR, 4/4 cuttings: 1-25mm
	490						
			0.0 ppm @ ≈493'				cuttings: 1-35mm
	495						
			0.0 ppm @ ≈497'				cuttings; 1-20mm (Commonly are 10mm) and less
	500						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	D. Haller	ERM-7D(Sent)	12 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	500	Dusky red medium to course grained SANDSTONE.					2.5YR, 3/2
		-Hard -Unweathered -cuttings: Subangular to subround.	0.0 ppm @ ≈504'				cuttings: 1-15mm
	505	- Some fine gravel sized angular feldspar + quartz clasts.					
			0.0 ppm @ ≈508'				cuttings: 1-10mm
	510	Dusky red calcareous or dolomitic SILTSTONE. No notable clasts > silt sized.					2.5YR, 4/3
		-Moderately hard to hard -Unweathered	0.0 ppm @ ≈514'				cuttings: 1-30mm.
	515	-cuttings: subangular/subround					
			0.0 ppm @ ≈517'				cuttings: 1-[illegible]mm
	520						
			0.0 ppm @ ≈524'				cuttings: 1-50mm
	525	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE. Some course sand sized clasts, (Mostly quartz)					2.5YR, 4/3
		-Hard - Moderately hard -Unweathered -cuttings: Sub rounded	0.0 ppm @ ≈529'				cuttings: 1-15mm
	530						
			0.0 ppm @ ≈534'				cuttings: 1-15mm
	535						
			0.0 ppm @ ≈537'				cuttings: 1-20mm
	540	Dusky red calcareous or dolomitic fine grained SANDSTONE.					2.5YR, 4/3
		-No course sand sized clasts. Trace (1-4mm) dolomite clasts. -Moderately hard - hard, Unweathered -cuttings: subrounded	0.0 ppm @ ≈544'				cuttings: 1-25mm
	545						

HTW DRILLING LOG

PROJECT: H1A Middletown | INSPECTOR: D. Heller | HOLE NO.: ERM-7D(Sent) | SHEET 13 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	550		0.0 ppm @ ≈549'				cuttings: 1-10um
	555		0.0 ppm @ ≈553'				cuttings: 1-15um
		Dusky red (clayey-lots of quartz) calcareous or dolomitic coarse grained SANDSTONE, some fine grained sized clasts. -Hard to very hard. Unweathered -cuttings: subangular to subround.	0.0 ppm @ ≈558'				(2.5YR, 4/3) cuttings: 1-15um
	560	Dusky red calcareous or dolomitic fine grained SANDSTONE. Trace medium to coarse grained clasts throughout -Hard -unweathered -cuttings: Subangular/subround	0.0 ppm @ ≈563'				(2.5YR, 3/2) cuttings: 1-15um
	565		0.0 ppm @ ≈568'				cuttings: 1-10um
	570	Dusky red calcareous or dolomitic SILTSTONE Trace, fine to medium sand sized quartz clasts -Moderately hard to hard -unweathered -cuttings: subangular to subrounded.	0.0 ppm @ ≈574'				(2.5YR, 3/3) cuttings: 1-10um
	575		0.0 ppm @ ≈578'				cuttings: 1-20um
	580		0.0 ppm @ ≈584'				cuttings: 1-15um
	585	Dusky red calcareous or dolomitic fine grained SANDSTONE Trace medium to coarse grained clasts which seem to increase in frequency w/depth. -unweathered -Hard to very hard -Cuttings are subangular to subround.	0.0 ppm @ ≈588'				(2.5YR, 4/3) cuttings: 1-15um
	590		0.0 ppm @ ≈594'				cuttings: 1-10um
	595						

PROJECT: H1A - Middletown | HOLE NO.: ERM-7D(Sent)

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
H1A Middletown	D. Heller	ERM-7D (Sent)	4 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	595						
			0.0 ppm @ ≈598'				cuttings: 1-15mm
	600						
			0.0 ppm @ ≈604'				cuttings; 1-10mm
	605	Dusky red Sandy Breccia. Lots of quartz					2.5YR, 4/3
		- Hard to very hard - Matrix supported (fine-medium sand) - unweathered	0.0 ppm @ ≈609'				cuttings: 1-15mm
	610	- cuttings; subangular					
		Ducky red calcareous or dolomitic SILTSTONE.					2.5YR, 4/3
		- Hard - unweathered	0.0 ppm @ ≈614'				cuttings: 1-10mm
	615	- cuttings: Subangular/subround					
		Weak red calcareous or dolomitic fine grained SANDSTONE					2.5YR, 6/2
		- Trace medium - coarse sand sized clasts - Hard-very hard. - unweathered	0.0 ppm @ ≈618'				cuttings; 1-15mm
	620	- cuttings: subrounded					
			0.0 ppm @ ≈624'				cuttings: 1-10mm
	625	Dusky red calcareous or dolomitic SILTSTONE					2.5YR, 3/3
		- unweathered - Moderately hard to hard - No noticable clasts > silt sized	0.0 ppm @ ≈629'				cuttings: 1-20mm
	630	- cuttings: Subangular					
		Weak red calcareous or dolomitic coarse grained SANDSTONE Trace clasts → fine gravel - mostly quartz					2.5YR, 5/3
		- Very hard - unweathered - cuttings: subangular to subrounded	0.0 ppm @ ≈634'				cuttings: 1-15mm
	635						
		Weak red calcareous or dolomitic SILTSTONE, Trace fine sand sized clasts.					2.5YR, 5/3
		- Moderately hard to hard - unweathered	0.0 ppm @ ≈639'				cuttings: 1-15mm
	640	- cuttings are subangular to subrounded					

HTW DRILLING LOG

HOLE NO. ERM-7D (Seat)

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | SHEET 15 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
			0.0 ppm @ ≈643'				cuttings: 1-10mm
	645						
		Dusky red (to grey - lots of quartz) Calcareous or dolomitic medium to course grained matrix supported SANDSTONE					2.5YR, 3/3
		- Very hard	0.0 ppm @ ≈644'				cuttings: 1-10mm
	650	- Unweathered					
		- cuttings: subangular to subrounded.					
			0.0 ppm @ ≈654'				cuttings: 1-10mm
	655						
		Dusky red calcareous or dolomitic SILTSTONE.					2.5YR, 3/3
		- 1-10 mm dolomite clasts throughout but decrease in frequency w/ depth.	0.0 ppm @ ≈657'				cuttings: 1-15mm
	660	- Moderately hard to hard					
		- unweathered					
		- cuttings: subangular to subrounded					
			0.0 ppm @ ≈663'				cuttings: 1-10mm
	665						
		Weak red calcareous or dolomitic fine to medium grained matrix supported SANDSTONE					2.5YR, 5/3
		- Very hard	0.0 ppm @ ≈669'				cuttings: 1-10mm
	670	- Unweathered					
		- cuttings are subangular to subrounded					
			0.0 ppm @ ≈674'				cuttings: 1-10mm
	675						
			0.0 ppm @ ≈678.5'				cuttings: 1-20mm
	680	Boring terminated @ 678.5' BGS					
		Total volume of injection water used was ≈ 9,400 gallons.					
		16" casing advanced to 20'					
		12" casing advanced to 198'					
		8" casing advanced to 546'					
		Note: Boring completed on 9/15/94. well installation will occur @ a later date					

North

Note: All casings were temporary

Garage

Well

OLD 441

o ERM-7D

o ERM-7I

o ERM-7S

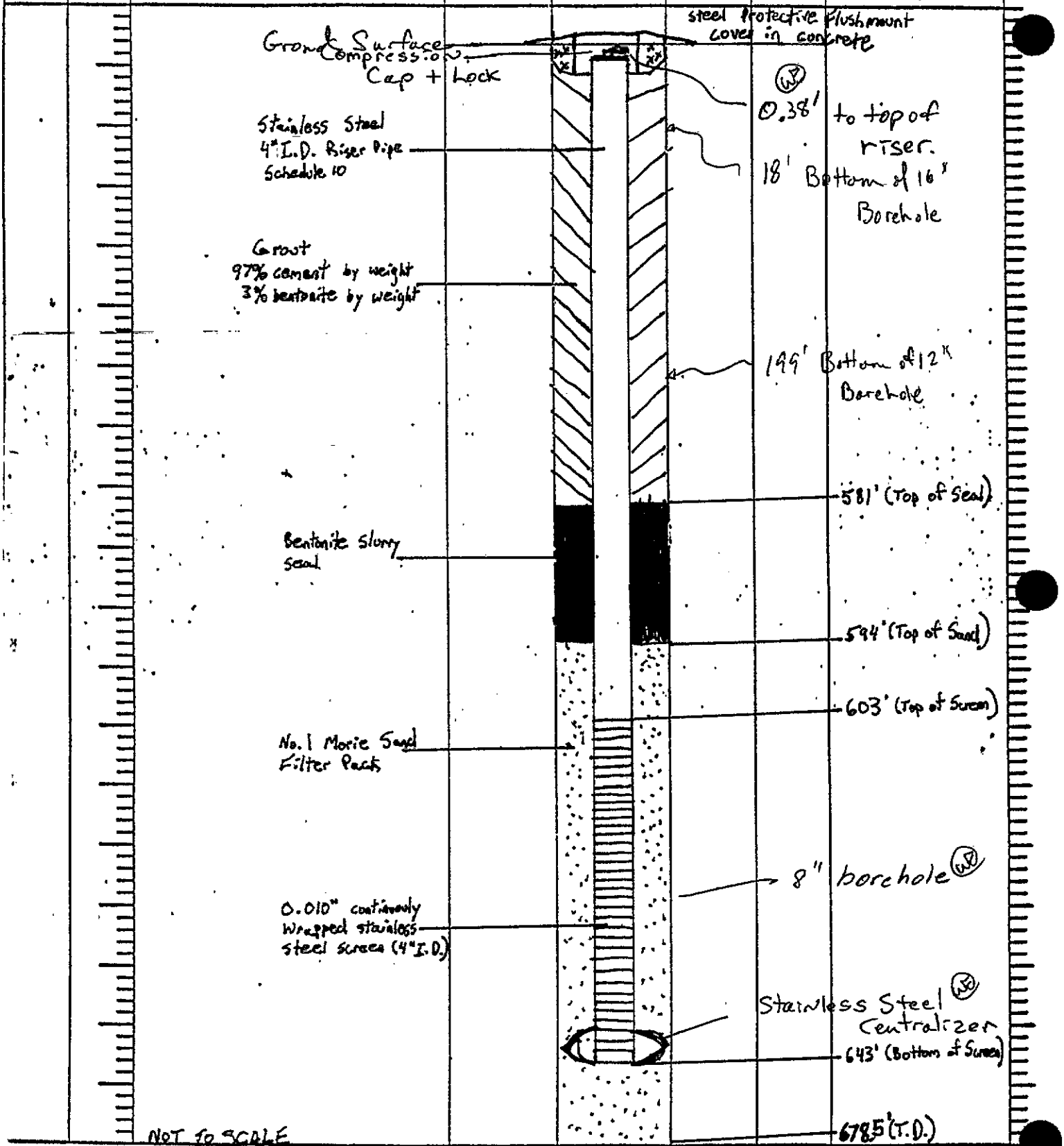
Union St

PROJECT: HIA Middletown | HOLE NO.: ERM-7D (Seat)

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	C. Salomon / Warren Fop	ERM-7D	16 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



NOT TO SCALE

PROJECT	HOLE NO.
HIA Middletown	~~ERM-13I~~ ERM-7D

HTW DRILLING LOG

HOLE NO. ERM-8S

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: Hydro Group	SHEET 1 OF 4 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Steve Blair	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber Drill Rig - Dual rotary methodology	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Barber Rig; 12" ID Casing and Bit; 8" ID Casing w/ Bit; Dual Rotary methods; Casings were temporary - *Note Temporary: 12" casing spun to 20'; 8" casing spun to 120'; Drilled open hole 120' - T.D.	8. HOLE LOCATION: See Map #	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-9-94	11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: 5.0' to 13.0'	15. DEPTH GROUNDWATER ENCOUNTERED: UNKNOWN	
13. DEPTH DRILLED INTO ROCK: 13' to	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:	
14. TOTAL DEPTH OF HOLE: 152	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
None						— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well ERM-8S (SENT) Installed		✓		Warren N. Fly

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Silt loose dry with gravel < 15% (1.0 to 30 mm Dia.) Sub rounded.	0 ppm PID No Odor	NS	NS	NA	2.5 YR 3/4 dusky red ≤ 1mm
	5.0'	Sandstone (m. grain. v. weathered m. hard subrounded	0 ppm No Odor	NS	NS	NA	2.5 YR 3/4 dusky red. 3mm to 30mm
	16.6'	Sandstone (f. grain.) v. weathered subrounded grain. m. hard. w/ Gravel ≤ 6mm - Sub rounded	0 ppm, No Odor	NS	NS	NA	2.5 YR 3/3 dusky red. 2.0 to 10mm
	150'	Sandstone (m. grain - weathered Subrounded m. hard - Trace Dolomite w/ Quartz Clasts (Sub-angular (< 3mm Dia.)	0 ppm, No Odor	NS	NS	NA	2.5 YR 3/4 dusky Red 1.0 to 8.0 mm
	20.0'	Sandstone (f. grain) Subangular weathered m. hard Quartz clasts - (1.0 to 30 mm) and dolomite Subangular cementation	0 ppm, No Odor	NS	NS	NA	2.5 YR 4/4 dusky Red. 1.0 to 10 mm
	25.0'						

PROJECT: HIA - Middletown HOLE NO. ERM-8S

HTW DRILLING LOG

HOLE NO. ERM-85

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox / Jeffrey Herrick | SHEET 2 OF 5 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25.0'	Sandstone c. grain m. hard subangular weathered to subround. quartz clasts 1.0 to 3.0 mm (dolomite - cementation)	0ppm PID No Odor	NS	NS	NA	2.5YR 4/4 dusky red. 2.0 to 28 mm
	30.0'	Sandstone f. grain. (dolomitic) subrounded hard weathered quartz clasts trace (< ? mm)	3ppm No Odor (Harder at 32.0')	NS	NS	NA	2.5YR 3/4 dusky Red 1.0 to 8.0 mm
	35.0'	Same material	0ppm, No Odor	NS	NS	NA	2.5YR 3/4 Dusky Red. 1.0 to 15 mm
	40.0'	Sandstone m. grain (dolomitic) (subrounded) v. hard. weathered quartz clasts (< 2 mm)	0ppm, No Odor	NS	NS	NA	2.5YR 3/4 Dusky Red 1.0 to 15.0 mm
	45.0'	Similar Sandstone but finer grain of sand in rock.	0ppm, No Odor	NS	NS	NA	2.5YR 3/3-3/4 2 mm to 35 mm
	50.0'	@55' Wacke/Sandstone (f. grain) (v. near sandy siltstone) sub ang. to sub rdd. v. hard, Weathered (slight dolomite Fiz) < ?mm Qtz pebbles sands, Trace	0ppm No odor	NS	NS	NS	2.5YR 3/4 2 mm to 15 mm chips
	55.0'	@60' Wacke/Sandstone (fine-med-crs grained) (near sandy siltstone) sub ang - sub rdd v. hard, Weathered (v. slight HCl Fiz.) ~1cm Qtz pebble, rounded, Trace < 2mm Qtz sands, angular, Trace	0ppm No odor	NS	NS	NS	2.5YR 3/3-3/4 chips 10-25 mls
	60.0'	@65' Wacke/Sandstone (near sandy siltstone) (fn-med-crs grained) sub rdd, v. hard, weathered noted calcite xtls (clasts?)(joints?) ~3-5mm, Trace. <4mm Qtz sands, angular, Trace.	0ppm Micas rare (muscovite?)	NS	NS	NS	chips 2mm-15 mm
	65.0'	@70' Wacke/Sandstone sandier than above. fn grained, sub rdd. v. hard, weathered, no Fiz w/ HCl Trace Qtz grains ~2mm, angular - sub rdd.	0ppm No odor	NS	NS	NS	5YR 5/3
	70.0'						chips 2-5 ml

PROJECT: HTW - Middletown | HOLE NO. ERM-85

HTW DRILLING LOG

HOLE NO. ERM-8S

PROJECT: Middletown

INSPECTOR: Jeffrey Frank Herrick

SHEET 3 OF 5 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	70 @75'	Wacke/Sandstone, med grained w/ silt w/ Qtz grains ≈15% sub rdd 2-4mm. V. hard, weathered	0 ppm	NS	NS	NS	5YR 3/3
			Harder drilling.				2-10mm chips
	75 @80'	Wacke/Sandstone med-fn grained subrdd! trace mica, trace Qtz 1-2mm subrdd.	0 ppm; little HCL Fiz	NS; Making H_2O ≈	7-10 gpm.	NS	5YR 3/3; V. uniform size 5-10mm chips
	80 @85	Sandy Siltstone. V.fn sand sub rdd bordering on V.fn grained Wacke; some HCL Fiz. V. Hard	0 ppm	still Making; Hard drilling	7-10 gpm		5YR 3/3; V. Flakey chips 20-40mm
	85						

add'l note: 75-80'; there was a lot of single grains (2-3mm, crs sand), Qtz primarily, non-cemented, loose. This constituted ≈ 50% by volume of the sample. The rest was Wacke chips as described. Was this a crs sand lens? old stream bed?

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	85	Wacke/Sandstone w/ silt fn-med grained sub rdd to rdd. V. hard mod fiz w/ HCL - some $CaCO_3$ - &/or Dolomite present - disseminated. Trace Qtz pebbles, subrdd, Lith frags, both 5-10mm	0 ppm	NS	NS	NS	5YR 3/3; chips 5-40mm
	90	Wacke/Sandstone w/ silt fn-med sand grains sub rdd, Mod Hard. Little or no HCL fiz. Trace Qtz pebbles ~5mm rounded to subrdd	0 ppm	NS	NS	NS	5YR 3/3; some patches of 7.5YR 5/6; chips 10-45mm
	95	Wacke/Sandstone w/ silt fn-med grains sub rdd, not very hard - easily broken. Qtz pebbles, Trace, 5-15mm, rdd to angular, slight HCL fiz.	0 ppm	NS	NS	NS	2.5YR 3/2 to 5YR 3/3; chips 2-20mm
	100	Wacke/Sandstone w/ silt, fn-med grains sub rdd, Not V. hard - easily broken, no pebbles seen, slight HCL fiz.	0 ppm; Drill break - accelerated rate!	NS	NS	NS	5YR 3/3; chips 30-50mm
	104	Wacke/Sandstone w/ silt, fn-med as above but smaller chips	0 ppm; slow drilling again.	NS	NS	NS	5YR 3/3; chips 5-10mm
	105	Wacke/Sandstone w/ silt med-crs grained Subrdd to subangular, few chips, cement mostly as single grains. Noted abundant Qtz grains, med-crs sands ≈ 40% by Volume, subrdd - subangular. No HCL Fiz. Trace 10-30mm Qtz pebbles subrdd.	0 ppm	NS	NS	NS	5YR 3/4; Varigated w/ Qtz sand. Chips 3mm to single grain
	110	Wacke/Sandstone w/ silt med-crs grained - V. much as seen above	0 ppm; Making 5-10 gpm H_2O	NS	NS	NS	5YR 3/4; Varigated w/ Qtz sand; chips 3mm to single grain
	115	Wacke/Sandstone w/ silt fn-med grained, weak, no HCL fiz. Sub rdd. Trace discolored arenite (sandstone w/o silt) 5YR 8/2, weak, not cemented, No HCL fiz, are these exotics (clasts)? Qtz gravels 20mm, rounded, Trace.	Drilling a little easier @ 116'; 0 ppm	NS	NS	NS	5YR 3/3; chips 10-40mm
	120	Wacke/Sandstone w/ silt fn-med-crs sands, weak w/ easy drilling. Sub rdd - no Qtz pebbles or light colored arenite seen	0 ppm; Drilled open hole w/ only Air hammer - yield	NS	NS	NS	5YR 3/3; 5-15mm few chips
	125						

PROJECT: Middletown | HOLE NO. ERM-8S

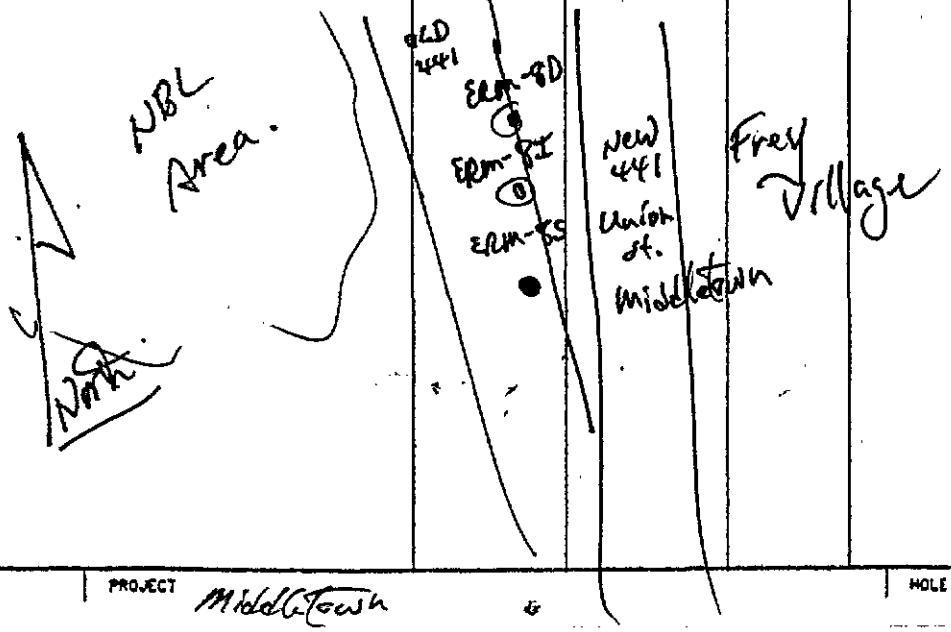
HTW DRILLING LOG

HOLE NO. ERM-85

PROJECT Middletown | INSPECTOR Jeffrey Frank Herrick | SHEET 4 OF 5 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	125	Wacke Sandstone as above	0 ppm	NS	NS	NS	5YR 3/3
	130	Wacke/Sandstone w/silt fn-med and m-crs mix, subrdd, the Larger grains are loose, the smaller are in Sandstone/Wacke chips. Arenite + other Lithic fragments seen. NO HCL fiz	0 ppm	NS	NS	NS	as above. few 5-10mm chips 5YR 3/3
	135	Wacke/Sandstone w/silt fn-med sands, weak, subrdd No HCL fiz. Few trace Lithics Qtz fragments	0 ppm	NS	NS	NS	5YR 3/3 as above
	140	Wacke/Sandstone w/silt Fn sandgrains, subrdd, weak to firm Trace Qtz pebbles + crs sand. subrnd Trace Lithic Sandstone + other fine sandstone pebbles	0 ppm	NS	NS	NS	5YR 3/3 chips 5mm-20mm
	145	Wacke/Sandstone w/silt as above	0 ppm	NS	NS	NS	5YR 3/3
	150	Wacke/Sandstone w/silt					as above. 5YR 3/3
	152	as above w/ Qtz + Lithic pebbles increased to ≈ 10-15%.					as above.

TD drilled hole 152' bgs @ 1100 hr 11 September 1994 JFH



PROJECT Middletown | HOLE NO. ERM-85

HTW DRILLING LOG

PROJECT: HIA Middletown
INSPECTOR: C. Salomon
HOLE NO.: ERM-85
SHEET 5 OF 5 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Ground Surface					Steel Protective Flushmount Cover in Concrete
		Compression Cap + Lock					0.26" to top of riser
		Stainless steel 4" I.D. Riser Pipe. Schedule 5.					
		Grout 97% cement by weight 3% bentonite					
		Bentonite pellet seal					97' (Top of seal)
							102' (Top of Sand)
							105' (Top of Screen)
		No. 1 Morie Sand					8" borehole
		0.010" continuously wrapped stainless steel screen (4" I.D.) Sch. 10					Stainless Steel Centralizer
							125' (Bottom of Screen)
		backfilled + sealed					
		Fine sand					127'
		Bentonite Pellets					130'
		No. 1 Morie Sand					132' 142' 145'
							152' ~~150~~ (Total Depth) JFH

NOT TO SCALE

PROJECT: HIA Middletown
HOLE NO.: ERM-85

HTW DRILLING LOG

HOLE NO. ERM-8I

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydro Group	SHEET 1 OF 10 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA.	
5. NAME OF DRILLER: Steve Blair / Tim Beacher	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber Rig DR-12	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Temp. 12" casing to 19'; Temp 8" casing to 341'. Dual Rotary Barber Rig. 12" & 8" casing advanced with overburden hammer	8. HOLE LOCATION: See Sheet # 9	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 1-23-95	11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: ≈50' (15.0' Competent Rock Consolidated)	15. DEPTH GROUNDWATER ENCOUNTERED: Unknown (≈ 14')	
13. DEPTH DRILLED INTO ROCK: 342.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 352.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			None

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
None						— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well ERM-8I (SENT) Installed		X		Warren Fox

Note: TRACE ≤ 10% SAMPLE

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Cuttings
	0.0	Organic Soil with subangular gravel loose Dry Poorly graded (GP) sorted Angular rock fragments	0ppm, No Odor	NS	NS	NA	10YR 5/4 yellowish brown chips/cuttings 2.0 to 30mm.
	5.0	Siltstone trace of fine sand subrounded v. soft. highly weathered No Clasts	0ppm No Odor	NS	NS	NA	7.5YR 4/3 brown chips/cuttings 1.0 to 12mm
Start to Add drill water	17.0						
	10.0	Sandy Siltstone, f.g. subr. Soft weathered Clasts of Qtz, angular ≤ 4mm.	0ppm No Odor	NS	NS.	NA	5YR 4/3 reddish brown 1.0 to 35mm
	15.0	Silty Sandstone / Wacke m. soft m. weathered f. to m.g. sand subrounded Clasts of Qtz, subangular ≤ 5mm HCl (-)	0ppm, No Odor	NS	NS	NA	2.5YR 3/4 dusky red 1.0 to 10 mm
	20.0	Same Material	0ppm No Odor	NS	NS	NA	2.5YR 3/3 dusky red 1.0 to 34mm
	25.0						

reviewed 4/6/95 JFH

PROJECT: HIA - Middletown

HOLE NO. ERM-8I

HTW DRILLING LOG

HOLE NO. ERM-8I

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 10 SHEETS

ELEV. L.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Cuttings
	25.0'	Sandy Siltstone, m-gr. sub-rounded m. hard m. weathered Clasts of Qtz ≤ 10mm sub-rounded. Volcanic Cementation.	0ppm, No Odor	NS	NS	NA	2.5YR 3/2 dusky red chips/cuttings 1.0 to 30mm
	30.0'	Similar Material w/ mottling. light silty Carbonate!	0ppm, No Odor	"	"	"	2.5 YR 3/3 dusky red 1.0 to 25mm
	35.0'	Same Material (trace of mottling - less than last material.)	0ppm, No Odor	"	"	"	2.5 YR 3/3 dusky red 1.0 to 30mm
fracture	40.0'	Silty Sandstone/Wacke. m to c. gr. sub-rounded. m hard m. weathered Qtz clasts ≤ 4mm sub ang. Dol. Cementation	0ppm, No Odor	"	"	"	2.5YR 3/4 dusky red 1.0 to 40mm
	45.0'	Similar Material. w/ traces of carbonate nothing on cuttings.	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
fracture	50.0'	Same Material No mottling	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 18mm
	55.0'	Sandy Siltstone m-gr. subrounded hard. Sl. weathered. Clasts ≤ 2mm, Qtz subangular Dol. Cementation.	0ppm, No Odor	"	"	"	2.5 YR 3/2 dusky red. 1.0 to 24mm
	60.0'	Same Material	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 25mm
	65.0'	Similar material (No Clasts of Qtz.)	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 28mm
	70.0'						1.0 to 30mm

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | HOLE NO.: ERM-8I | SHEET 3 OF 10 SHEETS

ELEV. b.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS (PID, d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / cuttings
	70.0'	Silty Sandstone / Wacke hard m.gr. s.weathered subround Odor clasts, Qtz ≤5mm Sub angular Dol. Cementation.	0ppm, No Odor	NS	NS	NA	2.5YR 3/3 dusky red. chips/cuttings 1.0 to 36 mm
	75.0'	Similar SSt / Wacke w/ Large amt. of f (≤20%) Qtz clasts ≤10mm (S.round to S.angular).	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 18 mm
	80.0'	Sandy Siltstone (f.gr. sub. angular) hard s.weathered No clasts Dol. Cementation.	0ppm No Odor	"	"	"	2.5YR 3/3 dusky red. 1.0 to 21 mm
	85.0'	Siltstone hard s.weathered No clasts Dol. Cementation.	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 25 mm
	90.0'	Same material.	0ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 30 mm
	95.0'	Silty Sandstone / Wacke hard s.weathered m.grain No clasts subangular Dol. Cemantation.	0ppm, No Odor	"	"	"	2.5YR 3/3 dusky red. 1.0 to 30 mm
	100.0'	Sandy Siltstone (m.gr. Subangular) hard s.weathered. Clasts qtz, angular ≤4mm Dol. Cemantation.	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red. 1.0 to 30 mm
(WS) Water	105'						
Water	105'	Siltstone hard to v.hard. s.weathered trace of Qtz clasts ≤3mm subangular Dol. Cemantation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 12 mm
(WS)	110'	Sandy Siltstone, f.gr. sub-angular v.hard. s.weathered Trace Qtz clasts ≤5mm angular Dol. Cemantation	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 10 mm
	115'						

HTW DRILLING LOG

HOLE NO. ERM-8I

PROJECT: HIA - Middletown | INSPECTOR: Warren Foy | SHEET 4 of 10 SHEETS

ELEV. b.	DEPTH b.l	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Cuttings
	115.0	Silty Sandstone / Wacke c.grain sub angular v. hard, s. weathered (50%) clasts (clots) of Qtz ≤5mm sub rounded Dol. Cementation.	0 ppm, No Odor	NS	NS	NA	2.5YR 3/4 dusky red chips/cuttings 1.0 to 12 mm
	120'	Sandy Siltstone (f.gr sub angular) v. hard s. weathered ≥50% clasts Qtz, sub angular ≤4mm Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 20 mm
	125'	Same Material (with carbonate clasts weathered, ≤5mm)	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 12 mm
	130'	Same Material.	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 10 mm
	135'	Same Material (v. hard)	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 15 mm
	140'	Sandy Siltstone (f.grain - sub angular) v. hard s. weathered clasts of Qtz and carbonate - sub angular Dol. Cementation.	0.0 ppm, No Odor	"	"	"	2.5YR 3/4 dusky red 1.0 to 10 mm
	145'	Silty Sandstone / Wacke v. hard, s. weathered. m. grain sub angular Clasts of Qtz and Carbonate ≤8mm sub angular Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/4 dusky red. 1.0 to 16 mm
	150'	Same Material Carbonate clasts up to 20mm	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 25 mm
	155'	Sandy siltstone (m. grain sub angular) v. hard. s. weathered angular clasts of Qtz <5mm Dol. Cementation	0 ppm No Odor	"	"	"	7.5YR 4/4 brown 1.0 to 15 mm
	160'						

PROJECT: HIA - Middletown | HOLE NO. ERM-8F

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA-Middletown	Warren Fox	ERM-8I	5 OF 10 SHEETS

EV. L.	DEPTH	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Cuttings
	160.0'	Sandy Siltstone (m.gr.-Sub angular v.hard s.weathered Clasts Qtz (≤5mm subangular) Dol. Cementation	0 ppm, No Odor	NS	NS	NA	2.5YR 3/3 dusky red chips/cuttings 1.0 to 14 mm
	165'	Similar sandy siltstone (w/ sand grains coarse/subangular) NP	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red 1.0 to 15 mm
	170'	Same material.	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 10 mm
	175'	Sandy Siltstone (f.gr. v.hard subangular) s.weathered fewer Qtz clasts ≤2cm 4mm subangular/angular Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 14 mm
	180'	Siltstone v. hard s. weathered Trace of Qtz clasts, rounded ≤ 10mm Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 15 mm
	185'	Silty Sandstone/Wacke v. hard, s. weathered. m.grain. subangular Qtz clasts subrounded ≤ 4mm Dol Cementation	0.0 ppm No Odor	"	"	"	2.5YR 3/4 dusky red 1.0 to 5 mm
	190'	Same material (sand grains are v. fine, subangular)	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 25 mm
	195'	Same material	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red 1.0 to 15 mm
	200'	Silty Sandstone /Wacke v.hard, s.weathered m.grain - subrounded Clasts Qtz ≤ 5mm subangular Dol Cementation & White mottling on cuttings	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red. 1.0 to 25 mm
	205'						

HTW DRILLING LOG

HOLE NO. ERM-8I

PROJECT HIA - Middletown | INSPECTOR Warren Fox | SHEET 6 OF 10 SHEETS

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS PID	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS Color/Cuttings
	205.0'	Silty Sandstone/Wacke V. hard, s. weathered f. grained - subrounded Qtz clasts ≤5mm Sub angular Dol Cementation.	0 ppm, No Odor	NS	NS	NA	2.5YR 3/2 dusky red
	210'						1.0 to 30 mm
		Same Material (mix f. grain sands)	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red.
	215'						1.0 to 20 mm
		Sandy Siltstone (m. grain v. Land sub rounded) s. weathered @ Qtz clasts sub-angular, ≤8mm Dol. Cementation & mottling.	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	220'						1.0 to 25 mm
		Same material. clasts of Qtz ≤ 4mm	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	225'						1.0 to 20 mm
		Sandy Siltstone (Coarse silt.) m. hard s. weathered Trace Qtz clasts ≤ 6mm Dol. Cementation & Mottling	0 ppm, No Odor	" (Gray-on cuttings)	"	"	2.5YR 3/3 dusky red.
	230'						1.0 to 30 mm
		Same Material	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	235'						1.0 to 45 mm
		Same material (f. gr. subrounded)	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
	240'						1.0 to 30 mm
		Similar Material ↑ high amount of mottling gray carbonate. 45%	0 ppm No Odor	"	"	"	2.5YR 3/2 dusky red
	245'						1.0 to 35 mm
		Same Material	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
	250'						1.0 to 25 mm

HTW DRILLING LOG

HOLE NO. ERM-8I

PROJECT HIA-Middletown | INSPECTOR Warren Fox | SHEET 7 OF 10 SHEETS

EV. L.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Bedding
	250.0	Sandy Siltstone (vfgr. subrounded) v. hard s. weathered No clasts Dol. Cementation.	0 ppm, No Odor	NS	NS	NA	2.5YR 3/2 dusky red
	255'						1.0 to 40 mm
		Same Material w/ clasts of carbonates weathered (<6 mm)	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	260'						1.0 to 30 mm
		Siltstone m. to hard s. weathered No clasts Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/3 Dusky red
	265'						1.0 to 25 mm
		Same Material	0 ppm, No Odor	"	"	"	2.5YR 3/3 Dusky red
	270'						1.0 to 30 mm
		Silty Sandstone / Wacke v. hard f. grain s. weathered subrounded No clasts Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red
	275'						1.0 to 20 mm
		Sandy Siltstone (vfgr. v. hard s. weathered subrounded No clasts Dol. Cementation	0.0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
	280'						1.0 to 20 mm
		Silty Sandstone / Wacke v. hard f to m. grain s. weathered No clasts Dol. Cementation	0 ppm, No Odor	"	"	"	2.5YR 3/3 dusky red.
	285'						1.0 to 25 mm
		Siltstone v. hard s. weathered No clasts / slight mottling (gray on cuttings)	0 ppm, No Odor	"	"	"	2.5 YR 3/3 dusky red
	290'						1.0 to 25 mm
		Sandy Siltstone (vfgr. subrounded) v. hard s. weathered No clasts Dol. Cementation.	0 ppm, No Odor	"	"	"	2.5YR 3/2 dusky red
	295'						1.0 to 30 mm
	X						

HTW DRILLING LOG

HOLE NO. ERM-8I

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 8 OF 10 SHEETS

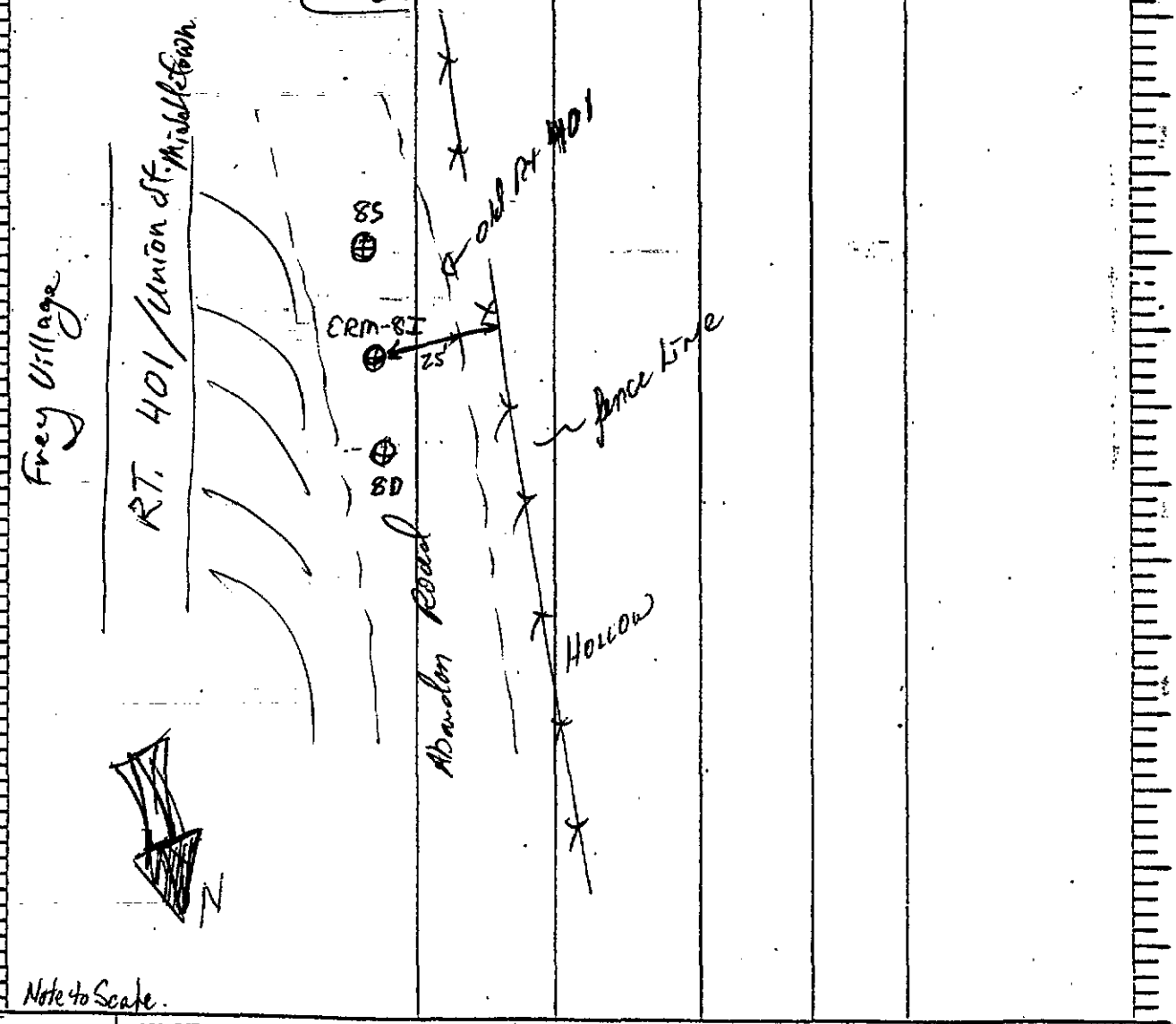
ELEV. a	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS Color / Cuttings
	295	Sandy Siltstone m.gray subrounded v.hard s.weathered clasts of qtz ≤3mm, subangular mottled with gray carbonate Dol Cementation.	0 PPM, No Odor	NS	NS	NA	2.5YR 3/2 dusky red
							1.0 to 35 mm
	300	Same material v.f. grain sands.	0 PPM, No Odor	"	"	"	2.5YR 3/3 dusky red
							1.0 to 30 mm
	305	Siltstone - Mottled gray v.hard, s.weathered clasts of Qtz ≤8mm s. rounded " of limestone and carbonates & angular. weathered clasts.	0 PPM, No Odor	"	"	"	2.5YR 3/3 dusky red
							1.0 to 50 mm
	310	Siltstone - trace f.gr. sand v.hard, s.weathered clasts of carbonate angular to sub rounded weathered ≤10 mm Dol Cementation	0 PPM, No Odor	"	"	"	2.5YR 3/3 dusky red
							1.0 to 15 mm
	315	Sandy Siltstone (f.gr. subrounded) v.hard, s.weathered large amount of angular Qtz clasts ≤ 4mm ≥20% Dol Cemented and carbonate clasts ≤5mm weathered.	0 PPM, No Odor	"	"	"	2.5YR 3/3 dusky red
							1.0 to 20 mm
	320	Same Material	PPM, Odor	"	"	"	2.5YR 3/2 dusky red
							1.0 to 35 mm
	325	Silty Sandstone / Wacke m. to f. grain s-rounded v.hard, s.weathered clasts of Qtz ≤ 5mm angular. Dol Cementation / Mottling (Gray).	0 PPM, No Odor	"	"	"	2.5YR 4/2 dusky red
							1.0 to 30 mm
	330	Silty siltstone v.f.gr. subrounded v.hard s.weathered No Qtz clasts slight mottling (gray) Dol Cementation.	0 PPM, No Odor	"	"	"	2.5YR 3/3 dusky red
							1.0 to 25 mm
	335	Same material w/ trace of Qtz clasts ≤10mm ANGULAR	0 PPM, No Odor	"	"	"	2.5YR 3/3 dusky red.
							1.0 to 15 mm
	340						

PROJECT: Middletown. | HOLE NO. ERM-8I

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA-Middletown	Warren Fox	ERM-8I	9 OF 10 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS PID d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	Color/ REMARKS Cuttings h
	340.0	Silty Sandstone/Wacke v. hard, s. weathered Trace of Qtz clasts ≤5 mm angular	0ppm, No Odor	NS	NS	NA	2.5YR 3/3 dusky red.
	345.0	v.f. grain Sandstone rounded, Dol. Cemented					1.0 to 12mm
		Same Material.	0ppm, No Odor	NS	NS	NA	2.5YR 3/3 dusky red.
	350.0						1.0 to 12mm
		NS					
	352.0	1-31-95 Bottom of borehole at 352.0' (WNE)					



Note to Scale.

PROJECT	HOLE NO.
HIA-Middletown	ERM-8I

HTW DRILLING LOG

ERM-8I

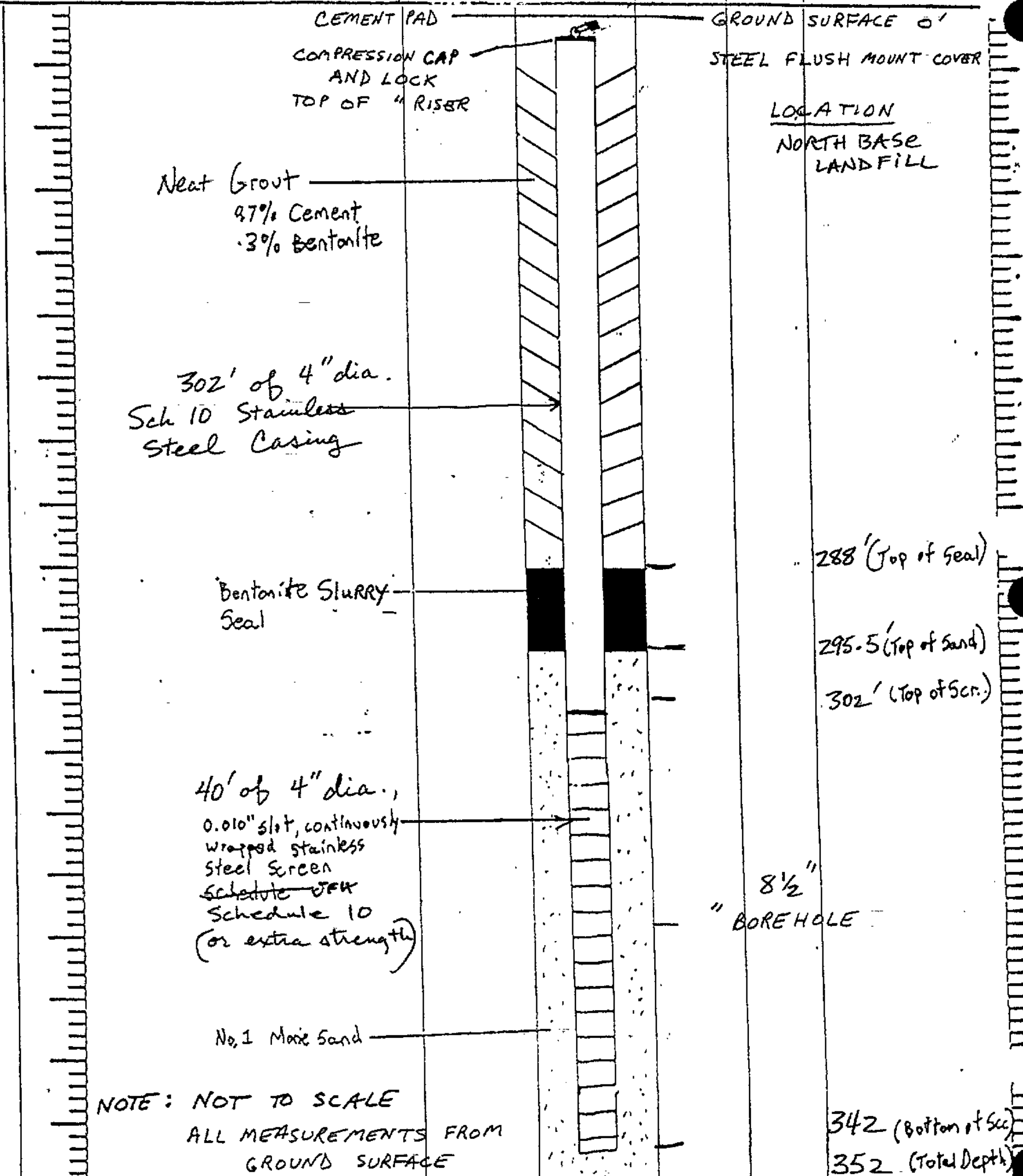
HOLE NO. ERM-8-I (Sent.)

PROJECT: HIA, Middletown

INSPECTOR: D. Menzie

SHEET 10 OF 10 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h



PROJECT: HIA, Middletown

HOLE NO. ERM 8-I (Sent)

HTW DRILLING LOG

HOLE NO. ERM-8D(Sent)

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydro Group	SHEET 1 of 17 SHEETS
3. PROJECT: Middletown Air Field NPL Site	4. LOCATION: NBL. - sentinel Wells, E. of NBL	
5. NAME OF DRILLER	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber - Dual Rotary Drilling	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Dual Rotary Drilling 16" casing to 20' bgs 12" casing to 136' BGS 8" cased to 676' BGS See pgs. 16 + 17 of this log for additional data	8. HOLE LOCATION: W. side Union Street, accross street from Frey Village, Middletown	
	9. SURFACE ELEVATION: not yet surveyed	
	10. DATE STARTED: 10/28/94	11. DATE COMPLETED: 11/15/94
12. OVERBURDEN THICKNESS: 15'	15. DEPTH GROUNDWATER ENCOUNTERED: Unknown	
13. DEPTH DRILLED INTO ROCK: 663'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 678'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
						%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well Installed ERM-8D(SENT)		Sentinel Well		D. Haden

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	Dusky red elastic SILT w/ Gravel - Sand + Gravel ≤ 30% - Gravel % > Sand % - Gravel is fine and is mixed subangular and rounded (ESI?)	0.0 ppm @ ≈3' 0.0 ppm @ ≈9'				2.5YR, 3/3 (MH)
	10	Reddish brown Sandy Silt - Sand + Gravel ≤ 30% - Gravel ≤ 15% - Trace bedrock fragments of Siltstone - Saprolitic	0.0 ppm @ ≈13'				2.5YR, 4/4 (ML)
	15	very dusky red claystone or dolomitic SILTSTONE - soft to moderately hard - moderately weathered - trace 1-3 mm dolomite crystals - cuttings: subangular	0.0 ppm @ ≈17'				2.5 YR, 2.5/3 cuttings: 1-15 mm
	20	See next pg. for this interval	—	—	—	—	—

reviewed 8Feb95 JPH

PROJECT: Middletown Air Field NPL Site

HOLE NO. ERM-8D(SENT)

HTW DRILLING LOG

PROJECT: Middletown | INSPECTOR: Jeffrey Herrick JFH | HOLE NO. ERM-8D | SHEET 2 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS PID d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	20	@25' Wacke (silty sandstone) fn-med crs grained, poorly graded, sub rnd, hard, trace rounded Qtz gravels, varied calcite chips ~3mm-5mm (a vein?)	0.5-a2 ppm slight oily odor				2.5YR 4/3 Dusky Red
25' JFH	25	@25' JFH	Flr w/ ACL = some calcite cementation.				2-5mm chips
		@30' Wacke (Silty Sandstone) fn-med crs grained, well graded, sub rnd, hard, some Qtz gravels, rounded	0.2-0.5 ppm sl. oily odor				2.5YR 4/3 Dusky Red
	30	@35' Wacke as above	sl. Flr w/ HCL = trace calcite cem. 0.5-1.0 ppm sl. oily odor				2-5mm chips as above
			sl. Flr w/ HCL = Trace calcite cem.				1-2mm chips
	35	@ 40' Wacke (Silty Sandstone) fn-med-crs grained, well graded, sub rnd, hard, trace Qtz gravels sub rounded, other lithic gravels seen (trace).	0.5-0.8 ppm sl. oily smell (lacquer?)				2.5YR 4/3 Dusky Red.
			No HCL Flr				2-5mm chips
	40	@45' Wacke (Silty Sandstone) as above except: noted several discolored chips (sl. mottled) w/ Gray.	0.2-0.5 ppm sl. oily odor				2.5YR 4/3 Dusky Red mottled w/ 5Y 6/1 Gray.
			sl. HCL flr = Trace calcite cementation				2-4mm chips
	45	@ 50' Wacke (Silty Sandstone) as noted above incl. the discolored gray mottles					2.5YR 4/3 Dusky Red Mottled w/ 5Y 6/1 Gray.

HTW DRILLING LOG

PROJECT: Middletown | INSPECTOR: Jeffrey Herrick JHH | HOLE NO. SRM-8D | SHEET 3 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	50	@55 Wacke (Silty Sandstone) fn-med-crs, well graded, subrnd, sl. oily odor common qtz + other lithic fragment gravels, subangular to subrnd. still noting Trace gray mottles 5Y 5/1	0.6 ppm				2.5YR 4/2 Dusky Red w/Trace 5Y 6/1 Gray chips ov 2-8mm
	55	Very dusky red calcareous or dolomitic SILTSTONE - Moderately hard to hard - Unweathered - cuttings: Subrounded	V. slight HCl fiz, = Trace calcite cementation 0.0 ppm @ ≈59'				2.5YR, 2.5/3 cuttings: 1-10mm
	60	Dusky red calcareous or dolomitic fine grained SILTY SANDSTONE, (wacke) Trace subangular medium sand Trace subrounded fine gravel - Hard - Unweathered - Cuttings: Subangular/subround - Only trace carbonate clasts (dolomite 1-3mm) - Most carbonates are in matrix.	0.0 ppm @ ≈63' 0.0 ppm @ ≈67' 0.0 ppm @ ≈73'				2.5YR, 3/3 cuttings: 1-10mm cuttings: 1-10mm cuttings: 1-20mm
	75		0.0 ppm @ ≈77'				cuttings: 1-20mm
	80	weak red calcareous or dolomitic coarse SILTY SANDSTONE - Matrix supported (wacke) - No apparent carbonate clasts - ≈5-10% fine gravel - Sand and gravel is subangular - Hard to very hard - Unweathered, except trace discoloration - Cuttings: Subangular/subrounded	0.0 ppm @ ≈83' 0.0 ppm @ ≈87'	slow drilling			2.5YR, 5/2 cuttings: 1-20mm cuttings: 1-20mm
	90						

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM - 8D(sent) | SHEET 4 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	90	SAME as above	0.0 ppm @ ≈93'	slow Drilling			cuttings: 1-15mm
	95	Dusky red calcareous or dolomitic SILTSTONE. No apparent dolomite or calcite clasts - moderately hard, unweathered - cuttings: subangular	0.0 ppm @ ≈96'				(2.5 YR, 3/2) cuttings: 1-20mm
	100	Dusky red calcareous or dolomitic SILTSTONE. Trace carbonate clasts. Mostly dolomite - moderately hard - Unweathered - dolomite clasts are 1-4 mm - cuttings: Subrounded.	0.0 ppm @ ≈103'				(2.5 YR, 3/3) cuttings: 1-20mm
	105		0.0 ppm @ ≈107'				cuttings: 1-25mm
	110		0.0 ppm @ ≈113'				cuttings: 1-10mm
	115	Dusky red calcareous or dolomitic fine to medium grained SILTY SANDSTONE. No apparent carbonate clasts - Mod. Hard to hard, unweathered - cuttings: Subangular / Subround.	0.0 ppm @ ≈117'				(2.5 YR, 3/4) cuttings: 1-25mm (wacke)
	120	Dusky red calcareous or dolomitic SILTSTONE. Trace 1-12mm dolomite clast - Moderately hard to hard - Unweathered - cuttings: Subangular.	0.0 ppm @ ≈123'				(2.5 YR, 3/3) cuttings: 1-20mm
	125	Dusky red calcareous or dolomitic fine to medium to coarse grained (OR FATY) SANDSTONE. (wacke) - Hard - Unweathered - Sand is Subangular to Subround - No notable carbonate clasts - Matrix supported - Trace subangular fine gravel	0.0 ppm @ ≈128'				(2.5 YR, 3/4) cuttings: 1-15mm
	130		0.0 ppm @ ≈132'				cuttings: 1-20mm
	135						

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Heller | HOLE NO.: ERM-8D(Sent) | SHEET 5 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		SAME AS ABOVE (120-135)	0.0 ppm ≈139				cuttings: 1-20mm
	140	Dusky red medium to coarse grained matrix supported SANDSTONE (wacke)					2.5YR, 3/2
		Hard to very hard -Unweathered -5-10% fine gravel -Sand+gravel is subangular	0.0 ppm ≈143'				cuttings: 1-20mm ↳ subangular
	145	Dusky red calcareous or dolomitic SILTSTONE. Trace 1-3mm dolomite clasts. -Moderately hard -Unweathered -cuttings: subangular/subround	0.0 ppm ≈147'				2.5YR, 3/3 cuttings: 1-25mm
	150		0.0 ppm ≈153'				cuttings: 1-20mm
	155	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE (WACKE) -Trace 1-3mm dolomite clasts. Matrix supported. -Trace subangular course sand -Hard, Unweathered -cuttings: Subangular/subround	0.0 ppm ≈159'				2.5YR, 3/3 cuttings: 1-30mm
	160	Very dusky red calcareous or dolomitic SILTSTONE. Trace 1-7mm dolomite clasts. -Hard -Unweathered	0.0 ppm ≈163'				2.5YR, 2.5/2 cuttings: 1-20mm
	165	-Trace fine sand -cuttings: Subangular	0.0 ppm ≈167'				cuttings: 1-10mm
	170	Dusky red medium to coarse grained SILTY SANDSTONE (wacke). Matrix supported. Trace fine gravel (<3%) Trace coarse SAND (≈10%-15%) -Sand+gravel is subangular/subround -Hard to very hard -Unweathered -cuttings: Subround.	0.0 ppm ≈174'				2.5YR, 3/3 cuttings: 1-20mm
	175		0.0 ppm ≈179'				cuttings: 1-20mm
	180		0.0 ppm ≈183'				cuttings: 1-25mm
	185						

PROJECT: HIA - Middletown | HOLE NO.: ERM-8D(Sent)

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	D. Heller	ERM-8D(Sent)	6 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	185	Dusky red calcareous or dolomitic fine to medium grained SILTY SANDSTONE (WACKE).	0.0 ppm @ ≈188'	HIGH WATER PRODUCTION			2.5YR, 4/3 cuttings; 1-50mm
	190	-Trace 1-20mm dolomite clasts throughout. -Moderately hard to hard -Unweathered -Medium sand is subrounded.					
		-cuttings; Subangular/subround.	0.0 ppm @ ≈193'				cuttings: 1-45mm
	195	(Note: More dolomite in 198' Sample than 193'.) -Very trace subangular fine gravel					
			0.0 ppm @ ≈198'				cuttings: 1-20mm
	200	Note: 185-215 - Makes good water - Not excessive, but constant (≈2000 gal in 25' of drilling)	0.0 ppm @ ≈203'				cuttings: 1-20mm
	205		0.0 ppm @ ≈207'				cuttings; 1-25mm
	210	Note: Increase in dolomite clast frequency in 214' sample	0.0 ppm @ ≈214'				cuttings; 1-30mm
	215	Dusky red to gray (lots of quartz) SANDY BRECCIA. -matrix supported, well sorted. -Hard to very hard	0.0 ppm @ ≈219'				2.5YR, 3/3 cuttings; 1-10mm
	220	-Unweathered -Sand + gravel is subangular -cuttings; Subangular	0.0 ppm @ ≈224'				cuttings; 1-10mm
	225	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE (WACKE) (Same as 185-215)	0.0 ppm @ ≈227'	HIGH WATER PRODUCTION			2.5YR, 4/3 cuttings; 1-15mm
		(See above for additional description)					
	230	-Dolomite clasts are trace and don't seem to be concentrated @ any specific depth.	0.0 ppm @ ≈233'				cuttings; 1-20mm

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-8D(cont) | SHEET 7 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		See above					
	235						
		Dusky red calcareous or dolomitic SILTSTONE	0.0 ppm @ ≈238'				2.5YR, 4/3 cuttings: 1-20mm
		-Trace fine sand					
		-Trace medium rounded sand (<1%)					
	240	-Trace 1-25 mm dolomite clasts throughout.					
		Highest occurrence is @ 241'	0.0 ppm @ ≈243'				cuttings: 1-20mm
		-Hard					
	245	-Unweathered					
		-cuttings: Subangular/subround	0.0 ppm @ ≈247'				cuttings: 1-40mm
	250						
			0.0 ppm @ ≈253'				cuttings: 1-25mm
	255						
			0.0 ppm @ ≈257'				cuttings: 1-25mm
	260						
			0.0 ppm @ ≈263'				cuttings: 1-55mm
	265						
			0.0 ppm @ ≈268'				cuttings: 1-30mm
	270						
		(Slight shining on cuttings surfaces @ 272'. - Fracture surfaces?)	0.0 ppm @ ≈272'				cuttings: 1-55mm
	275						
			0.0 ppm @ ≈277'				cuttings: 1-25mm
	280						

HIGH WATER PRODUCTION

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA-Middletown	D. Haller	ERM-BD(Sout)	8 of 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	280	SAME AS ABOVE	0.0 ppm @ ≈283'	HIGH WATER PRODUCTION			cuttings; 1-25mm
	285		0.0 ppm @ ≈287'				cuttings; 1-20mm
	290	Dusky red calcareous or dolomitic fine grained SILTY SANDSTONE (WACKE) -Trace 1-4mm dolomite clasts -Hard - very hard -Unweathered -cuttings; Subrounded	0.0 ppm @ ≈293'				(2.5YR/4/4) cuttings; 1-10mm
	295	Dusky red Calcareous or dolomitic SILTSTONE. Trace 1-10mm dolomite clasts throughout. -Hard -Unweathered -cuttings; Subangular/subround.	0.0 ppm @ ≈298'				(2.5YR, 3/3) cuttings; 1-20mm
	300		0.0 ppm @ ≈303'				cuttings; 1-15mm
	305	Dusky red calcareous or dolomitic fine grained SILTY SANDSTONE, (WACKE) -Trace 1-5mm dolomite clasts -Hard, unweathered -cuttings; subrounded	0.0 ppm @ ≈309'				(2.5YR, 4/3) cuttings; 1-15mm
	310	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE (WACKE). Carbonates in matrix only -Trace coarse sand, SAND is subangular -Hard, unweathered -cuttings; subrounded/subangular	0.0 ppm @ ≈314'				(2.5YR, 4/4) cuttings; 1-15mm
	315		0.0 ppm @ ≈317'				cuttings; 1-25mm
	320		0.0 ppm @ ≈324'				cuttings; 1-10mm
	325	Dusky red calcareous or dolomitic SILTSTONE to coarse grained SANDSTONE (WACKE)	0.0 ppm @ ≈328'	MODERATE WATER PRODUCTION			(2.5YR, 3/3) cuttings; 1-20mm

PROJECT: HIA-Middletown

HOLE NO.: ERM-BD(Sout)

HTW DRILLING LOG

PROJECT: HIA-Middletown

INSPECTOR: D. Haller

HOLE NO.: ERM-8D(cont)

SHEET 9 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		-Carbonates in matrix only -Sand is subangular		↑			
	330	-Trace subangular fine gravel -Hard -Unweathered -cuttings; subangular	0.0 ppm @ ≈333'	PRODUCTION			cuttings; 1-10mm
	335	↓	0.0 ppm @ ≈338'				cuttings: 1-25mm
	340	weak Red calcareous or dolomitic fine grained SILTY SANDSTONE (WACKE) -Trace 1-7mm dolomite clasts -Hard -Unweathered -cuttings; subrounded	0.0 ppm @ ≈343' 0.0 ppm @ ≈347'	WATER PRODUCTION (225-290')			(2.5YR, 5/4) cuttings; 1-25mm cuttings; 1-30mm
	350	weak red calcareous or dolomitic fine to medium grained SILTY SANDSTONE (WACKE). Matrix supported. Trace 1-3mm dolomite clasts - Moderately hard to hard -Unweathered -Trace coarse sand (subangular) -cuttings; subrounded	0.0 ppm @ ≈354' 0.0 ppm @ ≈359'	Moderate WATER (slightly less than above)			(2.5YR, 5/4) cuttings; 1-10mm cuttings; 1-25mm
	360	Dusky red calcareous or dolomitic fine grained SILTY SANDSTONE (WACKE) -no notable carbonate clasts, -Carbonates in matrix only. -Moderately hard to hard -Unweathered -cuttings; subangular/subround	0.0 ppm @ ≈363' 0.0 ppm @ ≈369'				(2.5YR, 4/4) cuttings; 1-10mm cuttings; 1-20mm
	370	↓	0.0 ppm @ ≈374'	↓			cuttings; 1-20mm
	375						

PROJECT: HIA-Middletown

HOLE NO.: ERM-8D(cont)

PROJECT: HIA - Middletown
INSPECTOR: D. Haller

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	375–395	SAME AS ABOVE (360-375')	0.0 ppm @ ≈378'	HIGH WATER PRODUCTION			cuttings; 1-50mm
			0.0 ppm @ ≈383'				cuttings; 1-35mm
		(Seem to be generating more water again)					
			0.0 ppm @ ≈388'				cuttings; 1-30mm
			0.0 ppm @ ≈393'				cuttings; 1-15mm
	395–410	Dusky red calcareous or dolomitic SILTSTONE. No notable carbonate clasts. -Moderately hard to hard -Unweathered -cuttings; Subangular	0.0 ppm @ ≈399'				(2.5YR, 3/3) cuttings; 1-45mm
			0.0 ppm @ ≈404'				cuttings; 1-50mm
			0.0 ppm @ ≈408'				cuttings; 1-20mm
	410–415	Weak red calcareous or dolomitic fine to medium grained SANDSTONE (wacke). Matrix supported. No notable carbonate clasts. -Trace coarse sand -Sand is subangular -cuttings: Subangular/Subround	0.0 ppm @ ≈414'				(2.5YR, 5/3) cuttings; 1-15mm
	415–420	Dusky red calcareous or dolomitic SILTSTONE. No notable carbonate clasts. Moderately hard to hard -Unweathered -cuttings; Subangular	0.0 ppm @ ≈418'				(2.5YR, 3/3) cuttings; 1-30mm
	420–	Dusky red calcareous or dolomitic silty fine SANDSTONE (wacke) -No notable carbonate clasts	0.0 ppm ≈423'				(2.5YR, 3/4) cuttings; 1-20mm

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | ERM-8D(sent) | SHEET 11 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		-Moderately hard to hard -Unweathered -cuttings: subround					
	425	Dusky red calcareous or dolomitic SILTSTONE.					2.5YR, 3/3
		-No notable carbonate clasts -Moderately hard	0.0 ppm @ ≈427'				cuttings: 1-25mm
	430	-Unweathered -cuttings: Subangular					
			0.0 ppm @ ≈433'				cuttings: 1-30 mm
	435	Dusky red calcareous silty dolomitic fine to medium SANDSTONE. -carbonates in matrix only -sand is subrounded	0.0 ppm @ ≈439'				2.5YR, 3/3 cuttings: 1-10mm
	440	-Hard -Unweathered -cuttings: Subrounded	0.0 ppm @ ≈444'				cuttings: 1-10mm
	445	Dusky red calcareous or dolomitic SILTY SILTSTONE. No Notable carbonate clasts Moderately hard to hard	0.0 ppm @ ≈448'				2.5YR, 4/3 cuttings: 1-25mm
	450	-Unweathered -cuttings: Subangular/subround	0.0 ppm @ ≈453'				cuttings: 1-30mm
	455		0.0 ppm @ ≈458'				cuttings: 1-20mm
	460	Trace 1-4mm dolomite clasts from 460 - 470'	0.0 ppm @ ≈464'				cuttings: 1-35mm
	465		0.0 ppm @ ≈469'				cuttings: 1-30mm
	470						

HIGH WATER PRODUCTION

PROJECT: HIA - Middletown | HOLE NO.: ERM-8D(sent)

PROJECT: HIA-Middletown | INSPECTOR: D. Haller | ERM-SD(cont) | SHEET 12 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS g.	GEOTECH SAMPLE OR CORE BOX NO g.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS n.
		SAME AS ABOVE	0.0 ppm @ ≈474				cuttings: 1-20%
	475	Fracture surface coated w/calcite precipitate noted in cuttings from 478'	0.0 ppm @ ≈478'				cuttings: 1-30%
	480		0.0 ppm @ ≈483'				cuttings: 1-25%
	485	Slight yellow staining noted in cuttings from 489'	0.0 ppm @ ≈489'				cuttings: 1-15%
	490		0.0 ppm @ ≈494'				cuttings; 1-30%
	495		0.0 ppm @ ≈498'				cuttings: 1-45%
	500		0.0 ppm @ ≈503'				cuttings; 1-30%
	505		0.0 ppm @ ≈508'				cuttings: 1-20%
	510		0.0 ppm @ ≈513'				cuttings: 1-10%
	515						

HIGH WATER PRODUCTION

PROJECT: HIA-Middletown | HOLE NO.: ERM-SD(cont)

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | (ERM-Consultant) | SHEET 13 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	530		0.0 ppm @ ≈519'				cuttings: 1-15m
	535		0.0 ppm @ ≈529'				cuttings: 1-20m
		weak red calcareous or dolomitic fine grained SILTY SANDSTONE (WACKE) -No apparent carbonate clasts -Hard -Unweathered -cuttings: Subangular	0.0 ppm @ ≈537'				2.5YR, 5/3 cuttings: 1-10m
	540		0.0 ppm @ ≈533'				cuttings: 1-15m
		Dusky red calcareous or dolomitic siltstone: ≈1-3%, 1-5mm carbonate clasts* -Moderately hard -Unweathered -Cuttings: Subrounded	0.0 ppm @ ≈539'				2.5YR, 3/3 cuttings: 1-7.5m
	545	weak red calcareous or dolomitic fine to medium grained SILTY SANDSTONE (WACKE). -Hard -Unweathered -Sand is subangular to subround. -No apparent carbonate clasts -Trace subangular coarse sand	0.0 ppm @ ≈543'				2.5YR. 5/3 cuttings: 1-20mm
	550		0.0 ppm @ ≈547'				cuttings: 1-10m
	555		0.0 ppm @ ≈553'				cuttings: 1-25m
	560		0.0 ppm @ ≈558'				cuttings: 1-20m
	565		0.0 ppm @ ≈563'				cuttings: 1-35m

HIGH WATER PRODUCTION

PROJECT: HIA - Middletown | HOLE NO.: ERM-8D(cont)

ERM-8D(cont)

PROJECT	INSPECTOR	SHEET 4 OF 17 SHEETS
H1A - Middletown	D. Heller	

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	565	Dusky red calcareous or dolomitic SILTSTONE. Trace 1-3mm dolomite clasts - Moderately hard - Unweathered - cuttings: Subangular	0.0 ppm @ ≈566'				2.5YR, 4/3 cuttings: 1-35mm
	570	Dusky red calcareous or dolomitic fine to medium SILTY SANDSTONE (WACKE). Trace 1-5mm dolomite clasts. Sand is subangular - Hard, unweathered - cuttings: Subrounded	0.0 ppm @ ≈573'				2.5YR, 4/2 cuttings: 1-15mm
	575	Dusky red calcareous or dolomitic SILTSTONE - Carbonates in matrix only - Moderately hard - hard - Unweathered - cuttings: Subangular	0.0 ppm @ ≈579'				2.5YR, 3/3 cuttings: 1-35mm
	580		0.0 ppm @ ≈584'				cuttings: 1-35mm
	585		0.0 ppm @ ≈588'				cuttings: 1-35mm
	590	Dusky red calcareous or dolomitic fine grained SILTY SANDSTONE (WACKE) Trace 1-3mm dolomite clasts - Hard - Unweathered - cuttings: Subangular/subround	0.0 ppm @ ≈593'				2.5YR, 4/3 cuttings: 1-40mm
	595	Dusky red calcareous or dolomitic SILTSTONE. - Carbonates in matrix only - Moderately hard	0.0 ppm @ ≈597'				2.5YR, 3/3 cuttings: 1-25mm
	600	- Trace fine sand - Unweathered - cuttings: Subangular	0.0 ppm @ ≈603'				cuttings: 1-25mm
	605		0.0 ppm @ ≈608'				cuttings: 1-20mm
	610		0.0 ppm @ ≈613'				cuttings: 1-15mm

HIGH WATER PRODUCTION

PROJECT: H1A - Middletown

HOLE NO.: ERM-8D(cont)

PROJECT: H1A - Middletown | INSPECTOR: D. Haller | ERM-8D(Sent) | SHEET 15 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	615	Dusky red calcareous or dolomitic fine to medium grained SILTY SANDSTONE (WACKE).	0.0 ppm @ ≈618'	HIGH WATER PRODUCTION			2.5YR, 3/3 cuttings: 1-30 mm
	620	-Hard -Unweathered -No apparent carbonate clasts (carbonates in matrix only. -Sand to subrounded -cuttings: subrounded.	0.0 ppm @ ≈624'				cuttings: 1-15 mm
	625		0.0 ppm @ ≈628'				cuttings: 1-15 mm
	630	Dusky red calcareous or dolomitic medium to coarse grained matrix supported SILTY SANDSTONE (WACKE).	0.0 ppm @ ≈633'				cuttings: 1-30 mm 2.5YR, 4/2
	635	-Hard to very hard -Sand is subangular to subround -Unweathered -cuttings: subangular	0.0 ppm @ ≈638'				cuttings: 1-20 mm
	640	-trace fine grained → subangular (mostly all quartz)	0.0 ppm @ ≈644'				cuttings: 1-20 mm
	645		0.0 ppm @ ≈648'				cuttings: 1-15 mm
	650		0.0 ppm @ ≈653'				cuttings: 1-20 mm
	655	Dusky red calcareous or dolomitic SILTSTONE -No apparent carbonate clasts -Moderately hard to hard	0.0 ppm @ ≈658'				2.5YR, 3/3 cuttings: 1-20 mm
	660						

PROJECT: H1A - Middletown | HOLE NO.: ERM-8D(Sent)

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-8D(Sent) | SHEET 16 OF 17 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	660	-Unweathered -cuttings; Subangular -Trace fine sand	0.0 ppm @ ≈663'				cuttings; 1-30mm
	665		0.0 ppm @ ≈667'				cuttings; 1-15mm
	670		0.0 ppm @ ≈673'				cuttings; 1-25mm
	675						

HIGH WATER PRODUCTION

→ Boring terminated @ 678' BGS on 11/15/94. Well Construction: to follow @ a later time.

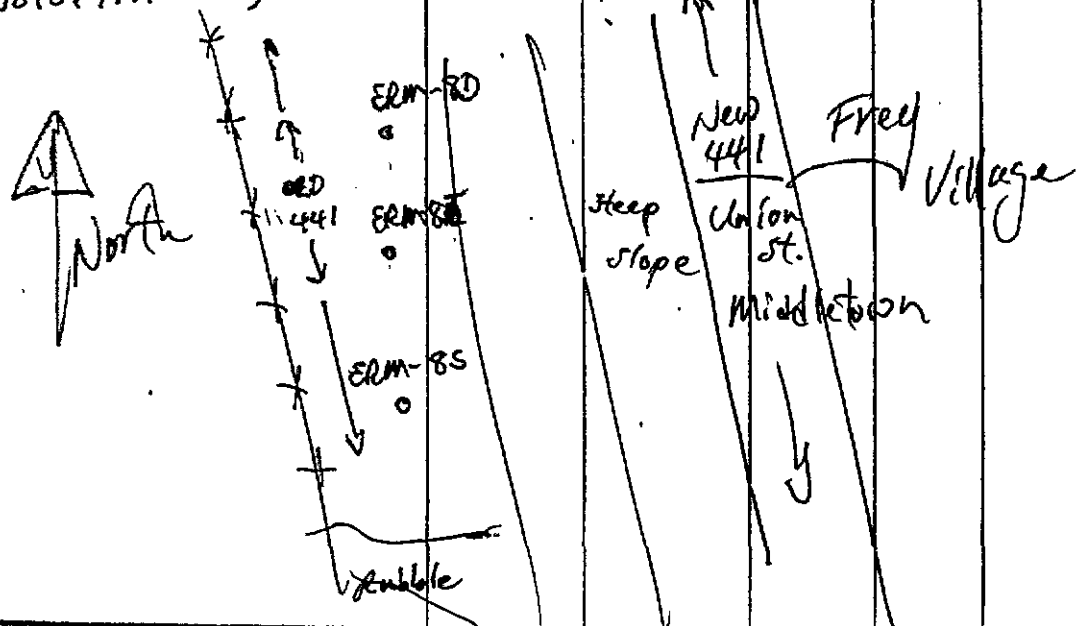
≈ total of Injection water used = 7,000 gallons

→ 16" casing advanced to 20' BGS.

→ 12" casing advanced to 136' BGS.

→ 8" casing advanced to 676' BGS.

Note: All casings used were temporary.

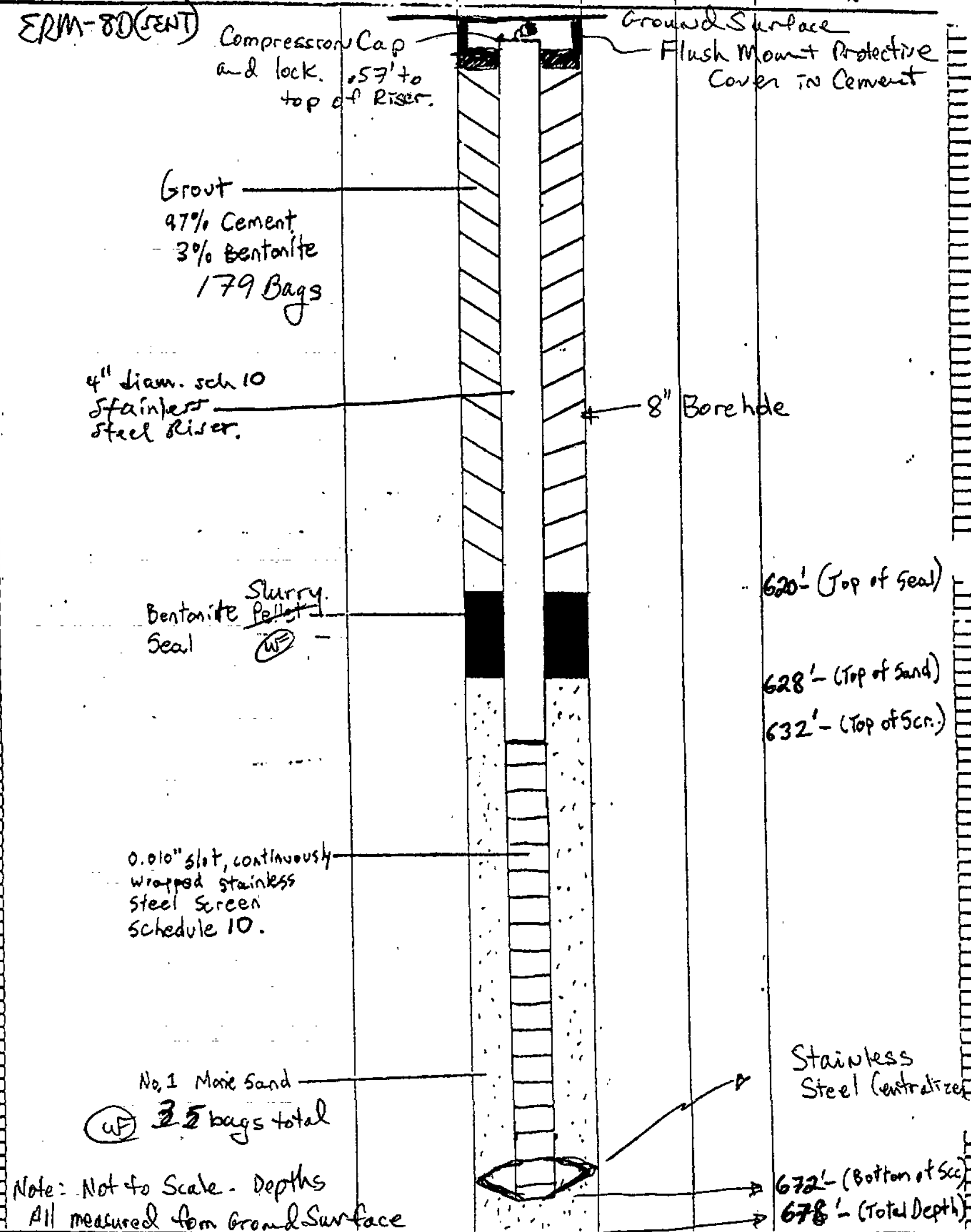


PROJECT: HIA - Middletown | HOLE NO.: ERM-8D(Sent)

HTW DRILLING LOG

PROJECT	INSPECTOR	SHEET	HOLE NO.
HIA, Middletown	WARREN FOX for Matt Van Wiedi	17 of 17 SHEETS	ERM-8D

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h



PROJECT	HOLE NO.
HIA, Middletown	ERM-8D

HTW DRILLING LOG

HOLE NO. ERM-97S

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: Hydro Group	SHEET 1 OF SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown PA	
5. NAME OF DRILLER: Steve Blair	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber Drill Rig DR-12	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: - Barber Rig - 12" I.D. 8" I.D. casing - 11½" and 7⅞" Drill bits - Rock rotary drilling method.	8. HOLE LOCATION: See Sheet	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 9-6-94	11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: 10.0'	15. DEPTH GROUNDWATER ENCOUNTERED:	
13. DEPTH DRILLED INTO ROCK: 139.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: JFH ~~152.0~~ ~~153.0~~ 152'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
None						— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well Installed		✓		Warren N. Fay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Silt with gravel and coarse sand (subangular) poorly graded loose	14 ppm PID No Odor	NS	NS	NA	5YR 4/3 reddish brown ≤ 2mm Dia.
	5.0'	Silt with gravel (quartz clasts) subrounded weathered slight	9 ppm, No Odor.	NS	NS	NA	5YR 4/3 reddish brown ≤ 4mm Dia ?
	10.0'	Sandstone weathered subrounded moderately hard trace of gravel	6 ppm, No Odor	NS	NS,	NA	5YR 3/4 dark reddish brown ≤ 2mm Dia
	15.0'	Sandstone moderately weathered v. hard, coarse grained rounded, subangular quartz clasts ≤ 4mm Dia. trace of calcite < 1mm Dia	7 ppm, No Odor (160' to 20.0' very dense)	NS	NS	NA	5YR 3/4 dark reddish brown ≤ 4mm Dia
	20.0'	Sandstone v. fine (subangular) quartz clasts (≤ 2mm) weathered. v. hard	9.5 ppm, No Odor.	NS	NS	NA	2.5 YR 3/4 dark ~~reddish brown~~ dusky red 1.0mm to 6.0mm
	25.0'						

PROJECT: HIA - Middletown

HOLE NO. ERM-97S

HTW DRILLING LOG

HOLE NO. ERM-9S

PROJECT: HIA - Middletown | INSPECTOR: Warren Fop | SHEET 2 OF SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25.0'	Sandstone - Same as above w/ Quartz clast ≤ 4mm (larger)	5.5 ppm PID No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 20.0 mm
	30.0'	Sandstone (f. grain - sub-angular) v. hard weathered quartz clasts (≤ 2.0 mm dia)	5.0 ppm, No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 30.0 mm
	35.0'	Same as above Sandstone.	9 ppm, No odor	NS	NS	NA	5YR 4/4 reddish brown 1.0 to 7.0 mm
	40.0'	Siltstone - subangular weathered cuttings m. hard quartz clasts ≤ 2 mm subangular (WF)	8 ppm, No Odor	NS (Soft at 41.0')	NS	NA	2.5YR 3/4 dusky red. 1.0 to 3.0 mm
	45.0'	Sandstone (subangular) v. hard C. grain weathered quartz clasts ≤ 5.0mm trace calcite (≤ 2mm - angular)	6 ppm, No odor	NS	NS	NA	2.5YR 3/3 dusky red. 1.0mm to 40mm
	50.0'	Siltstone - subangular m. hard cuttings weathered quartz clasts (sub rounded ≤ 8.0mm	5 ppm, No odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 4.0 mm
	55.0'	Sandstone C. grain - subrounded trace of siltstone (≤ 4mm) v. hard weathered	9 ppm, No Odor	NS (V. hard at 61.0')	NS	NA	2.5YR 3/4 dusky red. 1.0 to 2.0 mm
	60.0'	Siltstone v. hard weathered cuttings are subangular trace of calcite (v. weathered)	4 ppm, No odor	NS Still v. hard throughout	NS	NA	5YR 3/4 dark reddish brown 1.0 to 35.0 mm
	65.0'	Same as above (WF) w/ more calcite Dolomite v. hard weathered.	10 ppm, No odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 60mm
	70.1'						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Foy	ERM-9S	3 OF SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	70.0'	Siltstone - subangular m. hard cuttings weathered Dolomitic w/ quartz grains (2.0mm subangular)	0 ppm PID No odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 30.0 mm
	95.0'	Sandstone subangular cuttings m. hard (m. grain) weathered quartz clasts ≤ 10mm	0 ppm, No Odor (8-10 gal/min Producing water)	NS	NS	NA	2.5YR 3/3 dusky red. 1.0mm to 25.0mm
	80.0'	Siltstone Subangular cuttings m. hard weathered trace of quartz clasts 3/4mm Dolomitic subrounded	0 ppm, No odor	NS	NS	NA	2.5 YR 3/4 dusky red. 1.0 to 45.0mm
	85.0'	Sandstone f. grain Subangular m. hard weathered quartz clasts (many) white ≤ 10mm	0 ppm No Odor	NS	NS	NA	2.5YR 3/4 dusky red 1.0 to 25.0mm
	90.0'	Same as above.	0 ppm, No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 25.0mm
	95.0'	Sandstone m. grain. Sub angular m. hard weathered. quartz clasts, white ≤ 5mm and pink	0 ppm No odor (99' water producer)	NS	NS	NA	2.5YR 4/3 dusky red. 1.0 to 20 mm
	100.0'	Sandstone f. grain. Subangular (WC) m. hard weathered quartz clasts (≤ 5.0mm) traces of calcite.	0 ppm, No odor. (water at 102')	NS	NS	NA	2.5YR 3/4 dusky red 1.0 to 45.0mm
	105.0'	Siltstone Splaty - sub angular chips. (extremely fine grain) v. hard weathered dolomite trace quartz. (≤ 2mm)	0 ppm No odor	NS	NS	NA	2.5YR 3/3 dusky red. 1.0 to 25 mm
	110.0'	Sandstone angular v. hard weathered quartz clasts ≤ 10.0mm subangular trace of dolomite chips.	0 ppm, No Odor	NS	NS	NA	2.5 YR 3/4 dusky red. 1.0 to 11 mm
	115.0'						

HTW DRILLING LOG

HOLE NO. ERM-9S

PROJECT HA - Middletown | INSPECTOR Warren Foo | SHEET 4 OF SHEETS

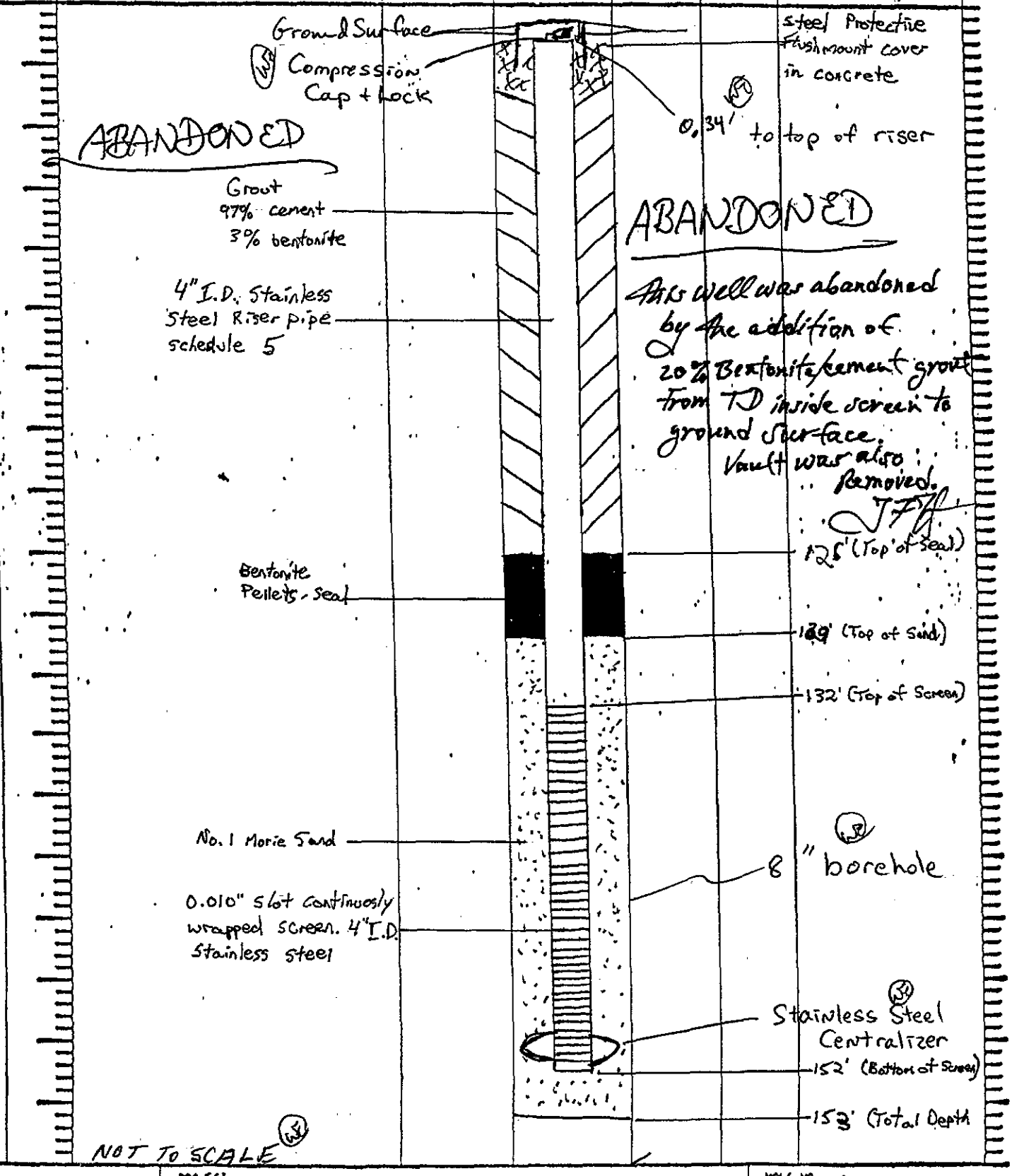
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	115.0'	Sandstone - angular cuttings v. hard unweathered quartz clasts (≤ 8.0mm) angular w/ dolomite.	0ppm PID, No odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 10mm
	120'	Similar Sandstone	0ppm, No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 15 mm
	125'	Same Sandstone clasts of quartz < 5mm diameter	0ppm, No odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 8.0mm
	130'	Sandstone - subrounded m. grained v. hard. Some weathering. quartz clasts subangular dolomite and < 1% mg calcite present.	0ppm, No Odor	NS	NS	NA	2.5YR 4/4 dusky red.
NOTE	135'	Sandstone - subround m. grained v. hard S. weathered quartz clasts < 10mm (some mustard yellow in color) * limestone chips with < 5% calcite layering (gray & white)	0ppm, No Odor	NS	NS	NA	2.5YR 3/4 dusky red 1.0 to 10mm.
	140'	Sandstone m. grained subrounded v. hard S. weathering few quartz clasts (< 4mm) Calcite / dolomite < 10%	0ppm, No Odor	NS	NS	NA	2.5YR 4/4 dusky red. 1.0 to 3.0mm
	145'	Sandstone Similar to above Quartz clasts are not as white, are more ~~assorted~~ (W) pink	0ppm, No Odor	NS	NS	NA	2.5YR 3/4 dusky red. 1.0 to 30mm.
		Bottom of Borehole at ~~150.0'~~ 152.0' (WHF) 9-7-94 JFH 7/25/95 That's correct 152.0' JFH 7/25/95					

PROJECT HA - Middletown | HOLE NO. ERM-9S

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	C. Salomon	ERM-95	of SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



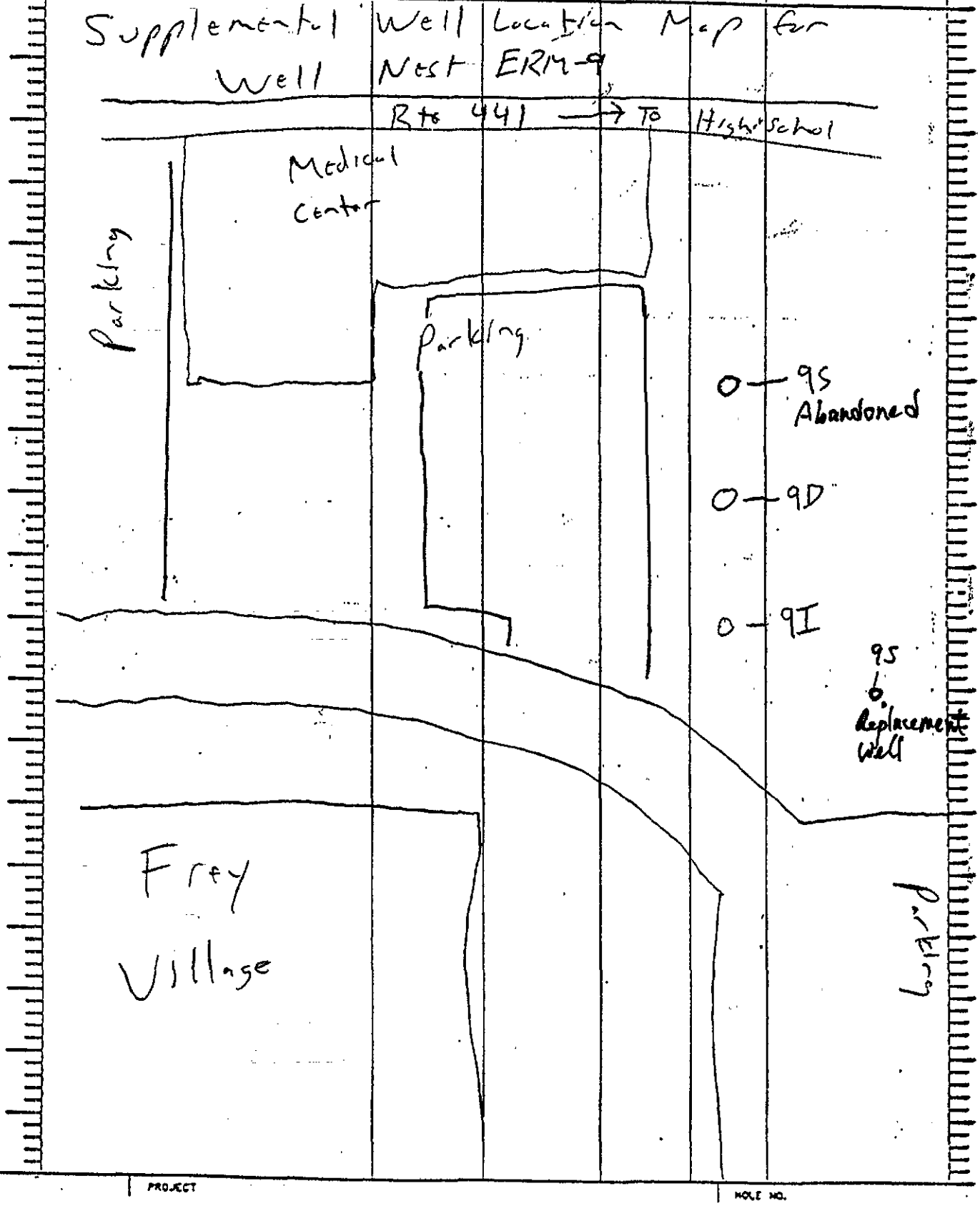
PROJECT HIA Middletown

HOLE NO. ERM-95

HTW DRILLING LOG

PROJECT | INSPECTOR | HOLE NO. ERM-9 (NEST) | SHEET OF SHEETS

ELEV. b	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h



PROJECT | HOLE NO.

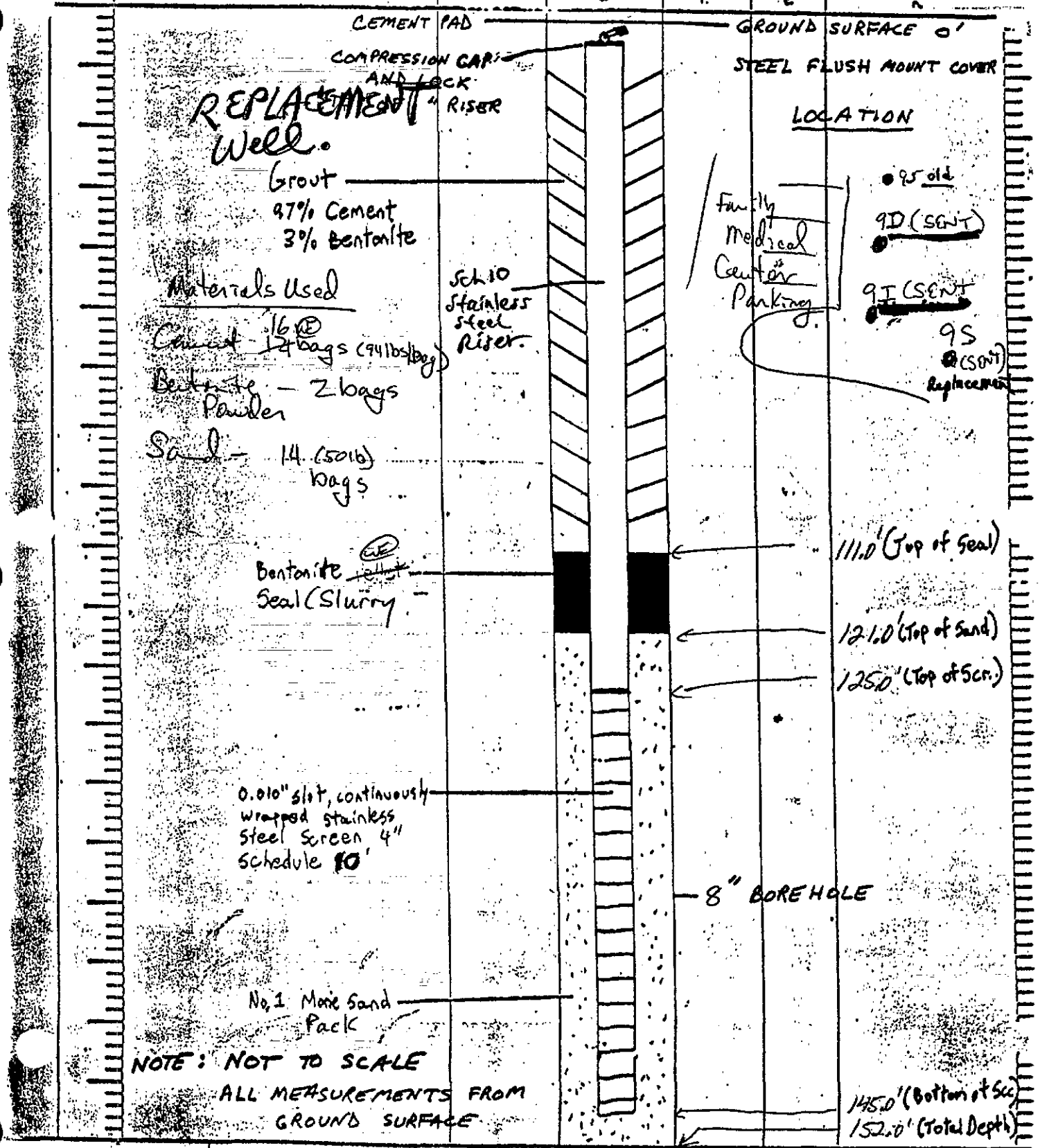
Figure 4-1 (Continued)

HTW DRILLING LOG.

HOLE NO. ERM-9S(SENT)

PROJECT: HIA, Middletown | INSPECTOR: WARREN FOX / DAVE MENZIE | SHEET: OF SHEETS

ELEV.	DEPTH ft.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE & CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS



PROJECT: HIA, Middletown | HOLE NO. ERM-9S(SENT)

HTW DRILLING LOG

HOLE NO. ERM-9I(Sent)

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 of 9 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: J. Arnett	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 12" casing + bit; 8" casing + bit; casings are temporary. See pgs. 8+9 of this log for additional info.	8. HOLE LOCATION: Frey Village	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 10/20/94	11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: ≈ 10'	15. DEPTH GROUNDWATER ENCOUNTERED:	
13. DEPTH DRILLED INTO ROCK: ≈342'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:	
14. TOTAL DEPTH OF HOLE: 352'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Built well ERM-9I(SENT)		yes		D. Haller

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS g.	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Reddish brown Sandy Silt.					5YR, 4/3
		-loose	0.0 ppm @ ≈3'				ML
		-Gravel < 15%					
	5	-Sand + Gravel ≥ 30%					
		-Sand % > Gravel %					
		-Poorly graded.	0.0 ppm @ ≈7'				
	10	Dusky red medium to coarse grained SANDSTONE (Wacke)					2.5YR, 3/4
		-Highly weathered @ top of interval	0.0 ppm @ ≈13'				cuttings: 1-10mm
		-Very soft to hard (quartz clasts)					(Note: Doesn't resemble appreciable saprolite like the 14' sample from 9D(Sent)).
	15	-cuttings are subangular (Rock breaks up easily by hand)					
		-Trace fine subangular gravel	0.0 ppm @ ≈17'				cuttings: 1-35mm
	20	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE (Wacke)					2.5YR, 3/3
		-Medium sand is subangular					
		-Moderately hard, moderately weathered. No notable carbonate clasts	0.0 ppm @ ≈23'				cuttings: 1-30mm
	25	-cuttings: subangular/subround					

PROJECT: HIA - Middletown

HOLE NO.: ERM-9I (Sent)

HYDROGEOLOGIC DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
H/A - Middletown	D. Heller	ERM-9I (Sent)	2 of 9 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25	-No apparent carbonate clasts -Carbonates present in matrix only.	0.0 ppm @ ≈28'				cuttings: 1-50mm
	30		0.0 ppm @ ≈33'				cuttings: 1-40mm
	35		0.0 ppm @ ≈37'				cuttings: 1-20mm
	40	37-39' and 44-48' and 51-53' > Fracture Zones. Notable increase in drilling rate	0.0 ppm @ ≈43'				cuttings: 1-25mm
	45		0.0 ppm @ ≈47'				cuttings: 1-80mm
	50	Weak red very coarse (subangular) SANDSTONE. matrix supported. Hard to very hard Slightly weathered cuttings: Subangular/Subround (Rock IS a breccia)	0.0 ppm @ ≈53'				(2.5 YR, 6/4) cuttings: 1-40mm
	55	Dusky red calcareous or dolomitic SILTSTONE. No apparent carbonate clasts. (Carbonates only present in matrix (cement) -Moderately hard - very slightly weathered - cuttings: Subangular - trace fine sand.	0.0 ppm @ ≈57'				(2.5 YR, 4/3) cuttings: 1-40mm
	60		0.0 ppm @ ≈63'				cuttings: 1-35mm
	65	weak red calcareous or dolomitic fine to medium SANDSTONE (wacke) -Trace 1-3mm dolomite clasts. - Hard - Unweathered - cuttings: Subangular	0.0 ppm @ ≈67'				(2.5 YR, 5/3) cuttings: 1-55mm
	70	Weak red calcareous or dolomitic coarse SANDSTONE. Trace 1-3mm dolomite clasts - matrix supported	0.0 ppm @ ≈73'				(2.5 YR, 5/3) cuttings: 1-15mm

ROCK DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	D. Haller	ERM-9I(Cont)	3 OF 9 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		-Hard to very hard (Rock is a wacke) -Unweathered -clasts are subangular					
	75	weak red calcareous or dolomitic SILTSTONE. Trace 1-3mm carbonate clasts (mostly dolomite). -Moderately hard to hard -Unweathered -cuttings: subangular/subround.	0.0 ppm @ ≈76'				2.5YR, 5/3 cuttings: 1-25mm
	80		0.0 ppm @ ≈84'				cuttings: 1-35mm
	85	weak red calcareous or dolomitic medium to coarse SANDSTONE (wacke) -Trace fine gravel (subangular sand + gravel). Matrix supported -slight weathering + yellow staining on some chips -Hard, Cuttings: subangular. No apparent carbonate clasts	0.0 ppm @ ≈88'				2.5YR, 5/3 cuttings: 1-25mm
	90	weak red calcareous or dolomitic fine to medium grained matrix supported SANDSTONE (wacke) -No apparent carbonate clasts -Unweathered, hard -cuttings: subangular/subround	0.0 ppm @ ≈93'				10YR, 5/3 cuttings: 1-20mm
	95	weak red (to gray). SANDY Breccia well sorted clast supported -Hard to very hard -Unweathered -cuttings: subangular -clasts: subangular	0.0 ppm @ ≈97'				2.5YR, 5/3 cuttings: 1-10mm
	100	weak red calcareous or dolomitic fine grained SANDSTONE (wacke) -No notable carbonate clasts -unweathered -Moderately hard to hard. -cuttings: subangular/subrounded	0.0 ppm @ ≈104'				2.5YR, 5/3 cuttings: 1-25mm
	105		0.0 ppm @ ≈107'				cuttings: 1-20mm
	110	Dusky red (to gray) medium to coarse grained SANDSTONE (wacke) -Calcareous or dolomitic w/ 1-8mm dolomite clasts apparent. → Rock is "speckled" w/ dolomite -matrix supported -Hard -trace weathering → discoloration of dolomite clasts -Sand is subangular -cuttings: subrounded/subangular	0.0 ppm @ ≈122'				2.5YR, 3/3 cuttings: 1-30mm
	115		0.0 ppm @ ≈117'				cuttings: 1-10mm
	120						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
H1A - Middletown	D. Haller	ERM-9I(Smt)	4 of 9 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	120	-Weak red calcareous or dolomitic coarse SANDSTONE. Matrix supported -Hard to very hard -Unweathered, Trace fine gravel -Sand is subangular - /Subround -cuttings: Subangular /Subround	0.0 ppm @ ≈123'				2.5YR, 5/3 cuttings: 1-25mm
	125	-Very dusky red calcareous or dolomitic SILTSTONE. Rock is speckled w/ 1-6 mm dolomite clasts -Unweathered -moderately hard to hard -trace fine - med. subangular/subround (cuttings: Subangular/subround) SAND	(Rock is a wacke) (No notable carbonate clasts) 0.0 ppm @ ≈126'				2.5YR, 2.5/3 cuttings: 1-20mm
	130	Dusky red calcareous or dolomitic fine to medium SANDSTONE. Trace 1-4 mm dolomite clasts. (Sand is Subround) -Slight weathering. (Trace discoloration (yellow)) -Hard -cuttings: subround. (≈5% fine-med. Subang. gravel)	0.0 ppm @ ≈132' (Rock is a wacke)				2.5YR, 3/3 cuttings: 1-20mm
	135	Dusky red (to gray) coarse to very coarse SANDSTONE. Sand is subround -Trace yellow staining → (slight weather.) -Hard to very hard cuttings: Subangular /Subround -Trace fine gravel (→ Subangular/Subround	0.0 ppm @ ≈137' (Rock is a wacke)				2.5YR, 3/3 cuttings: 1-10 mm
	140	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE (wacke) -Trace 1-7 mm dolomite clasts -moderately hard to hard -Unweathered -Trace subrounded coarse sand. -cuttings: Subangular/Subround.	0.0 ppm @ ≈143'				2.5YR 4/3 cuttings: 1-20mm
	145	Dusky red calcareous or dolomitic SILTSTONE. Trace 1-5 mm dolomite clasts -Moderately hard -Unweathered -cuttings: Subangular	0.0 ppm @ ≈148'				2.5YR, 3/3 cuttings: 1-65mm
	150	Dusky red calcareous or dolomitic fine to medium SANDSTONE. Trace 1-5 mm dolomite clasts. Trace angular fine gravel -Hard -Unweathered. Cuttings: subangular/subround -(wacke)	0.0 ppm @ ≈153'				2.5YR, 3/3 cuttings: 1-45 mm
	155		0.0 ppm @ ≈157	→ Note: A reading of 500 ppm was observed but is believed to be the result of H2O/particulates in the air baseline on the PID. (@ 158 → 0.0 ppm)			cuttings: 1-20 mm
	160		0.0 ppm @ ≈164				cuttings: 1-20mm
	165	Dusky red to gray calcareous or dolomitic matrix supported BRECCIA (SANDY) -Hard to very hard	0.0 ppm @ ≈169'				2.5YR, 3/3 cuttings: 1-20mm

HTW DRILLING LOG

PROJECT: H1A - Middletown | INSPECTOR: D. Heller | HOLE NO.: ERM-9I (cont) | SHEET 5 OF 9 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Clasts/cuttings are subangular unweathered					
	170	-Trace 1-4mm dolomite clasts.					
		Very dusky red (to gray) calcareous or dolomitic medium to coarse grained SANDSTONE (Wacke)	0.0 ppm @ ≈173'				(2.5YR, 2.5/3) cuttings: 1-15mm
		-Sand is subangular					
		-Unweathered					
		-Hard to very hard					
	175	-Trace 1-4mm dolomite clasts					
		-cuttings: subangular-/subround	0.0 ppm @ ≈176'				cuttings: 1-10mm
		-matrix supported					
	180						
		Dusky red calcareous or dolomitic (wacke) fine to medium grained SANDSTONE	0.0 ppm @ ≈184'				(2.5YR, 3/3) cuttings: 1-20mm
		-Trace subangular coarse sand + fine gravel					
	185	-Hard.					
		-Unweathered, except slight staining on trace mineral surfaces, bedding planes?	0.0 ppm @ ≈188'				cuttings: 1-30mm
	190	-Trace 1-5mm dolomite crystals throughout					
		-cuttings: subangular /subround	0.0 ppm @ ≈194'				cuttings: 1-20mm
	195						
			0.0 ppm @ ≈198'				cuttings: 1-20mm
	200						
			0.0 ppm @ ≈203'				cuttings: 1-25mm
	205						
			0.0 ppm @ ≈208'				cuttings: 1-20mm
	210						
		Weak red (to gray) calcareous or dolomitic matrix supported coarse SANDSTONE (wacke)					(2.5YR, 5/3) cuttings: 1-20mm
		-trace 1-4mm dolomite clasts					
	215	-trace fine gravel					

HTW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-9I (Sent) | SHEET 6 OF 9 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	215	-Gravel and sand are both subangular -hard to very hard -unweathered -cuttings: ~~tabular~~ Subangular	0.0 ppm @ ≈217'				cuttings: 1-10mm
	220	-Dusky red calcareous or dolomitic fine grained sandstone (wacke) -Hard -Unweathered -trace 1-7mm dolomite clasts -cuttings: Subangular/subround	0.0 ppm @ ≈223'				(2.5YR, 3/4) cuttings: 1-45mm
	225		0.0 ppm @ ≈227'				cuttings: 1-25mm
	230		0.0 ppm @ ≈233'				cuttings: 1-35mm
	235	Dusky red calcareous or dolomitic SILTSTONE -No apparent carbonate clasts -Moderately hard -Unweathered -cuttings: Subangular	0.0 ppm @ ≈237'				(2.5YR, 3/3) cuttings: 1-15mm
	240		0.0 ppm @ ≈243'				cuttings: 1-10mm
	245	Weak red calcareous or dolomitic fine grained SANDSTONE, No apparent carbonate clasts. Trace subangular medium + coarse sand. -Hard -Unweathered -cuttings: Subangular/subround	0.0 ppm @ ≈247' (Rock is a wacke)				(2.5YR, 5/3) cuttings: 1-10mm
	250	Dusky red calcareous or dolomitic SILTSTONE -No apparent carbonate clasts -Moderately hard -Unweathered -cuttings: Subangular (Note: Same as 235-245')	0.0 ppm @ ≈253'				(2.5YR, 3/3) cuttings: 1-15mm
	255		0.0 ppm @ ≈258'				cuttings: 1-10mm
	260	weak red calcareous or dolomitic fine grained SANDSTONE (wacke) -No notable carbonate clasts	0.0 ppm @ ≈263'				(2.5YR, 5/3) cuttings: 1-7mm

HTW DRILLING LOG

PROJECT: H1A - Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-9I(Sand) | SHEET 7 OF 9 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	265	- Hard - Unweathered - cuttings: Subangular/subround					
		weak red (to gray) calcareous or dolomitic matrix supported coarse SANDSTONE (wacke) - Hard to very hard - Unweathered	0.0 ppm @ ≈268'				(2.5 YR, 5/3) cuttings; 1-10mm
	270	- Trace subangular fine gravel - Sand is subangular - Cuttings are subangular/subround. - No notable Carbonate clasts	0.0 ppm @ ≈273'				cuttings; 1-10mm
	275		0.0 ppm @ ≈278'				cuttings 1-10mm
	280		0.0 ppm @ ≈283'				cuttings; 1-10mm
	285		0.0 ppm @ ≈288'				cuttings; 1-10mm
	290		0.0 ppm @ ≈293'				cuttings; 1-10mm
	295	Dusky red calcareous or dolomitic medium to coarse grained SANDSTONE (wacke) - Matrix supported - Sand is subangular - Trace fine gravel (subangular)	0.0 ppm @ ≈298'				(2.5 YR, 3/3) cuttings; 1-10mm
	300	- Hard to very hard - Unweathered - cuttings: Subangular/subround - No notable carbonate clasts	0.0 ppm @ ≈304'				cuttings; 1-10mm
	305	weak red to gray (lots of quartz) Sandy Breccia. Matrix supported - Hard to very hard - Unweathered - cuttings; subangular - clasts: subangular	0.0 ppm @ ≈307'				(2.5 YR, 5/3) cuttings; 1-15mm
	310						

HTW DRILLING LOG

PROJECT: H1A - Middletown | INSPECTOR: D. Heller | HOLE NO.: ERM-9I (Cont) | SHEET 8 OF 9 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	310	Dusky red calcareous or dolomitic SILTSTONE. Trace 1-4mm dolomite clasts - moderately hard to hard - Unweathered - cuttings: Subangular/Subrounded.	0.0 ppm @ ≈313'				2.5YR, 3/3 cuttings: 1-15mm
	315	Dusky red to gray Clasts of quartz) Sandy Breccia. Matrix supported - Hard to very hard - Unweathered - cuttings: Subangular - Clasts: Subangular	0.0 ppm @ ≈318' 0.0 ppm @ ≈323'				2.5YR, 3/3 cuttings: 1-10mm cuttings: 1-10mm
	320						
	325	Dusky red calcareous or dolomitic fine grained SANDSTONE (wacke) - No apparent carbonate clasts - Moderately hard to hard. - Unweathered - cuttings: Subangular/Subround	0.0 ppm @ ≈327' 0.0 ppm @ ≈333'				2.5YR, 3/3 cuttings: 1-10mm cuttings: 1-10mm
	330						
	335		0.0 ppm @ ≈337'				cuttings: 1-10mm
	340		0.0 ppm @ ≈343'				cuttings: 1-10mm
	345		0.0 ppm @ ≈348'				cuttings: 1-10 mm
	350						

Boring terminated @ 352' BGS. on 10/25/94. Well construction to follow @ a later time.
≈ total of injection water used = 3,000 gallons.
→ 12" casing advanced to 20' BGS
→ 8" casing advanced to 235' BGS

Note: All casings used were temporary

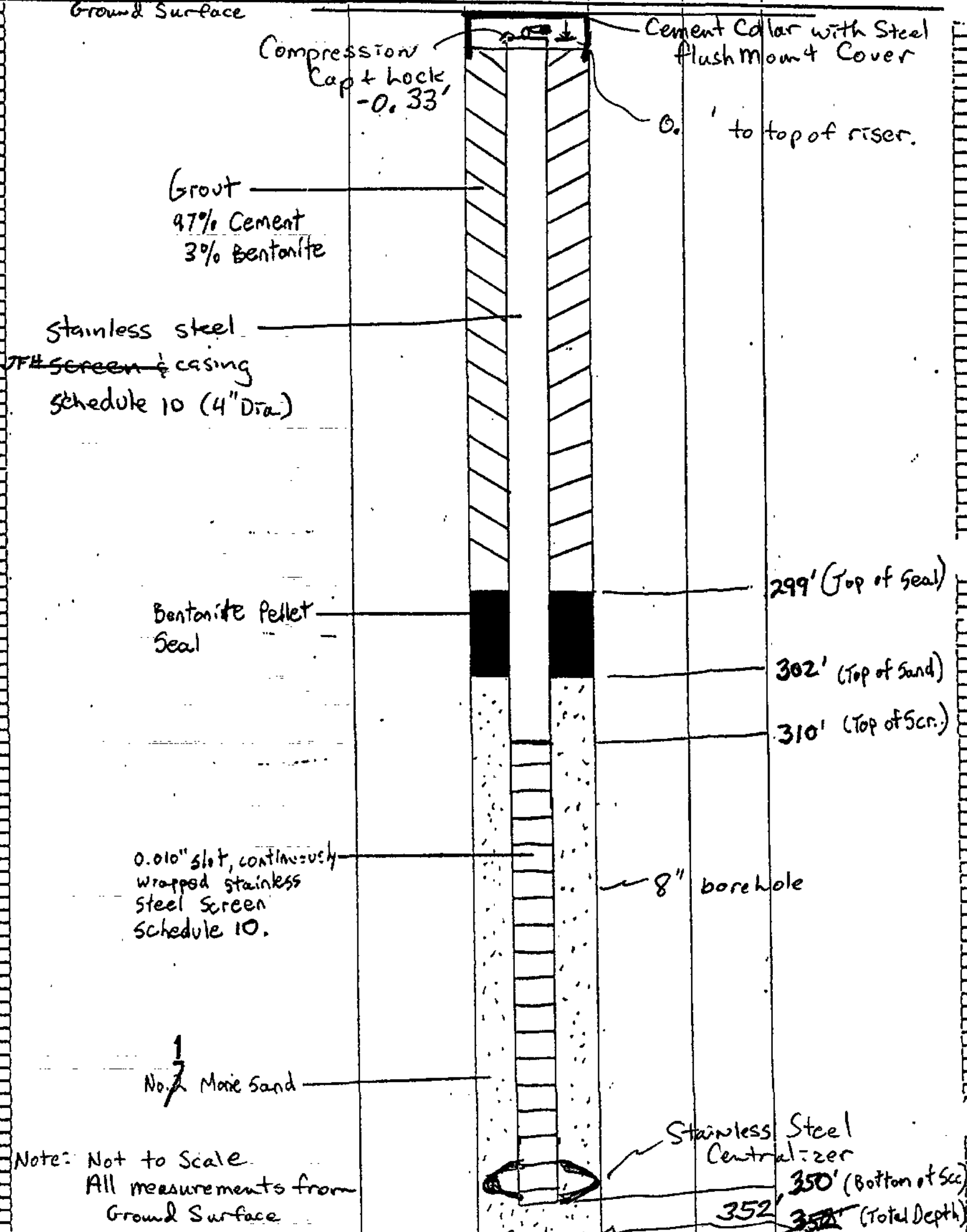
PROJECT: H1A - Middletown | HOLE NO.: ERM-9I (Cont)

Figure 4-4 (Continued)

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA, Middletown	~~C. Salomon~~ M. von Nieda	ERM-9 I	9 of 9 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



Ground Surface
Compression Cap + Lock -0.33'
Cement Collar with Steel flush mount Cover
0. ' to top of riser.
Grout 97% Cement 3% Bentonite
Stainless steel ~~screen~~ & casing schedule 10 (4" Dia.)
299' (Top of Seal)
Bentonite Pellet Seal
302' (Top of Sand)
310' (Top of Scr.)
0.010" slot, continuously wrapped stainless steel Screen Schedule 10.
8" borehole
No. 1 Morie Sand
Stainless Steel Centralizer
350' (Bottom of Scr.)
352' ~~352~~ (Total Depth)
Note: Not to Scale
All measurements from Ground Surface

PROJECT	HOLE NO.
HIA, Middletown	ERM-9I

HTW DRILLING LOG

HOLE NO. ERM-9(NEST)

PROJECT Middletown | INSPECTOR D. Haller | SHEET 1 OF 1 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

Supplemental Well Location Map for Well Nest ERM-9S, -9I, -9D

Union Street — Rte 441 → To High School

Family Medical Center

Parking

Parking

Parking

9S OLD

9D

9I

9S New

Frey Village

North

PROJECT Middletown HOLE NO. ERM-9S, -9I-9D

HTW DRILLING LOG

HOLE NO. ERM-9D(Sent)

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: Hydrogroup	SHEET 1 OF 16 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: J. Arnett	6. MANUFACTURER'S DESIGNATION OF DRILL: Barber	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 16" casing + bit to 76'; 12" casing + bit to 278'; 8" casing + bit to 677'; See pg. 15 of this log for additional data	8. HOLE LOCATION: Frey	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 9/20/94	11. DATE COMPLETED: 10/13/94
12. OVERBURDEN THICKNESS: ≈ 10'	15. DEPTH GROUNDWATER ENCOUNTERED: Unknown (water injected)	
13. DEPTH DRILLED INTO ROCK: ≈ 667'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 677'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	X		None

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
None						— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
ERM-9D Well Installed		X		D. Heller / Warren PA

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Reddish brown Sandy Silt - loose - Gravel < 15% - Sand % > Gravel % - Sand + Gravel ≥ 30% - Poorly graded	0.0 ppm @ ≈4'				5YR, 4/3 MC
	5		0.0 ppm @ ≈9'				
	10	Dusky red fine to medium grained silty Sandstone, Highly weathered to decomposed - very soft - cuttings are subrounded, (wacke) silty	0.0 ppm @ ≈14'				2.5YR, 3/4 cuttings; Silt sized to 7mm (Saprolite?)
	15	Dusky red medium to coarse grained SANDSTONE (wacke) - Moderately weathered. - Soft to Hard (lots of quartz clasts 1-5mm) - cuttings; Angular to subangular	0.0 ppm @ ≈17'				2.5YR 3/3 cuttings; 0-5mm
	20	Dusky red calcareous or dolomitic fine to medium grained SANDSTONE (wacke) silty - Moderately weathered - Soft to hard. No notable carbonate clasts - cuttings are subangular	0.0 ppm @ ≈23'				2.5YR, 3/3 cuttings; 1-10mm
	25						

HTW DRILLING LOG

HOLE NO. ERM-9D(Sent)

PROJECT: HIA Middletown | INSPECTOR: D. Haller | SHEET 2 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	25	(Sent cs 20-25')					
			0.0 ppm @ ≈28'				cuttings: 1-30mm
	30	Dusky red calcareous or dolomitic SILTSTONE, slightly to moderately weathered. - Moderately hard - cuttings: Subangular	0.0 ppm @ ≈32'				2.5YR, 4/3 cuttings: 1-30mm
	35	Dusky red calcareous or dolomitic SILTY fine to medium grained SANDSTONE (wacke). - slightly weathered - Hard to very hard - cuttings: Subangular - Silt/texture increases w/depth. - Black (Mn?) staining @ ≈43' on several cuttings surfaces. - No notable carbonate clasts - Sand is Subangular/Subround	0.0 ppm @ ≈37'				2.5YR, 3/3 cuttings: 1-10mm
			0.0 ppm @ ≈43'				cuttings: 1-20mm
	45	Dusky red fine to medium grained SANDSTONE. (Finer grained than above + 2% of fine sand). Hard, slightly weathered. - cuttings: Subangular/Subround	0.0 ppm @ ≈47'				2.5YR, 3/3 (wacke) cuttings: 1-30mm
	50	Weak red SANDY BRECCIA - well sorted. Matrix supported - Hard to very hard - Unweathered - cuttings: Subangular	0.0 ppm @ ≈52'				2.5YR, 6/3 cuttings: 1-25mm (4% coarse sand to fine gravel)
	55	Weak red calcareous SILTY or dolomitic fine grained SANDSTONE (wacke) - slightly weathered (discoloration in small areas) - Hard to very hard - cuttings: Subrounded - No notable carbonate clasts	0.0 ppm @ ≈57'				2.5YR, 5/3 cuttings: 1-10mm
	60	Reddish brown calcareous or dolomitic SILTSTONE - trace 1-3mm dolomite clasts - Moderately hard to hard - Slight weathering - cuttings: Subrounded	0.0 ppm @ ≈64'				5YR, 4/3 cuttings: 1-20mm
	65		0.0 ppm @ ≈68'				cuttings: 1-25mm
	70	Weak red (to gray) (lots of quartz) calcareous or dolomitic SILTY medium to coarse SANDSTONE (wacke)	0.0 ppm @ ≈73'				2.5YR, 5/3 cuttings: 1-15mm

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	D. Haller	ERM-9D(Sent)	3 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		-Unweathered -Hard to very hard					
	75	-cuttings: Subangular/subrounded -Trace 1-6 mm dolomite clasts	0.0 ppm @ ≈76'				cuttings: 1-25mm
		-Sand; Subangular					
	80	Dusky red calcareous or dolomitic SILTSTONE					(2.5 YR, 3/3)
		-Unweathered -moderately hard	0.0 ppm @ ≈84'				cuttings: 1-45mm
	85	-some fine silt towards bottom of interval. -No apparent calcite or dolomite crystals	0.0 ppm @ ≈89'				cuttings: 1-35mm
		-cuttings: Subangular/Subround					
	90	Weak red calcareous or dolomitic medium to coarse grained SANDSTONE (wacke)					(2.5 YR, 5/3)
		-Trace fine gravel -Sand + fine gravel clasts are subangular to subrounded	0.0 ppm @ ≈93'				cuttings: 1-25mm;
	95	-Hard to very hard -unweathered					
		-Trace 1-7mm dolomite clasts -cuttings: Subangular/subrounded -(clast supported)	0.0 ppm @ ≈98'				cuttings: 1-25mm;
	100	-dolomite clasts become less frequent w/depth	0.0 ppm @ ≈103'				cuttings: 1-35mm
	105	Dusky red calcareous or dolomitic SILTSTONE (No apparent clasts > siltstone. Carbonates present in matrix only)					(2.5 YR, 4/3)
		-unweathered -moderately hard -cuttings: Subangular/subrounded	0.0 ppm @ ≈107'				cuttings: 1-25mm
	110	Weak red calcareous or dolomitic medium to coarse grained SANDSTONE (wacke)					(2.5 YR, 5/3)
		-Trace fine gravel -Sand + fine gravel clasts are subangular to subrounded	0.0 ppm @ ≈113'				cuttings: 1-40mm (Note: Same as 90-105')
	115	-Hard to very hard -Unweathered					
		-Trace 1-10 mm dolomite clasts -cuttings: Subangular/subrounded -(clast supported)	0.0 ppm @ ≈118'				cuttings: 1-25mm
	120						

HIA DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	D. Haller	ERM-9D(S-1)	4 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	120	Same as above (110-120')					
		(Med-coarse SILTY SANDSTONE (wacke)	0.0 ppm @ ≈123'				cuttings: 1-35mm
	125						
			0.0 ppm @ ≈127'				cuttings: 1-30 mm
	130						
			0.0 ppm @ ≈133'				cuttings: 1-30 mm
	135						
			0.0 ppm @ ≈138'				cuttings: 1-25mm
	140						
			0.0 ppm @ ≈143'				cuttings: 1-25mm
	145						
			0.0 ppm @ ≈147'				cuttings: 1-30mm
	150	Dusky red calcareous or dolomitic fine to medium SILTY SANDSTONE. (wacke)					2.5YR, 4/3
		Trace subangular fine gravel					cuttings: 1-25mm
		-Hard-very hard, unweathered					(↑H2O @ ≈154')
		-Trace 1-15 mm dolomite clasts	0.0 ppm @ ≈153'				
		-cuttings: subangular/subrounded					
	155	Weak red calcareous or dolomitic SILTY medium to coarse grained SANDSTONE (wacke)					2.5YR, 5/4
		Trace angular fine gravel					
		-Hard-very hard. Unweathered	0.0 ppm @ ≈158'				cuttings: 1-30mm
		-Trace dolomite (1-5 mm) + less than 150-155					
		-cuttings: subangular/subround.					
	160						
			0.0 ppm @ ≈163'				cuttings: 1-15mm
	165						

PROJECT: HIA - Middletown

HOLE NO.: ERM-9D(scr)

MW DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-9D(Sent) | SHEET 5 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	170		0.0 ppm @ ≈167'				cuttings: 1-30mm (SH)
		Increase in frequency of 1-10mm dolomite crystals -1 coarse gravel sized angular piece of quartz	0.0 ppm @ ≈173'				cuttings: 1-40mm
	175						
			0.0 ppm @ ≈178'				cuttings: 1-35mm
	180	Dusky red calcareous or dolomitic fine to medium grained (Wacke) SANDSTONE. Trace subangular coarse sand + fine gravel (10-15%) (VC)	0.0 ppm @ ≈184'				2.5YR, 4/3 cuttings: 1-20mm
	185	-Hard -unweathered except slight discolouration on trace mineral grains, cuttings surfaces					(Increase in water production @ ≈187')
		-cuttings: subangular/subround	0.0 ppm @ ≈188'				cuttings: 1-30mm
	190	-Trace 1-5mm dolomite clasts throughout (Wacke - Sandstone has fines in matrix)	0.0 ppm @ ≈193'				cuttings: 1-20mm
	195						
			0.0 ppm @ ≈197'				cuttings: 1-45mm
	200						
			0.0 ppm @ ≈203'				cuttings: 1-30mm
	205		0.0 ppm @ ≈207'				cuttings: 1-25mm
	210						
			0.0 ppm @ ≈213'				cuttings: 1-20mm
	215						

PROJECT: HIA Middletown | HOLE NO.: ERM-9D(Sent)

HTH DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	D. Haller	ERM-9D(sc-t)	6 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	215	(Same as above)	0.0 ppm @ ≈217'				cuttings: 1-30mm
	220		0.0 ppm @ ≈224'				cuttings: 1-10mm
	225		0.0 ppm @ ≈227'				cuttings: 1-15mm
	230	Dusky red calcareous or dolomitic fine grained SILTY SANDSTONE. (wacke) Trace medium to coarse sand (subangular) -Hard -unweathered -Trace 1-5 mm dolomite clasts throughout w/an ≈20mm clast from the 238' sample -cuttings: Subangular/subrounded	0.0 ppm @ ≈232'				2.5YR, 4/4 cuttings: 1-25mm
	235		0.0 ppm @ ≈238'				cuttings: 1-35mm
	240		0.0 ppm @ ≈243'				cuttings: 1-30mm
	245	Dusky red calcareous or dolomitic SILTSTONE -Moderately hard -unweathered -Trace fine grained sized crystalline clasts -Trace 1-3mm dolomite crystals -cuttings: Subrounded.	0.0 ppm @ ≈248'				2.5YR, 4/3 cuttings: 1-15mm
	250		0.0 ppm @ ≈253'				cuttings: 1-15mm
	255		0.0 ppm @ ≈257'				cuttings: 1-25mm
	260	Weak red calcareous or dolomitic fine grained SILTY SANDSTONE. (wacke)					2.5YR, 5/3

PROJECT	HOLE NO.
HIA Middletown	ERM-9D (sc-t)

ROCK DRILLING LOG

PROJECT: HIA Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-9D (cont) | SHEET 7 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	265	- Moderately hard to hard - Unweathered - Trace 1-4mm dolomite clasts - Trace medium grained sand - Cuttings: Subangular/subrounded	0.0 ppm @ ≈263'				cuttings: 1-30mm
			0.0 ppm @ ≈267'				cuttings: 1-25mm
	270	(258-278' - slow drilling - hard)					
			0.0 ppm @ ≈272'				cuttings: 1-15mm
	275						
			0.0 ppm @ ≈277'				cuttings: 1-20mm
	280						
		Weak red calcareous or dolomitic float to medium grained SILTY SANDSTONE (wacke)					2.5YR, 5/3
		- Calcite and dolomite are both present in matrix and small (1-5mm clasts. Dolomite/calcite clasts throughout but are concentrated around 293' - Unweathered - Hard to very hard - Sand is subangular - Cuttings: Subangular/subrounded	0.0 ppm @ ≈284'				cuttings: 1-45mm
	285		0.0 ppm @ ≈288'				cuttings: 1-40mm
	290						
			0.0 ppm @ ≈293'				cuttings: 1-45mm
	295						
			0.0 ppm @ ≈297'				cuttings: 1-10mm
	300						
		Dusky red calcareous or dolomitic medium to coarse grained SILTY SANDSTONE (wacke)					2.5YR, 3/2
		- No notable calcite or dolomite clasts - Hard - Unweathered. - cuttings: subangular/angular	0.0 ppm @ ≈303'				cuttings: 1-25mm
	305						
		- Trace angular fine gravel clasts	0.0 ppm @ ≈308'				cuttings: 1-25mm
	310						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	D. Haller	ERM-9D(Sent)	6 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	340	Dusky red calcareous or dolomitic silty fine grained SANDSTONE (wacke)	0.0 ppm @ ≈313'				2.5YR, 3/2 cuttings: 1-20mm
		-Trace angular fine grained sized quartz. (Broken quartz vein?)					
	345	-Hard to very hard					
		-unweathered					
		-no notable calcite or dolomite clasts.	0.0 ppm @ ≈317'				cuttings: 1-25mm
		-cuttings: Subangular					
	350	Dusky red calcareous or dolomitic silty fine to medium grained SANDSTONE (wacke)	0.0 ppm ≈323'				2.5YR, 3/3 cuttings: 1-10mm
		trace coarse sand to fine grained sized angular quartz gravel.					
		-moderately hard to hard → Rock doesn't scratch easily w/a knife but it is brittle and can be broken into pieces by hand (poorly cemented?)	0.0 ppm @ ≈328'				cuttings: 1-30mm
		-unweathered					
		-cuttings: subangular/subrounded.					
	355	-no notable calcite or dolomite clasts.					
		-Rock is a "dirty" SANDSTONE" or "wacke."	0.0 ppm @ ≈333'				cuttings: 1-20mm
			0.0 ppm @ ≈337'				cuttings: 1-4mm (hardly any cuttings)
	360		0.0 ppm @ ≈343				cuttings: 1-10mm
		dusky red calcareous or dolomitic silty fine grained SANDSTONE (wacke)					2.5YR, 5/3
		-Trace medium grained sand.	0.0 ppm @ ≈347'				cuttings: 1-30mm
	365	-Hard to very hard					
		-unweathered					
		-cuttings: Subangular/subround					
		-Trace 1-4 mm dolomite clasts	0.0 ppm @ ≈353'				cuttings: 1-25mm
		-Med. sand is subangular					
	370		0.0 ppm @ ≈357'				cuttings: 1-10mm

PROJECT: HIA Middletown

HOLE NO.: ERM-9D(Sent)

RTH DRILLING LOG

PROJECT: H1A - Middletown | INSPECTOR: D. Heller | HOLE NO.: ERM-9D(sent) | SHEET 9 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	360						
		Weak red calcareous or dolomitic SILTSTONE; No notable calcite or dolomite clasts.	0.0 ppm @ ≈363'				2.5YR, 5/3 cuttings: 1-55mm
		- moderately hard to hard					
		- unweathered					
	365	- cuttings: Subangular.					
		Dusky red calcareous or dolomitic SILTSTONE or SHALE. Very trace very fine sand clasts	0.0 ppm @ ≈369'				2.5YR, 4/3 cuttings: 1-35mm
		- moderately hard to hard					
		- unweathered					
	370	- cuttings: subangular/subround.					
		- No notable calcite or dolomite clasts (Rock fizzes when crushed)	0.0 ppm @ ≈373'				cuttings: 1-25mm
	375						
		Weak red calcareous or dolomitic Clayey SILTSTONE. Trace 1-4mm angular dolomite clasts & medium to coarse sand clasts.	0.0 ppm @ ≈377'				2.5YR, 5/3 cuttings: 1-25mm
		- Moderately hard					
		- unweathered					
	380	- cuttings: Subrounded. SILTY					
		Dusky red medium to coarse grained SANDSTONE (wacke)	0.0 ppm @ ≈383'				2.5YR, 4/3 cuttings: 1-10mm
		- Hard - very hard					
		- unweathered					
		- cuttings: Subangular/Subrounded.					
	385	- Sand is subangular/subround					
		SILTY Dusky red fine grained SANDSTONE (wacke)					
		- Trace medium grained sand (subangular)	0.0 ppm @ ≈388'		fast drilling - fractured - lots of water (383-392')		2.5YR, 3/3 cuttings: 1-35mm
		- Moderately hard - hard					
		- unweathered					
	390	- cuttings: subrounded/subangular					
		Dusky red (to gray - lots of quartz) SILTY Coarse SANDSTONE. Trace fine to medium sand (wacke)	0.0 ppm @ ≈393'				2.5YR, 4/3 cuttings: 1-10mm
		- Hard - very hard					
		- unweathered, Poorly graded, clast supported, cuttings: subangular/subround.					
	395						
		Weak red SILTSTONE. Trace fine to medium angular sand.	0.0 ppm @ ≈397'				2.5YR, 5/3 cuttings: 1-10mm
		- moderately hard to hard					
		- Unweathered					
		- cuttings: Subangular/subrounded					
	400						
			0.0 ppm @ ≈403'				cuttings: 1-30mm
	405						

PROJECT: H1A - Middletown | HOLE NO.: ERM-9D(sent)

HYK DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA Middletown	D. Haller	ERM-9D (cont)	10 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	405	Dusky red calcareous or dolomitic fine to medium grained SILTY SANDSTONE - Trace subangular/subround coarse sand (fine grain) - Hard - very hard; unweathered - cuttings: Subangular/subrounded	(wacke) 0.0 ppm @ ≈408'				2.5YR, 4/3 cuttings: 1-30 mm
	410		→ No notable carbonate clasts				
		Weak red calcareous or dolomitic fine grained SILTY SANDSTONE. No clasts > fine sand. (wacke) - Hard - Unweathered - cuttings: Subrounded.	0.0 ppm @ ≈412'				2.5YR, 5/3 cuttings: 1-55 mm
	415						
		Weak red (to gray → lots of quartz) calcareous or dolomitic coarse SILTY SANDSTONE. Clast supported. - Hard → Very hard (Wacke) HF - Unweathered - cuttings: Subangular/Subround.	0.0 ppm @ ≈417'				2.5YR, 5/3 cuttings: 1-25 mm (Rock is a wacke).
	420						
		Dusky red calcareous or dolomitic SILTSTONE. Trace 1-3 mm dolomite clasts - moderately hard to hard - unweathered. - cuttings: Subangular/subrounded.	0.0 ppm @ ≈423'				2.5YR, 4/3 cuttings: 1-50 mm
	425		0.0 ppm @ ≈428'				cuttings: 1-45 mm
	430						
		Dusky red SILTY calcareous or dolomitic fine SANDSTONE. Trace 1-6 mm dolomite clasts throughout. Trace med-fine-coarse rounded sand. - Hard - very hard - unweathered - cuttings: Subround. - (Rock is a wacke)	0.0 ppm @ ≈433'				2.5YR, 3/3 cuttings: 1-40 mm
	435		0.0 ppm @ ≈437'				cuttings: 1-25 mm
	440						
		Weak red calcareous or dolomitic SILTSTONE. No noticeable calcite or dolomite clasts - Trace fine sand - Hard - Unweathered - cuttings: Subangular/subround	0.0 ppm @ ≈443'				2.5YR, 5/3 cuttings: 1-25 mm
	445		0.0 ppm @ ≈447'				cuttings 1-50 mm
	450		0.0 ppm @ ≈453'				cuttings: 1-35 mm

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.
HIA-Middletown	D. Haller	ERM-9D(sent) SHEET 11 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	455	Same as Above	0.0 ppm @ ≈457'				cuttings: 1-35mm
	460		0.0 ppm @ ≈463'	High Water Production (↓ approx. 462'–500')			cuttings: 1-50mm
	465	Weak red calcareous or SILTY dolomitic fine grained SANDSTONE (wacke) -Trace medium sand -Trace 1-5mm dolomite clasts -unweathered except trace discoloration on dolomite clasts -Hard -cuttings: Subrounded	0.0 ppm @ ≈468'				(2.5YR, 5/3) cuttings: 1-25mm
	470		0.0 ppm @ ≈472'				cuttings: 1-20mm
	475	weak red calcareous or dolomitic ~~fine~~ very fine grained SILTY SANDSTONE. Slightly smaller texture than 465'-475' -Hard to very hard -Very trace medium sand -Trace 1-10mm dolomite and calcite clasts throughout -unweathered except slight discoloration on carbonates -(Rock is a wacke)	0.0 ppm @ ≈476'				(2.5YR, 5/3) cuttings: 1-30mm
	480		0.0 ppm @ ≈484'				cuttings: 1-10mm
	485		0.0 ppm @ ≈488'				cuttings: 1-35mm
	490		0.0 ppm @ ≈493'				cuttings: 1-60mm
	495		0.0 ppm @ ≈497'				cuttings: 1-10mm
	500						

PROJECT: HIA-Middletown

HOLE NO. ERM-9D(sent)

H1A DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
H1A Middletown	D. Haller	ERM-9D(cont)	12 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	500	SAME AS Above	0.0 ppm @ ≈503'				cuttings: 1-35 mm
	505		0.0 ppm @ ≈508'				cuttings: 1-20 mm
	510	Dusky red calcareous or dolomitic coarse grained SILTY SANDSTONE. Matrix supported. (wacke) - Unweathered - Hard to very hard - No apparent calcite or dolomite clasts - cuttings: Subangular (Sand: Subangular)	0.0 ppm @ ≈512'				2.5YR, 3/3 cuttings: 1-40 mm
	515	- Weak red calcareous or dolomitic very fine grained SILTY SANDSTONE - Hard to very hard - Unweathered - No apparent calcite or dolomite clasts - cuttings: Subangular/Subrounded - trace medium grained sand subrounded clasts (Rock is a wacke)	0.0 ppm @ ≈517'				2.5YR, 5/3 cuttings: 1-10 mm
	520		0.0 ppm @ ≈523'				cuttings: 1-10 mm
	525		0.0 ppm @ ≈527'				cuttings: 1-50 mm
	530		0.0 ppm @ ≈533'				cuttings: 1-10 mm
	535		0.0 ppm @ ≈537'				cuttings: 1-25 mm
	540		0.0 ppm @ ≈543'				cuttings: 1-25mm
	545	weak red calcareous or dolomitic fine to medium grained SILTY SANDSTONE. (wacke)	0.0 ppm @ ≈547'				2.5YR, 5/3 cuttings: 1-35 mm

HIGH WATER PRODUCTION (Entire Interval)

ERM DRILLING LOG

ERM-9D(Sent)

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | SHEET 13 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	550	- Hard - unweathered. - Higher % of fine than medium sand. But not so high to call it a plain fine sandstone. - medium sand clasts are subangular to subrounded - cuttings: subrounded.	0.0 ppm @ ≈553'				cuttings: 1-30 mm
	555		0.0 ppm @ ≈557'				cuttings: 1-10 mm
	560		0.0 ppm @ ≈564'				cuttings: 1-20 mm
	565	Dusky red calcareous or dolomitic SILTSTONE. No apparent clasts > silt sized - Hard - unweathered - cuttings: Subangular/subrounded.	0.0 ppm @ ≈568'				2.5YR, 3/3 cuttings: 1-25 mm
	570	Weak red calcareous or dolomitic fine to medium grained SILTY SANDSTONE (wacke) - Higher % of fine sand than medium sand. - Hard - unweathered - medium sand clasts are subangular to subrounded. - cuttings: subrounded. Note: Slight increase in the % of medium grained sand. - No notable carbonate clasts - Carbonates in matrix only	0.0 ppm @ ≈573'				2.5YR, 5/3 cuttings: 1-15 mm (Same as 545-565)
	575		0.0 ppm @ ≈577'				cuttings: 1-10 mm
	580		0.0 ppm @ ≈584'				cuttings: 1-20 mm
	585		0.0 ppm @ ≈588'				cuttings: 1-40 mm
	590		0.0 ppm @ ≈593'				cuttings: 1-30 mm
	595						

High water production (centre interval)

PROJECT: HIA - Middletown | HOLE NO.: ERM-9D(Sent)

... DRILLING LOG

ERM-9D(cont)

PROJECT: HIA Middletown

INSPECTOR: D. Haller

SHEET ?? of 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	595	Dusky red calcareous or dolomitic SILTSTONE. Trace 1-3mm dolomite clasts. -moderately hard to hard -unweathered -cuttings: Subrounded	0.0 ppm @ ≈597'	High Water Production (entire interval)			(2.5YR, 4/3) cuttings: 1-10mm
	600	Dusky red calcareous or dolomitic medium to coarse grained SILTY SANDSTONE -matrix supported (wacke) -No noticeable dolomite or calcite clasts -Hard to very hard -unweathered -cuttings: Subangular/subround -Sand: Subangular/Subround	0.0 ppm @ ≈603' 0.0 ppm @ ≈608'				(2.5YR, 4/3) cuttings: 1-20mm cuttings: 1-10mm
	605						
	610	Dusky red calcareous or dolomitic fine grained SILTY SANDSTONE (wacke) -trace 1-3mm dolomite clasts -Hard-very hard -unweathered -cuttings: Subrounded.	0.0 ppm @ ≈613'				(2.5YR, 4/3) cuttings: 1-35mm
	615	Dusky red calcareous or dolomitic medium to coarse grained SILTY SANDSTONE (wacke) -No apparent carbonate clasts. -Hard to very hard -unweathered -cuttings: Subangular/Subround -Sand: Subangular/Subround	0.0 ppm @ ≈617				(2.5YR, 4/3) cuttings: 1-10mm
	620	Dusky red calcareous or dolomitic SILTSTONE. -No apparent carbonate clasts -Moderately hard -Unweathered -cuttings: Subangular/Subround	0.0 ppm @ ≈623' 0.0 ppm @ ≈628' 0.0 ppm @ ≈633' 0.0 ppm @ ≈637'				(2.5YR, 4/3) cuttings: 1-45mm cuttings: 1-10mm cuttings: 1-20mm cuttings: 1-10mm
	625						
	630						
	635						
	640	See next pg. for 640↓ log					

PROJECT: HIA Middletown

HOLE NO.: D. Haller

ERM DRILLING LOG

PROJECT: HIA - Middletown | INSPECTOR: D. Haller | HOLE NO.: ERM-9D(cont) | SHEET 6 OF 16 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	645	Weak red calcareous silty dolomitic fine grained SANDSTONE.	0.0 ppm @ 643'				2.5YR, 5/3
		- No apparent carbonate clasts					cuttings: 1-15mm
		- Hard to very hard					
		- Unweathered					
		- cuttings: Subrounded/subangular	0.0 ppm @ ≈648'				cuttings: 1-15mm
		- Trace medium sized angular					
	650	Sand. Subrounded (WE)					
		- (Rock is a wacke)					cuttings: 1-30mm
			0.0 ppm @ ≈653'				
	655	Weak red calcareous silty dolomitic medium to coarse grained SANDSTONE (wacke)					2.5YR, 5/3
		- Matrix supported.					cuttings: 1-10mm
		- Hard	0.0 ppm @ ≈658'				
		- Unweathered					
		- no apparent carbonate clasts					
	660	- cuttings: subangular					
		Dusky red calcareous silty dolomitic fine grained SANDSTONE (wacke)					2.5YR, 4/3
		- No apparent carbonate clasts	0.0 ppm @ ≈663'				cuttings: 1-30mm (Since as 640-655')
		- Hard to very hard. Trace med. sand.					
		- Unweathered					
	665	- cuttings: subround					
		Dusky red calcareous silty dolomitic fine to medium grained SANDSTONE (wacke)					2.5YR, 4/3.
		- No apparent carbonate clasts.	0.0 ppm @ ≈667'				cuttings: 1-10mm
		- Hard-very hard					
		- unweathered					
	670	- cuttings: Subangular/subround					
							cuttings: 1-10mm
			0.0 ppm @ ≈673'				
	675						
			0.0 ppm @ ≈676'				cuttings: 1-10mm
		Boring terminated @ 677' BGS on 10/11/94. Well construction to follow @ a later time.					
	680	≈ total of injection water used = 10,800 gallons.					
		→ 16" casing advanced to 76' BGS					
		→ 12" casing advanced to 278' BGS					
		→ 8" casing advanced to 677' BGS.					
		Note: All casings used were temporary					

PROJECT: HIA - Middletown | HOLE NO.: ERM-9D(cont)

Figure 4-1 (Continued)

HTW DRILLING LOG

HOLE NO. ERM-9D

PROJECT HIA, Middletown

INSPECTOR DEREK EVANS

SHEET 16 OF 16 SHEETS

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE & CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS

CEMENT PAD

GROUND SURFACE

STEEL FLUSH MOUNT COVER

COMPRESSION CAP AND LOCK TOP OF RISER (4" STAINLESS STEEL) -0.31

LOCATION

PA TURNPIKE

FRUEHAUF

ERM-9D

FREY VILLAGE

N

BRUNNER RUN (UNNAMED ST.)

Grout
97% Cement
3% Bentonite

20' OF 16" BOREHOLE

4" diam. Schedule 5+10 Stainless Steel riser

612' (Top of Seal)

Bentonite SLURRY Seal

625' (Top of Sand)

630' (Top of Scr.)

4" DIAMETER 0.010" slot, continuously wrapped stainless steel screen Schedule 10

8" BOREHOLE

No. 1 Morie Sand

NOTE: NOT TO SCALE

ALL MEASUREMENTS FROM GROUND SURFACE

670' (Bottom of Scr.)

673' (Total Depth)

PROJECT HIA, Middletown

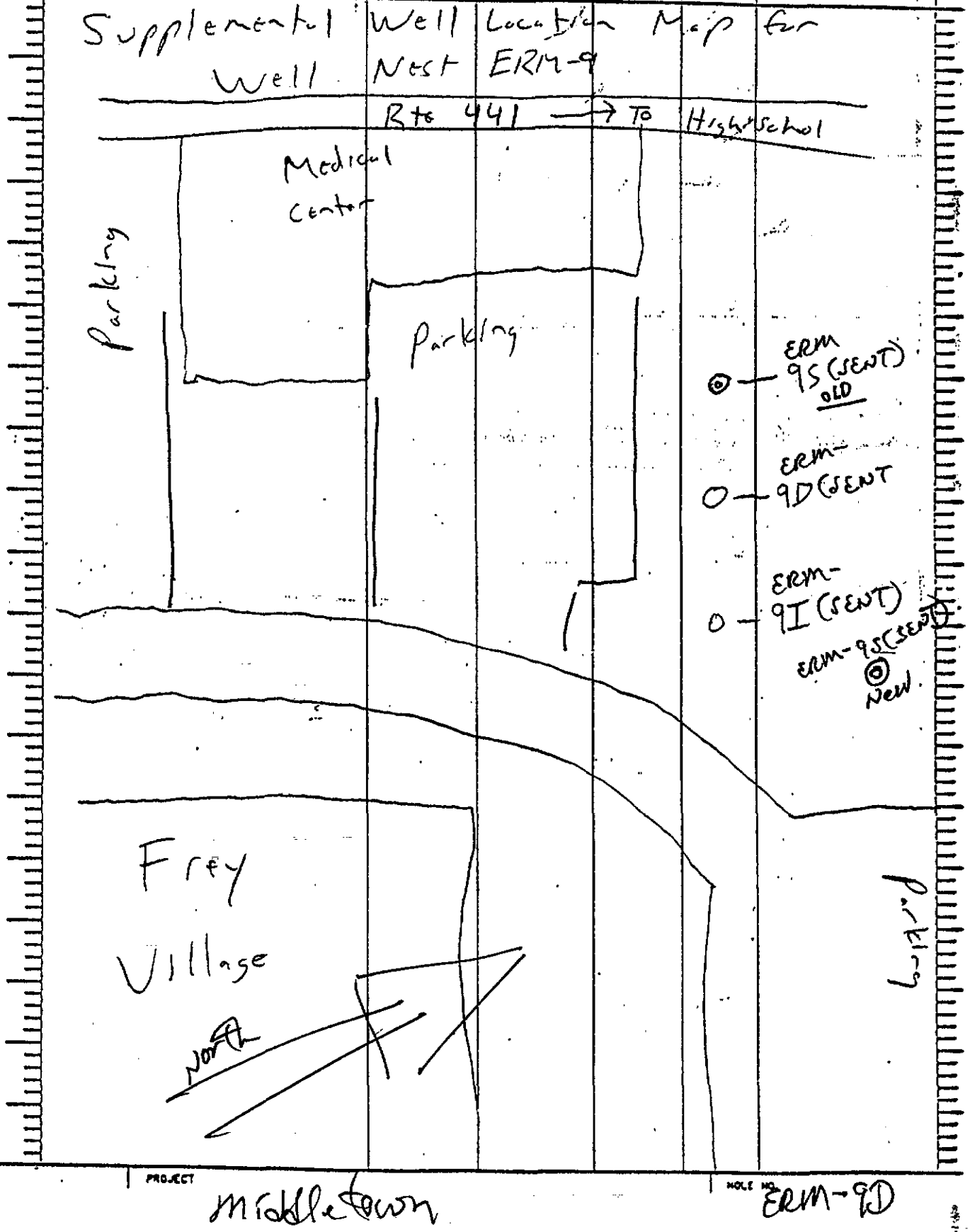
HOLE NO. ERM-9D

HTW DRILLING LOG

HOLE NO. ERM-9(NEST)

PROJECT Middletown | INSPECTOR D. Haller | SHEET 1 OF 1 SHEETS

ELEV. ft.	DEPTH ft.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS



PROJECT Middletown | HOLE NO. ERM-9D

Industrial Area - Main Building Area
Soil Borings

HTW DRILLING LOG

HOLE NO. 1AB-SB13

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT
SHEET 1 OF 2 SHEETS	
3. PROJECT: HIA - Middletown	4. LOCATION: Behind Chloé / Middletown, PA.
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-59 (H.S.A. Rig)
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. rig. / 3" S.S. Split spoons (I.D.) / 3 1/4" I.D. ~~Drill bit~~ + Augers / 7" O.D. ~~Drill Rods~~ Augers / 140 lb hammer	8. HOLE LOCATION: West most boring / See Sheet 2.
	9. SURFACE ELEVATION: NA - Unknown
	10. DATE STARTED: 5-31-94
	11. DATE COMPLETED: 5-31-94
12. OVERBURDEN THICKNESS: >9.0 feet. H.S.A to 7.0' S.S. to 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 9.0'
13. DEPTH DRILLED INTO ROCK: N/A / no rock encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.0' — 0.0 time elapsed
14. TOTAL DEPTH OF HOLE: 9.0 feet.	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	~~UNDISTURBED~~ (WE)	19. TOTAL NUMBER OF CORE BOXES
NONE	X	X	~~3 total~~ (WE) NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 total	See 20. X	X	See ~~T.R. 2~~ (WE)	—	—	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X	—	—	Warren N. Fup

(S.S. = Split spoon sample - 2')

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Gravel layer. (FILL) (1/4" to 1" Dia) angular S.S.		NS	NS	NA	Possible limestone gravel
	1	Poorly graded sand with with silt. (<15% GR) subround; Loose; Dry; medium to coarse grained sands; slightly plastic, alluvial?	0 PID no odor	~~(.5 to 2.5)~~ (WE)	IAB-SB 13(.5-2.5)	18, 27, 40, 41	.6' recovery (SP-SM) 10YR 4/4 dark yellowish brown
	2						
		(Similar) Same as above S.S. (cuttings from augers)		NS	NS	NA	~~.5 ft recovery~~
	3	Poorly graded sand with silt. (gray - limestone rock within. (<15% GR); loose; dry; medium to fine grain sand; slightly - plastic, rounded alluvial?	0 PID No odor	~~(3' to 5')~~ (WE)	IAB-SB 13(3-5)	49, 44, 38, 31	(SP-SM) 10YR 4/3 brown; gray limestone prevented good recovery
	4						

PROJECT: HIA - Middletown HOLE NO. IAB-SB13

HTW DRILLING LOG

HOLE NO. IAB-SB13

PROJECT HIA - Middletown | INSPECTOR Warren Fow | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	6	S.S. Split spoon rejected, cobbles No recovery Drilled to 7.0' river rock, 3" dia rounded.		NS	NS	NA	Split spoon rejected NO sample
	7	S.S. Poorly graded sand with gravel. (7.5Y 5/6) loose moist v. Coarse grained with small quartz gravel. non-plastic alluvial? -Slight blackish 1" layer at the bottom	0 PID	(7'-9') (WE)	IAB-SB 13 (7-9)	27, 27, 80, 71	(SP) 10YR 4/4 dark yellowish brown .7' recovery 9' saturated at bottom of spoon.
	9	End of boring at 9' T.D. spoon	(WE) 5-31-94				

North.

Chloe Bldg. # 142

~60'

~40'

PRIVE WAY

IAB-SB13 boring

DUMPSTER (Removed)

* Not to scale

HTW DRILLING LOG

HOLE NO. IAB-SB14

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Behind Chloé / Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobil B-59 (H.S.A. Rig.)	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. Rig Mobile B59; 3" S.S. Split spoon S(O.D.); 3 1/4" I.D. ~~Drill bit~~ AUGERS; 7" O.D. ~~Drill rods~~ AUGERS; 140 lb hammer	8. HOLE LOCATION: Center location - See sheet 2.	
	9. SURFACE ELEVATION: N/A - UNKNOWN	
	10. DATE STARTED: 5-31-94	11. DATE COMPLETED: 5-31-94
12. OVERBURDEN THICKNESS: >12.5' H.S.A to 10.5', SS. to 12.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 11.0'	
13. DEPTH DRILLED INTO ROCK: N/A - Not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 11.0' - at 0.0 Min. elapsed.	
14. TOTAL DEPTH OF HOLE: 12.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~IAB-SB14(10.5-12.5)~~ (WF)	X	~~X~~ (WF)	(WF) ~~0 total~~ NONE

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 total	X	X	See T.R. (WF)	-	-	NA %

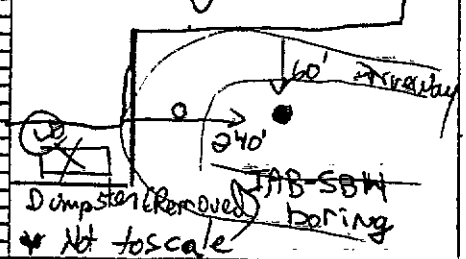
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X	-	-	Warren N. Fyfe

ELEV. a.	DEPTH b.	(S.S. = 2' split spoon) DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Topsoil, loose, dry, organic soil S.S. with Sand.	0 PID NO ODOR	~~(0' to 2')~~ (WF)	IAB-SB 14 (SSC)	NA	10YR 5/3 BROWN OL-OH
	1.5	Poorly graded sand with silt (<15% GR) loose moist medium to fine (sand) grained non-plastic (sand)	0 PID NO ODOR	~~(1.5 to 2.5')~~ (WF)	IAB-SB 14 (0.5-2.5)	19, 34, 34, 34	SP-SM 1.3' recovery 10YR 4/4 dark yellowish brown
	2	alluvial? S.S. * small amount of coal					
	3	Poorly graded sand with silt (<15% GR) loose dry fine grain sand non-plastic	0 PID NO ODOR	~~(2.5' to 4.5')~~ (WF)	IAB-SB 14 (2.5-4.5)	30, 38, 46, 26	SP-SM 1.4' recovery 10YR 4/3 ~~dark yellowish~~ brown. (WF)
	4	alluvium?					
	5	Poorly graded sand with (<15% GR) silt.	0 PID NO ODOR	~~4.5 to 6.5~~ (WF)	IAB-SB 14 (4.5-6.5)	15, 22, 16, 22	SP-SM Full recovery 2'

HTW DRILLING LOG

HOLE NO. IAB-SB14

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	loose - alluvium dry fine grain, non plastic					10YR 4/3 brown
	5.5	very silty fine sand. poorly graded (<15%) soft moist sub rounded alluvium?					SP 10YR 3/1 very dark gray
	6	S.S.					
		Very silty fine sand (.8)	O PID NO ODOR	(6.5 to 8.5)	IAB-SB 14 (6.5-8.5)	56, 109 134/6"	SP full recovery, 2' 10YR 3/2 very dark grayish brown
	7	Poorly graded Sand loose dry non-plastic slight red oxidation					SP 10YR 6/3 pale brown.
	8	S.S. alluvium?					
		Poorly ~~graded~~ (w) gravel well Sorted with Sand (>15%) loose dry v. coarse grain. angular alluvium?	O PID NO ODOR	(8.5 - 10.5)	IAB-SB 14 (8.5-10.5)	61, 43 31, 23	GP 10YR 6/3 light yellowish brown small cobbles (1½" DIA.) 5 recovery
	9						
	10	S.S.					
		Poorly ~~graded~~ (w) gravel well Sorted with Sand. loose saturated (11.0') sub-angular gravel alluvium?	No odor O PID.	NS	NO SAMPLE COLLECTED	36, 32, 34, 28	GP 10YR 6/3, lt. yellowish brown Encountered water
	11						
	12	↑ North.					
		Chloé Bldg. # 142  * Not to scale	End of boring (12.5')			WF	5-31-94

PROJECT: HIA - Middletown | HOLE NO. IAB-SB14

HTW DRILLING LOG

HOLE NO. IAB-SB15

1. CONTRACTOR NAME: ERM
2. DRILLING SUBCONTRACTOR: ADT
SHEET 1 OF 2 SHEETS

3. PROJECT: HIA - Middletown, PA
4. LOCATION: Middletown, PA IAB-SB15 - Behind Chloe
5. NAME OF DRILLER: Tom Brown / John Bowers
6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-58 (H.S.A Rig).
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT:
- H.S.A. Rig Mobile B-5
- 3" S.S. split spoons (S.O.)
- 3¼" I.D. Drill bit Auger
- 7.0" O.D. Drill rods Auger
- 140 lb hammer
8. HOLE LOCATION: Eastmost location
9. SURFACE ELEVATION: N/A - Unknown
10. DATE STARTED: 5-31-94
11. DATE COMPLETED: 5-31-94
12. OVERBURDEN THICKNESS: >12.5 feet. H.S.A. to 10.5, S.S. to 12.5'
13. DEPTH DRILLED INTO ROCK: N/A - Not encountered
14. TOTAL DEPTH OF HOLE: 12.5 feet.
15. DEPTH GROUNDWATER ENCOUNTERED: 11.5'
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 11.5' @ 0.0 time elapsed.
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A
18. GEOTECHNICAL SAMPLES: — DISTURBED: X UNDISTURBED: X (WP)
19. TOTAL NUMBER OF CORE BOXES: ~~5 Samples~~ (WP) NONE

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 total	X	X	See T.R. 1	—	—	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X	—	—	Warren N. Fox

(S.S. = 2' split spoon)

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		ORGANIC TOP SOIL	0 PID	0'-0.2' (WP)	IAB-SB 15 (SSC)	N/A	OL-OH
		S.S.				28, 65,	10YR5/3 Brown
	1.0'	SILT (WITH SMALL AMOUNT OF SAND, <15%) loose dry massive v. fine sand grains brown ~~SAND~~ rounded. alluvium?	0 PID NO ODOR	(0.5 to 2.5) (WP)	IAB-SB 15(0.5-2.5)	58, 64	ML 10YR 4/4 dark yellowish brown soil. 1.5' recovery
	2.0'	S.S.					
	3.0'	SILT (WITH SMALL AMOUNT OF SAND <15%) Loose Dry Massive v. fine sand (rounded) brown some quarts 1" Dia. cobbles (round) S.S. Alluvial?	0 PID. NO ODOR	(2.5 to 4.5) (WP)	IAB-SB 15(2.5-4.5)	130, 80, 60, 50	ML. 10YR 4/4 dark yellowish brown. 1.6" Recovery
	4.0'						
	5.0'	Same material with large 2" cobbles	0 PID No Odor	(4.5 to 6.5) (WP)	IAB-SB 15(4.5-6.5)	65, 115, 63, 27	ML. .5' Recovery

HTW DRILLING LOG

HOLE NO. IAB-SB15

PROJECT: HIA-Middletown | INSPECTOR: Warren Fay | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	Same as above					10YR 4/4 dark yellowish brown
	6.0	S.S.					
		Same silt (with small amount of sand <15%) Loose dry traces of gravel and m. to f. grain sand	O PID NO ODOR	~~6.5 to 8.5~~ (WF)	IAB-SB 15(6.5-8.5)	89, 109, 143, 100	(ML)
	7.0	Dashed Line					1.4' recovery ~~SM-SP~~
		Poorly graded sand with silt loose Dry m. to f grain alluvium					10YR 4/3 brown
	8.0	S.S.					
		Poorly graded sand. loose moist m. to coarse grain sand trace of silt alluvium	O PID NO ODOR	~~8.5 to 10.5~~ (WF)	IAB-SB 15(8.5-10.5)	38, 26, 25, 48	(SP) 10YR 4/3 Brown
	9.0						
	10.0	S.S.					
		Similar material as (8.5 to 10.5)	O PID NO ODOR	~~10.5 to 12.5~~ (WF)	IAB-SB 15(10.5-12.5)	65, 50, 65, 86	No sample collected for analysis
	11.0						-11.5' saturated
	12.0	North					
		Chloé Bldg #142		End of Boring at 12.5'			(WF) 5-31-94
		60' 120' IAB-SB15					
		Not to scale					
		Straight line from edge of building.					

PROJECT: HIA - Middletown | HOLE NO.: IAB-SB15

HTW DRILLING LOG

HOLE NO. IAB-SB16

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT	SHEET 1 OF 3 SHEETS
3. PROJECT: HIA-Middletown	4. LOCATION: Middletown, Pennsylvania	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: B-59 Mobile Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A RIG "MOBILE DRILL B-59"; 3" S.S. split spoons (O.D.); 3 1/4" ID & ~~Drill bit~~ 7" O.D. ~~Drill Rods~~ Augers; 140 lb hammer	8. HOLE LOCATION: (See sheet #3)	
	9. SURFACE ELEVATION: UNKNOWN	
	10. DATE STARTED: 6-1-94	11. DATE COMPLETED: 6-1-94
12. OVERBURDEN THICKNESS: >14.5' - H.S.A to 12.5', S.S. to 14.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 12.5'	
13. DEPTH DRILLED INTO ROCK: Rock not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 12.5' no elapsed time.	
14. TOTAL DEPTH OF HOLE: 14.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
(1) IAB-SB16 (5.0-7.0)	X	~~X~~ (WP)	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 total	X	X	~~See F.R.~~ (WP)	—	—	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X	—	—	Warren N. Fox

ELEV. a.	DEPTH b.	(S.S. = 2' split spoon) DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	ORGANIC RICH TOP SOIL, LOOSE, MOIST	0 PID	~~0'to 2'~~ (WP)	IAB-SB16(SS)0	N/A	(OL-OH) 10YR 3/2 V. dark grayish brown
		S.S. Augered Interval		NS	NS		
	0.5	Silt with small amount of Sand. (<15%) loose dry fine grain Sand (rounded) massive/uniform alluvium?	0 PID NO ODOR	~~.5' to 2.5'~~ (WP)	IAB-SB 16(0.5-2.5)	23, 40, 41, 42	(ML) 10YR 4/4 dark yellowish brown 1.8' recovery
	1.0						
	2.0						
		S.S					
		Silt (with small amount of Sand. (<15%) loose dry trace of fine grain Sand. massive/uniform alluvium?	0 PID NO ODOR	~~(2.5 to 4.5)~~ (WP)	IAB-SB 16(2.5-4.5)	29, 26, 22, 23	(ML) 10YR 3/4 Brown 2.0' Recovery
	3.0						
	4.0						
		Augered Interval		NS	NS	NA	
	5.0						

PROJECT: HIA - Middletown | HOLE NO. IAB-SB16

HTW DRILLING LOG

HOLE NO. IAB-SB16

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 1 OF 3 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	S.S. Poorly graded sand loose dry to moist m. grain sand (angular) (salt + pepper mix) Alluvium?	0 PID No Odor	(5' to 7')	IAB-SB 16(5-7)	15,17, 22,25	SP 10YR 5/4 yellowish brown 2.0' Recovery
	6.0 7.0	Augered Interval	NS	NS	NA		
	8.0	S.S. Poorly graded sand (salt & pepper mix of grains) loose moist m. to coarse grain (angular)	0 PID no odor	~~(8' to 10')~~ WF	IAB-SB 16(8-10)	60,88, 72,100	SP 10YR 4/3 Brown 1.2 Recovery
	9.0 10.0	Augered Interval	NS	NS	NA		
	11.0	S.S. Poorly graded gravel with sand (≥15%) loose small moist clay lense (Continued) gravel w/ round cobbles (1" to 3" Dia) Sand - coarse grain. (angular)	0 PID no odor	~~(10.5' to 12.5')~~ WF	IAB-SB 16(10.5-12.5)	50,100, 72,81	GP 10YR 4/3 Brown 2.0' Recovery
	12.0 13.0	Same as above	0. PID No Odor	NS	NS	47,47 53,50	Saturated at 12.5' no sample collected for analysis.
	14.0 14.5	14.5' End of boring - WF		6-1-94			

PROJECT: HIA - Middletown | HOLE NO. IAB-SB16

HTW DRILLING LOG

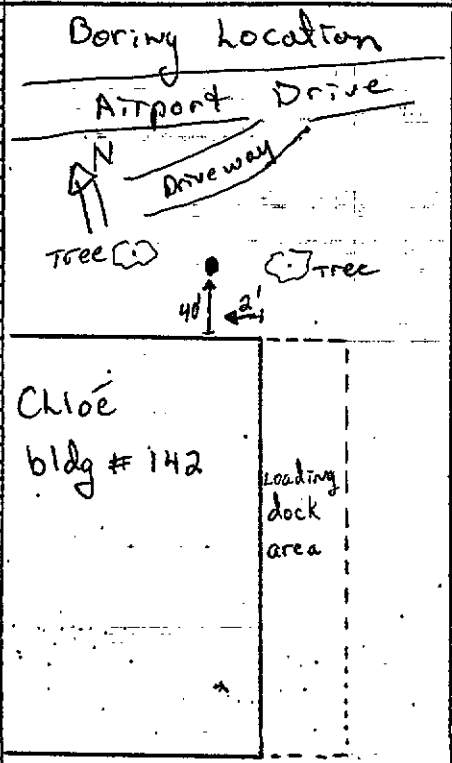
HOLE NO. IAB-SB16

PROJECT: HIA - Middletown

INSPECTOR: Warren Fox

SHEET 3 OF 3 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



* Not to scale

HTW DRILLING LOG

HOLE NO. IAB-SB17

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: HIA - Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bower	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig "B-59"	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A rig - Mobile B-59; 3" S.S. split spoons (O.D.); 3 1/4" I.D. ~~Drill bit~~ (H.S.A.); 2" O.D. ~~Drill~~ Rods (H.S.A); 140 lb hammer; Augers (WE)	8. HOLE LOCATION: See Sheet # 2	
	9. SURFACE ELEVATION: Unknown	
	10. DATE STARTED: 6-2-94	11. DATE COMPLETED: 6-2-94
12. OVERBURDEN THICKNESS: >12.0' (H.S.A. to 10.0', S.S. to 12.0')	15. DEPTH GROUNDWATER ENCOUNTERED: 9.5'	
13. DEPTH DRILLED INTO ROCK: Not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.5' ZERO TIME ELAPSED	
14. TOTAL DEPTH OF HOLE: 12.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	X	~~X~~ (WE)	—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	X	X	~~See T, R~~ (WE)			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X			Warren N. Zapp

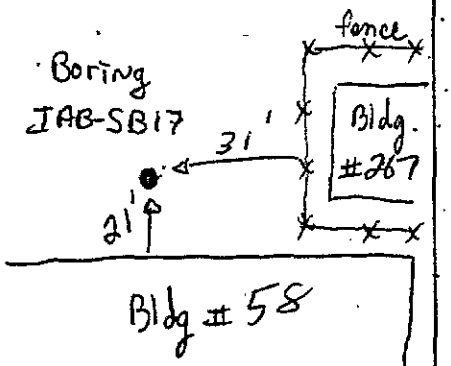
ELEV. a.	DEPTH b.	(S.S. = Split spoon - 2') DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	ORGANIC RICH, SOIL, ROOT (GRASS)	0. PID NO ODOR	~~(0"-2")~~ (WE)	IAB-SB17(SSC)	NA	(OL-OH) 2.5Y 5/3 light olive brown
		S.S. Same as above			NS		
	.5	Same as above (Augered Interval)	0. PID NO ODOR	~~(2.5'-4.0 2.5')~~ (WE)	IAB-SB 17(0.5-2.5)	12, 27, 37, 38	
	1.0	Poorly graded Sand w/ silt (<15% GR) loose dry fine grain sand (round) Alluvium?					1.7' recovery (SP-SM) 10YR 5/6 yellowish brown
	2.0	S.S.					
		Silt with fine sand (<15%) stiff moist v. fine grain sands mixed with 5% gravel 1/8" dia. uniform Alluvium?	0 PID NO ODOR	~~(2.5'-4.5')~~ (WE)	IAB-SB 17 (2.5-4.5)	48, 56, 35, 31	(ML) 1.5' recovery 10YR 5/6 yellowish brown
	4.0						
		Same as Above		NS	NS	NA	
	5.0						

HTW DRILLING LOG

HOLE NO. IAB-SB17

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	S.S. Same as above	0 PID NO ODOR	(5'to7') WB	IAB-SB 17(5-7)	27, 31 36, 49	same as above
	6.0	Poorly graded sand with gravel (≥15%) loose moist salt-pepper (med-to coarse grain sand angular from 6'to7'					SP 10YR 5/4 yellowish brown 1.7' Recovery
	7.0	S.S. Alluvium. Same material as (6'to7') Noted many small rounded gravel "river rocks". ½" to 1" in diameter.	0 PID NO ODOR	(7'to9') WE	IAB-SB 17(7-9)	59, 100 75, 88	1.3' Recovery
WE	9.0	~~End of Boring at 9.0'~~ WE			NS	NA	WE
		S.S. Same as above (Augered Interval)					9.5' Saturated (Estimated)
	10.0	S.S. Similar Material. Saturated (9.5') Estimated	0 PID NO ODOR	(10'to12') WE	NS	8, 11, 24, 50	.8' recovery To confirm saturation zone
	11.0	AIRPORT ROAD					
		End of Boring at 12.0'					WE 6-2-94
	12.0						



PROJECT: HIA - Middletown | HOLE NO. IAB-SB17

HTW DRILLING LOG

HOLE NO. IAB-SB18

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT - MA
SHEET 1 OF 2 SHEETS	
3. PROJECT: HIA - Middletown	4. LOCATION: HIA - Middletown, PA
5. NAME OF DRILLER: Tom Brown / John Bower	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig → B-59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. Rig → Mobile B-59; 3" S.S. split spoons (W.D.); 3.25" I.D. ~~HS Augers~~; 7" O.D.; 140 lb hammer	8. HOLE LOCATION: See sheet #2
	9. SURFACE ELEVATION: Unknown
	10. DATE STARTED: 6/2/94 — 11. DATE COMPLETED: 6/2/94
12. OVERBURDEN THICKNESS: >12.0' (H.S.A to 10.0', S.S. to 12.0')	15. DEPTH GROUNDWATER ENCOUNTERED: 9.5' BGS
13. DEPTH DRILLED INTO ROCK: Bedrock not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.5' / immediate
14. TOTAL DEPTH OF HOLE: 12.0' BGS	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None		✓	

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	X	X		~~See FR's~~ O.H.		NA %

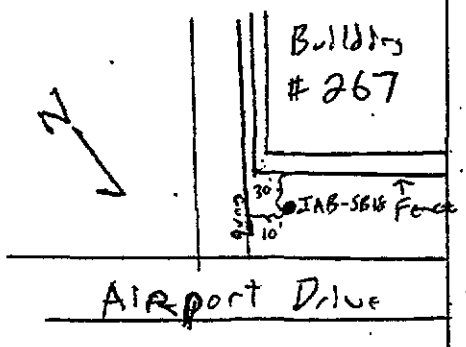
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted to surface	X			D. Hall

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Grayish brown organic rich, some rocks - Organic soil auger interval	0.0 ppm PID; No odor	0-2'	IAB-SB18 (SSC) NA; NS		(OL) (OH) 2.5Y 5/2 (Grayish brown)
	.5	Olive brown gravelly sand, some silt. Grades to silty sand at ≈2.0'. Color change at 2.0' to black. Loose (Poorly graded Sand w/silt + Gravel) Dry.	0.0 ppm PID; No odor	0.5-2.5'	IAB-SB18 (0.5-2.5)	34, 34; 47, 44	(SP) - (SM) 2.5Y, 4/3 1.7' recovery
	2.0						SLT ≥ Cl (SM) 2.5Y, 2.5/1
	3.0	Light olive brown silty Sand, some gravel, Loose (poorly graded Sand w/silt and gravel) Dry	0.0 ppm PID; No odor	2.5-4.5	IAB-SB18 (2.5-4.5)	54, 63; 54, 32	(SP-SM) 2.5Y, 5/6 1.8' recovery
	4.0						
	5.0	No Sample Collected	augered interval				

HTW DRILLING LOG

HOLE NO. IAB-SB18

PROJECT: HIA Middletown | INSPECTOR: D. Haller | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	Light olive brown silty Sand w/some gravel to ~5.2'. Then grading to black ~~silty~~ clay. ~~Silty~~ Clay is moist and slightly elastic (Clay = Fat Clay)	0.0 ppm PID No odor	5-7'	IAB-SB18 (5-7')	8,8,13, 14	Some as 2.5-4.5' (CH) 2.5Y, 2.5/1 recovery = 1.6'
	6.0	(Poorly graded Sand w/silt + gravel)					
	7.0	Same as 5.2-7.0' to 7.2' then grading to olive brown clay. Clay is moist and slightly elastic near bottom (Clay = Fat Clay)	0.0 ppm PID No odor	7-9'	IAB-SB18 (7-9')	16,19, 28,30	Recovery = 2.0' Same as 5.2-7.0' (CH) 2.5Y, 4/3
	9.0	augered interval					No Sample Collected
	10.0	Similar to 7.2-9.0 w/ trace gravel. Wet.	0.0 ppm PID No odor	10-12	NS	9,6, 9,12	(CH) 1.0' recovery 2' run w/ 2" span to contain saturation
	11.0	Boring terminated @ 12' BGS.					(DH) 6/2/94
	12.0						

HTW DRILLING LOG

HOLE NO. IAB-SB19

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: HIA - Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bower	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig "B-59"	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. - Drill Rig "B-59"; 3" S.S. Split spoon (O.D.); 3¼ I.D. H.S.A.; 7 O.D. H.S.A.; 140 lb. hammer	8. HOLE LOCATION: See Sheet # 2.	
	9. SURFACE ELEVATION: Unknown	
	10. DATE STARTED: 6-3-94	11. DATE COMPLETED: 6-3-94
12. OVERBURDEN THICKNESS: >9.0' H.S.A to 7.0' S.S. to 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 8.0'	
13. DEPTH DRILLED INTO ROCK: Not Encountered.	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 8.0' no elapsed time.	
14. TOTAL DEPTH OF HOLE: 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
☐ Samples	X	X (WF)	—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 Samples	X	X	See T.R.'s (WF)			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X			Warren Taft

ELEV. a.	DEPTH b.	(S.S. = 2' split spoon) DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Asphalt black top ≅ 1.0' and gravel (angular gray)	0 PID NO ODOR	NS	NS	NA	
	.5	(Augered Interval)					
		S.S.					
	1.0	Silt with trace of coarse sand (<15%) tight moist uniform	0 PID NO ODOR	~~(1' to 3')~~ (WF)	IAB-SB 19(1-3)	12, 12, 12, 13	(ML) 1.7' Recovery 7.5YR 3/2 dark brown
	2.0	Alluvium?					
	2.5	2" of Gravel mix ½" to 1" Dia. bottom					(Slightly Darker)
	3.0	Silt tight uniform moist - increases with depth.	0 PID NO ODOR	~~(3' 5')~~ (WF)	IAB-SB 19(3-5)	9, 9, 20, 22	(ML) 1.8' Recovery 10YR 4/2 dark grayish brown
	9.0	Alluvium? Very little gravel ¼" Dia. (<15%)					
	5.0						

PROJECT: HIA - Middletown | HOLE NO.: IAB-SB19

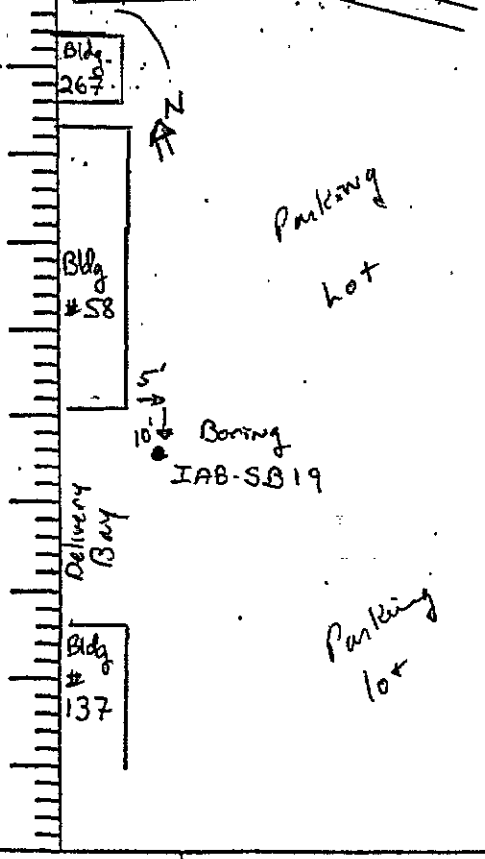
HTW DRILLING LOG

HOLE NO. IAB-SB19

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 of 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	S.S. Sand with Gravel well graded (>15%) moist loose poorly sorted (Gravel throughout gets smaller as you go deeper, but more gravel) Alluvium?	0 PID No odor	~~(C167)~~ (WF)	IAB-SB 19(5-7)	15, 42, 62, 49	(SW) 1.3' Recovery 10YR 4/4 dark yellowish brown
	7.0	S.S. Well graded gravel with sand (>15%) moist loose poorly sorted saturated Alluvium?	0 PID No Odor	~~(7169)~~ (WF)	IAB-SB 19(7-9)	67, 88, 97, 100 over 4"	(GW) 1.3' Recovery 10YR 4/4 Saturated at 8.0'. (WF) 6-3-94
	9.0	End of Boring at 9.0'	(WF) 6-3-94				

Airport Drive



HTW DRILLING LOG

HOLE NO. IAB-SB20

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT
SHEET 1 OF 2 SHEETS	
3. PROJECT: HIA - Middletown	4. LOCATION: HIA - Middletown, PA
5. NAME OF DRILLER: John Bower / Tom Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig "B-59"
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. Mobile Rig B-59; 3" S.S. Split Spoons (O.D.); 3 1/4" I.D. ~~Drill Bit~~ H.S.A; 7" O.D. ~~Drill Rods~~ H.S.A; 140 lb hammer (WE)	8. HOLE LOCATION: See Sheet #2
	9. SURFACE ELEVATION: Unknown
	10. DATE STARTED: 6-2-94 — 11. DATE COMPLETED: 6-2-94
12. OVERBURDEN THICKNESS: >9.0' (H.S.A. to 7.0', SS. to 9.0')	15. DEPTH GROUNDWATER ENCOUNTERED: 6.0'
13. DEPTH DRILLED INTO ROCK: Not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 6.0' - no elapsed time
14. TOTAL DEPTH OF HOLE: 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	X	~~X~~ (WE)	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	X	X	~~See F.R.'s~~ (WE)	—	—	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X	—	—	Warren M. Zapp

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c. (S.S. = 2" Split spoon)	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		ORGANIC RICH TOP SOIL - NO SAND	0 PID	~~SSC (0'-2')~~ (WE) NS	IAB-SB20(SSC) NS	NA	OL-OH 2.5Y 4/3 olive brown
	0.5	S.S. Augered Interval					
	1.0	Silt, loose, soil dry, 10% gravel (small angular) fine sand, trace pebbles, alluvium?	0 PID NO ODOR	(0.5 to 2.5) (WE)	IAB-SB20 (0.5-2.5)	49, 55, 52, 34	1.5' Recovery ML 10YR 5/6 yellow brown
	2.0	S.S.					
	3.0	Silt (with some sand < 15%) loose, dry, fine grained sand (Sub-angular) Uniform ~~Sample~~ (WE) Alluvium?	0 PID NO ODOR	(2.5-4.5) (WE)	IAB-SB 20 (2.5-4.5)	23, 23, 21, 13	ML 1.5' recovery 10YR 5/8 yellowish brown
	4.0	Augered Interval		NS	NS		
	5.0						

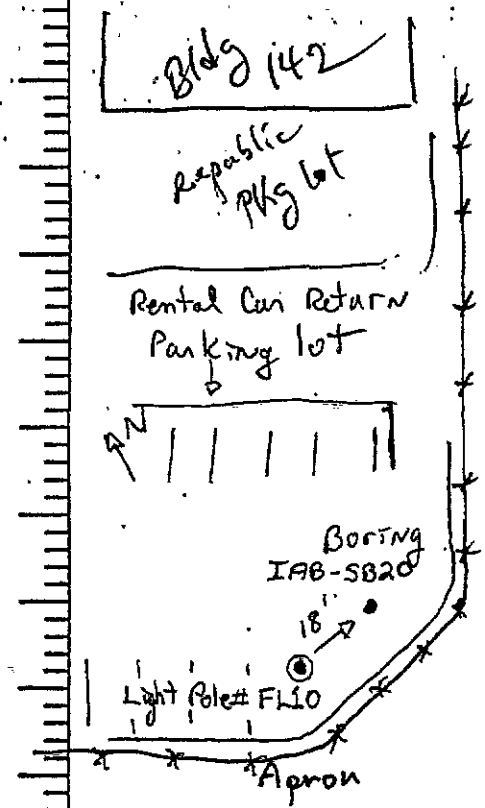
PROJECT: HIA - Middletown — HOLE NO.: IAB-SB20

HTW DRILLING LOG

HOLE NO. IAB-SB20

PROJECT: HIA - Middletown | INSPECTOR: Warren Fay | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	S.S. Silt with Sand. loose dry Uniform Alluvium?	0 PID NO ODOR	~~(5'-7')~~ (WP)	IAB-SB 20(5-7)	6, 7, 21, 31	ML 10YR 5/5 yellowish brown
	6.0	Sand with Gravel Poorly graded loose saturated med. to fine grain. (sub-angular)					SP 10YR 4/4 dark yellowish brown Saturated at 60' 2' Recovery
	7.0	S.S. Alluvium					
	7.0	Sand with gravel (7'-9') (poorly graded) loose saturated coarser grains than (5'-7') (angular) Alluvium?	0 PID NO ODOR	(7'-9') (WP)	NS	37, 31, 29, 67	SP 10YR 3/4 dark yellowish brown 1.6' Recovery (Sample to confirm saturation)
	9.0	End of boring ≅ 9.0'	(WP) 6-2-94				



HTW DRILLING LOG

HOLE NO. IAB-SB21

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: AOT	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: John Bower / Tom Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig "B-59"	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. Mobile Rig B-59; 3" S.S. split spoon (S.S.); 3 1/4" I.D. ~~Bail Bit~~; 7" O.D. ~~Drill rods~~ (WP); 140 lb hammer Augers	8. HOLE LOCATION: See Attached Sheet #2	
	9. SURFACE ELEVATION: UNKNOWN	
	10. DATE STARTED: 6-2-94	11. DATE COMPLETED: 6-2-94
12. OVERBURDEN THICKNESS: > 7.0' H.S.A. to 50' S.S. to 7.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 5.0'	
13. DEPTH DRILLED INTO ROCK: Not encountered.	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 5.0', No elapsed time.	
14. TOTAL DEPTH OF HOLE: 7.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1 Sample	X	X (WP)	—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2 Samples	X	X	~~See F.R's~~ (WP)	—	—	NA %

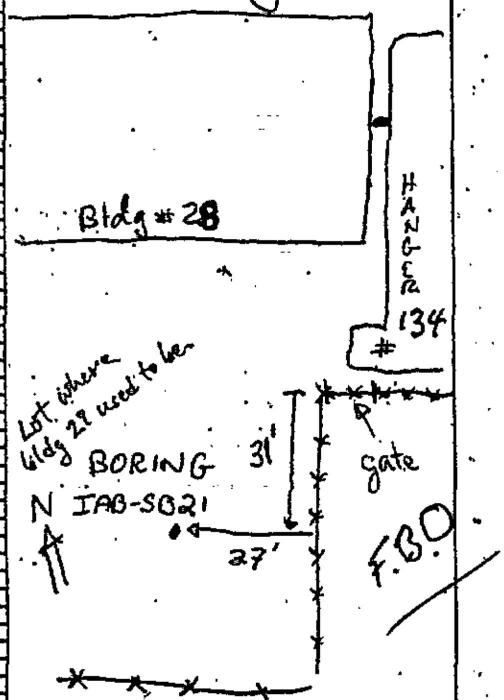
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X			Warren N. Rupp

ELEV. a.	DEPTH b.	(S.S. = 2' split spoon) DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Cement and loose gravel. (gray)	0 PID NO ODOR	NS / NS	NS / NS	NA / NA	Cement / gravel NO SOIL
		S.S. 0' to 1' Augered					Cuttings, Visual Description
	1.0	Silt (with small amount of sand < 15%) loose moist uniform fine grain (round) alluvium?	0 PID NO ODOR	~~(1'to3')~~ (WP)	IAB-SB 21(1-3)	41, 39, 24 23	(ML) 1' recovery 10YR 3/6 dark yellowish brown
	2.0						
	3.0	S.S. Silt (with small amount sand < 15%) very moist tight uniform v. fine grained (5%) sand alluvium? (WP)	30.1 ppm Strong petroleum odor.	(3'to5')	IAB-SB 21(3-5)	22, 22, 23, 24	(ML) Full 2' recovery 10YR 2/2 very dark brown
	4.0						
	5.0						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	IAB-SB21	SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	50	S.S. Silt ~~y~~ (WF) (30% <15% sand) saturated tight. uniform alluvium?	.122 ppm with a 427 ppm peak Strong fuel odor	NS	NS	20, 20, 21, 50 over 2".	No Sample collected (ML) for analysis High fuel odor. 2' recovery Saturated at 5'
	60						
	70	End of boring at 70'	(WF).	6-2-94			



PROJECT	HOLE NO.
HIA - Middletown	IAB-SB21

HTW DRILLING LOG

HOLE NO. IAB-SB22

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT (WE)
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Tom Brown / John Bower	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig B-59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. mobile B-59; 3" S.S. split spoons (O.D.); 3 1/4" I.D. ~~Drill bit~~; 7" O.D. ~~Drill rods~~; 140 lb hammer Augers (WE)	8. HOLE LOCATION: Behind Hershey (building #130) in lot.
	9. SURFACE ELEVATION: unknown
	10. DATE STARTED: 6-1-94 / 11. DATE COMPLETED: 6-1-94
12. OVERBURDEN THICKNESS: >5.0', H.S.A. to 5'.0	15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered
13. DEPTH DRILLED INTO ROCK: not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 5.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE	N	(WE)	NONE

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
NONE	NA	NA	—	—	—	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X	—	—	Warren Rap

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Asphalt and road (1" Dia.) gravel	NO ODOR O PID	NS	NS	N/A	
	.5	limestone gravel (angular) (fill material		NS	NS	39,100 over 3"	.5' to 1' limestone gravel. 1' recovery Not enough to have a sample analyzed: 0' to 5' described from cuttings
	1.0	Cement with rebar (solid = foundations?) two attempts to break through - two locations (WE)					
	2.0	Bldg. #130					
	3.0	35' 30' Raised Concrete					
	4.0	Bldg. # 246					
	5.0	End of boring - ~~Hole~~ Abandoned and ~~Grouted~~					Auger refusal

HTW DRILLING LOG

HOLE NO. IAB-SB22

1. COMPANY NAME: ERM-PNC	2. DRILLING SUBCONTRACTOR: KOT-MA	SHEET 1 of 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. Augers; 3" S.S. split spoon; 300lb Hammer.	8. HOLE LOCATION: See Sheet	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-4-94	11. DATE COMPLETED: 8-4-94
12. OVERBURDEN THICKNESS: ≥ 4.5'	15. DEPTH GROUNDWATER ENCOUNTERED: ≡ 4.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 4.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
No Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
1 Sample ⊛ (S)	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren M. Tot

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Asphalt with gray angular gravel below - ≤1"dia.	0ppm PID No Odor	NS	NS	NA	Asphalt Driveway
	0.5'					Augered	to 1.0'
	1.0'	Split Spoon 1.0' to 3.0'					
		Silt - trace of angular loose, (gravel. ≤5%) moist massive poorly graded	0ppm PID No Odor	NS	IAB-SB 22(0-3')	5,2,1,1	No recovery moved 'try again' - Second set.
	2.0'					2,3,4,6	1.4' recovery. ML 10YR 4/4 dark yellowish brown
	3.0'	Split spoon 3.0' to 5.0'					
		"Same silt as above"	0ppm PID No Odor	NS	NS	6,7,7,9	.2' recovery wet sample Not enough soil to sample
	4.0'	Hit concrete - Utility clearance was made, but bad location in general					Split spoon refusal ✓ at 4.5'
	5.0'						

PROJECT: HIA - Middletown | HOLE NO. IAB-SB22

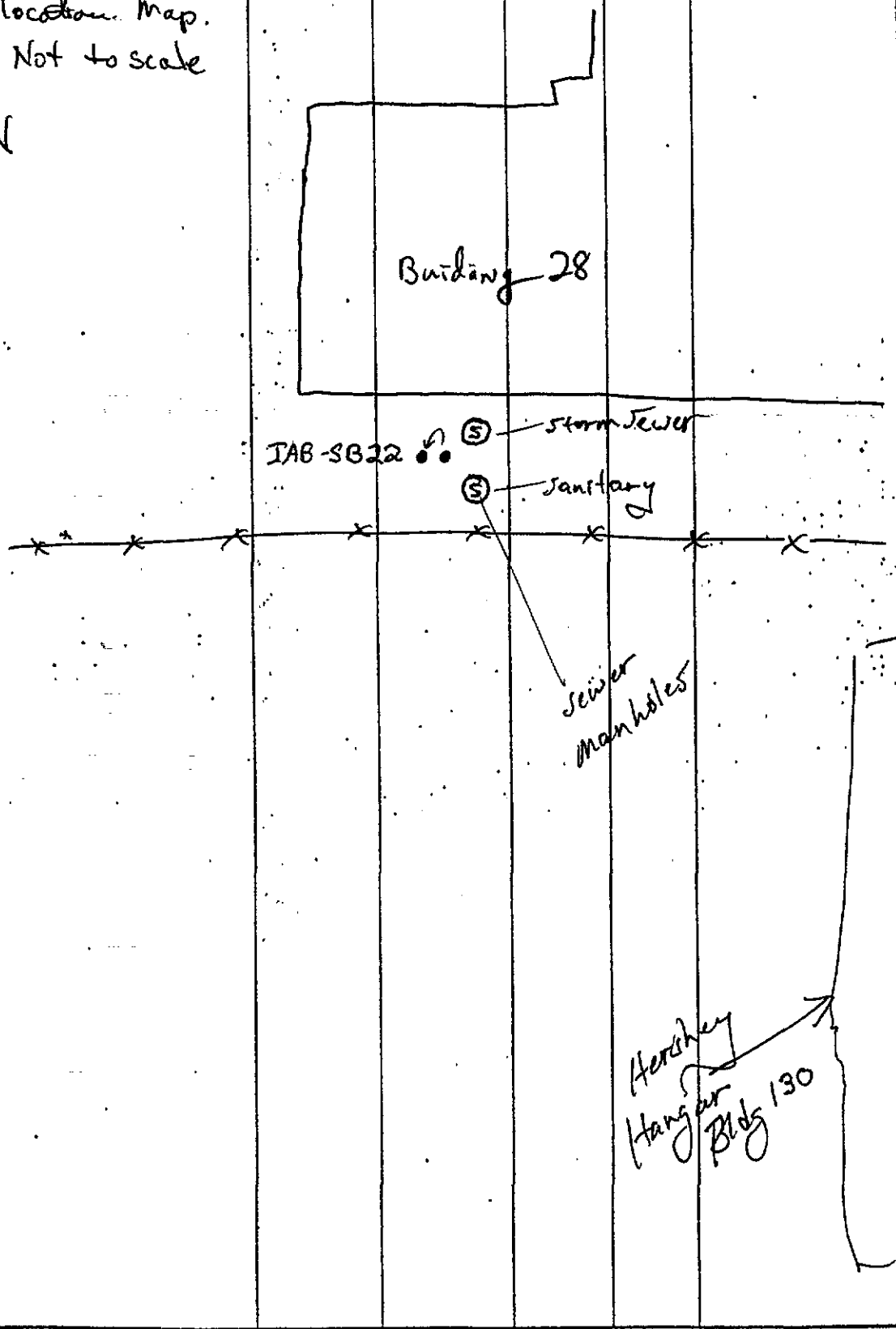
HTW DRILLING LOG

HOLE NO. IAB-SB22

PROJECT HIA - Middletown | INSPECTOR Warren Foy | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.

Sample location Map.
Note: Not to scale



HTW DRILLING LOG

HOLE NO. JAB-SB23

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bower	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. Mobile Rig B-59; 3.14 I.D. ~~Drill bit~~, H.S.A; 7" O.D. ~~Drill Rods~~ H.S.A; 3" O.D. S.S. split spoon; 140 lb hammer	8. HOLE LOCATION: See Sheet 2. (WE)	
	9. SURFACE ELEVATION: unknown	
	10. DATE STARTED: 6-1-94	11. DATE COMPLETED: 6-1-94
12. OVERBURDEN THICKNESS: >8.0' H.S.A. to 6.0' S.S. to 8.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 6.0' depth	
13. DEPTH DRILLED INTO ROCK: Not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 6.0' depth no elapsed time	
14. TOTAL DEPTH OF HOLE: 8.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE	X	X (WE)	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
1 Sample	X	X	~~Sect. R~~ (WE)			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X			Warren M. Fay

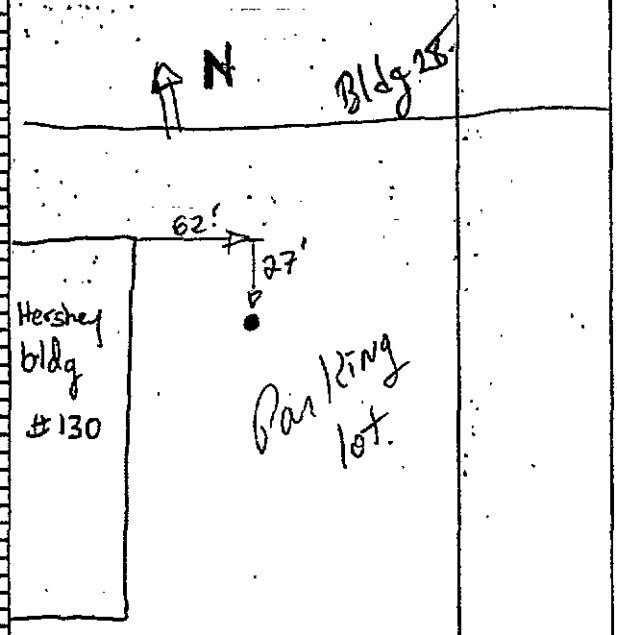
ELEV. a.	DEPTH b.	(S.S. = 2' split spoon) DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	1.0	Broken concrete, asphalt and gravel	0 PID NO ODOR	NS	NS	NA	No split spoons could be collected here because of the cement - split spoon Refusal. Description from Auger cuttings
	2.0						
	3.0						
	4.0	S.S. Poorly graded sand loose moist very uniform fine grain - Sand (rounded)	0 PID NO ODOR	(4'-6') (WE)	JAB-SB 23(4-6)	7, 8, 9 and 9	(SP) 2.5Y 4/4 olive brown 2.0 recovery

HTW DRILLING LOG

HOLE NO. IAB-SB23

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		trace of silt (≤5%) Alluvium?					
	6.0'	S.S. Poorly graded sand loose wet/saturated uniform fine grained (≤15%) trace med. grain. Alluvium?	O PID NO ODOR	NS	NS	13, 36 61, 71	SP Saturated 2.0 recovery
	7.0						
		mixed with 1/2" to 1/4" gravel (≤15%)					Last .2' of split spoon - gravel too
	8.0	End of boring at 8.0'.	8.0'.	WF	G-1-94		



Note: Not to scale

HTW DRILLING LOG

HOLE NO. IAB-SB24

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: HIA - Middletown, PA	
5. NAME OF DRILLER: John Bowen / Tom Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig "B-59"	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. Rig - Mobile B-59; 3" S.S. split spoon (O.D.); 3 1/4" I.D. Augers; 7" O.D. Augers; 140 lb hammer	8. HOLE LOCATION: See bottom of Sheet #1	
	9. SURFACE ELEVATION: Unknown	
	10. DATE STARTED: 6-3-94	11. DATE COMPLETED: 6-3-94
12. OVERBURDEN THICKNESS: ~~3.0~~ (WF) >9.0' H.S.A. to 7.0' S.S. to 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 1.0'	
13. DEPTH DRILLED INTO ROCK: Not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 1.0' No elapsed time	
14. TOTAL DEPTH OF HOLE: (WF) ~~3.0'~~ (WF) 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

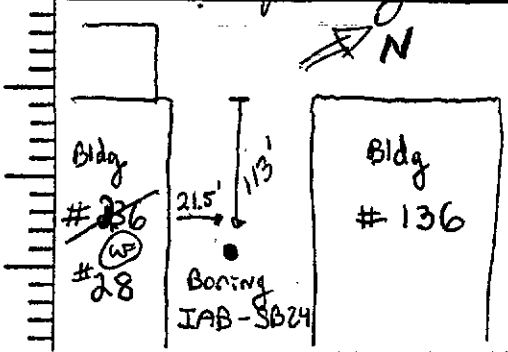
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None		(WF)	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
1 Sample	X	X	~~See T.R.'s~~ (WF)	—	—	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grout / asphalt	X	—	—	Warren Fost

(S.S. = 2' split spoon)

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Asphalt	0 PID No Odor	NS	NS	NA	Asphalt driveway
	0.5'	Augered from 0' to 1'		NS	NS	NA	
	1.0'	S.S. No Sample					
		Silty Sand Loose Saturated <15% pea gravel Uniform sand - Fine grained. Alluvium? round	0 PID No Odor	(1 to 3')	IAB-~~SB~~ 24(1-3)	29, 44, 25, 22	(SM) 2.5Y 4/4 olive brown 1' Recovery
	3.0'	~~3.0'~~ End of boring (WF) 6-3-94					



Returned to boring and continued to drill to 9' (WF) 6-3-94

Bldg 28

PROJECT	HOLE NO.
HIA - Middletown	IAB-SB24

HTW DRILLING LOG

HOLE NO. IAB-SB24

PROJECT: HIA - Middletown | INSPECTOR: Warren Fop | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	3.0'	S.S. Silt with clay (trace plastic of sand <5%) dense wet for saturated Alluvium?	0 PID NO ODOR	(3'-5') WF	IAB-SB 24(3-5)	10, 5, 8, 28	10YR 3/3 dark brown (SM) 2' recovery
	5.0'	S.S. Clay lense ± 2"					
	6.0'	S.S. Sand (<15% GR) subrounded (¼" Dia.) elastic (fine) Silt ≈ 15% uniform saturated Alluvium?	0 PID NO ODOR	(5'-7') WF WE	~~IAB-SB 24(5-7)~~ IAB-SB 24(5-7)	12, 17, 15, 52	10YR 5/4 yellowish brown 2' recovery (SP)
	8.0'	Sand with gravel (>15%) poorly graded sand well graded gravel mod. grain sand. (angular) gravel ¼" diam. saturated. Alluvium?	0 PID. NO ODOR	(7'-9') WF WE	~~IAB-SB 24(7-9)~~ IAB-SB 24 (7-9)	39, 79 46, 52	(SP) 2' recovery 10YR 4/3 brown
	9.0'	End of boring at 9'. (WF)	6-3-94		Well saturated.		

See Map of boring location on Sheet #1.

HTW DRILLING LOG

HOLE NO. IAB-SB25

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: HIA - Middletown, PA	
5. NAME OF DRILLER: John Bower / Tom Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig "B-59"	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. Rig "B-59"; 3" S.S. Spl.t Spoon (O.D.); 3 1/4" I.D. Augers; 7" O.D. Augers; 140 lb hammer	8. HOLE LOCATION: See.	
	9. SURFACE ELEVATION: Unknown	
	10. DATE STARTED: 6-3-94	11. DATE COMPLETED: 6-3-94
12. OVERBURDEN THICKNESS: >9.0' H.S.A. to 7.0 S.S. to 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 9.0'	
13. DEPTH DRILLED INTO ROCK: Not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.0' - No elapsed time	
14. TOTAL DEPTH OF HOLE: ~~9.0~~ 11.0 (WE) ~~MK~~	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	0	5 (WE)	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 Samples			~~See T.R's~~ (WE)	—	—	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓	—	—	Warren N. Fox

ELEV. a.	DEPTH b.	(S.S. = 2' split spoon) DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Asphalt parking lot	0 PID No odor	NS	NS	NA	Asphalt
	0.5	Some gravel ≅ 1" Dia. within lower .5'					
		0'to1' Angered interval					
	1.0	S.S.					
		Silty sand w/ gravel (<1" Dia.) loose (>15%) moist fine to med. grain sand. pieces of vertical wood chips. Alluvium?	0 PID No odor	~~(1'to3')~~ (WE)	IAB-SB 25(1-3)	18, 17, 14, 12	(SM) 2.5Y 4/3 olive brown 1' recovery
	2.0						
	3.0	S.S.					
		Clay (Fat) plastic firm moist trace of sand (<2%) Alluvium?	0 PID No odor	~~(3'-5')~~ (WE)	IAB-SB 25(3-5)	17, 22, 29, 25	(CH) 2.5Y 4/1 dark gray 1.8' recovery

PROJECT	HOLE NO.
HIA Middletown	IAB-SB25

HTW DRILLING LOG

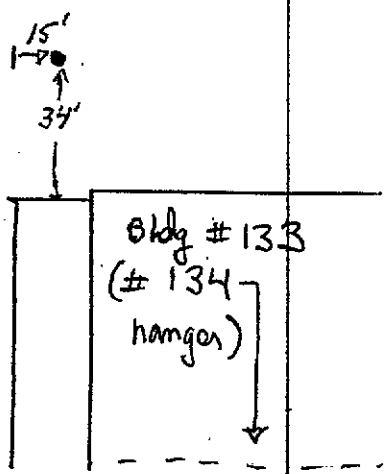
HOLE NO. IAB-SB25

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.8	S.S.					
		Clay(fat) same as above	0 PID No odor	(5'~~to 7'~~) WF	IAB-SB 25(5-7)	13, 12, 10, 14	CH 2.5Y 4/1 dark gray 1.8' recovery
	6.0						
	7.0	S.S.					
		Clay(fat) similar to above has trace brownish yellow mottling. v. firm	0 PID. No odor	(7'~~to 9'~~) WF	IAB-SB 25(7-9)	16, 21, ~~30~~, 44	CH 5Y 7/1 light gray 2' recovery
	8.0						
	9.0	S.S.					
		Clay - Saturated 9.0'	0 PID No odor	NS	NS	24, 30, 99, 99	Saturated CH. at 9.0' 2' recovery
	11.0	End of boring at ~~9~~ 11' (WF) 6-3-94					

DRIVE WAY

N



HTW DRILLING LOG

HOLE NO. IAB-SB26

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA
3. PROJECT: HIA - Middletown	4. LOCATION: HIA - Middletown, PA
5. NAME OF DRILLER: John Bower / Tom Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig - "B-59"
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: H.S.A. Rig; 3" S.S. split spoons (WE); 3¼" I.D. Augers; 7" O.P. Augers; 140 lb hammer	8. HOLE LOCATION: See Second Sheet (#2)
	9. SURFACE ELEVATION: Unknown
	10. DATE STARTED: 6-3-94 / 11. DATE COMPLETED: 6-3-94
12. OVERBURDEN THICKNESS: ~~9.0'~~ (WE) 7.0' (H.S.A to 5.0', S.S. to 7.0')	15. DEPTH GROUNDWATER ENCOUNTERED: 7.0'
13. DEPTH DRILLED INTO ROCK: Not encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 7.0' zero elapsed time
14. TOTAL DEPTH OF HOLE: ~~9.0'~~ (WE) 7.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
☐ Sample	X	~~X~~ (WE)	—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 Samples	X	X	—	—	—	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	X	←	—	Warren N. Fox

ELEV. a.	DEPTH b.	(S.S. = 2' split spoon) DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Asphalt with gravel below. (~4')	0 PID NO ODOR	NS	NS	NA	Asphalt parking lot
	0.5	(Gray, 1" angular)					
	1.0	S.S. Augered 0' to 1' (1.0')					
		Silt loose Dry traces of fine sand (<15%) gravel (<10% ½" to 1" dia.) Alluvium?	0 PID NO ODOR	~~(1' to 3')~~ (WE)	IAB-SB 26(1-3)	26, 41, 26, 34	(ML) 10YR 5/6 yellowish brown 1.7' recovery
	2.0						
	3.0	S.S.					
		Silt Same as above less gravel (<5%)	0 PID NO ODOR	~~(3' to 5')~~ (WE)	IAB-SB 26(3-5)	18, 22, 15, 9	(ML) 10YR 5/6 yellowish brown 1.6' recovery
	4.0						
	5.0						

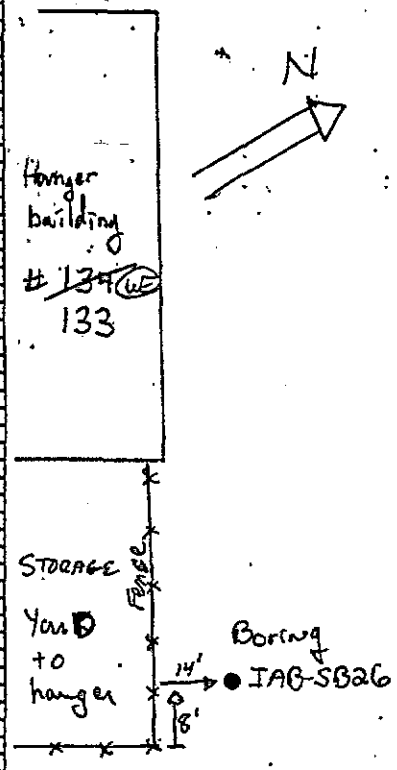
PROJECT: HIA - Middletown | HOLE NO.: IAB-SB26

HTW DRILLING LOG

HOLE NO. IAB-SB26

PROJECT HIA - Middletown | INSPECTOR Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	S.S. Poorly graded sand with silt loose (~~5~~ 15% GR) (WP) moist to wet sand (Fine grained rounded) Alluvium?	0 PID No odor	~~(5'-7')~~ (WP)	IAB-SB 26(5-7)	6,6, 6,7	SP-SM 10YR 4/4 dark yellowish brown 7.0' saturated
	6.0						
	7.0	End of Boring at 7.0'	(WP) 6-3-94				



UPS bldg. # 100

Figure 4-1

HTW DRILLING LOG

HOLE NO. IAB-SB27

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. DRILLER: Tom Brown / John Bower	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.d. / 7.0" O.D. HSA; 3" stainless steel split spoon; 140 lb hammer	8. HOLE LOCATION: ~~ERM IS~~ IAB-SB27	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 6/7/94	11. DATE COMPLETED: 6/7/94
12. OVERBURDEN THICKNESS: > 7.0' Bedrock not encountered	13. DEPTH GROUNDWATER ENCOUNTERED	
14. DEPTH DRILLED INTO ROCK: NA	15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
16. TOTAL DEPTH OF HOLE: 7.0' Sample + Auger	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	8		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
Yes	X	X	X			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	David A. Fuller

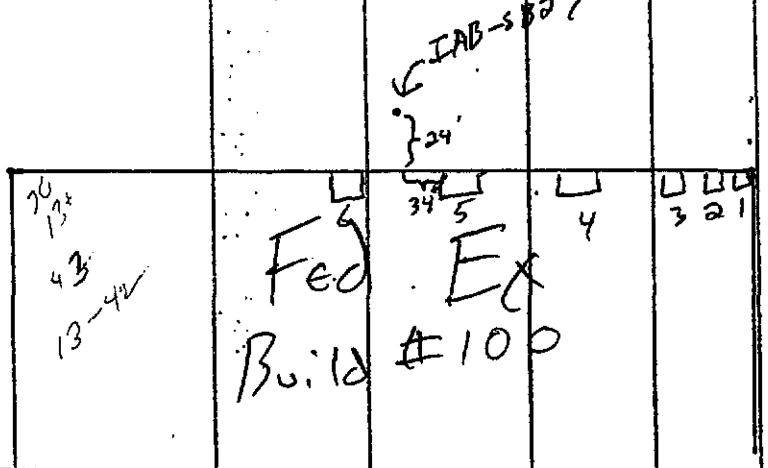
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Asphalt					
		No lithologic sample collected - Gravel fill					
	1	Dark brown Poorly Graded Sand (fine) w/Silt + Gravel Gravel < 1/4" Dry (slightly compact, cannot be dug easily w/a tablespoon Gravel size 0.25" to 1.0"	No odor 0.0 ppm PID	~~Yes~~ No, not enough volume D.A. 6/7/94	IAB-SB27 (1-3)	24, 28, 20, 18	10YR, 3/3 (SP-SM) 1.2' recovery 3" split spoon
	2						
	3	Yellowish brown Poorly graded fine sand w/Silt. Trace to no gravel (<1/4") - Increase in silt content from above interval - Increasingly compact probably due to increase in silt content.	No odor 0.0 ppm PID	Yes	IAB-SB27 (3-5)	14, 21, 23, 22	10YR, 5/4 (SP-SM) 1.5' recovery - Moist @ ≈4.5' 3" split spoon
	4						
	5						

HTW DRILLING LOG

HOLE NO.	SHEET	OF
IAB-SB27	2	2 SHEETS

PROJECT: HIA – Middletown
INSPECTOR: David Hallor

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	Dark yellowish brown Poorly graded fine sand w/silt. No apparent gravel. Very little silt, mostly sand. Soft. ~~D.H. 6-7'~~	0.0 PPM PID No odor	Yes (Saturated) from bottom of spoon	IAB-SB27 (5-7)	~~17, 24,~~ ~~23, 22~~ D.H. 6/17 9, 12, 13, 16	10YR, 4/4 (SP-SM) 1.7' recovery 5-6' – moist
	6	~~6-7'~~ 5-6' Same as interval ~~7-5'~~ 3-5' D.H. 6/17/94					– Saturated @ 6.0' BGS 3" split spoon
	7						



PROJECT: HIA – Middletown **HOLE NO.:** IAB-SB27

HTW DRILLING LOG

HOLE NO. IAB-SB28

1. COMPANY NAME: ERM
2. DRILLING SUBCONTRACTOR: ADT - MA
SHEET 1 OF 2 SHEETS
3. PROJECT: HIA Middletown
4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Tom Brown / John Bowers
6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. / 7.0" O.D. HSA; 3" S.S. Split Spoons; 300 lb hammer
8. HOLE LOCATION: IAB-SB28
9. SURFACE ELEVATION:
10. DATE STARTED: 6/13/94
11. DATE COMPLETED: 6/13/94
12. OVERBURDEN THICKNESS: > 7.0'
13. DEPTH DRILLED INTO ROCK: NA
14. TOTAL DEPTH OF HOLE: 3" Sampler + Auger to 7.0' BGS
15. DEPTH GROUNDWATER ENCOUNTERED: 6.0' BGS
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 6.0' BGS / No elapsed time
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):
18. GEOTECHNICAL SAMPLES: Yes — DISTURBED: 1 — UNDISTURBED:
19. TOTAL NUMBER OF CORE BOXES:
20. SAMPLES FOR CHEMICAL ANALYSIS: Yes — VOC: X — METALS: X — OTHER (SPECIFY): X — OTHER (SPECIFY): — OTHER (SPECIFY): — 21. TOTAL CORE RECOVERY: %
22. DISPOSITION OF HOLE: → — BACKFILLED: — MONITORING WELL: — OTHER (SPECIFY): Grouted
23. SIGNATURE OF INSPECTOR: David A. Hall

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		No Sample Collected - Concrete			0-1 No Sample		
	1	Dark Yellowish brown Silt w/Sand <30% (poorly graded, fine) No gravel - Color change to black @ 2.7' (staining?) - Slightly compacted, but friable. - Dry	0.0 ppm PID - No odor	No	IAB-SB28 (1-3) 8 VOA/2L for QA Sample	9, 8, 6, 5	1.3' recovery 10YR, 4/4 ML 3" split spoon
	2						
	3						10YR, 2/1
		Varying dark brown to brown Silt w/Sand, Sand < 15% Gravel < 15% - trace (subrounded gravel) - Color varies - not staining - Slightly more compacted but still friable - Dry w/ slight moisture @ ≈ 4.8'.	0.0 ppm PID - No odor	No	IAB-SB28 (3-5) 8 VOA/2L for QC Sample	4, 3, 3, 4 Color range.	1.6' recovery 3" split spoon 7.5YR, 3/2 to 7.5YR, 4/3 (varies randomly - not staining) ML
	4						
	5						

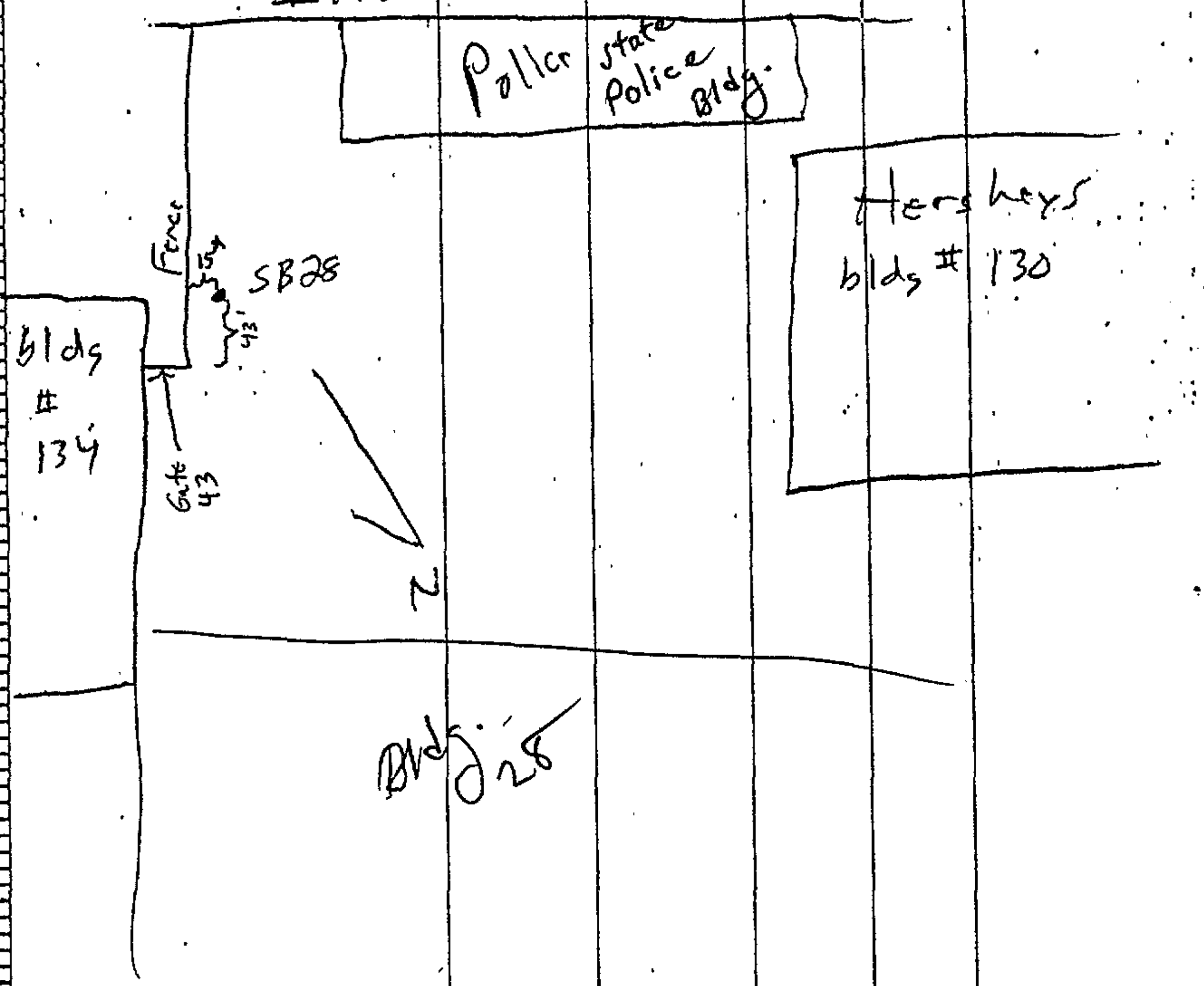
PROJECT: HIA Middletown
HOLE NO. IAB-SB28

HTW DRILLING LOG

PROJECT: ERM	INSPECTOR: David G. [signature]	HOLE NO. IAB-SB28	SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	Dark greyish brown silt with sand (fine) Sand < 15% (poorly graded, round)) Gravel < 15% - trace Slightly more compacted. Less friable -Slightly moist to saturated @ 6.0'	No odor 0.0 ppm PID	Yes Geotechnical Sample.	IAB-SB28 (5-7) 4 voa, 12 (500 ml for Geotech)	5, 5, 7, 8	1.6' recovery Saturated @ 6.0' 3" split spoon (10YR, 4/2) (ML) -Sample collected in unsaturated zone
	6						
	7						

IAB-SB28 Location



PROJECT: HIA - Middletown	HOLE NO. IAB-SB28

HTW DRILLING LOG

HOLE NO. IAB-SB29

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. / 7.0" O.D. HSA; 3" S.S. split spoons; 300 lb hammer	8. HOLE LOCATION: IAB-SB29	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 6/13/94	11. DATE COMPLETED: 6/13/94
12. OVERBURDEN THICKNESS: >4.5'	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 3" Sampler to 4.0', Auger to 4.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
No			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	24. TOTAL CORE RECOVERY
Yes	X	X	X			%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	David A. Hallen

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	1	Dark reddish brown Poorly graded Sand w/ silt + Gravel Dry. (Fine Sand) Gravel >1/4" (≈ 30%) loose, trace brick fragments	0.0 ppm PID No odor	No	IAB-SB29 (0-2) QA collected (Brad, 2:2)	8, 25, 11, 25	(SP-SM) 5 YR, 3/3 1.4' recovery 3" split spoon
	2	All fractured brick chips - Slight moisture @ bottom - very trace soil.	0.0 ppm PID No odor	No	No Sample collected - only trace soil - poor recovery	10, 14, 26, 28	USCS - NA Recovery 0.6' 3" spoon
	3						
	4	Western (D.H. 6/13/94) Location: ~~Eastern~~ corner of old building #25 - See pg. 2 for map				100/2" refusal	Tried to auger past but couldn't - Auger refusal @ 4.5' BGS.
	5						

PROJECT: HIA - Middletown

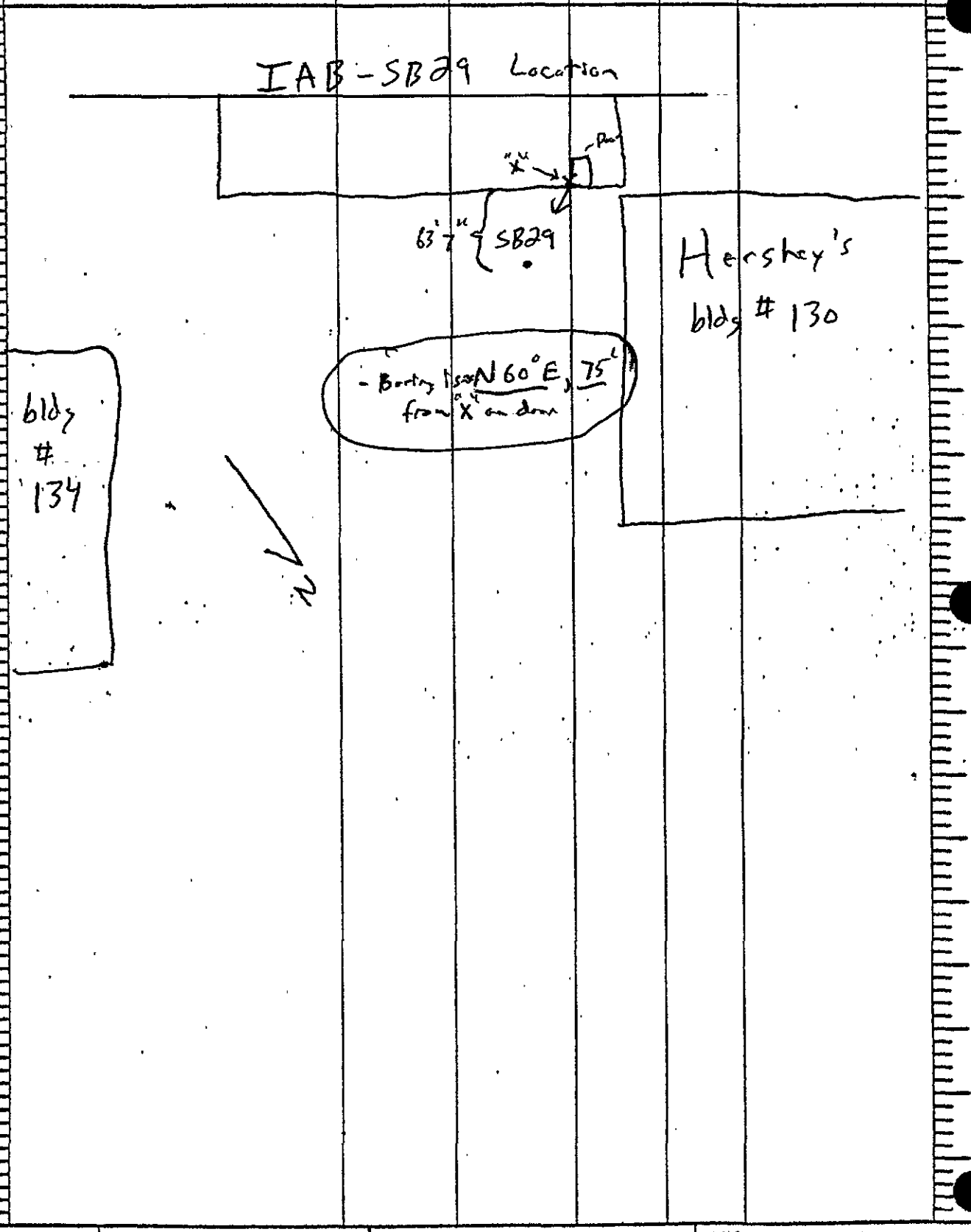
HOLE NO.: IAB-SB29

HTW DRILLING LOG

HOLE NO. IAB-SB29

PROJECT HIA-Middletown | INSPECTOR David a. Haller | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



HTW DRILLING LOG

Field	Entry
HOLE NO.	IAB-SB30
SHEET 1 OF 2 SHEETS	
1. COMPANY NAME	ERM
2. DRILLING SUBCONTRACTOR	ADT-MA
3. PROJECT	HIA Middletown
4. LOCATION	Middletown, PA
5. NAME OF DRILLER	Tom Brown/John Bowers
6. MANUFACTURER'S DESIGNATION OF DRILL	Mobile B59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	3.25' I.D. → HSA; 7.0' O.D. → HSA; 3" stainless steel split spoons; 300 lb hammer
8. HOLE LOCATION	IAB-SB30
9. SURFACE ELEVATION	
10. DATE STARTED	6/14/94
11. DATE COMPLETED	6/14/94
12. OVERBURDEN THICKNESS	> 7.0' (Bedrock not encountered
13. DEPTH DRILLED INTO ROCK	NA
14. TOTAL DEPTH OF HOLE	7.0' BGS - Sampler + Auger
15. DEPTH GROUNDWATER ENCOUNTERED	5.7'
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	5.7'/No elapsed time
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
18. GEOTECHNICAL SAMPLES	Yes — DISTURBED: 1; UNDISTURBED:
19. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS	Yes — VOC: X; METALS: X; OTHER (SPECIFY): X; OTHER (SPECIFY): ; OTHER (SPECIFY):
21. TOTAL CORE RECOVERY	%
22. DISPOSITION OF HOLE	→ BACKFILLED: ; MONITORING WELL: ; OTHER (SPECIFY): Grouted
23. SIGNATURE OF INSPECTOR	[signature]

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Organic soil w/sand (OL/OH) ~~Sand 6 O.H. ≤15% ≤15%~~ - Black → (10YR, 2/1)	No PID hits No odor	No	IAB-SB30 (SSC) (1.1)	NA	Surface Sample Sample collected
	1	Dark yellowish brown Organic soil w/sand grading to Dark yellowish brown Silt w/sand @ 2.1' BGS, Dry. Friable (Sand is fine)	No PID hits No odor	No	IAB-SB30 (0.5-2.0) (8vocs, 2.0)	4, 7, 18, 14	1.3' recovery 3" split spoon (10YR, 4/4) (OL/OH)
	2						(10YR, 4/4) (ML)
		No Sample Collected →					(overdrilled interval)
	3	Dark yellowish brown Silt w/sand Sand ≤15% (fine) More soft, then friable Dry, but becomes moist (slightly) @ 4.5'.	No PID hits No odor	No	IAB-SB30 (3.0-5.0) (8vocs, 2.0)	11, 17, 11, 10	1.1' recovery 3" split spoon (ML) (10YR, 4/6)
	4						
	5						

PROJECT: HIA Middletown

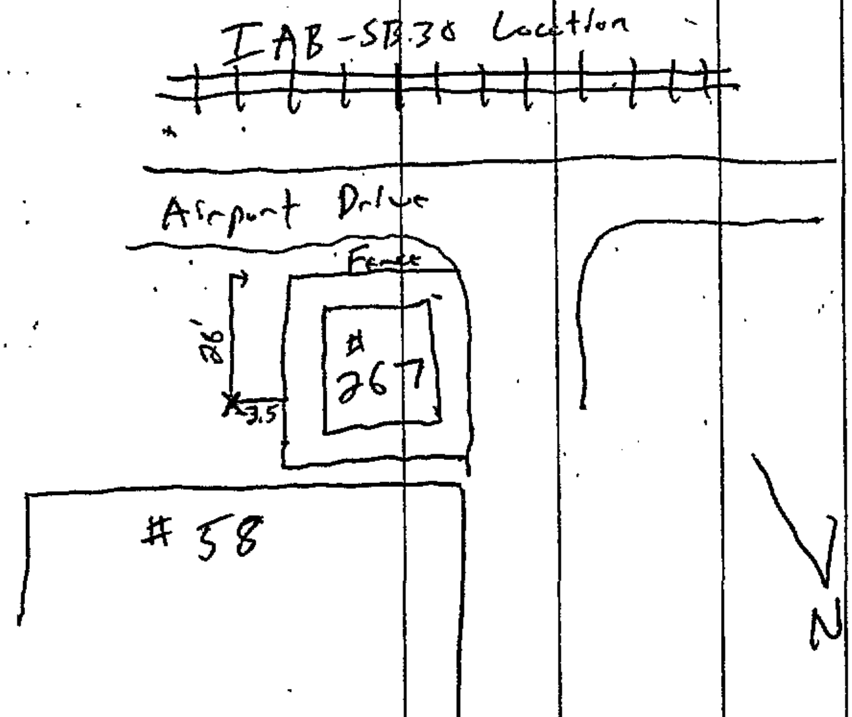
HOLE NO.: IAB-SB30

HTW DRILLING LOG

HOLE NO. IAB-SB30

PROJECT: HIA Middletown | INSPECTOR: David a. [signature] | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5 6	Dark yellowish brown silt w/ sand (fine). Sand <15%, grading to an increase in sand + gravel content @ 6.7' - Soft in moist (5-5.7') zone - Slightly compact in saturated (5.7-7.0') zone	No PID hits No odor	Yes	IAB-SB30 (5-7') (4 VOAs, 1 2,500 mL) (VOAs* collected above saturated zone)*	4,3 4,11	1.6' recovery 3" spoon Saturated @ 5.7' (10YR, 4/6) (ML) Sand + gravel >30%
	7	Boring terminated @ 7.0'					



26' from tip of fence
3.5' off of fence ⊥.

PROJECT: HIA-Middletown | HOLE NO. IAB-SB30

HTW DRILLING LOG

HOLE NO. IAB-SB31

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 of 2 SHEETS
3. PROJECT: HIA Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. ~~HSA~~ 7.0" O.D. 3" Stainless Steel Split Spoon 300 lb hammer	8. HOLE LOCATION: IAB-SB31	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 6/14/94	11. DATE COMPLETED: 6/14/94
12. OVERBURDEN THICKNESS: >6.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 4.5'	
13. DEPTH DRILLED INTO ROCK: NA (Bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 4.5' / No time elapsed	
14. TOTAL DEPTH OF HOLE: 6.5' - Auger + Sampler	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
No			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
Yes	X	X	X			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	David A. Keller

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0	Dark brown Organic soil w/sand, Sand + Gravel <15%	0.0 ppm PID No odor	No	IAB-SB31 (SSC) Surface Sample	NA DH.	7.5 YR, 3/3 OL/OH
	1	Poorly graded sand w/silt (fine sand) (Dark yellowish brown) -Dry -loose + soft	1.0 ppm PID No odor	No	IAB-SB31 (0.5-3.5') Bottles, 2 L for QA	4, 9, 4, 5	1.8' recovery 3" split spoon 10 YR, 4/4 SP-SM
	2						
	3	Dark yellowish brown poorly graded sand w/silt (fine sand) grading to Poorly graded sand w/gravel (also dk. yellowish brown) Gravel <15% -loose	0.0 ppm PID No odor	No	IAB-SB31 (3.5-4.5') (Bottles, 2)	2, 1, 2, 3	1.5' recovery 3" split spoon 10 YR, 4/4 SP-SM
	4						10 YR, 4/4 SP
	5	See Next Page →			→	See next pg.	→

PROJECT: HIA - Middletown

HOLE NO. IAB-SB31

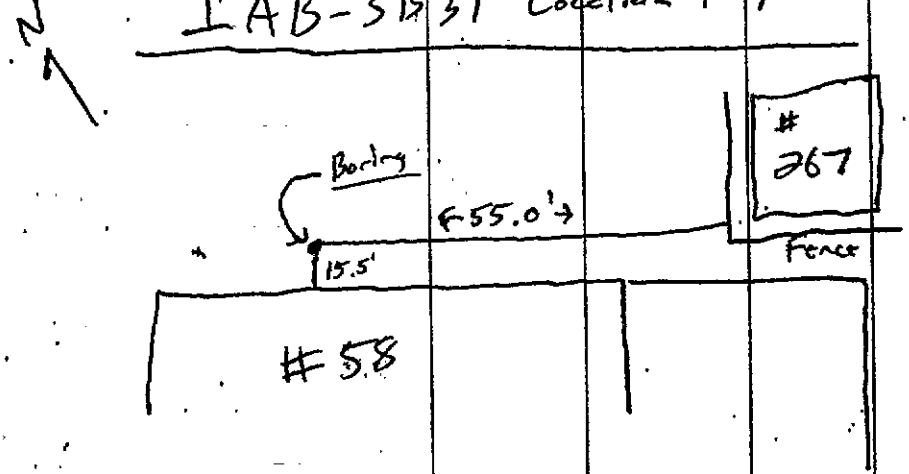
HTW DRILLING LOG

HOLE NO. IAB-SB31

PROJECT H1A - Middletown | INSPECTOR David C. Hall | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	6	- Dark yellowish brown poorly graded sand w/Gravel (fine sand) Gravel content increases w/depth 4.5-5.5 → ≈ 10-15% gravel 5.5-6.5 → ≈ 35-40% gravel - loose, (gravel up to 1" dia.)	0.0 ppm PID - No odor	No	Not Sampled b/c wet	8, 8, 9, 10	1.8' recovery 3" split spoon - Saturated @ 4.5' 10YR, 4/4 SP
	6.5	Boring terminated @	6.5'				
	7						

IAB-SB31 Location Map



HTW DRILLING LOG

HOLE NO. IAB-SB32

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 of 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7.25" I.D. HSA; 7.0" O.D.; 3" S.S. Split Spoon; 310 lb hammer	8. HOLE LOCATION: IAB-SB32	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 6/14/94	11. DATE COMPLETED: 6/14/94
12. OVERBURDEN THICKNESS: > 7.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 6.2' BGS	
13. DEPTH DRILLED INTO ROCK: NA (Bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 6.2' BGS / No elapsed time	
14. TOTAL DEPTH OF HOLE: 7.0' Sampler + auger	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	1		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
~~N~~ D.U. Yes	X	X	X			%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	David G. [illegible]

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Asphalt - No Sample Collected					
	1	Brown Poorly graded sand (fine) w/gravel, Gravel ≥ 15%, -Dry, -loose	0.0 ppm PID No odor	Yes - Geotech	IAB-SB32 (1-3) (4 ounce, 1/2)	11, 20, 21, 15	10YR, 4/3; SP; -2.0' recovery; -3" split spoon
	2						
	3	Brown Poorly graded sand (fine) w/gravel, Gravel ≥ 15%, -Dry, -loose	0.0 ppm No odor	No	IAB-SB32 (3-5) -No Sample	13, 13, 9, 8	0.1' recovery; 3" SS Wt spoon; 10YR, 4/3; SP
	4	-No chemical Samples collected due to poor recovery *					
	5						

PROJECT: HIA - Middletown

HOLE NO. IAB-SB32

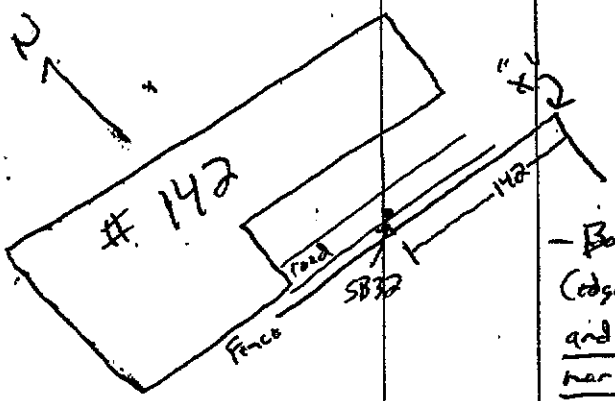
HTW DRILLING LOG

HOLE NO. IAB-SB32

PROJECT HIA-Middletown | INSPECTOR David A. Heller | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	6	Olive brown poorly graded sand w/gravel (fine) Gravel ≈ 15% loose - Saturated @ 6.2' BGS - Sand becomes increasingly larger in grain size w/depth.	0.0 ppm PID No odor	No	IAB-SB32(5-7) (4 VOAs, 1L) UOAS, 1L collected from above saturated zone	4, 8, 11, 9	1.7' recovery 3" spoon 2, 54, 4/3 SP <Saturated @ - 6.2' BGS
	7	Boring terminated @ 7.0'					

IAB-SB32 Location Map



- Boring is on edge of road (edge of asphalt), 38' ± to fence and 142' from the fence corner marked "X" on this map.

HTW DRILLING LOG

HOLE NO. IAB-SB33

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. → HSA; 7.0" O.D.; 3" S.S. Split Spoons; 300 lb hammer	8. HOLE LOCATION: IAB-SB33	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 6/15/94	11. DATE COMPLETED: 6/15/94
12. OVERBURDEN THICKNESS: > 11.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 10.5' BGS	
13. DEPTH DRILLED INTO ROCK: NA (Bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 10.5' BGS / No elapsed time	
14. TOTAL DEPTH OF HOLE: 11.0' - Auger + Sampler	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	1		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Yes	X	X	X			%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	David A. Heller

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Asphalt - No SAMPLE Collected					
	1	Dark Brown Poorly graded Sand w/silt + gravel - gravel < 15% - loose - Dry - (fine sand)	330 ppm PID peak 250-280 sustained - No apparent odor	No	IAB-SB33 (1-3) (Bucks, 2d)	17, 19, 14, 11	1.6' recovery 3" split spoon 10YR, 3/3 SP-SM
	2						
	3	Brown Poorly graded Sand (fine) w/silt + gravel - gravel < 15% (less gravel than 1-3') - silt content increase as compared to 1-3' - a little stiffer (CT in silt content) - Dry - Thin brick red (dusky) band from ≈ 4.7-4.9	20 ppm peak 5-10 ppm sustained - No apparent odor	No	IAB-SB33 (3-5) (Bucks, 2d)	16, 19, 20, 5H	1.5' recovery 3" split spoon 10YR, 4/3 SP-SM 2.5YR, 3/4
	4						

PROJECT

HOLE NO. IAB-SB33

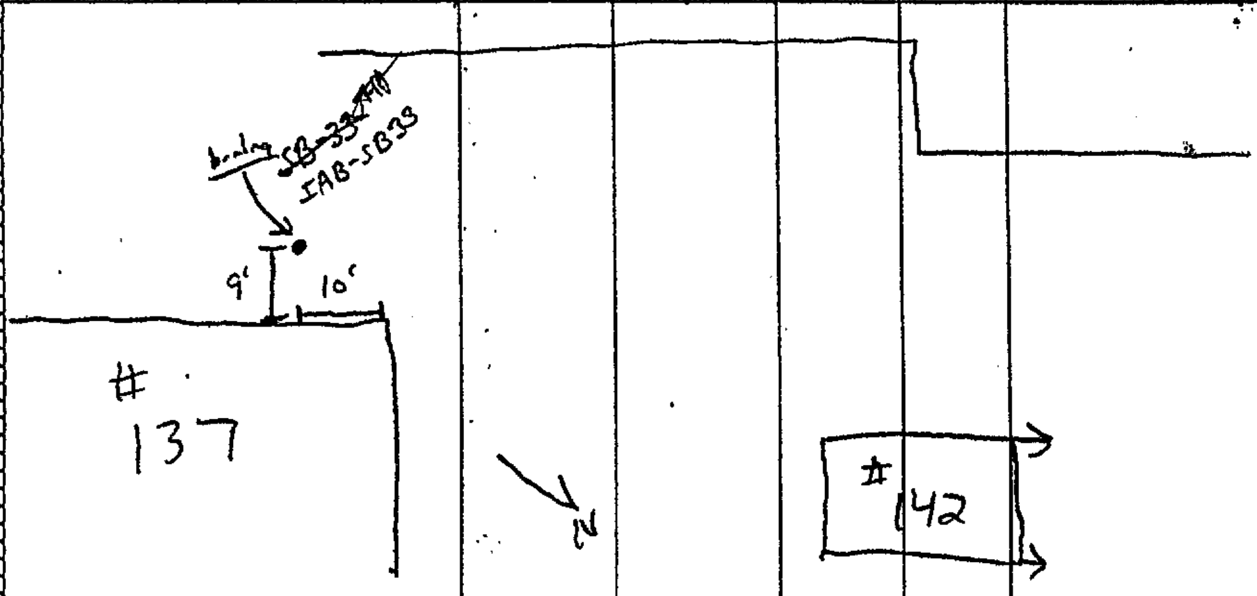
HTW DRILLING LOG

HOLE NO. IAB-SB33

PROJECT HIA Middletown **INSPECTOR** David a. [signature] **SHEET** 2 of 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5 6	Strong brown Poorly graded sand (fine to medium) Gravel - trace amount Silt - trace amount - Dry - very loose	24 ppm peak 7 11ppm sust. No apparent odor	No	IAB-SB33 (5-7) (8 vocs, 2 A)	24, 27, 27, 24	1.4' recovery 3" spoon 7.5YR, 4/6 SP
	7 8	Dark yellowish brown Poorly graded sand (fine-medium) Gravel < 15% (increase from 5-7) Silt - trace - Dry - very loose	0.0ppm PID - No apparent odor	No	IAB-SB33 (7-9) (4 vocs, 1 Q)	22, 26, 30, 34	1.0' recovery 3" spoon 10YR, 4/4 SP
	9 10	Dark brown Poorly graded sand (fine to medium) w/silt + gravel Gravel > 15% Silt - trace - very loose - Saturation @ 10.5' BGS	0.0ppm PID - No odor	Yes	IAB-SB33 (9-11) (4 vocs, 1 Q, 1 S.V. m.Q.) - Sample collected above saturation	34, 34, 42, 36	1.5' recovery 3" spoon - Saturated @ 10.5 10YR, 3/3 SP-SM

Location



PROJECT HIA - Middletown **HOLE NO.** IAB-SB33

HTW DRILLING LOG

HOLE NO. IAB-SB34

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. ~~7.0" O.D.~~ > HSA; ~~2~~ D.H. 3" S.S. Split Spoons; 300 lb hammer	8. HOLE LOCATION: IAB-SB34	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 6/16/94	11. DATE COMPLETED: 6/16/94
12. OVERBURDEN THICKNESS: > 6.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 6.0	
13. DEPTH DRILLED INTO ROCK: NA (Bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 6.0 / No elapsed time	
14. TOTAL DEPTH OF HOLE: 6.5' Auger + Sampler	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes, 1	1		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
Yes	X	X	X			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	David A. Allen

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Very dark gray Organic silt w/Sand + Sand + Gravel < 15%	0.0 ppm No odor	No	IAB-SB34 (SSC) (12)	NA	(10YR, 3/1) OL/OH
	1	Dark yellowish brown Poorly graded Sand w/silt + gravel. Gravel ≥ 15% - Dry - Stiff. (fine sand)	0.0 ppm No odor	Yes	IAB-SB34 (0.5-2.5) (grass, 12) 500.2.	10, 15, 22, 17	(10YR, 4/4) SP-SM 1.5' recovery 3" spoon
	2						
	3	Dark yellowish brown Poorly graded Sand w/silt ~~significant~~. Gravel < 15% - Dry - Slightly compacted - (Increase in silt from 0.5-2.5') - (fine sand)	10.0 ppm peak D.H. ~~the~~ odor (Jus fuel odor @ ≈ 3' (4-7 sustained) ppm	No	IAB-SB34 (2.5-4.5) (grass, 24)	10, 9, 8, 6	1.9 recovery 3" spoon (10YR, 4/4) SP-SM
	4						
	5	See pg. 2	7 ppm peak (0 ppm sustained) Slight fuel odor	No	IAB-SB34 (4.5-6.5) (grass, 20)	3, 4, 4, 6	1.8 recovery 3" spoon

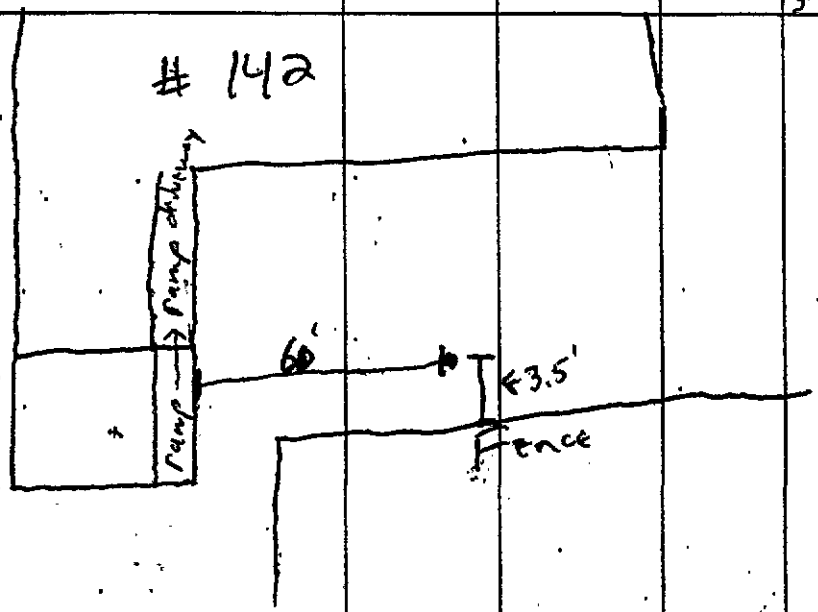
PROJECT: HIA - Middletown

HOLE NO. IAB-SB34

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA-Middletown	David a. Hall	IAB-SB34	2 of 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	Brown Poorly graded sand w/silt Gravel < 15% -Slightly complacted -wet @ 6.0'	previous page		4.5-6.0 IAB-SB34	?	10 YR, 4/3 SP-SM
	6	-Potential staining (4.5-5.2) -(fine sand)				10YR 3/1 very dark gray	-Potential staining from 4.5-5.2 Hard to tell for sure (2ppm)
	7						



HTW DRILLING LOG

HOLE NO. IAB-SB35

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA Middletown	4. LOCATION: Middletown PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~3.25" I.D. > HSA~~ ~~7.0" O.D. > HSA~~ ~~3" S.S. split spoon~~ ~~300 lb hammer~~	8. HOLE LOCATION: IAB-SB35	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 6/15/94	11. DATE COMPLETED: 6/15/94
12. OVERBURDEN THICKNESS: > 12.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 12.0'	
13. DEPTH DRILLED INTO ROCK: NA (Bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 12.0' / No time elapsed	
14. TOTAL DEPTH OF HOLE: 12.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	1		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	24. TOTAL CORE RECOVERY
Yes	X	X	X			%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	David a. Gallo

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Brown Organic Soil w/Sand, Gravel <15%. Dry.	0.0 ppm No odor	No	IAB-SB35 (SSC) (Surface)	NA	7.5YR, 5/4 (GC) (OH)
	1	Brown poorly graded fine sand w/silt, - Gravel ~~→ trace~~ - Dry - loose	0.0 ppm No odor	Yes	IAB-SB35 (0.5-2.5') 4 vons, 1 l, 500 ml	4,6, 2,2	1.6' recovery 3" spoon 7.5YR, 4/4 (SP-SM) 1st boring attempt (2.0' to wall)
	2						
	3	Brown poorly graded fine Sand w/silt + gravel Gravel ~~→ trace~~ > 15% D.M. - Dry - loose (but not as loose as 0.5-2.5)	0.0 ppm No odor	No	IAB-SB35 (2.5-4.5') (4 vons.) 1 l	7,7, 7,7	1.8' recovery 3" spoon 7.5YR, 4/3 (SP-SM)
	4						
	5	See next pg. for description of 4.5-6.5					

PROJECT: HIA Middletown

HOLE NO.: IAB-SB35

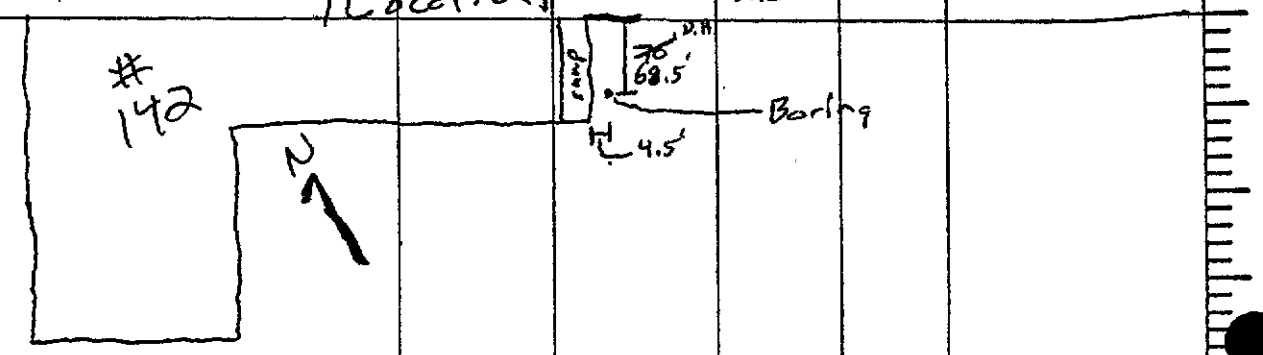
HTW DRILLING LOG

HOLE NO. IAB-SB35

PROJECT H1A - Middletown | INSPECTOR David A. Hahn | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	-Dark brown poorly graded sand w/gravel. -Gravel >1540 (≈30%) -Gravel size → 0.5-3" -loose -Sand is fine → medium -Dry	0.0 ppm No odor	No	IAB-SB35 (4.5-6.5) (4 VOAs, 1 L)	6,13, 10,8	1.5' recovery 3" spoon 7.5YR, 3/2 SP
	6						
	7	-Dark yellowish brown poorly graded sand w/gravel -Fine → Medium Sand -Gravel >1540 (≈30%) -Gravel size -0.5-3" -loose -Dry	0.0 ppm No odor	No	IAB-SB35 (6.5-8.5) (4 VOAs, 1 L)	7,18, 16,23	recovery = 1.3' 3" spoon 10YR, 4/6 SP
	8						
	9	-Dark yellowish brown poorly graded sand w/ gravel -Sand is medium grained -Increase in gravel content → Gravel ≈ 40% (very hard to sample due to high gravel content) -Gravel → 0.5"-3" -loose -Dry	0.1 ppm No odor	No	IAB-SB35 (8.5-10.5) (4 VOAs, 1 L)	16,20, 14,18	recovery - 1.8' 3" spoon 10YR, 4/4 SP
	10						
	11	-Dark yellowish brown poorly graded sand w/gravel -Sand is medium grained -Gravel content is ≈ to 8.5-10.5' (≈40%) -Gravel size - 0.5-3" -wet @ 11.0'	0.0 ppm No odor	No	IAB-SB35 (10.5-12.5) -No Analytical Samples Collected due to Saturation @ 11.0'	9,17, 10,11	recovery - 1.6' 3" spoon 10YR, 4/4 SP ★ Saturation at 11.0'
	12						
	13						

Location



HTW DRILLING LOG

HOLE NO. IAB-SB36

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. ~~7" O.D.~~ HSA; 3" S.S. split spoons; 300 lb hammer	8. HOLE LOCATION: IAB-SB36	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 6/16/94	11. DATE COMPLETED: 6/16/94
12. OVERBURDEN THICKNESS: > 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 8.4'	
13. DEPTH DRILLED INTO ROCK: N/A (bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 8.4' / No elapsed time	
14. TOTAL DEPTH OF HOLE: 9.0' sampler, 7.0' augered	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	1		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Yes	X	X	X			%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	David A. O'Hallaran

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Asphalt → No Samples Collected					
	1	Dark yellowish brown poorly graded sand w/silt ~~+ gravel~~ D.H. Gravel ≤ 15% - (fine - medium) (fine sand) (round - subround)	8.2 ppm BZ peak - No sustained - No odor	No	IAB-SB36 (1-3) (8 VOAs, 2 O)	3, 3, 4, 5	(10YR, 4/4) 1' recovery 3" spoon (SP-SM)
	2	(silt ≤ 5%) ≈ - Dry - Slightly compacted					
	3	Dark yellowish brown poorly graded fine sand w/silt. Gravel ≤ 15% (silt ≤ 5%) ≈	1.2 ppm peak 0.0 sustained	No	IAB-SB36 (3-5') (6 VOAs, 2 O)	4, 4, 5, 12	2.0' recovery 3" spoon (10YR, 4/4) (SP-SM)
	4	- Dry - Slightly compacted. - Grades to Brown Poorly graded sand w/ Gravel @ 4.6'. ↳ Gravel ≥ 15% All gravel - (fine - medium) (round - subround)					(7.5YR, 4/4) (SP)
	5						

PROJECT: HIA - Middletown

HOLE NO. IAB-SB36

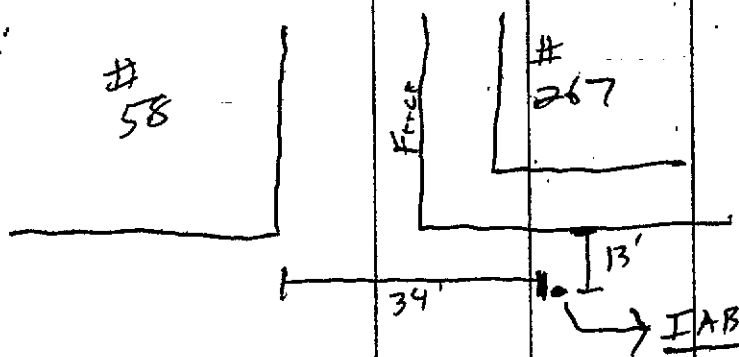
Edits made by D.H. 8/3/94

HTW DRILLING LOG

HOLE NO. IAB-SB36

PROJECT H1A - Middletown | INSPECTOR David a. Dalla | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	6	- Brown Silt (Sand + Gravel < 15%) - Slightly plastic (Keeps it shape a little when formed) - Dry - Slightly compacted - grades to Brown poorly graded sand w/gravel @ 5.7' - Gravel ≥ 15%	0.0 ppm PID No odor	Yes	IAB-SB36 (5-7) (4 vocs, 1,1 SVOCs, 1,1)	12, 13 13, 14	1.8' recovery 3" spoon 7.5YR, 4/4 (ML) 7.5YR, 4/4 (SP)
	7	Brown poorly graded sand w/gravel. - Gravel ≥ 15% - loose - Saturated @ 8.4'	0.0 ppm PID No odor	No	IAB-SB36 (7-9) (4 vocs, 1,1) - Sample Collected about Saturated zone	15, 14, 10, 9	1.6' recovery 3" spoon 7.5YR, 4/4 (SP) - Saturated @ 8.4'
	8						
	9	Boring terminated @ 9.0'					
	10						



IAB-SB36
34' from NE corner of #58 around #267
13' ⊥ to fence

PROJECT H1A - Middletown | HOLE NO. IAB-SB36

HTW DRILLING LOG

IAB-SB37

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: ~~IAB-SB37~~ Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. / 7.0" O.D. HSA; 3" S.S. Split spoons; 300 lb hammer	8. HOLE LOCATION: IAB-SB37	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 6/16/94	11. DATE COMPLETED: 6/16/94
12. OVERBURDEN THICKNESS: > 11.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 8.9'	
13. DEPTH DRILLED INTO ROCK: NA (bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 8.9' / No elapsed time	
14. TOTAL DEPTH OF HOLE: 11.0' Sampler, 9.0' auger	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	1		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Yes	X	X	X			%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
→			Grouted	Paula Hall

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Asphalt - No Sample collected					
	1	Brown poorly graded sand w/ silt (fine sand)	5.0 ppm peak	No	IAB-SB37 (1-3) ~~Sample Collected~~ No Sample collected @ 1.6' - low vol. of dry soils.	6,3, 5,9	7.5YR, 4/3 SP-SM - Recovery 1.2' - 3" spoon - Saturated @ 1.6'
	2	- Gravel - trace - (fine - medium) (round - subrounded)	0.0 sustained				
		- Slightly compact	- No odor				
		- Saturated @ 1.6' → perched zone (3-5' is dry) Thick layer may have been hindering infiltration					
	3	Dark yellowish brown poorly graded sand w/ silt	0.0 ppm No odor	No	IAB-SB37 (3-5) Brass, 13 MS1NS1	3,3, 4,4	Brick fragments 1.9' recovery 3" spoon 10YR, 3/4 SP-SM
		- Gravel - trace - (fine - medium) (round - subrounded)					
	4	- Sand is fine but increases to fine to medium grained sand w/ depth					
		- Also, silt content decreases w/ depth					
	5	- Dry					

PROJECT: HIA - Middletown
Edits made by D.H. 8/3/94

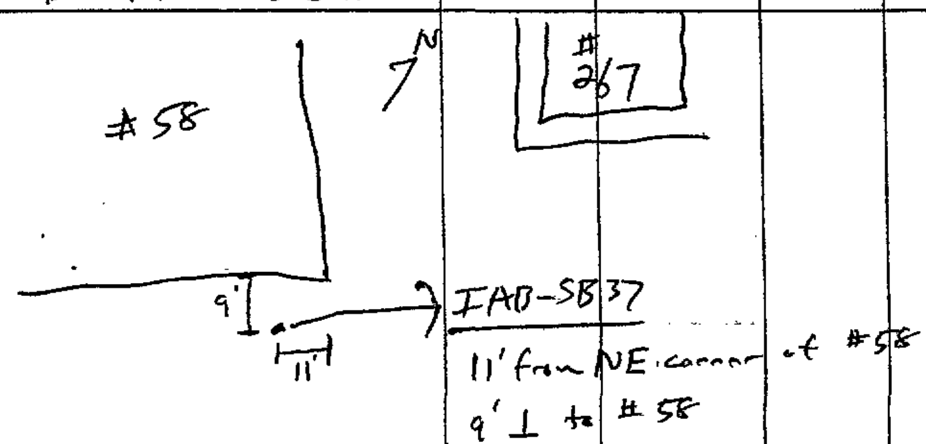
HOLE NO.: IAB-SB37

HTW DRILLING LOG

HOLE NO.	SHEET
IAB-SB37	2 of 2 SHEETS

PROJECT: HIA Middletown
INSPECTOR: David A. Holler

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	Dark yellowish brown fine to medium sand w/silt + gravel Silt - trace Gravel > 15% - (fine - medium) (round - subrounded) - Sand is poorly graded - Dry - loose - Gravel content increases w/depth	0.0 ppm No odor	Yes	IAB-SB37 (5-7') 4 vocs, 4, 500ml	12, 14, 16, 17	1.8' recovery 3" spoon (7.5YR, 4/4) (SP-SM) Gravel size ¼" - 1.5"
	7	- Dark brown poorly graded sand w/gravel Gravel > 15% - (fine - medium) (round - subrounded) - Sand (medium) - (Round) - loose - Saturated @ 8.9'	0.0 ppm No odor	No	IAB-SB37 (7-9') 4 vocs, 12 - Sample collected above saturation	17, 24, 17, 17	(7.5YR, 3/2) (SP) 1.4' recovery 3" spoon Saturated @ 8.9'
	9	- Dark brown poorly graded medium sand w/gravel - Gravel > 15% - loose - Saturated	432 ppm peak 40-50 sustained 432 ppm area had slight staining (≈11.0') - very bottom	No	IAB-SB37 (9-11') No sample	13, 14, 13, 13	1.5' recovery 2" spoon (continuation of II) (7.5YR, 3/2) (SP) Saturated
	11	Boring terminated @ 11.0'					



MTH DRILLING LOG

IAB-SB38

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. / 7.0" O.D. HSA; 3" S.S. split spoons; 360# hammer	8. HOLE LOCATION: IAB-SB	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 6/16/94	11. DATE COMPLETED: 6/16/94
12. OVERBURDEN THICKNESS: > 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 8.4'	
13. DEPTH DRILLED INTO ROCK: NA (Bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 8.4' / No elapsed time	
14. TOTAL DEPTH OF HOLE: 9.0' Sampler, 7.0' Auger	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
No			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
Yes	X	X	X			

22. DISPOSITION OF HOLE →	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
			Grouted	David A. Hahn

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	1	Asphalt, concrete, gravel - No Sample Collected.					
	2	~~Auger~~ D.H. refusal @ 2.0'. Spoon is bouncing on something hard. Sampler					
	3	- Going to auger to 5.0' + try to sample again.					
	4						
	5						

→ over

PROJECT: HIA - Middletown

HOLE NO.: IAB-SB38

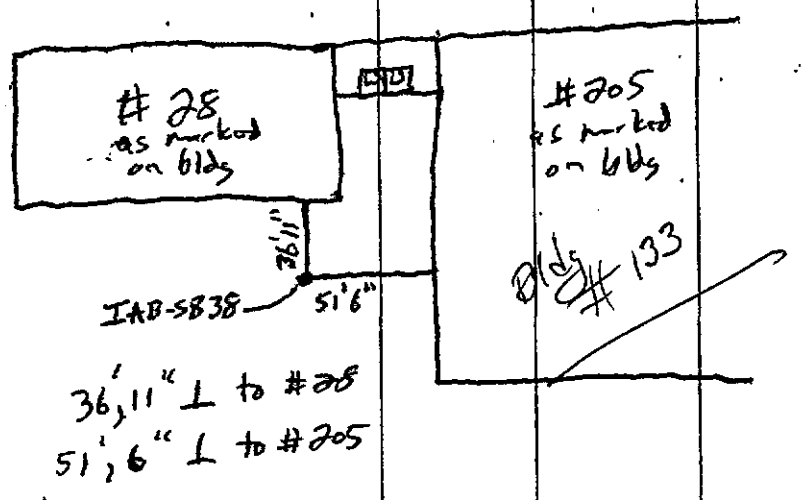
Edits made by D.H. 8/3/94

HTW DRILLING LOG

HOLE NO. IAB-SB38

PROJECT H1A-Middletown | INSPECTOR David A. Hahn | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5	Dark brown Silt w/Sand Sand ≥ 1540 - Dry - Slightly compacted - Fine Sand	0.7 ppm peak 0.0 sust. No odor	No	IAB-SB38 (5-7) 8 ounces, 2 jars	3,3, 3,4	7.5YR, 3/2 ML 1.5' recovery 3" spoon
	7	Dark brown silt w/ Sand, (fine) Sand ≥ 1540 - Saturated @ 8.4' - Slightly compacted - Slightly plastic	0.0 ppm No odor	No	IAB-SB38 (7-9') (6 ounces, 2 jars) - voks collected above saturated	4,6, 8,16	1.7' recovery 3" spoon 7.5YR, 3/3 ML Saturated @ 8.4'
	9						



HTW DRILLING LOG

IAB-SB39

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 of 2 SHEETS
3. PROJECT: HIA-Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bowers	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. / 7.0" O.D. } HSA; 3" S.S. Split Spoons; 300# hammer	8. HOLE LOCATION: IAB-SB39	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 6/16/94	11. DATE COMPLETED: 6/16/94
12. OVERBURDEN THICKNESS: > 7.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 5.4'	
13. DEPTH DRILLED INTO ROCK: NA (Bedrock not encountered)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 5.4' / No elapsed time	
14. TOTAL DEPTH OF HOLE: 7.0-Sampler, 5.0 Auger	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	1		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
No D.H.						%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Caved in up to 1.5'; 1.5'-0 → Grouted			Grouted	David a. [signature]

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0–1	Dark gray well graded gravel Sand < 15% (fine-medium) -Dry -Gravel 0.25-2" (rounded to subrounded) -No Sample Collected	0.0 ppm No odor	~~Yes~~ No D.H.	~~IAB-SB39 (0-2)~~ ~~[illegible]~~ D.H. No Sample - all coarse gravel could never sample for VOAS	4, 6, 5, 4	1.3' 3" Spoon (GW) (N4)
	2	Sampler refusal @ 2.1' -No Sample collected -Augering to 5' to try to push a spoon ↓			↓		
	3	-Note! while ~~augering~~ drilling, the auger grabbed something + shifted ≈ 6" to the SE.					
	4–5						

PROJECT	HOLE NO.
HIA-Middletown	IAB-SB39

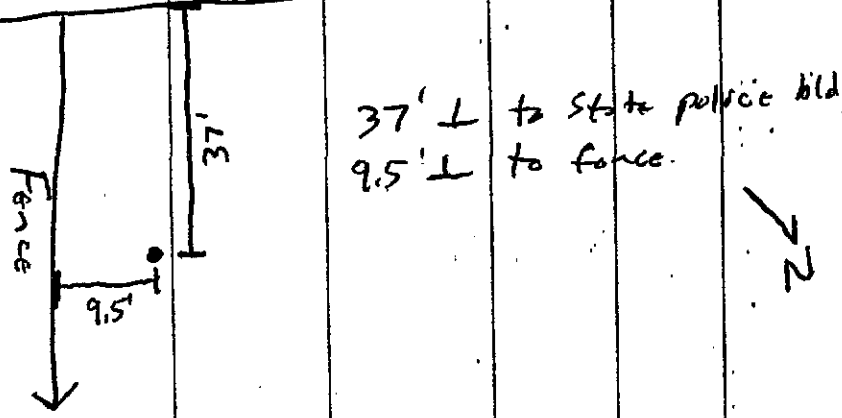
Edits made by D.H. 8/3/94

HTW DRILLING LOG

HOLE NO. IAB-SB39

PROJECT: HIA - Middletown | INSPECTOR: David A. Haller | SHEET 2 OF 2 SHEETS

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
	5	Dark yellowish brown poorly graded Sand w/ (fine-medium) Silt + gravel	0.0 ppm No odor	Yes	IAB-SB39 (5-7') Geotech only sampled blc of Saturation	2, 1, 6, 13	1.6' recovery 3" Spoon 10YR 4/4 SP-SM ~ Saturated @ 5.4'
	6	Gravel ≥ 15% (fine-Med.) ↳ content increases w/ depth (rounded-subrounded)					
		-loose.					
	7	~ Saturated @ 5.4' ~					
			State #246	Police			
	8						
	9			37' ⊥ to State police bldg #246. 9.5' ⊥ to fence.			
	10						



PROJECT: HIA - Middletown | HOLE NO. IAB-SB39

HTW DRILLING LOG

IAB-SB40

1. COMPANY NAME: ERM	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA-Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Tom Brown / John Bower	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.25" I.D. HSA; 2.0" O.D.; 3" S.S. split spoon; 300 lb hammer	8. HOLE LOCATION: IAB-SB40	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 6/17/94	11. DATE COMPLETED: 6/17/94
12. OVERBURDEN THICKNESS: > 9.0'	13. DEPTH GROUNDWATER ENCOUNTERED: 7.6' BGS	
14. DEPTH DRILLED INTO ROCK: Na (bedrock not encountered)	15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 7.6' / No elapsed time	
16. TOTAL DEPTH OF HOLE: 7.0' sampler, 9.0' auger	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
No			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Yes	X	X	X			%

22. DISPOSITION OF HOLE →	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
			Grouted	David A. Hahn

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Asphalt – No Sample Collected					
	1	-Dark yellowish brown poorly graded sand (fine) w/ silt,	0.0 ppm No odor	No	IAB-SB40 (1-3) 4 oz, jar	15, 13, 13, 24	1.0' recovery 3" spoon 10YR, 4/4 SP-SM
	2	-Gravel – trace (fine – medium) (round – subrounded) -Dry -Slightly compacted but friable					
	3	-Olive brown poorly graded fine sand w/ silt grading to poorly graded fine sand w/ silt & gravel	0.0 ppm No odor	No	IAB-SB40 (3-5) 8 oz, jar	7, 7, 9, 18	1.7' recovery 3" spoon 2.5Y, 4/3 SP-SM
	4	3-4.2 → trace gravel 4.2-5 → Gravel ≥ 15% (fine – medium) (round – subrounded)					2.5Y, 4/3 SP-SM
	5	-Dry -Slightly compacted but friable -loose					

PROJECT: HIA - Middletown

HOLE NO.: IAB-SB40

Edits made by D.H. 8/3/94

HTW DRILLING LOG

HOLE NO. IAB-SB40

PROJECT: H1A-Middletown

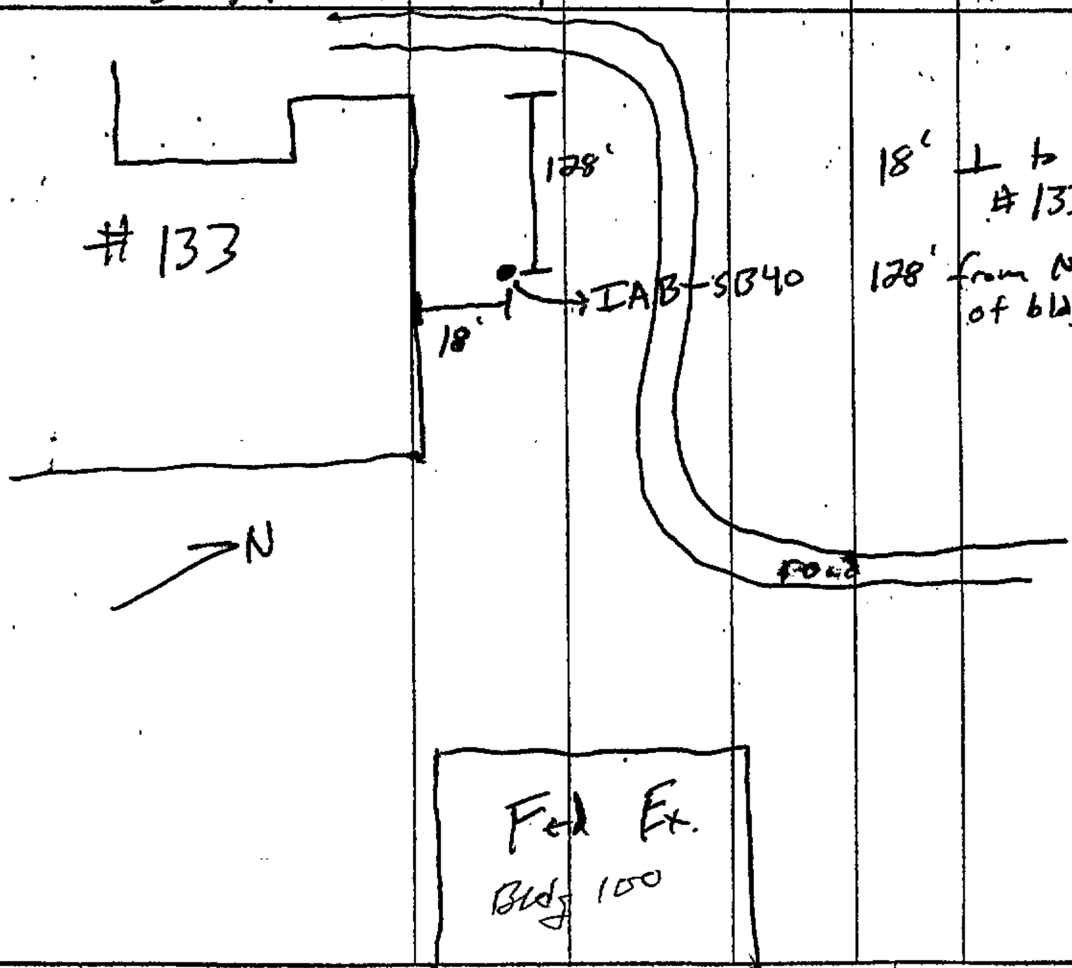
INSPECTOR: David A. [signature]

SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5 – 6	Very dark greyish brown poorly graded sand w/clay (fine) + gravel - Gravel > 15% (fine-medium) (round-subround) - plasticity varies w/clay + gravel content - Areas w/increased clay content are reasonably plastic - Dry	0.0 ppm No odor	No	IAB-SB40 (5-7) (4 vocs, 2)	10, 17, 11, 6	1.3' recovery 3" spoon 2.5Y, 3/2 SP-SC
	7 – 8	- Dark gray Lean Clay - Sand + Gravel < 15% - low plasticity - Saturated @ 7.6' BGS - not very stiff.	0.0 ppm No odor	No	IAB-SB40 (7-9) - wet - No samples collected	5, 6, 7, 6	1.8' recovery 3" spoon 2.5Y, 4/1 CL Saturated @ 7.6' BGS

Boring terminated @ #133

9



18' ⊥ to bldg #133
128' from NW corner of bldg #133

PROJECT: H1A-Middletown

HOLE NO. IAB-SB40

HTW DRILLING LOG

HOLE NO. IAB-HSB41 (W)

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Drill Rig; 3 1/4" I.D. Augers & 3" O.D. SS Split spoons; 300 lb. Hammer.	8. HOLE LOCATION: See Map. Sheet #2	
	9. SURFACE ELEVATION: Not Surveyed.	
	10. DATE STARTED: 8-2-94	11. DATE COMPLETED: 8-2-94
12. OVERBURDEN THICKNESS: ≥9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 7.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted.	✓			Warren N. Zapp

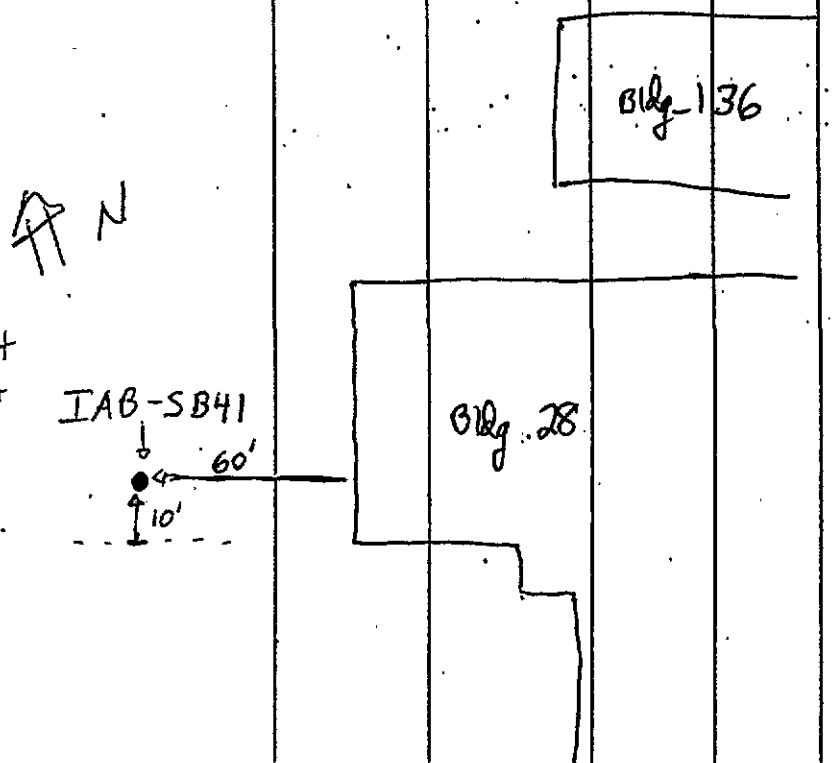
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Concrete, gravel (gray) angular ≈ 1.0" Dia.					
	0.5'	Augered to 1.0'					
	1.0'	Split spoon (1.0' to 3.0')					
		Silt w/ sand & fine grain (round) loose, moist poorly graded ≤15%	100 ppm	IAB-SB 41(1-3)	IAB-SB41 (1.0-3.0)	8, 9, 7, 7	10YR 4/3 brown ML 1.8' recovery
	2.0'	Coarse grain Sand (foundry sand) Silty, loose, moist, ang/sub. poorly graded					SP-SM 2.5Y 2.5/1 black
	3.0'	Split spoon (3.0' to 5.0')					
		Silt w/ sand v. fine grain loose, (Crown) moist, poorly graded.	30 ppm PID.	NS	IAB-SB 41(3.0 to 5.0)	9, 14, 14, 22	10YR 4/3 brown ML 2.0' recovery
	4.0'	4.0' to 5.0' with cobbles (1/4" to 1" Dia.)					
	5.0'						

HTW DRILLING LOG

HOLE NO. IAB-SB41

PROJECT: HIA - Middletown | INSPECTOR: Warren Foy | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS a.	GEOTECH SAMPLE OR CORE BOX NO a.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS a.	REMARKS n.
	5.0'	Split spoon 5.0' to 7.0'					
		Gravel w/ coarse sand. (angular) Lt rounded, loose, v. moist, poorly graded 1/4" to 1 1/2" Dia.	0ppm PID	IAB-SB 41(5-7)	IAB-SB 41(5-7)	16, 19, 22, 50	1.6' recovery GP. 10YR 3/4 dark yellowish brown.
	6.0'						
	7.0'	Split Spoon 7.0' to 9.0'					
		"Same as above" lots of rounded gravel No sample collected.	0ppm PID.	NS	NS	60, 87, 23, 27	GP. 1.0' recovery. Saturated at 7.5'
	8.0'						
	9.0'	Bottom of borehole at 9.0' WWE 8-2-94					



HTW DRILLING LOG

HOLE NO. IAB-SB42

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 of 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3 1/4" I.D. Augers; 3" O.D. S.S. split spoons; 300 lb hammer	8. HOLE LOCATION: See Sheet #2	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-3-94	11. DATE COMPLETED: 8-3-94
12. OVERBURDEN THICKNESS: ≥ 10.5'	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 10.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted.	✓			Wann M. Fay

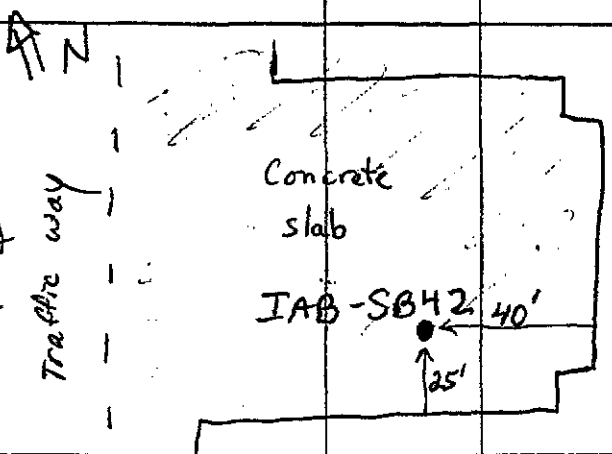
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Old concrete floor. drilled through it.	0 ppm PID	NS	NS	NA	Concrete
	0.5'						
	1.0'	Split spoon 1.0' to 3.0'					
		Sand with ≥ 15% gravel subrounded 1/4" to 1" Dia. loose (lesser sand than dry poorly sorted gravel) uniform. (Coarse to medium grain)	15 ppm PID No Odor	IAB-SB42 (1.0-3.0)	IAB-SB42 (1.0-3.0)	13, 22, 18, 23	2.0' recovery salt/pepper color GP 10YR 4/4 dark yellowish brown
	2.0'						
	3.0'	Split spoon 3.0' to 5.0'					
		"Same as above"	0 ppm PID No Odor	NS	IAB-SB 42 (3.0-5.0)	19, 15, 18, 22	1.8' recovery
		Lense of Sand w/ silt and gravel mix fine grain - loose, poorly graded. (subangular)					10YR 4/6 dark yellowish brown SP-SM
	4.0'						10YR 4/2 dark grayish brown GP
		Similar to 1.0' to 3.0' spoon but more angular					
	5.0'						

HTW DRILLING LOG

HOLE NO. IAB-SB42

PROJECT: HIA - Middletown | INSPECTOR: Warren Foy | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split spoon 5.0' to 7.0'					
		Gravel w/ sand. Subangular f. to m. grain sand. gravel subrounded. loose 1/8" to 1" Dia. moist. poorly graded.	7 ppm PID slight odor.	NS	IAB-SB 42(5.0-7.0)	25, 17, 20, 30	1.9' recovery. 10YR 4/4 dark yellowish brown GP.
	7.0'	Split spoon 7.0' to 9.0'					
		"Same as above"	3 ppm. PID Slight odor.	NS	IAB-SB 42(7.0-9.0)	20, 26, 37, 50	2.0' recovery.
	8.0'	Silt with sand (2"/5%) fine-v.fine (rounded) loose, moist w/ gravel (rounded) loose poorly graded.	—	—	—	—	10YR 4/4 dark yellowish brown ML
	9.0'	Augered 9.0' to 10' No samples collected	—	NS	NS	NA	Augered Interval.
	10.0'	Split spoon 10.0' to 12.0'					
		Asphalt Split spoon Auger Refusal at 10.5' (WF) 8-3-94	0 ppm PID	NS	NS	100/5'	refusal. Saturated @ 10.5'
	11.0'						
	12.0'						



Industrial Area - Pipelines and Lagoons
Soil Borings

HTW DRILLING LOG

HOLE NO. IAP-SB1

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT - MA
SHEET 1 OF 2 SHEETS	
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3¼ I.D. augers; B-59 Mobile Rigs; 3" O.D. S.S. split spoons; 300lb hammer	8. HOLE LOCATION: See Map on Sheet 2.
	9. SURFACE ELEVATION: Not Surveyed
	10. DATE STARTED: 8-1-94 / 11. DATE COMPLETED: 8-1-94
12. OVERBURDEN THICKNESS: >10.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 8.5' to 9.0'
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 10.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren M. Toy

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Asphalt and gravel to 1.0' Lt gray angular <1" Dia.	0 ppm PID No odor	NS	NS	NA	No Sample collected.
	0.5'	Augered interval					
	1.0'	Split spoon 1.0' to 3.0'. Silt w/ fine sand (rounded) loose, poorly graded moist, uniform	0 ppm PID No odor	NS	IAP-SB1 (1.0-3.0)	5, 4, 9, 20	1.5 recovery 10YR 3/3 dark brown ML
	2.0'	(Bottom .5' had a few cobbles 1" Dia. rounded)					
	3.0'	Split spoon @ 3.0' to 5.0' fine sand with < 15% silt loose, very moist, poorly graded, subrounded	0 ppm PID No odor	NS (DUP) IAP-SD1 (3.0-5.0)	IAP-SB1 (3.0-5.0)	8, 7, 4, 5	1.8' recovery 10YR 4/3 Brown SP-SM
	4.0'						
	5.0						

PROJECT: HIA - Middletown

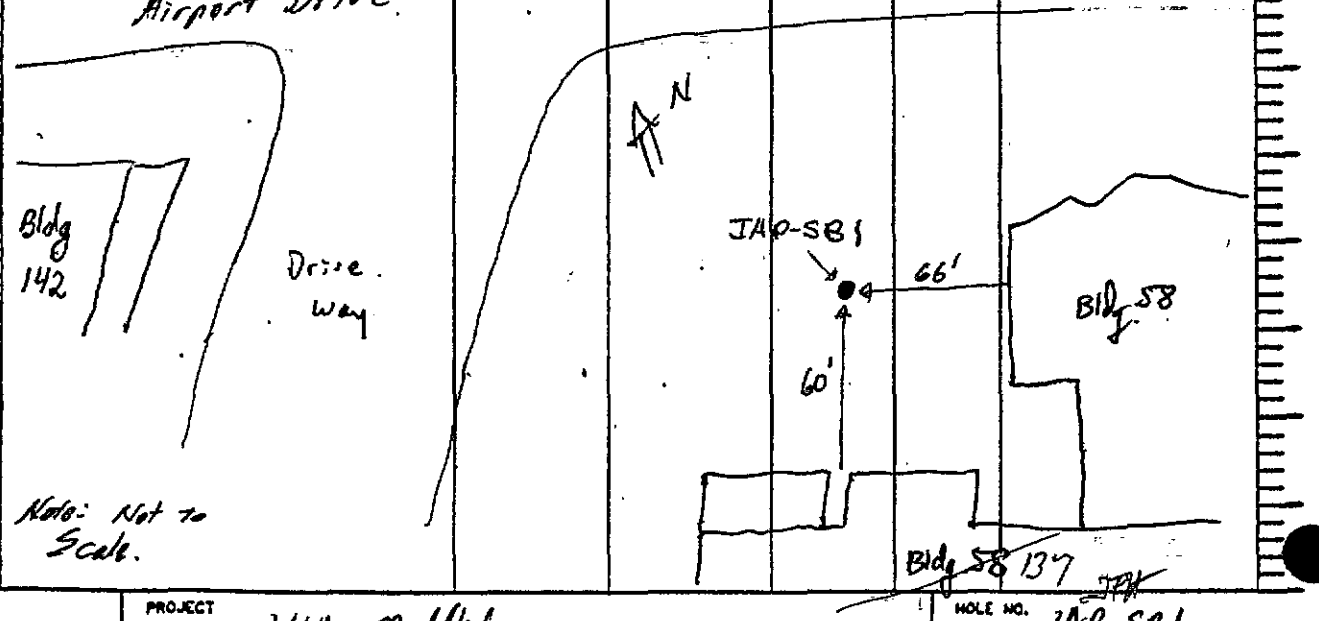
HOLE NO. IAP-SB1

HTW DRILLING LOG

HOLE NO. IAP-SB1

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 1 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Split spoon 5.0' to 7.0'					
	5.0'	Sand w/ Gravel (~15%) coarse grain (sub angular) loose, moist, gravel (rounded) 1/4" Dia. to 2" Dia. Sand is variegated. poorly graded, well sorted.	0 ppm PID	NS	IAP-SB1 (5.0-7.0)	4,5,5, 4.	2.0' recovery 10YR 4/4 dark yellowish brown SP.
	7.0'	Drilled Interval, no samples collected.		NS	NS	-	
	8.0	Split spoon - 8.0' to 10.0'					
		Saturated at ≈ 8.5' to 9.0' Sand w/ silt (<15%) loose, poorly graded rounded (v.f.-med grains) moist	80 ppm PID	IAP-SB1 (6.0-8.5)	~~NS~~ IAP-SB1 (8.0-8.5)	11,9,10 32	2.0' recovery 10YR 4/3 brown SP-SM
	10.0'	Bottom of bore hole at 10.0' 8-1-94 (DNF)					



Note: Not to Scale.

PROJECT: HIA - Middletown | HOLE NO. IAP-SB1

(SB) FAB

HTW DRILLING LOG

HOLE NO. IAP-SB2

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: ADT-MA.	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3 1/4 I.D. Augers; 3" O.D. ss split spoons; 300 lb hammer	8. HOLE LOCATION: See map on sheet #2	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-1-94	11. DATE COMPLETED: 8-1-94
12. OVERBURDEN THICKNESS: ≅ 12.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 10.0'	
13. DEPTH DRILLED INTO ROCK: 0.0', reached bedrock	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 12.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
1140	0.0	Topsoil, organic, loose dry, rooted. No sample collected as a surface scrape	0ppm PID No odor	NS	~~DUP~~ IAP SB (SSC)	NA	10 YR 3/2 very dark grayish brown OL-OH
	0.5'	Split spoon (1.0' to 3.0')					
1145	1.0'	Silt - trace of fine sand loose (rounded <15%) moist poorly graded, well sorted uniform	0ppm PID. No odor.	IAP-SB2 (1.0-3.0)	IAP-SB2 (1.0-3.0)	5,2,3,2	2.0' recovery 10YR 5/4 yellowish brown ML
	2.0'						
	3.0'	Split spoon 3.0' to 5.0'					
1200		"Same Silt as above"	0ppm PID No Odor.	IAP-SB2 (3.0-5.0)	IAP-SB2 (3.0-5.0)	3,3,6,5	2.0' recovery Same as above
	4.0'						
	5.0'						

PROJECT: HIA - Middletown

HOLE NO. IAP-SB2

HTW DRILLING LOG

HOLE NO. IAP-SB2

PROJECT: HIA - Middletown | INSPECTOR: Warren Fop | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split spoon 5.0' to 7.0'					
		Sand w/ Gravel ≥ 15% Very moist at bottom. loose, var graded poorly graded. Subrounded coarse grains. gravel - rounded 1/4" to 1/2" Dia.	0 ppm PID No Odor	NS	IAP-SB 2(5.0-7.0)	18,21, 21,23	2.0' recovery 10YR4/3 brown SP
	7.0'	Split spoon 7.0' to 9.0'					
		Gravel with sand (sub angular ≥ 15%) loose, moist, poorly graded, sub-rounded 3/4" Dia to 1" Dia.	0 ppm PID no odor	NS	IAP-SB 2 (7.0-9.0)	19,23, 32,32	GP 2' recovery 2.5Y 4/3 olive brown
	9.0'	Augered Interval, no sample collected.	NA	NS	NS	NA	
	10.0'	Split Spoon 10.0' to 12.0'					
		Saturated @ 10.2' no samples collected. (UNF) 8-1-94	No Odor 0 ppm PID	NS	NS	17,21, 37,77/3"	Very dense split spoon refusal at 11.7'
	12.0'	12.0' bottom of borehole (UNF) 8-1-94					

Airport Drive

N

IAP-SB2

Cement cradle for tank.

Bldg #58

Note: Not to Scale.

PROJECT: HIA - Middletown | HOLE NO. IAP-SB2

HTW DRILLING LOG

HOLE NO. IAP-SB3

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. Augers; 3" O.D. SS. Split spoons; 300 lb hammer	8. HOLE LOCATION: See Map Sheet #2	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-1-94	11. DATE COMPLETED: 8-1-94
12. OVERBURDEN THICKNESS: ≥ 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 8.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fay

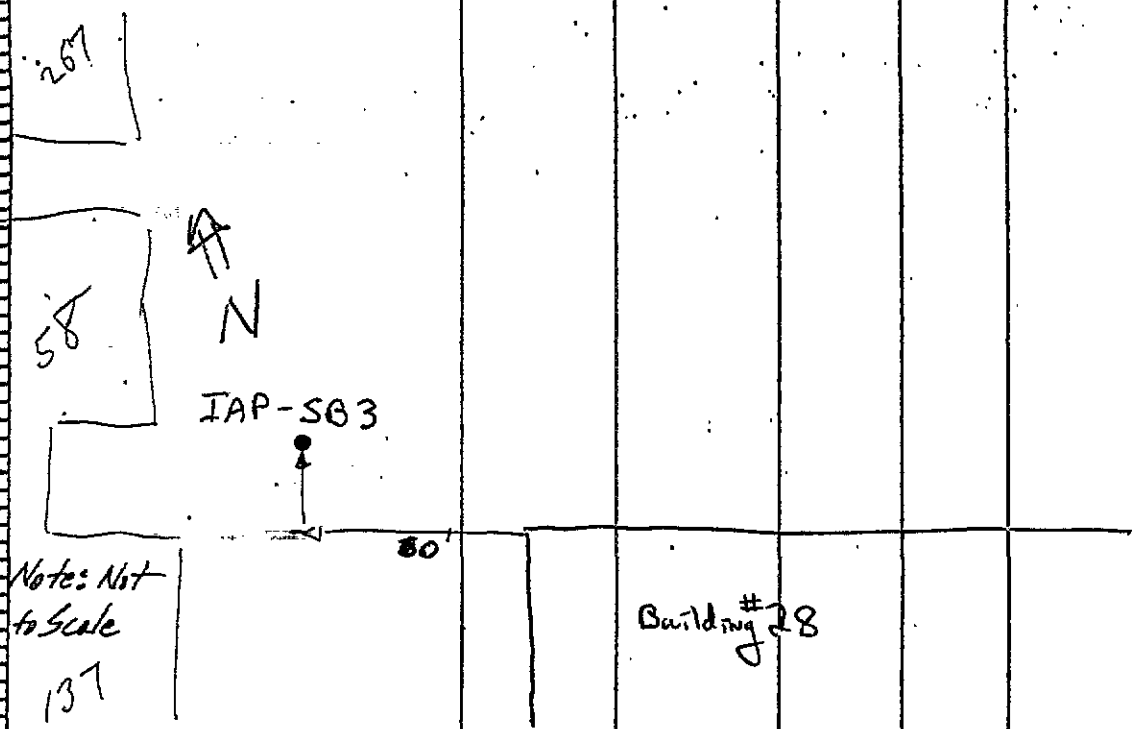
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Asphalt and gravel (gray and angular ½" to 1" Dia	No odor.	NS	NS	NA.	Asphalt parking lot w/ gravel below
	0.5'	augered to 1.0'					
	1.0'	Split spoon 1.0' to 3.0'					
		Sand w/ silt ≤ 15% loose, moist, poorly graded, fine grain (rounded) uniform w/ black streaks.	320 ppm, Petroleum odor.	IAP-SB3 (1.0-3.0)	IAP-SB3 (1.0-3.0)	5, 4, 6, 5.	1.5' recovery, 2.5Y 4/4 olive brown SP-SM
	2.0'						
	3.0'	Split spoon 3.0' to 5.0'					
		Sand w/ silt ≤ 15% loose very moist poorly graded constantly uniform (factory sand) v. fine grain, rounded.	241 ppm strong pet. odor	NS	IAP-SB3 (3.0-5.0)	11, 6, 7, 8	2.0' recovery GLAY color 2.5/N2.5 black.
	4.0'						
	5.0'						

HTW DRILLING LOG

HOLE NO. IAP-SB3

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH 5.0' b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Split spoon @ 5.0' to 7.0'					
		Sand w/ Gravel ≥ 15% m-grain (sub-rounded) V. moist. loose, poorly graded gravel 1/4" to 3/4" Dia. sub-rounded	220 ppm PID. No Odor.	IAP-SB3 (5.0-7.0)	IAP-SB 3(5.0-7.0)	10, 13, 13, 13	1.6' recovery 10YR 4/2 dark grayish brown. SP.
6.0'							
7.0'		Split spoon 7.0' to 9.0'					
		"Same as above"	10 ppm OVA No odor.	NS	IAP-SB 3(7.0-9.0)	9, 11, 16, 35	2.0' recovery SP.
8.0'		Gravel ≥ 15% and size increased to 1.5"					8.5' saturated. Collect sample above 8.5'
9.0'		9.0' Bottom of borehole (WF) 8-1-94					
10.0'							



PROJECT: HIA - Middletown | HOLE NO. IAP-SB3

HTW DRILLING LOG

HOLE NO. IAP-SB4

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3 1/4" I.D. Augers; 3" O.D. S.S. Split Spoons; 300 lb hammer	8. HOLE LOCATION: See Map - Sheet # 2	
	9. SURFACE ELEVATION: Not Surveyed.	
	10. DATE STARTED: 8-1-94	11. DATE COMPLETED: 8-1-94
12. OVERBURDEN THICKNESS: ≥ 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 9.0'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	✓					— x

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fox

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Asphalt and gray angular gravel, 3/4" dia.	0 ppm PID	NS	NS	~~6, 17, 8,~~ WR ~~10~~	
	0.5'	Augered to 1.0'					
	1.0'	Split spoon 1.0' to 3.0'					
		Sand w/ silt (≥ 15%) loose, moist, massive (uniform) poorly graded fine grains - subrounded	580 ppm PID	IAP-SB4 (1.0-3.0)	IAP-SB4 (1.0-3.0)	6, 17, 8, 10.	1.5' recovery 2.5Y 4/4 olive SM brown
	2.0'						
	3.0'	Split Spoon 3.0' to 8.0'					
		~~Silt~~ WR same as above	227 ppm	NS	IAP-SB4 (3.0-5.0)	3, 5, 3, 7	2.0' recovery (10 YR 4/6 dark yellowish brown ML (at 4.5')
	4.0'	4.2' 2 - 1/2" bands of black sand.				4.5' to 5.0'	
		Silt with sand (v. fine - rnd) cohesive, moist, low plasticity poorly graded.	—	—	—	—	—
	5.0'						

PROJECT: HIA - Middletown

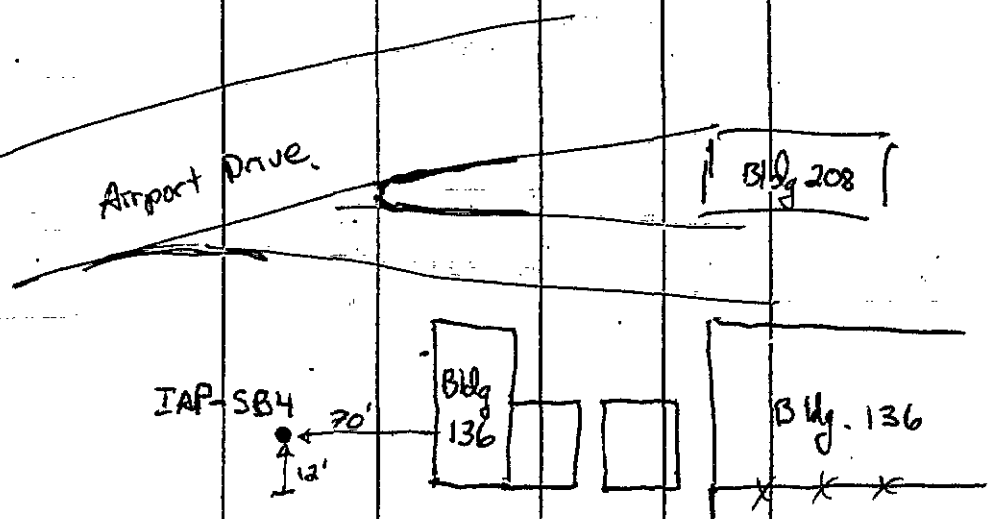
HOLE NO. IAP-SB4

HTW DRILLING LOG

HOLE NO. IAP-SB4

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	Split spoon 5.0' to 7.0'					
		Silt, cohesive, moist to v. moist, uniform, poorly graded, trace of sand? low plasticity.	70 ppm PID; Noodor	NS	IAP-SB 4(5.0-7.0)	5, 7, 7, 10	.5' recovery 10YR 5/4, ML yello w/sl brown
	7.0'	Split spoon (7.0 to 9.0')					
		'Same as above' but more sand. fine grain ≤ 15% rounded.	120 ppm PID. Faint odor on bottom .5'	IAP-SB4 (7.0-9.0)	IAP-SB4 (7.0-9.0)	9, 12, 12, 12	2.0' recovery. ML.
	9.0'	Gravel w/ sand. both subangular - gravel ≅ 1/4" to 1" Dia. w/fine to fine sand. (≯ 15%) loose, v. moist.					G.P. 2.5Y 5/1 Gray Saturated at 9.0'
	10.0'	Bottom of borehole at 9.0' WNS B-1-94					



PROJECT: HIA - Middletown | HOLE NO. IAP-SB4

HTW DRILLING LOG

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: ADT-MA	HOLE NO. IAP-SB5 SHEET 1 of 2 SHEETS
3. PROJECT: HIA-Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-57 Mobile Rig; 3¼" I.D. Augers; 3" O.D. S.S. Split spoon; 300 lb Hammer.	8. HOLE LOCATION: See Sheet 2. 9. SURFACE ELEVATION: Not Surveyed 10. DATE STARTED: 8-4-94 11. DATE COMPLETED: 8-4-94	
12. OVERBURDEN THICKNESS: > 7.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 5.0'-5.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 7.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fox

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Asphalt and gray gravel (angular ≤1" Dia)	0 ppm PID, No Odor	NS	NS	NA	Parking lot
	0.5'						Augered to 1.0'
	1.0'	Split Spoon 1.0' to 3.0' Silt with sand (v. fine grain, loose, subround) dry, poorly graded, uniform.	70 ppm PID. No odor.	IAP-SB5 (1.0-3.0)	IAP-SB5 (1.0-3.0)	7, 4, 4, 3	10YR 4/4 dark yellowish brown ML 2' recovery
	3.0'	Split Spoon (3.0' to 5.0') Silt (trace of sand) loose, moist, poorly graded, well sorted, uniform	0 ppm PID	NS	IAP-SB5 (3.0-5.0)	5, 6, 10, 15.	10YR 5/3 brown 2' recovery ML

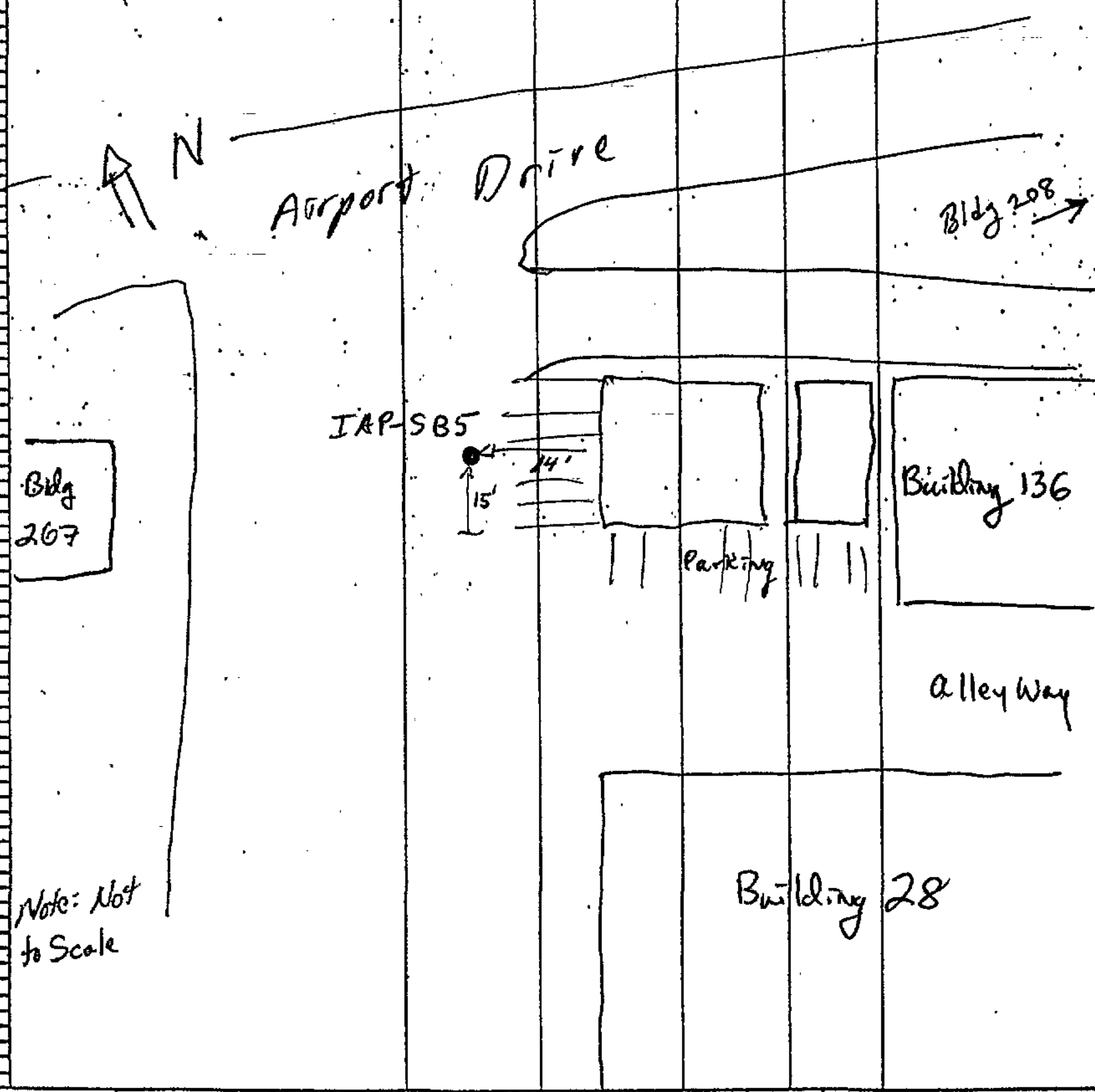
PROJECT: HIA-Middletown

HOLE NO. IAP-SB5

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.
HIA - Middletown	Warren Fox	IAP-SB5
		SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split Spoon @ 5.0' to 7.0'					
	5.0' – 6.0'	Sand w/ gravel ≅15% coarse grain - round. gravel - ≤ ½" dia angular - loose wet poorly graded	20 ppm, Strong odor	IAP-SB5 (5.0-5.5	NS	8, 8, 12, 21	1.6' recovery SP, 2.5Y 4/2 dark grayish brown. Saturated at 5.0' to 5.5'
	7.0'	Bottom of borehole at 7.0'					



HTW DRILLING LOG

HOLE NO. IAP-SB6 (IAB-SB42)

1. COMPANY NAME: ERM-PNC	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: HIA - Middletown	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 - Mobile Drill Rig.; 3¼" I.D. Augers; 3" O.D. S.S. split spoons; 300lb Hammer	8. HOLE LOCATION: See Map. Sheet #2	
	9. SURFACE ELEVATION: Not Surveyed.	
	10. DATE STARTED: 8-2-94	11. DATE COMPLETED: 8-2-94
12. OVERBURDEN THICKNESS: ≥ 9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 9.0'	
13. DEPTH DRILLED INTO ROCK: > 9.0', Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
3 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fat

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Asphalt and gray gravel (top 1') (angular.) augered to 1.0'					
	1.0'	Split spoon collected (1.0 to 3.0)					
		Silt w/ ≥ 15% gravel. loose, moist poorly graded (gravel ≤ 1¼" Dia. rounded.	6 ppm PID No odor	IAP-SB6 (1.0-3.0)	IAP-SB6 (1.0-3.0)	6, 6, 9, 10	.6' recovery 2.5Y 4/3 olive brown ML
	3.0'	Split spoon collected 3.0 to 5.0'					
		Red piece of brick. 1½" Dia. No sample collected	No odor	NS	NS	5, 6, 10, 12.	No recovery brick in spoon
	4.0'						

PROJECT: HIA - Middletown

HOLE NO. IAP-SB6 (IAB-SB42)

IAP-SB6

HTW DRILLING LOG

HOLE NO. ~~IAP-SB42~~

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS (WP)

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split Spoon 5.0' to 7.0'					
		Silt, trace of v. fine sand, rom dod. cohesive, ~~from~~ (WP) very moist. poorly graded uniform sample.	0 ppm PID.	NS	IAP-SB 6 (5.0-7.0)	7, 7, 8, 13.	2.0' recovery 2.5Y 5/4 light olive brown, ML
	7.0'	Split Spoon 7.0' to 9.0'					
		"Same as above"	0 ppm PID.	IAP-SB6 (7.0-9.0)	IAP-SB6 (7.0-9.0)	19, 28, 18, 28	2.0' recovery CML
	8.0'	Gravel w/ coarse sand (Subround) loose v. moist poorly graded, well sorted 1/4" to 1 1/2" in Diam.					10 YR 4/4 dark yellowish brown GP
	9.0'	Bottom of Borehole at 9.0' WNF (WP) 8-2-94					9.0' saturated

N

Bldg 136

Bldg 135

16'

19'

IAP-SB6

Bldg 28

Note: Not to Scale

IAP-SB6

PROJECT: HIA - Middletown | HOLE NO. (WP) IAP-SB42

HTW DRILLING LOG

HOLE NO. IAP-SB7

1. COMPANY NAME: ERM-ANC	2. DRILLING SUBCONTRACTOR: ADT-NA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig. 3¼" I.D. Augers 3" O.D. x 5' split spoons 300 lb hammer	8. HOLE LOCATION: See Map Sheet #2	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-3-94	11. DATE COMPLETED: 8-3-94
12. OVERBURDEN THICKNESS: ≥ 7.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 4.8'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 7.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fox

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Asphalt and gray gravel. angular (≤ 1" Dia.)	0 ppm PID No Odor	NS	NS	NA	Asphalt parking lot.
	0.5'						Augered to 1.0'
	1.0'	Split Spoon 1.0' to 3.0'					
		Silt w/ trace of v. fine sand and some gravel (subround to - wards bottom (3.0') cohesive, moist poorly graded, uniform.	30 ppm PID, No Odor	IAP-SB7 (1.0-3.0)	IAP-SB 7(1.0-3.0)	27, 10, 12, 10	7.5 YR 3/3 dark brown 1.7' recovery ML.
	2.0'						
	3.0'	Split spoon 3.0' to 5.0'					
		Same as above (more gravel → 15%)	10 ppm PID, No Odor.	NS	IAP-SB 7(3.0-5.0)	4, 5, 2, 4.	
	4.0'	Silt w/ gravel (≤ 1.5" Dia) v. moist subround Cohesive. Brick fragments - angular.					7.5 YR 2.5/3 very dark brown 1.5' recovery. ML Saturated at 4.8'
	5.0'						

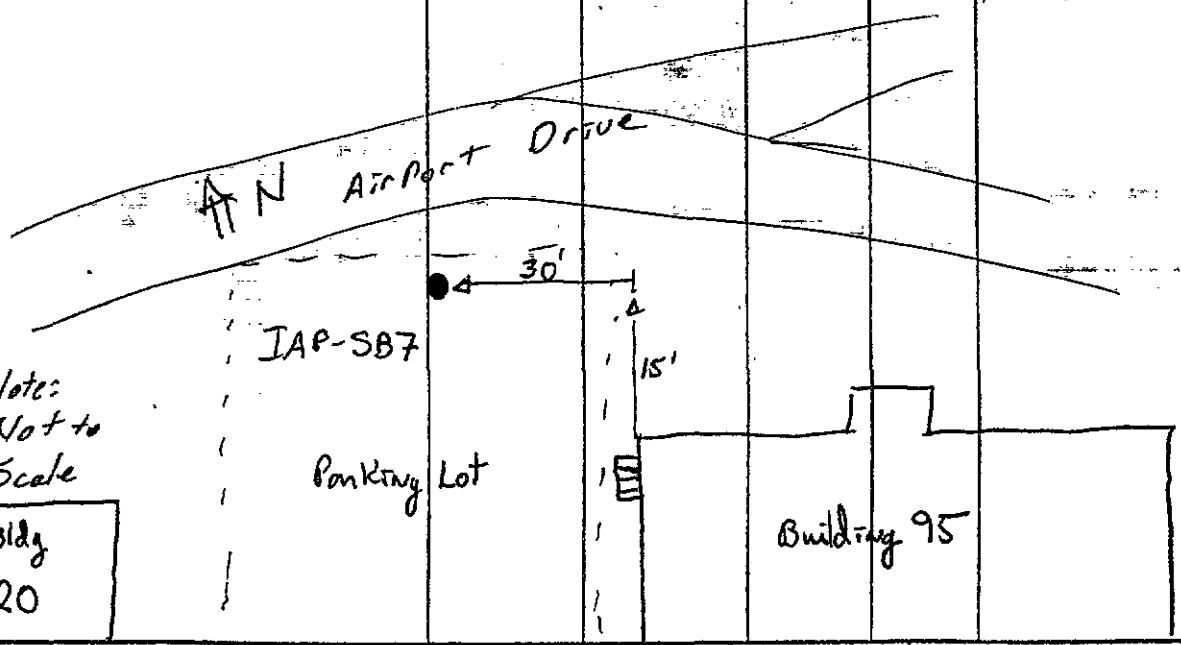
PROJECT: HIA - Middletown

HOLE NO. IAP-SB7 (A2)

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Foy	IAP-SB7	2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Spl-t Spoon 5.0' to 7.0'					
		"Same as above"	8 ppm PID No Odor.	IAP-SB7 (5.5)	NS	2, 2, 2, 4.	Saturated thruout. 2.0' recovery
	6.0'	Silt cohesive, saturated uniform poorly graded.					2.5Y 7/1 light gray. ML
	7.0'	Bottom of bore hole at 7.0' (WNF) 8-3-94					



HTW DRILLING LOG

HOLE NO. IAP-SB8

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: AOT - MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. Augers ✓ HSA; 3" O.D. SS split spoons; 300 lb hammer	8. HOLE LOCATION: See Map Sheet #2	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-2-94	11. DATE COMPLETED: 8-2-94
12. OVERBURDEN THICKNESS: >9.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 7.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Geo. Samples	✓		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted.	✓			Warren N. Pop

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Top soil, organic rich, loose dry with round cobbles/gravel, ≤2" dia	0 ppm No odor. augered to 1.0'	NS	NS	NA	
	0.5'						
	1.0'	Split spoon 1.0' to 3.0'					
		Silt w/ Sand (f. grain subround) loose moist poorly graded (trace gravel - angular)	0 ppm No Odor	IAP-SB8 (1.0-3.0)	IAP-SB8 (1.0-3.0)	2,2,3,5	10YR 3/2 very dark grayish brown 1.8' recovery
	2.0'	Sand coarse grain angular (trace) silty sand loose moist poorly sorted					10YR 2/1 Black SP
	3.0'	Split spoon 3.0' to 5.0'					
		black slag angular gravel - clay. (coal ≤½" Diameter.)	0 ppm PID. No Odor.	NS	IAP-SB8 (3.0-5.0)	2,2,3,3.	10YR 2/1 black 1.6' recovery
	4.0'	Silt (slight elastic) cohesive, v. moist uniform w/ Brown/tide (red) banding throughout.	—	—	—	—	10YR 5/3 brown ML
	5.0'						

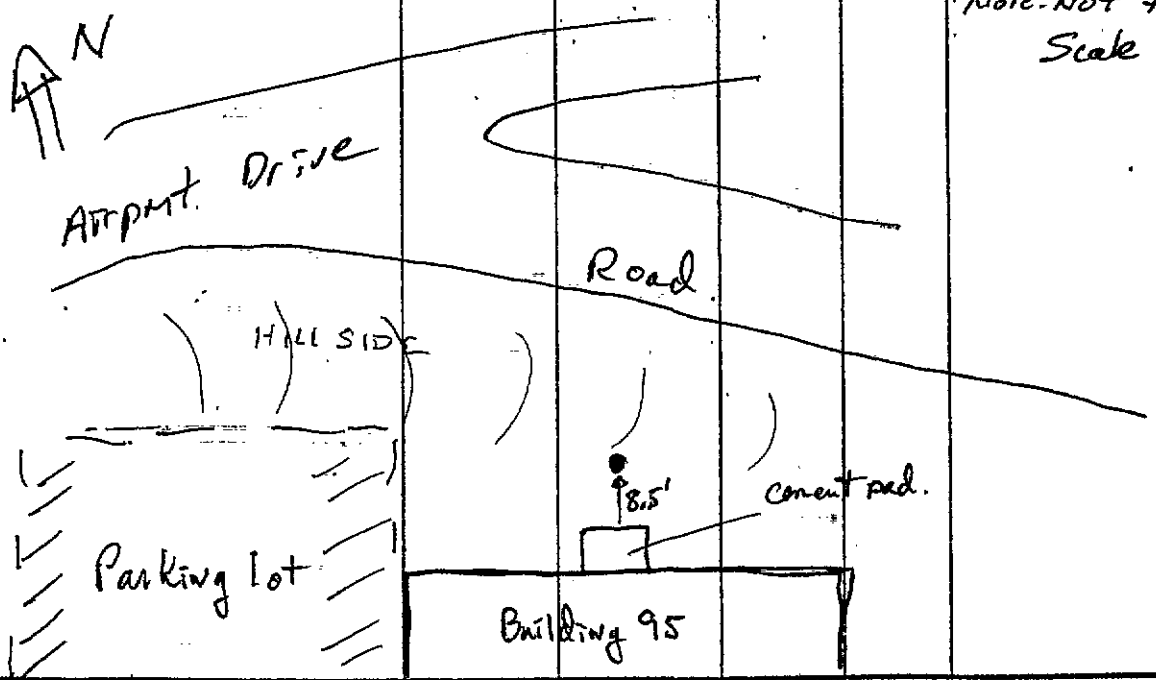
PROJECT: HIA - Middletown | HOLE NO. IAP-SB

HTW DRILLING LOG

HOLE NO. IAP-SB8

PROJECT HIA - Middletown | INSPECTOR Warren Fop | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split spoon 5.0' to 7.0'					
		Silt w/ gravel (rounded) very dense, tight, v. moist. 1/4" to 3/4" gravel. w/ brown banding.	0 ppm PID No odor	IAP-SB8 (5.0-7.0)	IAP-SB8 (5.0-7.0)	10, 8, 13, 16	2.0' recovery 2.5Y 6/2 light brownish gray.
	7.0'	Split Spoon 7.0' to 9.0'					
		Similar as above - Saturated at 7.5' No Samples Collected.	0 ppm. No odor	NS	NS	9, 11, 14, 16	1.0' recovery. Saturated 7.5'
	9.0'	Bottom of bore hole at 9.0' WWE 8-2-94					



Note: Not to Scale

PROJECT HIA - Middletown | HOLE NO. IAP-SB8

HTW DRILLING LOG

HOLE NO. IAP-SB22 (9)

1. COMPANY NAME: ERM - PNC	2. DRILLING SUBCONTRACTOR: AOT - MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. Augers HSA; 3" O.D. 2" I.D. split spoons; 300 lb hammer	8. HOLE LOCATION: See Map. Sheet #2	
	9. SURFACE ELEVATION: Not Surveyed.	
	10. DATE STARTED: 8-2-94	11. DATE COMPLETED: 8-2-94
12. OVERBURDEN THICKNESS: >9.0'	13. DEPTH GROUNDWATER ENCOUNTERED: ≈ 7.5'	
14. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
15. TOTAL DEPTH OF HOLE: 9.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Jay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Asphalt and gravel (gray ≤1" dia and angular.) augered to 1.0'	0 ppm PID	NS	NS	NA	
	1.0'	Split spoon 1.0' to 3.0'					
		Silt w/ gravel >.15" (sub-rounded) cohesive, moist poorly graded (trace of sand) 1/4" Dia - gravel.	0 ppm PID	IAP-SB9 (1.0-3.0)	IAP-SB9 (1.0-3.0)	20, 16, 8, 10	1.8' recovery 10YR 3/3 dark brown. ML
	2.0'						
		Split spoon 3.0' to 5.0' (brick fragment near bottom					
	3.0'	Silt w/ gravel (round) similar to above but mottled w/ light brown throughout.	0 ppm PID	~~IAP~~ NS	IAP-SB9 (3.0-5.0)	6, 6, 6, 6.	1.7' recovery 10YR 4/2 dark grayish brown ML
	4.0'						
	5.0'						

PROJECT: HIA — Middletown

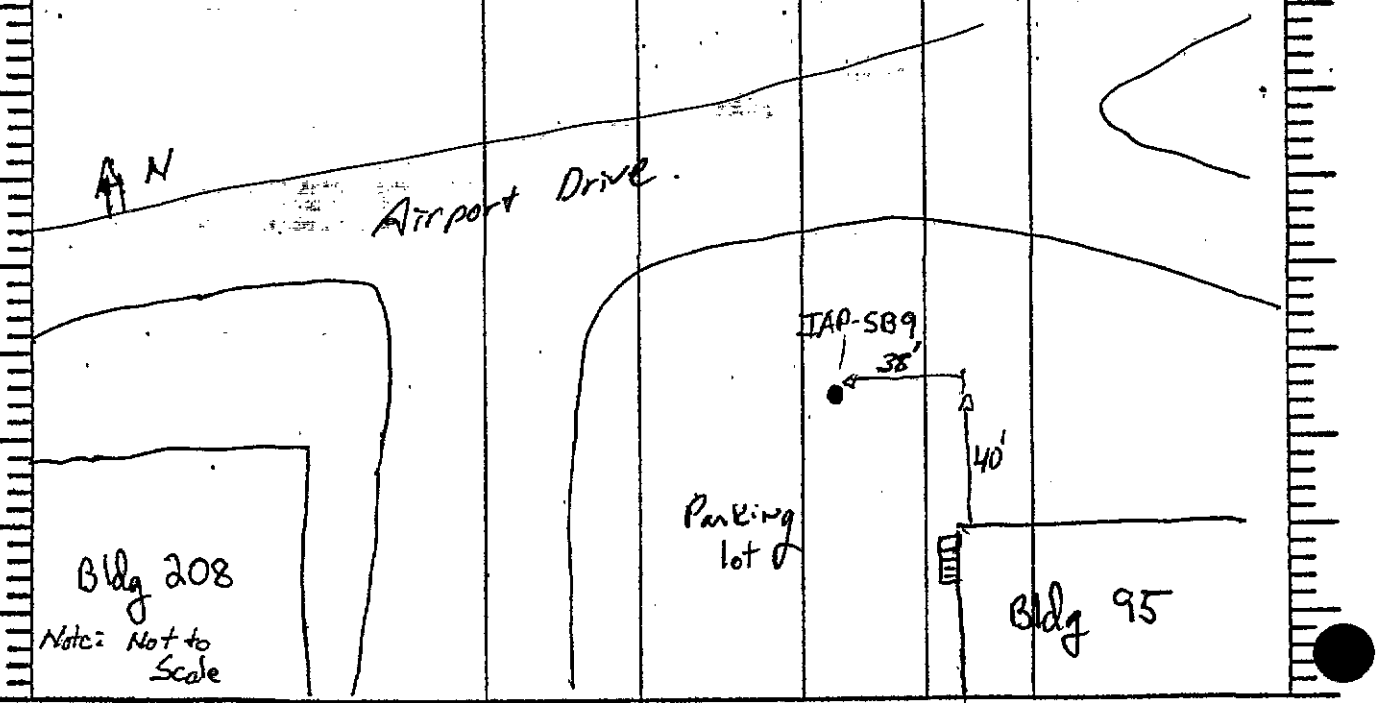
HOLE NO. IAP-SB9

HTW DRILLING LOG

HOLE NO. IAP-SB9 (WF)

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 7 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS c.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split Spoon 5.0' to 7.0' Silt w/ small amount of gravel.	0 ppm PID	NS	IAP-SB9 (5.0-7.0)	3,2,2, (WF) 6,4,4, 1	1.3' recovery ML same color 10YR 4/2 Dark grayish brown 2.5Y 8/6 yellow
	6.0'	Lense of cement brick (yellow)					
		"					
	7.0'	Split spoon (7.0 to 9.0') Poor recovery. Geotech. sample collected. Similar material as (5.0 to 7.0)	0 ppm PID	~~NS~~ IAP-SB9 (7.0)	NS	3,2, 2,8	.1' recovery. wet spoon.
	8.0'						
	9.0'	Bottom of Borehole at 9.0' WNF 8-2-94					
	10.0'						



PROJECT: HIA - Middletown | HOLE NO. IAP-SB9

HTW DRILLING LOG

HOLE NO. IAP-SB 10

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig. 3 1/4" I.D. Augers 3" O.D. SS split spoons 300 lb Hammer	8. HOLE LOCATION: See Sheet #2 (Map)	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-2-94	11. DATE COMPLETED: 8-2-94
12. OVERBURDEN THICKNESS: >11.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 11.0'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 11.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
5 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted.	✓			Warren M. Fox

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Organic Rich Soil, rooted dry.	0 ppm PID.		IAP-SB 10 (SS)	NA	10YR 4/6 OL-OH dark yellowish brown
	0.5'	Split Spoon 1.0' to 3.0'					
	1.0'	"Same as above".	0 ppm PID.	IAP-SB10 (1.0-3.0)	IAP-SB 10(1.0-3.0)	14, 20, 37, 37	
		Silt with gravel and brick fragments. loose dry poorly graded subround gravel. 1/4" to 1" dia.					10YR 3/3 dark brown 1.6' recovery
	3.0'	Split spoon 3.0' to 5.0					
		Sand - w/ gravel (1/2" Dia) round. loose, moist. poorly sorted gravel fine grain - subangular (tighter at bottom .5')	4 ppm PID.	NS	IAP-SB 10(3.0-5.0)	32, 23, 15, 15	7.5YR 3/3 dark brown 1.8' recovery SW
	5.0'						

PROJECT: HIA - Middletown

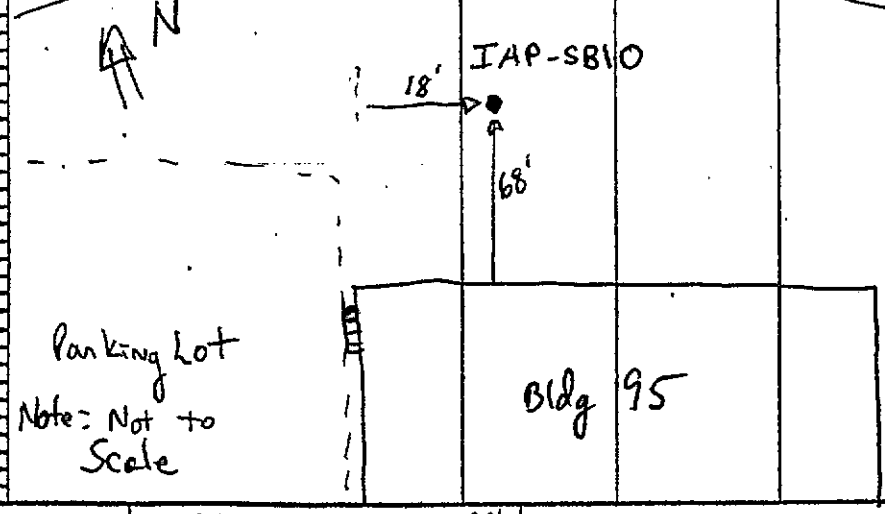
HOLE NO. IAP-SB 10

HTW DRILLING LOG

HOLE NO. IAP-SB10

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	Split spoon @ 5.0' to 7.0' "Same as above" less gravel than before	0 ppm PID No odor	NS	IAP-SB 10(5-7)	12,8,7, 6	2.0' recovery 2.5YR3/4 dusky red.
	6.0						
	7.0	Split spoon 7.0' to 9.0' more dense than above similar red material more gravel.	0 ppm PID.	NS	IAP-SB 10(7-9)	7,6,2, 3.	"
	8.0						
	9.0	Split spoon @ 9-11					
			0 ppm PID Fuel odor	IAP-SB10 (9.0-11.0)	IAP-SB10 (9.0-11.0)	5,6,6,7	"
	10.0	Silt (trace of gravel) (≤1" round dia.) tight, cohesive v. moist. poorly graded.					ML 2.0' recovery 2.5Y5/1 gray. 10.5' saturated.
	11.0	TD=11'					Bottom of borehole at 11.0'. (WNF) 8-2-94



PROJECT: HIA - Middletown | HOLE NO. IAP-SB10

HTW DRILLING LOG

HOLE NO. IAL-SB11

1. COMPANY NAME: ERM-NMC	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: HSA; B-59 Mobile Rig; 3 1/4" I.D. S.S. split spoons; 3" O.D. Cut Augers; S.S. split spoons; 300 lb Hammer	8. HOLE LOCATION: See Sheet # 2	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-3-94	11. DATE COMPLETED: 8-3-94
12. OVERBURDEN THICKNESS: ≥ 8.5'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 6.0' to 6.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 8.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fap

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Surface cover - Organic rich soil, loose, moist, rooted	0 ppm PID	NS	IAL-SB11(SSC)	NA	2.5Y5/4 light olive brown OL-OH
		Split spoon 0.5 to 2.5					
		Silty sand w/ trace of gravel. fine grain (sub angular) loose dry poorly graded	0 ppm PID, no Odor	IAL-SB11 (0.5-2.5)	IAL-SB11(0.5-2.5)	6,6,6,6	2.0' recovery 7.5YR 3/3 dark brown, SM
	1.0'						
	2.0'						
		Split spoon 2.5 to 4.5					
		Same as above	0 ppm PID No odor	NS	IAL-SB11(2.5-4.5)	7,9,9,10	2.0' recovery 10YR 4/6 dark yellowish brown color.
	3.0'	Silt, cohesive tight, moist uniform poorly graded					ML
	4.0'						
		Split spoon 4.5' to 6.5'					
		Silt w/ gravel (round) 1/4 to 1/2" Dia. V. moist loose	0 ppm PID no Odor	IAL-SB11 (5.0')	NS	4,3,6,10	.5' recovery 2.5Y4/4 olive brown
	5.0'						

PROJECT: HIA - Middletown

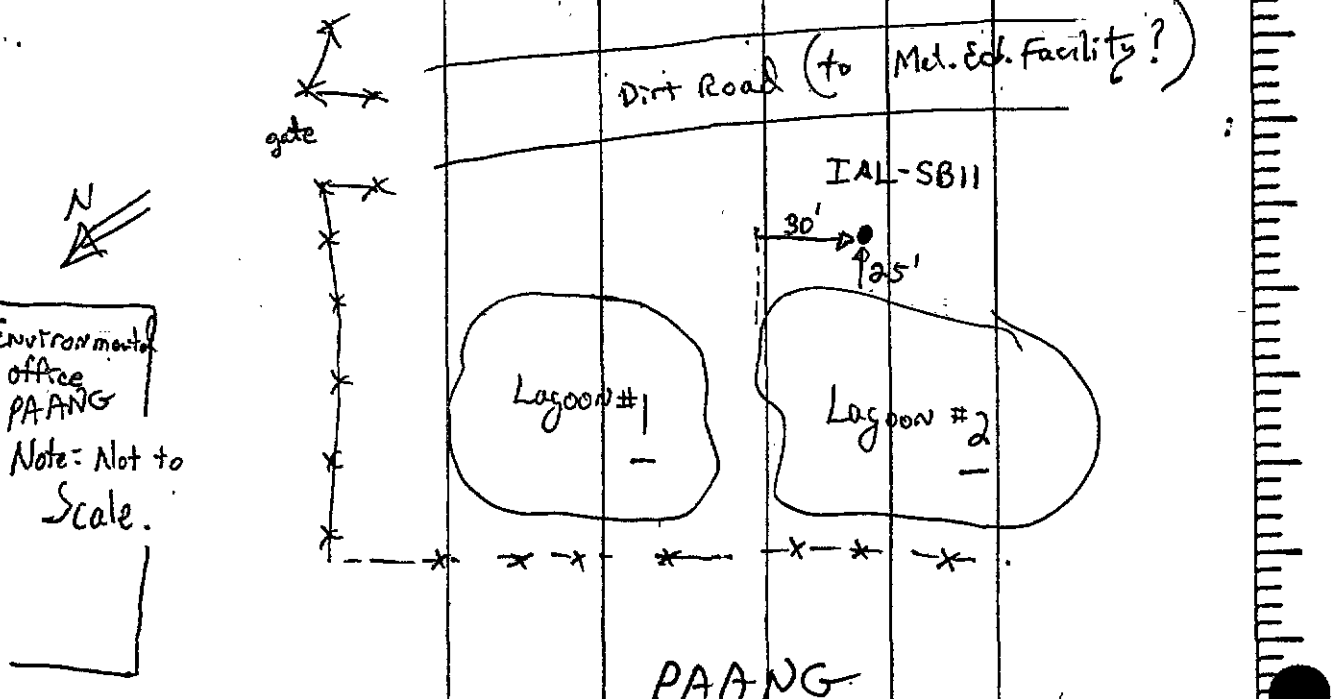
HOLE NO.: IAL-SB11

HTW DRILLING LOG

HOLE NO. IAL-SB11

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	See above 4.5 to 5.0'					
	5.5						
	6.0						
	6.5	Split spoon 6.5' to 8.5'					
	7.0	Saturated spoon No sample collected. ≅ 6' to 6.5' groundwater encountered.	0 ppm PID No Odor.	NS	NS	10, 9, 7, 7.	2.0' recovery. No sample collected Saturated 6.0' to 6.5'
	7.5						
	8.0						
	8.5	Bottom of borehole at 8.5' (WNF) 8-3-94					



HTW DRILLING LOG

HOLE NO. IAL-SB12

1. COMPANY NAME: ERM - PNC	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 of 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Drill Rig; 3 1/4" I.D. Augers; 3" O.D. ss. Split spoons; 300 lb Hammer	8. HOLE LOCATION: See Sheet # 2	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-3-94	11. DATE COMPLETED: 8-3-94
12. OVERBURDEN THICKNESS: ≥ 6.5'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 4.0'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 6.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 Samples	✓		—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Tap

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Organic rich Silt, Loose, moist, poorly graded. rooted. Split Spoon 0 to 2.5	0ppm PID No Odor	NS	IAL-SB 12(SSC)	NA	10 YR 4/2 dark grayish brown. OL-OH
	0.5	Silt w/ gravel < 1/2" Dia Sub rounded v. moist loose poorly graded	0ppm PID No Odor	IAL-SB12 (.5-2.5)	IAL-SB 12(0.5-2.5)	18, 10, 9, 9	2' recovery 10YR 4/3 brown ML
	2.0'	Less gravel				slight color change	10 YR 5/3 brown
		Split spoon 2.5' to 4.5'					
	3.0'	Lean clay med. plasticity soft, uniform gray w/ black fine banding poorly graded.	0ppm PID No Odor.	NS	IAL-SB 12(2.5-4.5)	6, 4, 5, 8	10YR 3/1 very dark gray 2' recovery: — saturated at ≅ 4.0'
	4.0'	Split Spoon 4.5' to 6.5'					
		"Same as above" w/ silt.		IAL-SB 12(4.5)	NS	6, 8, 18, 18.	
	5.0'						

PROJECT: HIA - Middletown

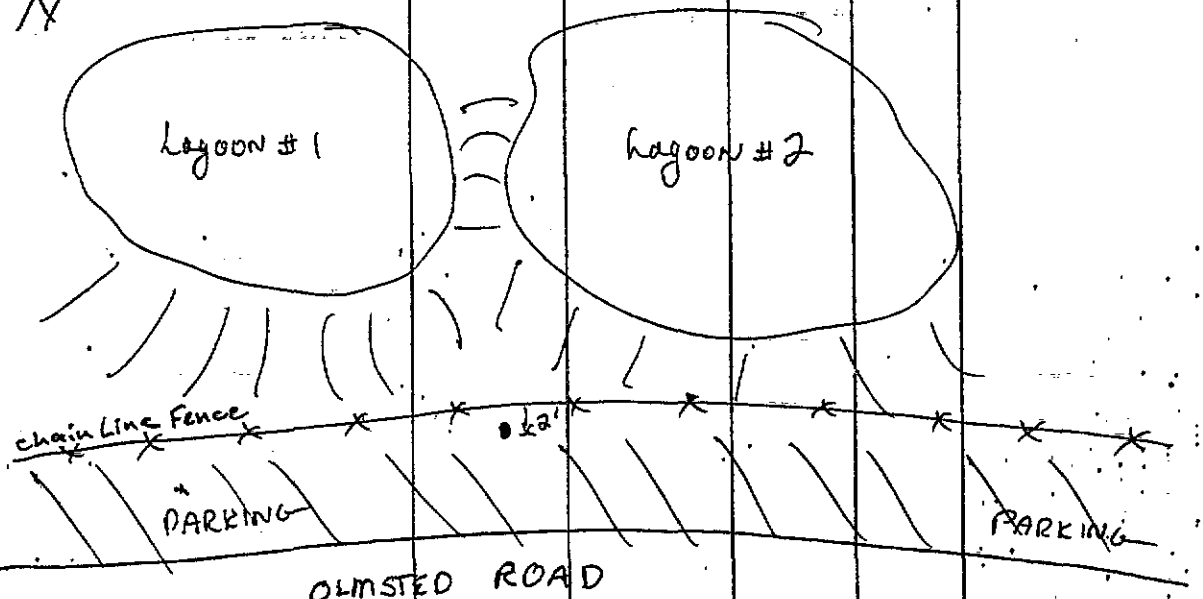
HOLE NO. IAL-SB12

HTW DRILLING LOG

HOLE NO. IAL-SB12

PROJECT: HIA - Middletown | INSPECTOR: Warren Foy | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	6.5	material as above Bottom of boring @ 6.5'					



Note: Not to Scale

Runway Area
Soil Borings

HTW DRILLING LOG

HOLE NO. RA-SB53

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 OF 3 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill B-59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig HSA; 3 1/2" I.D. Augers; 3" O.D. SS split spoon; 300 lb hammer	8. HOLE LOCATION: ~~See Sheet~~ See Master Sheet/Runway	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-17-94	11. DATE COMPLETED:
12. OVERBURDEN THICKNESS: ≥15.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 14.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1 Sample	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
4 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted.	✓			Warren N. Fop

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Split Spoon 0.0' to 2.0' Soil - Organic Rich	0 ppm PID No Odor	NS	RASB53 (0.0-2.0)	7, 22, 24, 26	2.0' recovery 7.5 YR 5/4 brown OL-OH
	0.5'						
	1.0'	Gravel lense (.2' thick) Silt tight, dry poorly graded mottled w/ gray clay					ML
	2.0'	Split Spoon 2.0'-4.0' "Same as above"	0 ppm, No Odor	NS		65/.3'	.3' recovery refusal
	3.0'	Augered Interval Split Spoon 2.3' to 3.0', 3.0' to 5.0' Slag and gray rock - angular w/ Sand coarse grain - subround loose dry poorly graded.	0 ppm, No Odor		RA-SB53 (3.0-5.0)	14, 13, 16 11	2' recovery 2.5Y 4/1 dark gray. GP
	4.0'						
	5.0'						

PROJECT: HIA - Middletown | HOLE NO. RA-SB53

HTW DRILLING LOG

HOLE NO. RA-SB53

PROJECT: HIA- Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 3 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split Spoon 5.0 to 7.0'					
		Some slag material (loose, dry, w/ some angular sand. (slag ≤ 3/4" Dia)	Oppm PID.	RA-SB53 (5.0-7.0)	RA-SB 53(5.0-7.0)	11,14,11 18	20' recovery GP
	6.0'						
	7.0'	Split spoon 7.0' to 9.0'					
		Some slag. larger pieces ≤ 2" Dia	Oppm No Odor	NS	NS	16,13,13, 21	2.0 recovery GP
	8.0'						
	9.0'	Split Spoon 9.0' to 11.0'					
		Some Slag.	Oppm No Odor	NS	NS	16,16, 20,41	20' recovery. 10YR4/1 dk gray. GP
	11.0'	11.0' to 13.0 Augered					
		Augered Interval.					
	13.0'	Split Spoon 13.0' to 15.0					
		Sand m to f. grain. Sub angular Foundry (Handy) sand) trace of silt (poss. coal moist moderate) loose uniform poorly graded — Saturated at 14.5'	Oppm, PID No Odor.	NS	RA-SB 53(13.0 -14.5)	1,2,2,2	2.0' recovery 10YR 2/1 black SP-SM
	14.0'						
	14.5'						
	15.0'	Bottom of borehole at 15.0' (WNF) 8-17-94		Saturated at 14.5			

HTH DRILLING LOG

RA-SB53

JECT	MIDDLETOWN-HIA	INSPECTOR	Warren Fox	SHEET 3 OF 3 SHEETS

EV. L	DEPTH D.	DESCRIPTION OF MATERIALS C.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.

PROJECT MIDDLETOWN — HIA

HOLE NO. RA-SB53

HTW DRILLING LOG

HOLE NO.	RA-SB54
1. COMPANY NAME	ERM - PMC
2. DRILLING SUBCONTRACTOR	ADT - MA
SHEET	1 OF 3 SHEETS
3. PROJECT	HIA - Middletown
4. LOCATION	Middletown, PA
5. NAME OF DRILLER	Troy Brown
6. MANUFACTURER'S DESIGNATION OF DRILL	Mobile Drill Rig
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	B-59 Mobile Rig HSA; 3 1/2" I.D. augers; 3" O.D. S.S. split; 300 lb hammer spoon
8. HOLE LOCATION	See Sheet attached to all Borings TW Runway
9. SURFACE ELEVATION	Not Surveyed
10. DATE STARTED	8-17-94
11. DATE COMPLETED	8-17-94
12. OVERBURDEN THICKNESS	≥ 15.0'
15. DEPTH GROUNDWATER ENCOUNTERED	≥ 15.0'
13. DEPTH DRILLED INTO ROCK	Not Encountered.
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
14. TOTAL DEPTH OF HOLE	15.0'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	—

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1 Sample	✓		NA.

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
5 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fry

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Split Spoon @ 0.0' to 2.0'					
		Top Soil Organic Rich	0ppm PID, No Odor.	NS	NS	1, 34, 17, 80	2.0' recovery. OL-OH
	1.0'	Gravel lense .8' to 1.0' gray Silt (mottled) - trace gray tight clay dry banding poorly graded					10YR4/4 dark yellowish brown GP
	2.0'	Split Spoon 2.0' to 4.0'					
		Slag, gravel and Sand (c-grain) subangular dry loose poorly graded (trace gray mottling)	0ppm, No Odor	NS	RA-SB 54(2.0-4.0)	15, 18, 30, 17.	2.0' recovery 10YR3/1, very dark gray, GP
	3.0'						
	4.0'	Split Spoon 4.0' to 6.0'					
		Same material more mottled gray and blue.	0ppm, No Odor	NS	NS	14, 19, 11, 6	2.0' recovery 10YR5/1 gray GP
	5.0'						

PROJECT: HIA - Middletown

HOLE NO.: RA-SB54

HTW DRILLING LOG

HOLE NO. RA-SB54

PROJECT HIA - Middletown | INSPECTOR Warren Fox | SHEET 1 OF 3 SHEETS

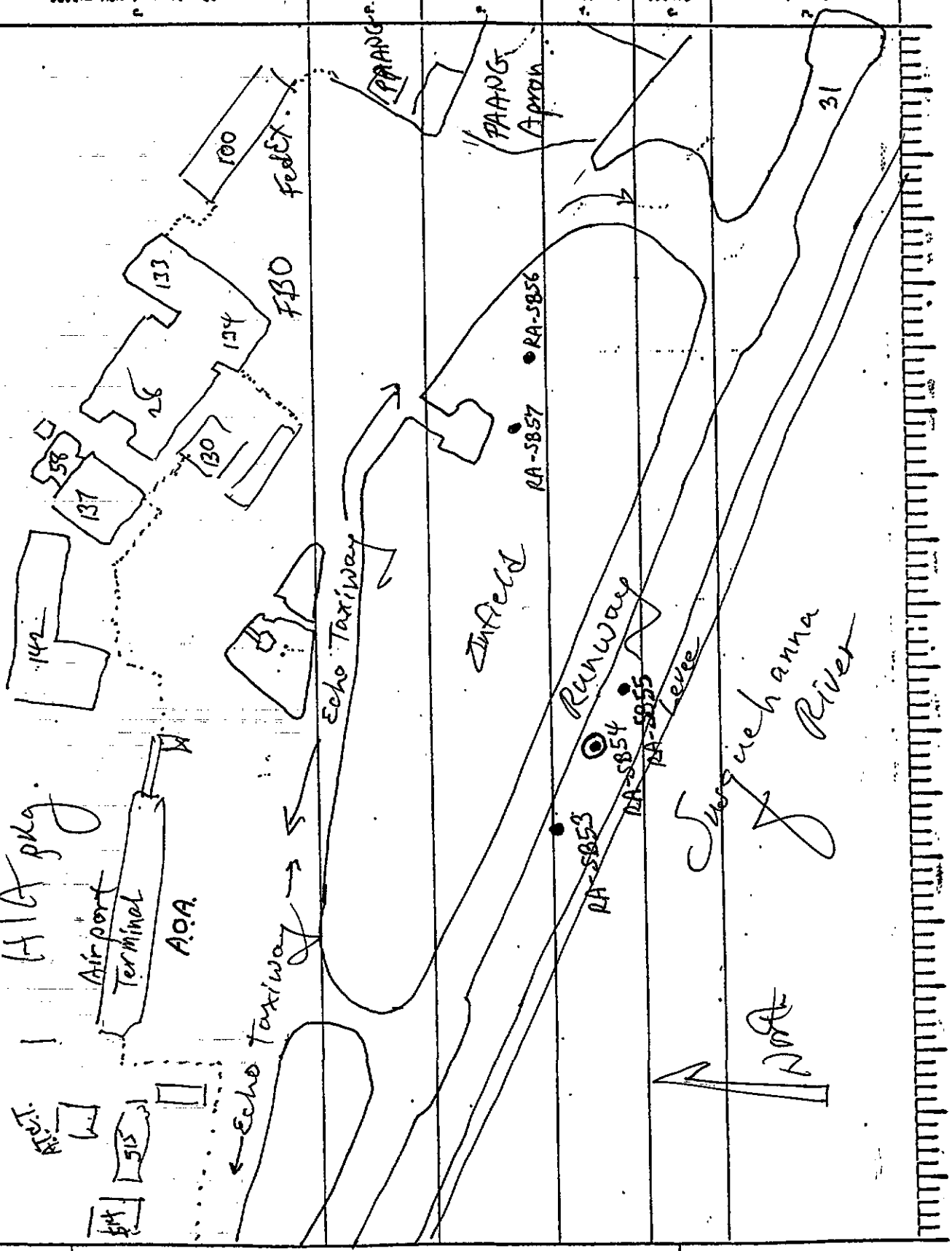
ELEV. a.	DEPTH	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.8'						
	6.0'	Split spoon 6.0' to 8.0'					
		Same as above	0 ppm PID, No Odor	NS	RA-SB 54 (6.0-8.0)	15, 15, 21, 14	2.0' Recovery 10YR 3/2 very dark gray to brown GP
	7.0'						
	8.0'	Split spoon 8.0' to 10.0'					
		Same as above	0 ppm No Odor	NS	RA-SB 54 (8.0-10.0)	16, 20, 9, 7	2.0' Recovery "same color" GP
	9.0'						
	10.0'	Split spoon 10.0 to 12.0					
		Similar - color change (slight)	0 ppm No Odor	RA-SB 54 (10.0-12.0)	RA-SB 54 (10-12)	10, 11, 12, 19	2.0' recovery 10YR 4/1 dark gray, GP
	11.0'						
	12.0'						
		Augered Interval.	0 ppm, Breathing Zone	NS	NS	NA	
	13.0'	Split Spoon 13.0' to 15.0' (13.0' to 13.0')					
		Same as above. Slag - (gravel - broken - w/ blue hues)	0 ppm No Odor	NS	RA-SB 54 (13.0-15.0)	16, 18, 22, 28	1.5' recovery GP
	14.0'						
		15.0' Bottom of borehole,	Saturated at 15.0'		WNF	8-17-94	
	15.0						

PROJECT HIA - Middletown | HOLE NO. RA-SB54

ATH DRILLING LOG

PROJECT MIDDLETOWN-HIA | INSPECTOR Warren Fox | RA-SB54 | SHEET 3 OF 3 SHEETS

ELEV. L	DEPTH B.	DESCRIPTION OF MATERIALS C.	FIELD SCREENING RESULTS D.	GEOTECH SAMPLE OR CORE BOX NO E.	ANALYTICAL SAMPLE NO. F.	BLOW COUNTS G.	REMARKS H.



PROJECT MIDDLETOWN — HIA

HOLE NO. RA-SB54

HTW DRILLING LOG

HOLE NO. RA-SB55

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: AOT-MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 mobile Rig HSA; 3½" I.D. Augers; 3" O.D. s.s. split spoon; 300 lb hammer	8. HOLE LOCATION: See Separate Sheet/Master	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-17-94	11. DATE COMPLETED: 8-17-94
12. OVERBURDEN THICKNESS: ≥ 12.0'	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 12.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NO Samples	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fay

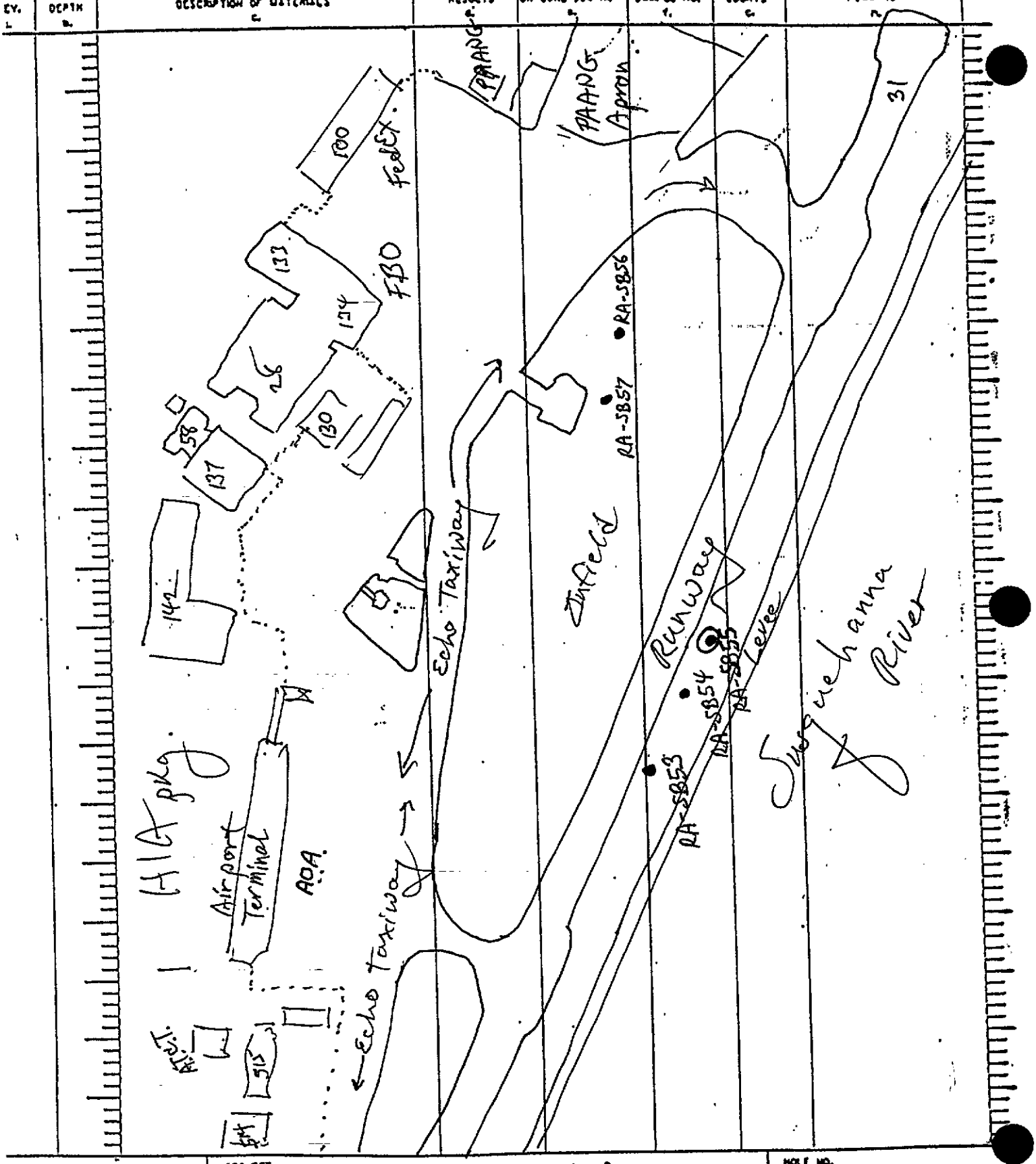
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Augered Interval 0.0' to 5.0'	Oppm PID Breathing Zone	NS	NS	NA	Fill material.
	5.0'	Split spoon 5.0' to 7.0' Slag material w/ rock loose angular (porous) dry poorly graded w/ trace of sand c-grain.	Oppm, No Odor	NS	RA-SB 55(5.0-7.0)	9, 10, 12, 10	2' recovery 10YR3/1 very dark GP gray
	7.0'	Augered Interval 7.0' to 10.0'	Oppm for Breathing Zone	NS	NS	NA	More Fill Material
	10.0'	Split spoon 10.0' to 12.0' "Same as above" tighter material.	Oppm, No Odor	NS	RA-SB 55(5.0-7.0)	26, 41, 28, 19	1.5' recovery GP
	12.0'	(P.O') Bottom of Borehole at 12.0' (WNF) 8-17-94					

HTH DRILLING LOG

RA-SB55

PROJECT MIDDLETOWN-HIA | INSPECTOR Warren Fox | SHEET 2 OF 2 SHEETS

ELEV.	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS



PROJECT MIDDLETOWN — HIA

HOLE NO. RA-SB55

HTW DRILLING LOG

HOLE NO. RA-SB56

1. COMPANY NAME: Erm - PMC	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 OF 2 SHEETS
3. PROJECT: HRA Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig HSA; 3 1/2" I.D. Augers; 3" O.D. S.S. Spl. Spoons; 300 lb hammer	8. HOLE LOCATION: See Separate Sheet / Master	
	9. SURFACE ELEVATION: Not Surveyed.	
	10. DATE STARTED: 8-18-94	11. DATE COMPLETED: 8-18-94
12. OVERBURDEN THICKNESS: ≥19.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 17.5'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 19.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1 Sample	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
(WP 8-18-94) 4 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Top

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS c.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Split spoon 0.0' to 2.0'					
		Top Soil, Organic rich, loose, v. moist	0ppm PID, No Odor.	NS	NS	3,5,5,6.	2' recovery 10YR3/1 Very dark gray OL-OH
	0.5						
	1.0	Silt, (trace f. sand ≤15%) loose, moist, poorly graded					10YR 4/4 Dark yellowish brown ML
	2.0'	Split Spoon 2.0' to 4.0'					
		Silt w/ fine sand sub rounded, loose, moist, uniform, poorly graded.	0ppm, No Odor	NS	NS	8,6,5,4	2' recovery ML
	3.0'						
		Sand fine subrounded, loose, moist, poorly graded, uniform (trace of silt)					10YR 4/6 Dark yellowish brown
	4.0'	Split spoon 4.0' to 6.0				6,5,5,4	2' recovery, SP
			0ppm, No Odor	RA-SB56 (4.0-6.0)	RA-SB 56(40-60)		
	5.0'						

HTW DRILLING LOG

HOLE NO. RA-SB56

PROJECT: HIA - Middletown | INSPECTOR: Warren Foy | SHEET 2 OF 3 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
				NS	NS	NA	
		Sand coarser grained, loose, moist, sub angular			RA-SB 56 (2-4)		10YR 4/4 dark yellowish brown 2' recovery, SP
	6.0'	Split spoon 4.0' to 6.0' Same	0 ppm PID, No Odor	NS	RA-SB 56 (6.0-8.0)	9, 14, 16, 18	Cobble (pepper) SP
	7.0'						
	8.0'	Split spoon 8.0' to 10.0' Gravel at bottom ≤ 1" Dia					
		Gravel and cobbles ≤ 1" Dia loose moist uniform poorly graded w/ coarse grained sand - sub angular	Oppm, No Odor.	NS	NS	21, 9, 22, 26	2' recovery 10YR 4/4 dark yellowish brown GP
	10.0'	Split spoon 10.0' to 12.0 (WS)					
		" Same material "	0 ppm, No Odor	NS	RA-SB 56 (10.0 - 12.0)	4, 4, 5, 6	1.3' recovery " GP
	11.0'						
	12.0'						
		Augered 12.0' to 15'	NA	NS	NS	NA	2.0' recovery
	14.0	Split spoon 15' to 17'					10YR 6/4 light yellowish brown
8R84	15.0	Same Material Lighter color	Oppm, No Odor	NS	RA-SB 56 (15.0-17.0)	6, 9, 7, 11	15' to 17' spoon (WS) GP
	16.0'						
	17.0'						

HTW DRILLING LOG

HOLE NO. RA-SB56

PROJECT: HIA – Middletown | INSPECTOR: Warren Fox | SHEET 3 OF 3 SHEETS

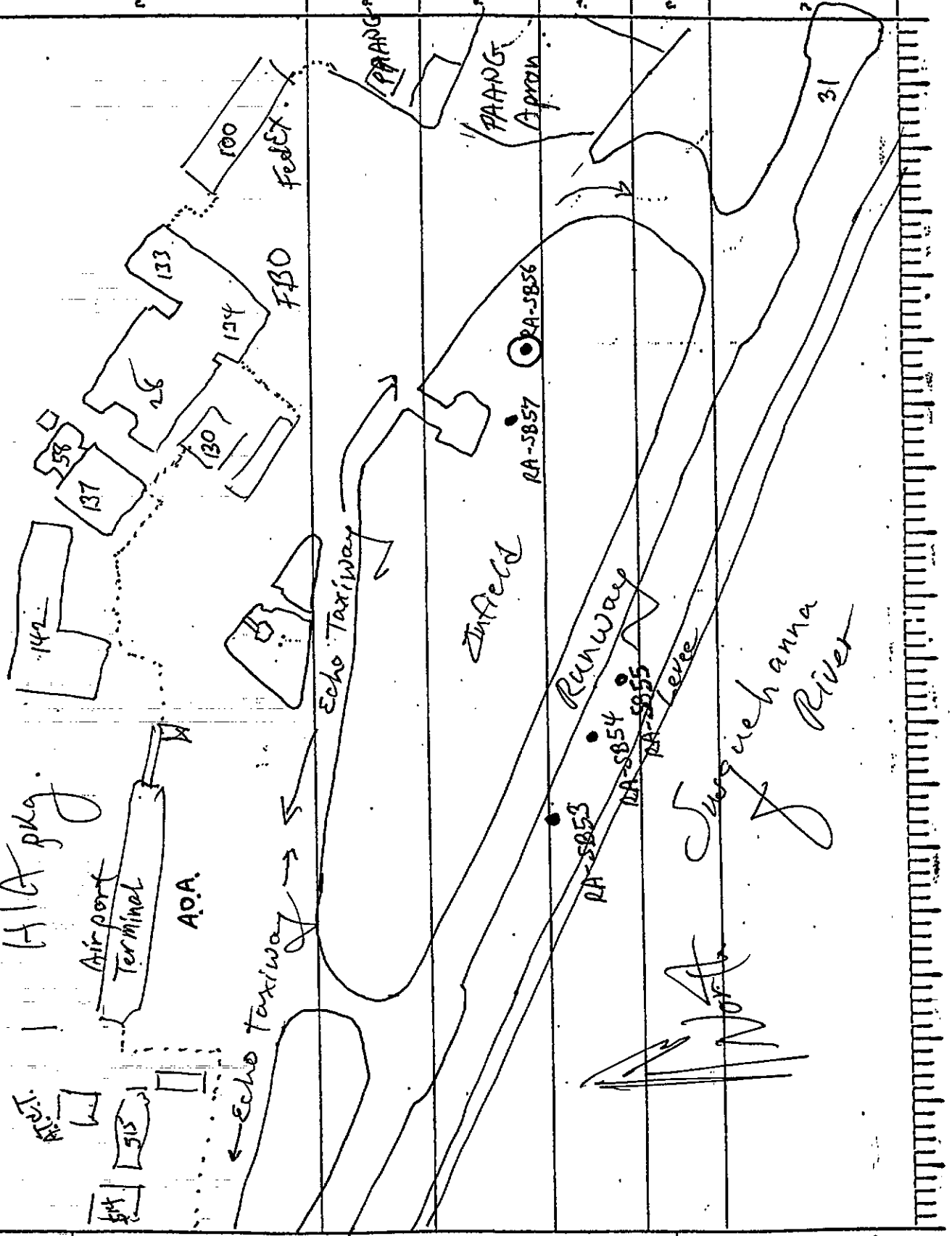
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	17.0	Some Gravel and Cobbles Saturated at 17.5'	0ppm PID, No Odor	NS	NS	11, 7, 7, 8	2.0' recovery GP 10YR 6/4 light yellowish brown
	18.0	Bottom of borehole at 18.0' 19.0' WNE 8-18-94					

PROJECT HIA- Middletown | HOLE NO. RA-SB56

RA-SB56

JECT MIDDLETOWN-HIA | INSPECTOR Warren Fox | SHEET 1 OF 1 SHEETS

EV. L	DEPTH B.	DESCRIPTION OF MATERIALS C.	FIELD SCREENING RESULTS D.	GEOTECH SAMPLE OR CORE BOX NO E.	ANALYTICAL SAMPLE NO. F.	BLOW COUNTS G.	REMARKS H.



PROJECT MIDDLETOWN — HIA | HOLE NO. RA-SB56

HTW DRILLING LOG

HOLE NO. RA-SB57

1. COMPANY NAME: ERM-PMC	2. DRILLING SUBCONTRACTOR: ADT-MT
SHEET 1 OF 3 SHEETS	
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3 1/2" I.D. Augers; 3" O.D. S.S. Split Spoons; 300 lb hammer.	8. HOLE LOCATION: See Sheet #3 (W) Separate Matrix
	9. SURFACE ELEVATION: Not Surveyed
	10. DATE STARTED: 8-18-94 / 11. DATE COMPLETED: 8-18-94
12. OVERBURDEN THICKNESS: ≥ 18.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 17.8'
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 18.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1 Sample	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
5 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren Fay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS c.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Split Spoon 0.0' to 2.0'					
		Organic Soil / rooted	0 ppm PID No Odor	NS	NS	3, 3, 3, 3	2.0' recovery 3/2 very dark brown. OL-OH
	0.5'						
	1.0'	Silt w/ sand ~~loose to slightly~~ moist, (W) cohesive poorly graded					ML 10YR 4/3 brown
	2.0'	Split Spoon 2.0' to 4.0'					
		Some silt.	0 ppm PID, No Odor	NS	RA-SB 57 (2.0-4.0)	4, 5, 4, 5	" ML
	3.0'						
		Sand coarse grain (sub-angular) loose. moist, poorly graded					10YR 4/6 Dark yellowish brown SP
Split Spoon 4.0' to 6.0'	4.0'		0 ppm, No Odor.	NS	NS	3, 4, 5, 8	2.0' recovery SP
	8.0'						

PROJECT: HIA - Middletown

HOLE NO. ~~RA-SB57~~ RA-SB57

HTW DRILLING LOG

HOLE NO. RA-SB57

PROJECT | INSPECTOR | SHEET 2 OF 3 SHEETS

ELEV. a.	DEPTH	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'					~~8,8,10,12~~ (NR)	GP
	6.0'	Split Spoon 6.0' to 8.0'					
		Gravel and cobbles sand coarse grain angular loose, moist (1/8" to 2" Diameter) sub rounded poorly graded	No Odor 0 ppm PID.	NS	RA-SB 57 (6.0-8.0)	8,8,10, 12	10YR 4/3 brown 2.0' recovery GP
	7.8						
	8.0	Split Spoon 8.0' to 10.0'					
			0 ppm, No Odor	NS	NS	4,4,3,4	GP, 2' recovery
		Sand - med. grain (sub- angular) loose moist brown					10YR 4/4 dark yellowish brown SP
	9.0'						
		Gravel again. as above Split Spoon 10.0' to 12.0'					
	10.0'		No Odor 0 ppm.	RA-SB57 (10.0-12.0)	RA-SB 57 (10.0-12.0)	13,14, 25,16	2' recovery, SP 10YR 4/3 brown
		"Same"					
	11.8'						
	12.0'						
		Augered Interval. 12.0' to 14.0'	NA	NS	NS	NA	
	14.0'	Split Spoon 14.0' to 16.0'					
		Gravel and cobbles with silt. cohesive, moist, poorly graded.	0 ppm, No Odor	NS	RA-SB 57 (14-16)	10,7,7, 12	8.0' recovery 10YR 4/6 dark yellowish brown GP
	15.0'						
		Silty fine gravel w/ sand (c. grain) color change (Gravel and cobbles ≤ 1" Dia)					10YR 5/3 brown

PROJECT HSA - Middletown | HOLE NO. RA-SB57

HTW DRILLING LOG

HOLE NO. RA-SB57

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 3 OF 3 SHEETS

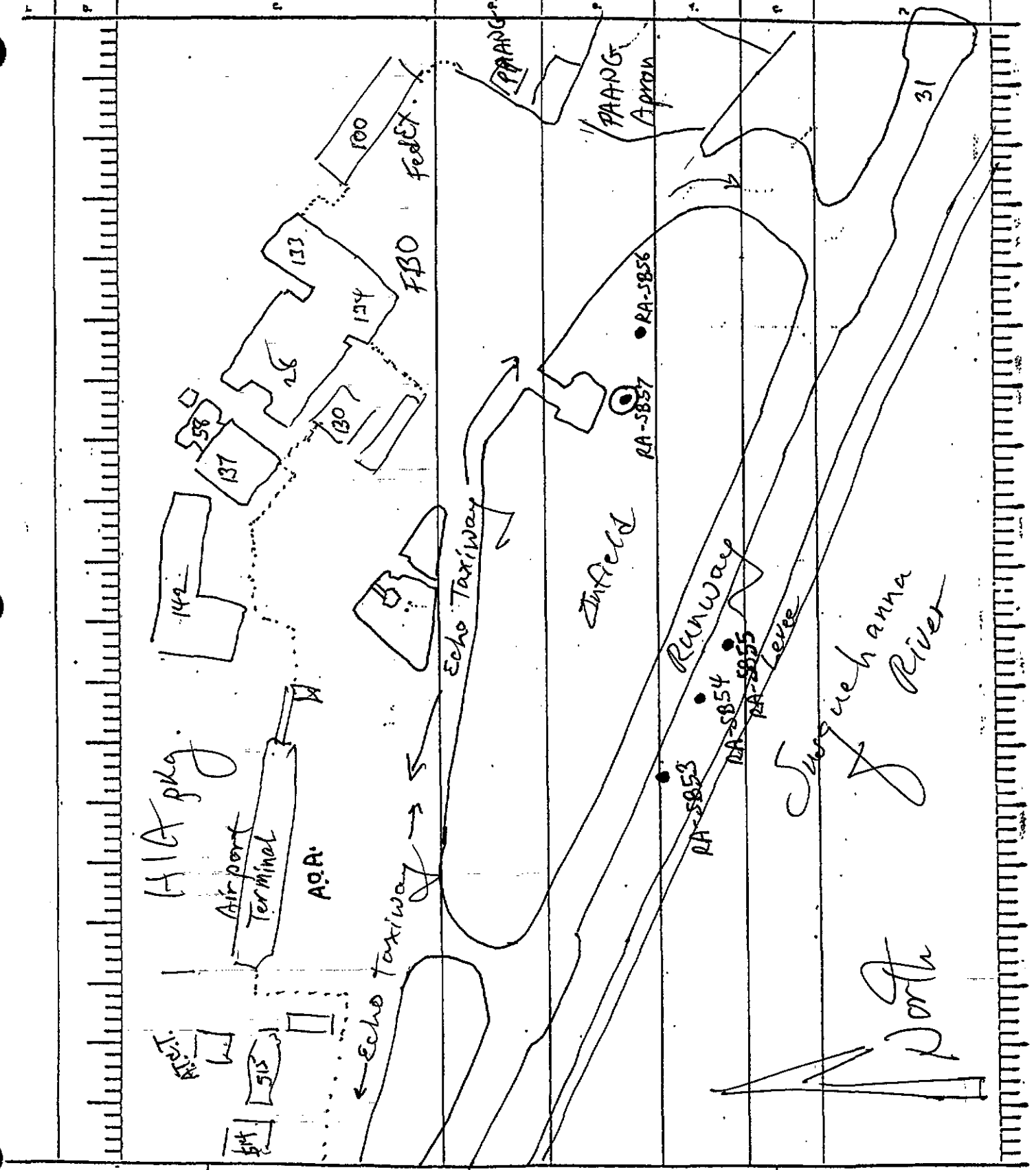
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS c.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	16.0'	Split Spoon 16.0' to 18.0'					
		Same gravel/cobbles throughout	0 ppm PID, No Odor	NS	RA-SB 57 (16.0 18.0)	10,8,6, 8	2.0' recovery 10YR 4/3 brown GP
	17.0'						
	18.0	less large cobbles ≤ ¼" Dia.					17.8' Saturated
		Bottom of borehole at 18.0' WHS 8-15-94					

PROJECT: HIA - Middletown | HOLE NO. RA-SB57

HTW DRILLING LOG

PROJECT: MIDDLETOWN-HIA | INSPECTOR: Warren Fox | HOLE NO. RA-SB57 | SHEET 1 OF 1 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



PROJECT: MIDDLETOWN — HIA | HOLE NO. RA-SB57

Background
Soil Borings

HTW DRILLING LOG

HOLE NO. ~~BK-SB43~~ BK-SB43/44

1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: ADT - MA	SHEET 1 OF 3 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. HSA; 3" O.D. split spoon; 300 lb Hammer	8. HOLE LOCATION: See Sheet	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-4-94	11. DATE COMPLETED: 8-4-94
12. OVERBURDEN THICKNESS: >14.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≈14.0'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 14.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
8 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted.	✓			Warren N. Taft

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		Organic rich soil, rooted	0 ppm PID No Odor	BK-SB43 (SSC) → NS BK-SB43 (.2-.5)		NA	10YR 3/2 very dark grayish brown OL-OH
	1.0	Agreed Interval					
		Notes: Surface scrapes also collected 2-3' west of boring. BK-SB44 (SSC) BK-SB44 (0.2-0.5)			*		
	2.0	Split spoon 2.0' to 4.0'					
		Silt w/ gravel. loose, dry poorly graded	4.1 ppm PID no odor	NS	BK-SB 43(2.0-5.0)	19, 9, 9, 9	1.6' recovery 10YR4/3 Brown ML
	3.0	Slag, Brick and gravel within pieces - angular ≤ 1" Dia.					
	4.0	Split Spoon 4.0' to 5.0'					
		Silt w/ trace of sand, reddish grey (gravel) loose, dry, poorly graded	0 ppm PID No odor	NS	BK-SB 43(4.0-4.5)	7, 7	1' recovery 10YR 5/2 grayish brown ML
	5.0						

PROJECT: HIA- Middletown

HOLE NO. BK-SB43 BK-SB44

HTW DRILLING LOG

HOLE NO. BK-SB43

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 3 SHEETS

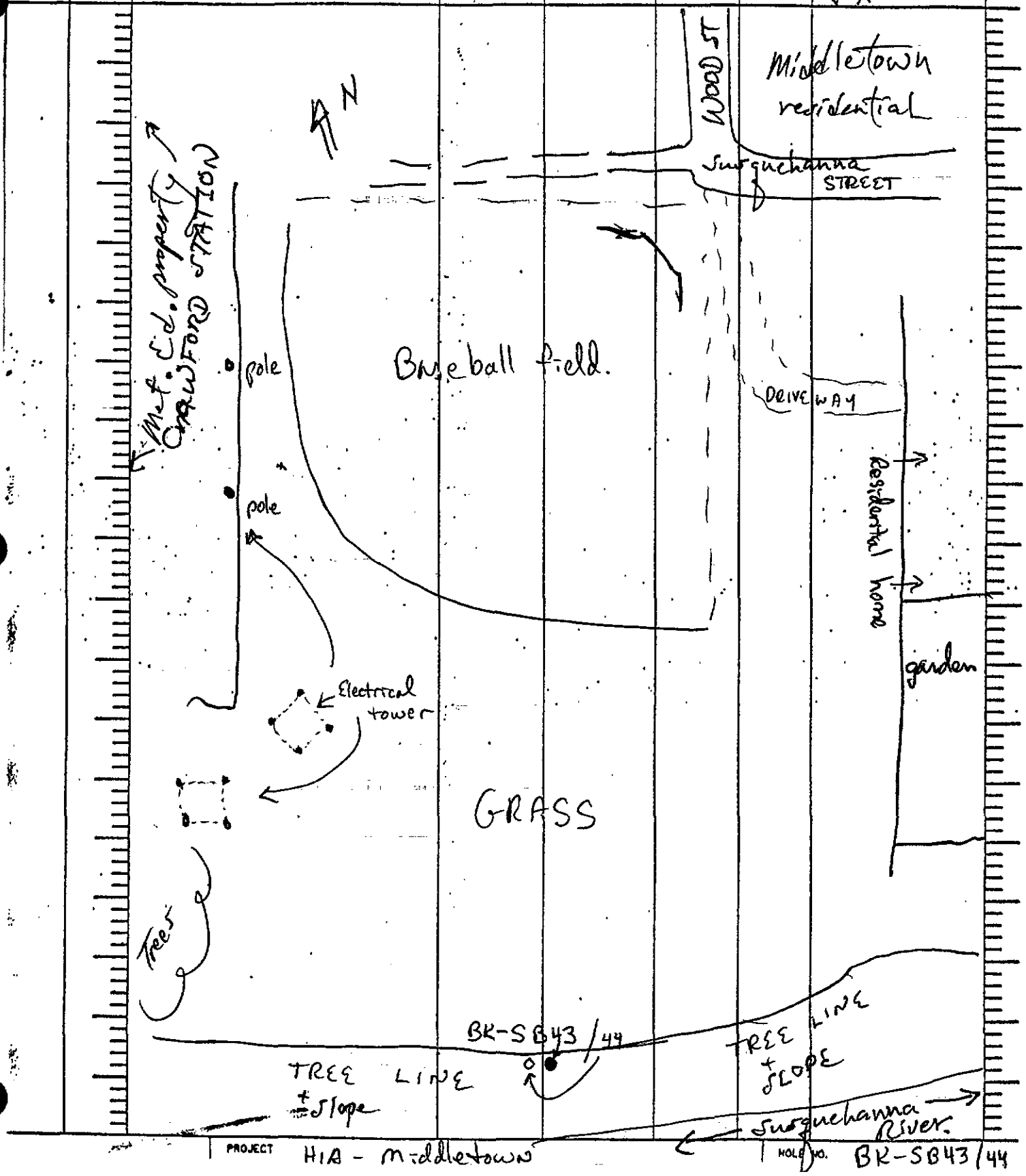
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	Split spoon 5.0' to 7.0' Silt cohesive moist poorly graded well sorted mottled w/ red staining.	0 ppm PID	NS	BK-SB 43(5.0-10.0)	9, 8, 7, 10	ML 7.5YR 4/4 brown 2.0' recovery.
	6.0						
	7.0	Split Spoon 7.0 to 9.0' "Same as above"	0 ppm PID	NS	NS	10, 9, 8, 10	2.0' recovery ML
	8.0						
	9.0	Split Spoon 9.0' to 10.0' Silt and bands of gray clay and black specks. ~~Firm~~ Firm. through bottom v. moist uniform.	0 ppm PID	NS	BK-SB 43(9.0-9.5)	8, 9	1.2' recovery. 10YR 4/4. dark yellowish brown
	10.0'	Split Spoon 10-12' Clay (lean) tight v. moist uniform. mix of gray and yellowish brown low plasticity from 9.0-10.0'	0 ppm PID	NS	BK-SB43 (10.0-14.0)	7, 10, 10, 19	1.6' recovery. 2.5Y 7/1 light gray CL
	11.0'						
	12.0'	Split Spoon 12.0' to 14.0' Same as above more dense and tight, same banding of yellowish brown gravel ≤15% Bottom of split spoon saturated w/ trace of gravel	0 ppm PID, No Odor	NS	BK-SB 43(13.5-14.0)	10, 21, 35, 42	1.2' recovery. 5Y 5/1 Gray. CL
	13.0'						
	14.0'	Bottom of borehole at 14.0' (WNF)		8-4-94			

PROJECT: HIA - Middletown | HOLE NO. BK-SB43

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	BK-SB43	4 OF 4 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



PROJECT HIA - Middletown HOLE NO. BK-SB43/44

HTW DRILLING LOG

HOLE NO. BK-SB45/46

1. COMPANY NAME: ERM-PNC	2. DRILLING SUBCONTRACTOR: ADT-MA	SHEET 1 OF 3 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown PA 17057	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. Augers; 3" O.D. S.S. Split Spoons; 300lb. Hammer	8. HOLE LOCATION: See Sheet	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-4-94	11. DATE COMPLETED: 8-4-94
12. OVERBURDEN THICKNESS: >10.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 9.7'	
13. DEPTH DRILLED INTO ROCK: Not Encountered	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 10.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Foy

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS c.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
		2-Surface Scrapes					
		Organic silt, loose, moist, rooted.	0ppm PID	NS	BK-SB45 (SSC)	NA	10YR 3/2 very dark grayish brown OL-OH
		Same as above			BK-SB45(0.2-0.5)		
		Augered Interval No Sample collected	0ppm PID No Odor	NS	NS	NA	Gravel
		2 additional surface scrapes collected. BK-SB46(SSC) and BK-SB46(0.2-0.5)					
		Split Spoon 2.0' to 4.0'					
		Clay (lean) Moist Cohesive poorly graded very uniform. low plasticity. w/ red rust bands - occasional 1/4" width.	0ppm PID Organic odor.	NS	BK-SB45 (2.0-5.0)	8,3,2, 4	1.6' recovery Chart for Clay 2.5/N2.5 CL black.
		Split Spoon 4.0' to 5.0'					
		Same as above	0ppm, No odor	NS	BK-SB 45(4.0-4.5)	5,3	Same 1.0 Recovery

HTW DRILLING LOG

HOLE NO. BK-SB45

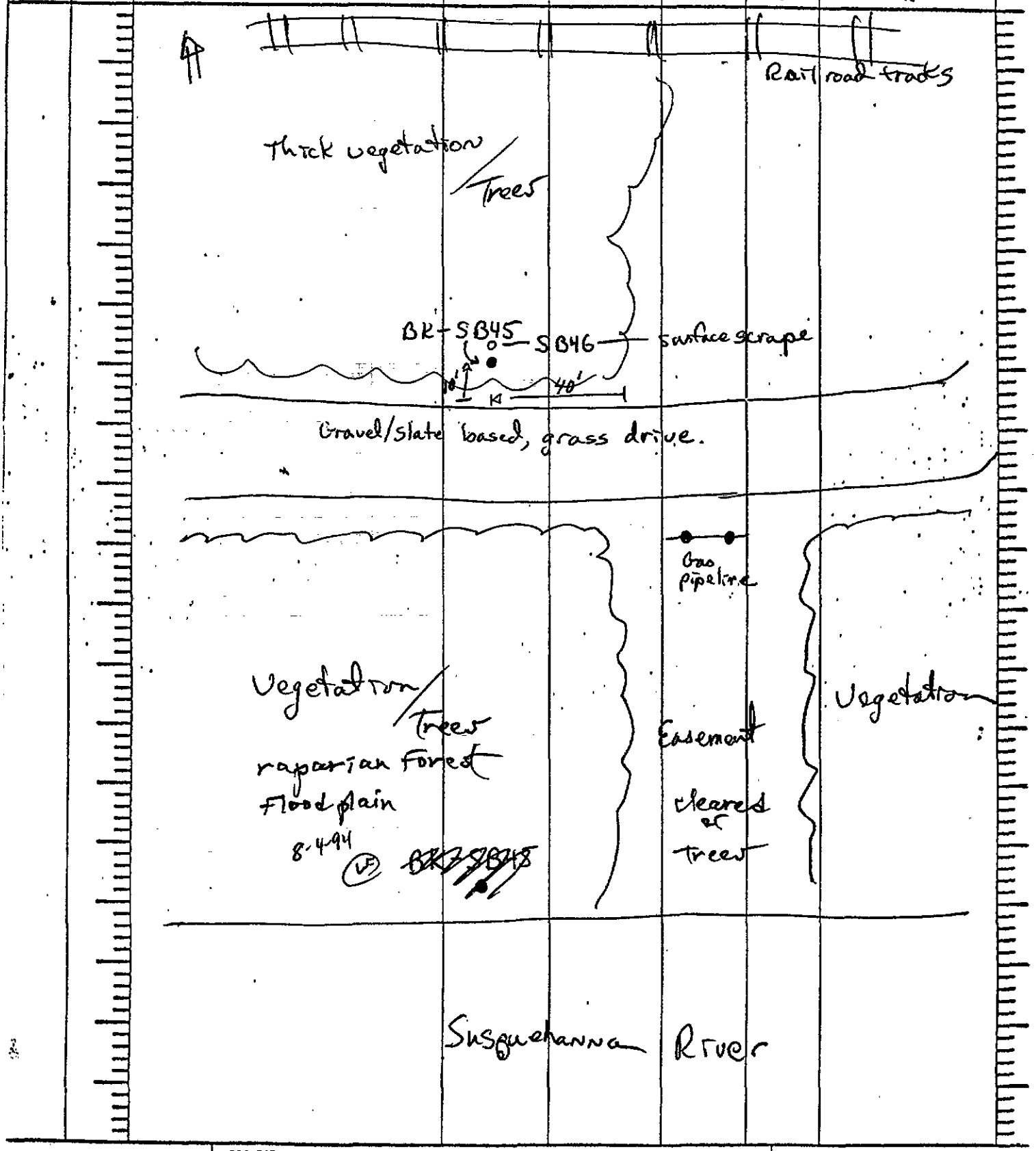
PROJECT: HTA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 3 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split spoon 5.0' to 7.0'					
		Same as above with gravel angular - slag ≤ 1" Dia.	0ppm PID No Odor	NS	BK-SB 45(5.0-10.0)	2,1,1,2	2.0' recovery 10YR 3/1 very dark gray CL.
	6.0'						
	7.0'	Split spoon 7.0' to 9.0'					
		Silty Sand loose moist v. fine to fine sand (angular) poorly graded well sorted uniform.	0ppm PID No Odor.	NS		1,2,1,2	1.8' recovery 10YR 3/1 very dark gray SM
	8.0'						
	9.0'	Split spoon 9.0' to 10.0'					
		Gravel (rounded) w/ coarse Sand. loose also round. Wet (9.7') poorly graded	0ppm PID No Odor.	NS	BK-SB 45(9.0-9.5)	5,6	1.2' recovery 7.5YR 4/4 brown saturated @ 9.7'.
	10.0'	Bottom of borehole at 10.0 (WT= 8-4-94)					
		See Sheet 3 for Sample locations.					

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	BK-SB45	3 OF 3 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



PROJECT HIA - Middletown

HOLE NO. BK-SB45/46

HTW DRILLING LOG

HOLE NO. BK-SB47/48

1. COMPANY NAME: ERM-PNC	2. DRILLING SUBCONTRACTOR: ADT-MA
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. Augers; 3" O.D. S.S. Split spoons; 300 lb Hammer	8. HOLE LOCATION: See Sheet
	9. SURFACE ELEVATION: Not Surveyed
	10. DATE STARTED: 8-5-94 — 11. DATE COMPLETED: 8-5-94
12. OVERBURDEN THICKNESS: 8.0'	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered.
13. DEPTH DRILLED INTO ROCK: 0.0 ~~8.0'~~ Hit bedrock.	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 8.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
8 Samples.	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted/Sodded	✓			Wayne N. Tag

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Surface Scrapes					
		Organic Rich topsoil, sod, rooted.	0ppm PID	NS	~~BK-SB47~~ (SSC)	NA	7.5YR 3/3 dark brown OL-OH
		"	"	NS	BK-SB47 (0.2-0.5)		
	0.5'	Augered Interval.	NA	NS	NS	NA	
	1.0'	No Sample Collected					
		2 additional Samples BK-SB48 (SSC) and BK-SB48 (0.2-0.5) collected.					
		Split spoon 2.0' to 4.0'					
	2.0'	Silt loose dry poorly graded well sorted very uniform	0ppm, No Odor.	NS	BK-SB47 (2.0-5.0)	10, 11, 12, 15	2.0' recovery 2.5YR 4/4 Dusky red. ML
	3.0'						
	4.0'	Split spoon 4.0' to 5.0'					
		"Same as above"	0ppm, No Odor	NS	BK-SB47 (4.5-5.0)	17, 13	1.1' recovery
	5.0'	Rounded gravel ≤ 3/4" Dia					

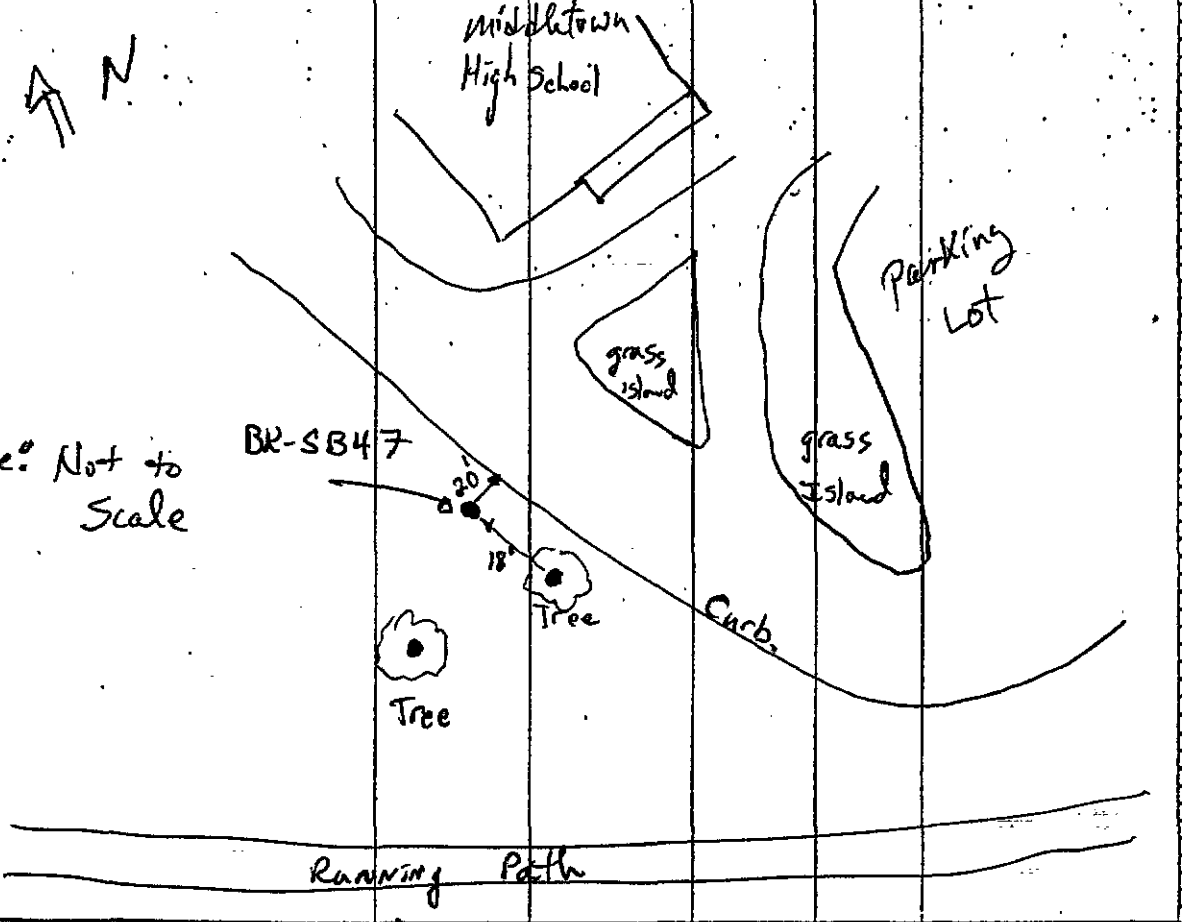
GP #8

HTW DRILLING LOG

HOLE NO. BK-SB47

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH	DESCRIPTION OF MATERIALS b.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0'	Split Spoon c. 5.0' to 7.0'					
		Same as Above	0 ppm, No odor.	NS	BK-SB47 (5.0-8.0)	6, 9, 15, 31	1.5' recovery 2.5YR 3/4 dusky red. SW-SC
	6.0'						
		Sand w/ silt f. grain (round. tight, dry, poorly graded					
	7.0'	Split spoon 7.0' to 9.0'					
		Same as above	Appx. 1 ppm, No odor.	NS	BK-SB47 (7.5-8.0)	57, 100/4"	1.0' recovery 2.5YR 4/4 dusky red. SW-SC "Sandstone"
		Refusal at ≈ 8.0' weathered sandstone f. grain. Bottom of borehole at ≈ 8.0' ~~DNF~~	8-5-94				



PROJECT: HIA - Middletown | HOLE NO. BK-SB47

HTW DRILLING LOG

HOLE NO. BKSB49 /50

1. COMPANY NAME: ERM- PMC	2. DRILLING SUBCONTRACTOR: ADT - NA	SHEET 1 OF 2 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Drill Rig	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. Augers; 3" O.D. S.S. split spoons; 300lb Hammer	8. HOLE LOCATION: See Map, Sheet	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-5-94	11. DATE COMPLETED: 8-5-94
12. OVERBURDEN THICKNESS: 8.5'	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13. DEPTH DRILLED INTO ROCK: 0.0', Not Drilled into	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 8.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
6 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren Huf

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Surface Scrape Samples Organic rich, top soil, loose, rooted, moist	Oppm PID, No odor	NS	BK-SB49 (SSC) BK-SB49 (0.2-0.5)	NA	7.5YR 3/3 dark brown OL-OH
	0.5'	Augered 0.5' to 2.0'	NA	NS	NS	NA	Auger Cuttings; No desc.
	1.0'	Note: BK-SB50 (SSC) and BK-SB50 (0.2-0.5) also collected nearby					
	2.0'	Split spoon 2.0' to 4.0' Sand w/ gravel ≈ 15% sub-rounded 1/4" to 1/2" Dia loose v. moist poorly graded, uniform.	Oppm, No odor.	NS	BK-SB49 (2.0-5.0)	2, 5, 6, 7.	1.5' recovery 2.5YR 2.5/4 very dusky red SP
	3.0'	(3.0' - moist zone)					
	4.0	Split spoon 4.0' to 5.0' Same as above	Oppm, No odor	NS	BK-SB 49 (4.5-5.0)	21, 34	1.0' recovery
	5.0'	clay lense gray (¼" wide)					

PROJECT: HIA: Middletown

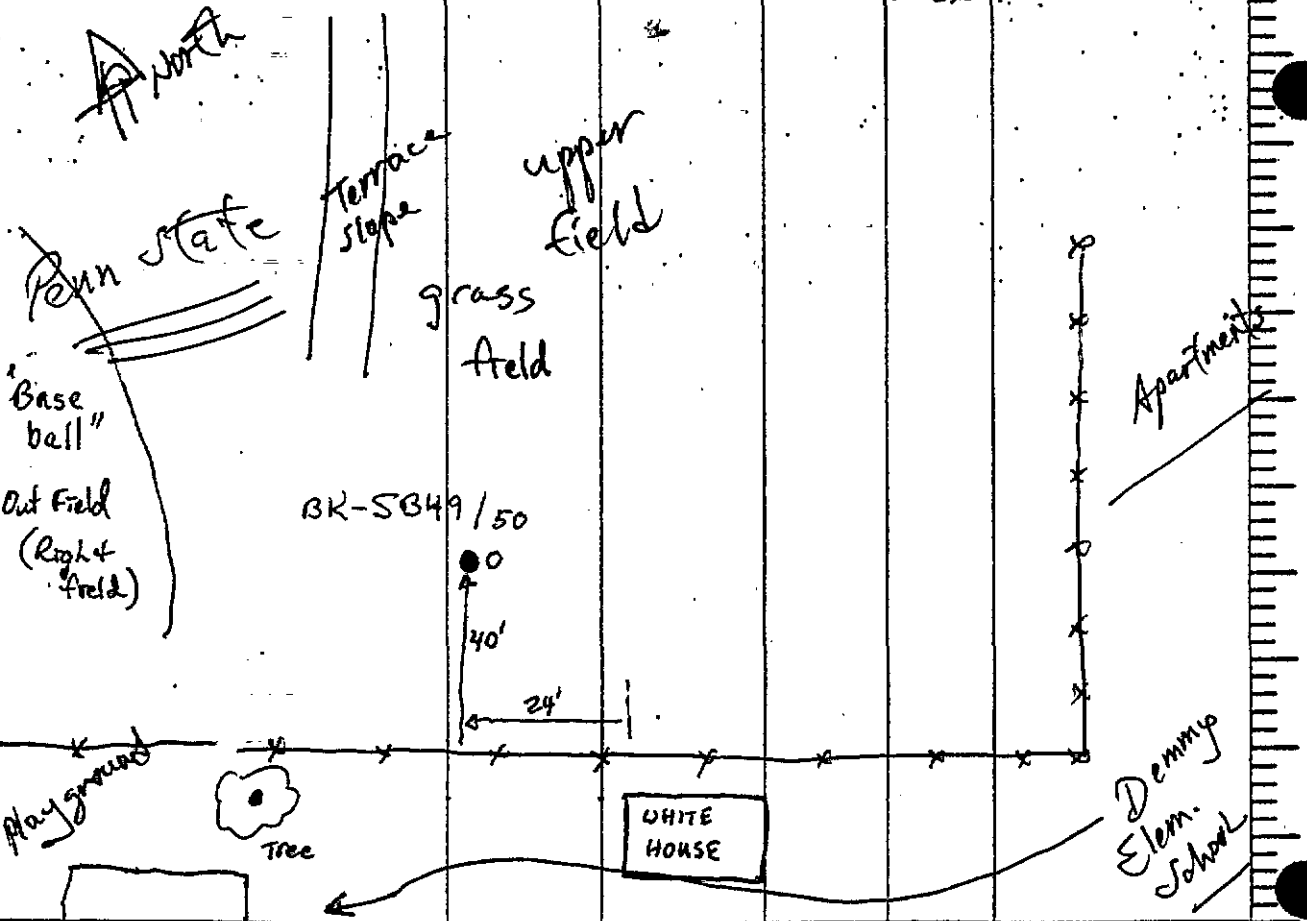
HOLE NO. BK-SB49

HTW DRILLING LOG

HOLE NO. BK-SB49

PROJECT: HIA - Middle town | INSPECTOR: Warren Fox | SHEET 2 OF 2 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	Split spoon 5.0' to 7.0' Sand (f. grain) subrounded w/ silt. loose dry poorly graded	0ppm PID, No Odor	NS	BK-SB49 (5.0-8.5)	6, 9, 15, 27	2.0' recovery SW-SM 2.5YR 2.5/3 very dusky red
	6.0'						
	7.0'	Split spoon 7.0 to 9.0' (white to (gray) tighter - clay lense again. Sand v. fine grain. subangular tight dry uniform poorly graded weathered sandstone	0ppm, No Odor.	NS	BK-SB49 (8.0-8.5)	27, 75, 100/6"	1.5' recovery SW-SM 2.5YR 3/3 dusky red.
	8.0'						
	9.0'	Bottom of borehole at 8.5' (WMF) 8-5-94				Auger refusal at 8.5'	



PROJECT: HIA - Middle town | HOLE NO. BK-SB49

HTW DRILLING LOG

HOLE NO. BK-SB51/52

1. COMPANY NAME: ERM-PNC	2. DRILLING SUBCONTRACTOR: ADT-NA	SHEET 1 OF 3 SHEETS
3. PROJECT: HIA- Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Troy Brown	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile Dr. 11 Rig.	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: B-59 Mobile Rig; 3¼" I.D. Augers; 3" O.D.S.S. split spoons; 300 lb Hammer	8. HOLE LOCATION: See Sheet #3	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 8-5-94	11. DATE COMPLETED: 8-5-94
12. OVERBURDEN THICKNESS: 14.0'	15. DEPTH GROUNDWATER ENCOUNTERED: Not Encountered.	
13. DEPTH DRILLED INTO ROCK: 0.0' Ht Bedrock	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 14.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
8 Samples	✓					— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	ORGANIC rich topsoil w/ sand ≤15% grass, rooted. loose, moist	0ppm PID No ODor	NS	BK-SB51 (SSC) BK-SB51 (0.2-0.5)	NA	OL-OH 7.5YR 3/3 dark brown
	0.5'	Augered interval (0.5' to 2.0') ...	NA	NS	NS	NA	Auger cuttings No description
	1.0'	Note: Second samples for BK-SB52 (SSC) and BK-SB52 (0.2-0.5) were collected too			*		
	2.0'	Split spoon (2.0 to 5.0) Clay soil with gravel ≥15% (rounded ½" Dia.) moist poorly graded chunky low plasticity (Fill material)	0ppm, No Odor	NS	BK-SB51 (2.0-5.0)	9, 12, 9, 10	2.0' recovery 10YR 4/4 dark yellowish brown CL
	3.0'						
	4.0'	Split spoon 4.0' to 5.0' "Same as above"	0ppm, No Odor	NS	BK-SB51 (4.5-5.0)	12, 6	1.0' recovery
	5.0'						

PROJECT: HIA- Middletown.

HOLE NO. IA WP BK-SB51/52

HTW DRILLING LOG

HOLE NO. BR-SB51

PROJECT: HIA - Middletown | INSPECTOR: Warren Fox | SHEET 2 OF 3 SHEETS

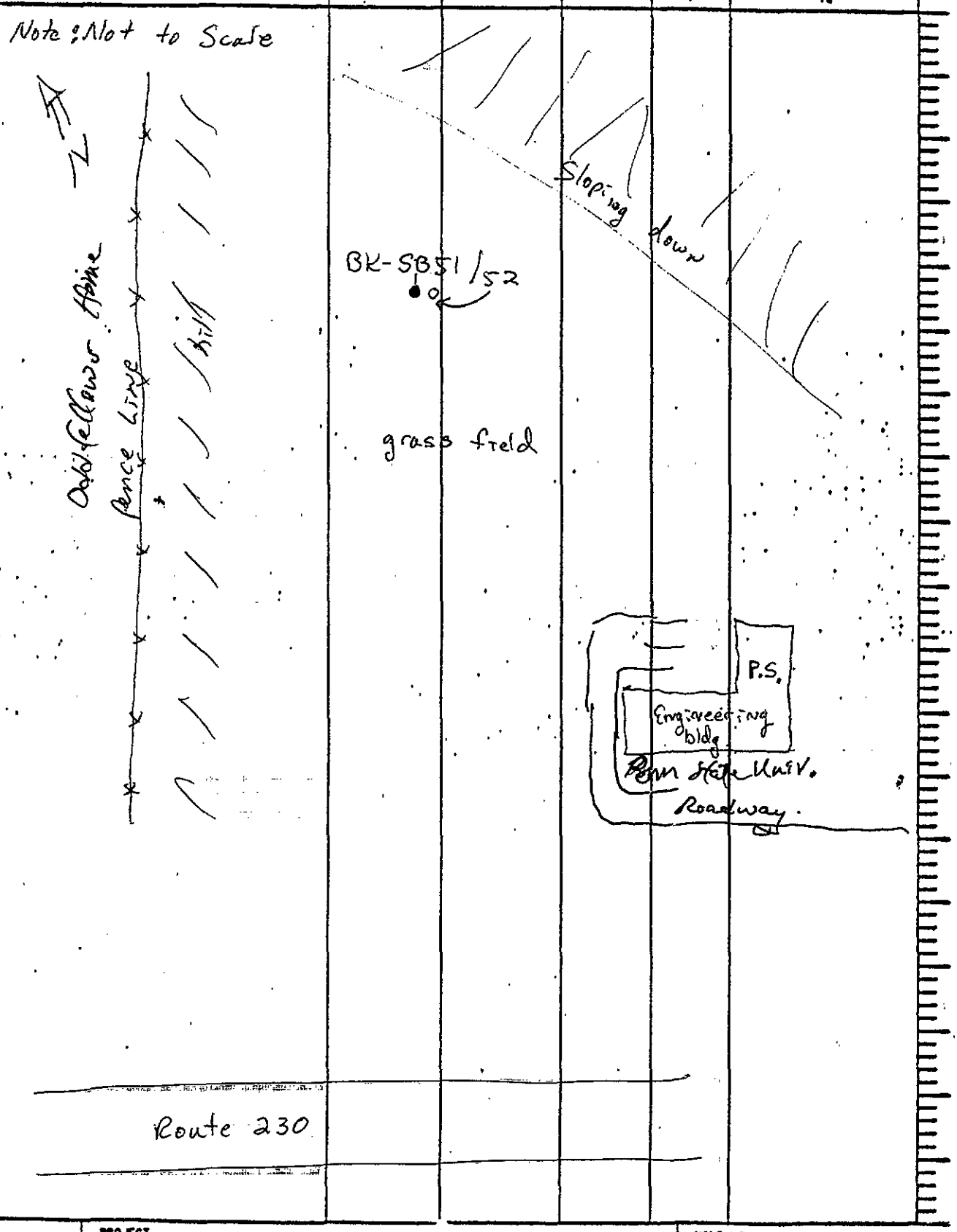
ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	5.0	Split Spoon 5.0' to 7.0'					
		Gravel w/ Sand m grain (sub angular) gravel - subangular (⅜" to 1/4" Dia) w/ clay loose moist poorly graded	0ppm, No Odor	NS	BR-SB51 (5.0-10.0)	6,4,4,4	2' recovery 10YR5/4 yellowish brown, GP
	7.0	Split Spoon 7.0' to 9.0'					
		"Same as above"	0ppm, No odor	NS		4,5,4,5	2' recovery
	8.0'	Sand (coarse grain.) w/ gravel - angular. round ≤ 1/2" Dia loose, poorly graded, moist					7.5YR 5/8 SP
	9.0	Split Spoon 9.0' to 10.0'					
		Same as above but color.	0ppm, No Odor	NS	BR-SB51 (9.5-10.0)	9,10	1.0' recovery 10YR5/4 yellowish brown
	10.0	Split Spoon 10' to 12'					
		Same as above			BR-SB51 (10.0-14.0)	12,18,16, 20	≅ 1.1' recovery
	11.0'	Sand m/grain angular. small gravel ≤ 1/4" also angular loose dry poorly graded					SP
	12.0	Split Spoon 12' to 14.0'					
						29,35,35, 55	2.0' recovery
	13.0'	Sand fine grain sub round firm, dry poorly graded			BR-SB51 (13.5-14.0)		2.5YR 3/4 dusky red, SP
	14.0'	Sandstone (red) Bottom of borehole at 14.0' WNE 8-5-94					split spoon refusal at 14.0'

PROJECT: HIA - Middletown | HOLE NO. BR-SB51

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
HIA - Middletown	Warren Fox	BK-SB51	3 OF 3 SHEETS

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.



Industrial Area - Pipelines and Lagoons
Direct Push Ground Water, Soil, and Soil Vapor Sampling

HTW DRILLING LOG — Ground Water Sampling

HOLE NO. IAP-GPW1

1. COMPANY NAME: EEM-PMC	2. DRILLING SUBCONTRACTOR: NCP- Analytical
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA
5. NAME OF DRILLER: Randy Wallendorf	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 5400; 3' long steel push rods w/a 1" Dia. and GW 4404 sampler for groundwater	8. HOLE LOCATION: See Separate Map.
	9. SURFACE ELEVATION: Not Surveyed
	10. DATE STARTED: 7-15-94 / 7-19-94
	11. DATE COMPLETED: 7-15-94 / 7-19-94
12. OVERBURDEN THICKNESS: ≅ 21.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 17.0'
13. DEPTH DRILLED INTO ROCK: 0.0' (Bed rock encountered at 21.0')	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 21.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

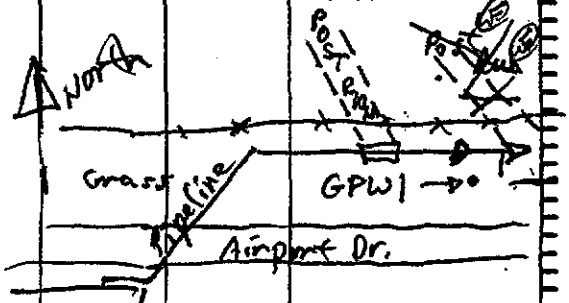
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2 Samples	✓					NA %

22. DISPOSITION OF HOLES	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Pushed Geoprobe Rods	No Odor	NS	NS	NA	Loose soil
	4.0'	No soil Samples were collected.					
	8.0'						
	12.0'						
	16.0'	18.0' screened interval for a water sample		—	IAP-GPW1 (18.0-18.0)		
	20.0'	19.0' to 21.0' Second screened interval for a groundwater sample		—	IAP-GPW1 (19.0-21.0)		Weathered
	21.0'	End of borehole at 21.0' encountered bedrock. (WNF) 7-15-94					Bed rock. Rock Refusal

Note: Redrilled sampling point and sampled on 7-19-94 (WNF)



PROJECT: HIA -- Middletown

HOLE NO.: IAP-GPW1

HTW DRILLING LOG — Groundwater Sampling

HOLE NO. IAP-GPW2

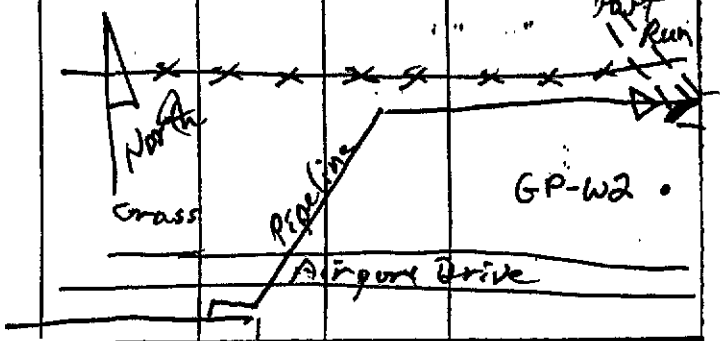
1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: NCP - Analytical
SHEET 1 OF 1 SHEETS	
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown PA
5. NAME OF DRILLER: Randy Wallendorf	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe ®
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 5400; 3' long steel push rods w/ a 1" DIA. (GW4404 sampler for groundwater - screen)	8. HOLE LOCATION: See Separate Map.
	9. SURFACE ELEVATION: Not Surveyed
	10. DATE STARTED: 7-15-94 / 7-19-94 — 11. DATE COMPLETED: 7-15-94 / 7-19-94
12. OVERBURDEN THICKNESS: 22.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 17.0'
13. DEPTH DRILLED INTO ROCK: (Refusal) 0.0' Encountered bedrock	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 22.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2 Samples	✓					NA %

22. DISPOSITION OF HOLES	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren N. Fay

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0'	Pushed Geoprobe Rods - No Soil Samples Collected	No Odor	NS	NS	NA	loose Soil
	9.0'						
	8.0'						
	20'						
	16.0'	- 16.0'-18.0' screened interval collected Sample (groundwater) water			IAP-GPW2(16.0-18.0)		
	18.0'	- 20.0'-22.0' screened interval collected Sample of groundwater			IAP-GPW2(20.0-22.0)		
22.0'	22.0'	Bottom of bore hole at 22' WNF 7-15-94 Water					Weathered bedrock rod refusal.
		Note: Redrilled and sampled This location on 7-19-94 WNF					



PROJECT: HIA - Middletown — Bldg 142 — HOLE NO. IAP-GPW2

HTW DRILLING LOG

HOLE NO. IAP-GPW3

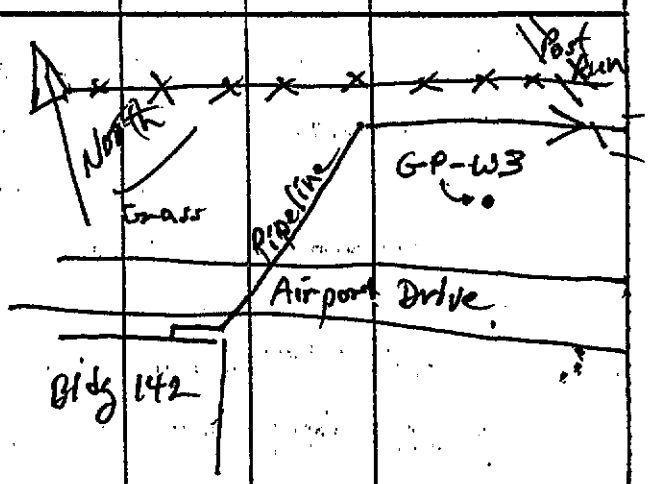
1. COMPANY NAME: ERM - PMC	2. DRILLING SUBCONTRACTOR: NCA - Analytical	SHEET 1 OF 1 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown PA	
5. NAME OF DRILLER: Randy Wallendorf	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe®	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 5400; 3' long steel push rods w/ a 1" DIA. and GW 4404 Sampler for Groundwater (screen)	8. HOLE LOCATION: See Separate Map	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 7-15-94 / 7-19-94	11. DATE COMPLETED: 7-15-94 / 7-19-94
12. OVERBURDEN THICKNESS: 22.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 17.0'	
13. DEPTH DRILLED INTO ROCK: 0.0 Encountered bedrock.	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 22.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2 Samples	✓					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren M. Top

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0	Pushed Geoprobe Rods					
	4.0'	No Soil Samples Collected					
	8.0'						
	12.0'						
	16.0'	16.0' to 18.0' screened interval collected ground water sample dark gray, silty.					
	20.0'	20.0' to 22.0' screened interval collected ground water sample silty, dark gray - lighter than above					
	24.0'	Bottom of borehole at 22.0' (WNF) 7-15-94					weathered bedrock "rod refusal" (22.0')
		Note: Redrilled and sampled this location on 7-19-94 (WNF)					



PROJECT: HIA - Middletown

HOLE NO. IAP-GPW3

HTW DRILLING LOG

Water Samples Collected

HOLE NO. IAP-GPW4

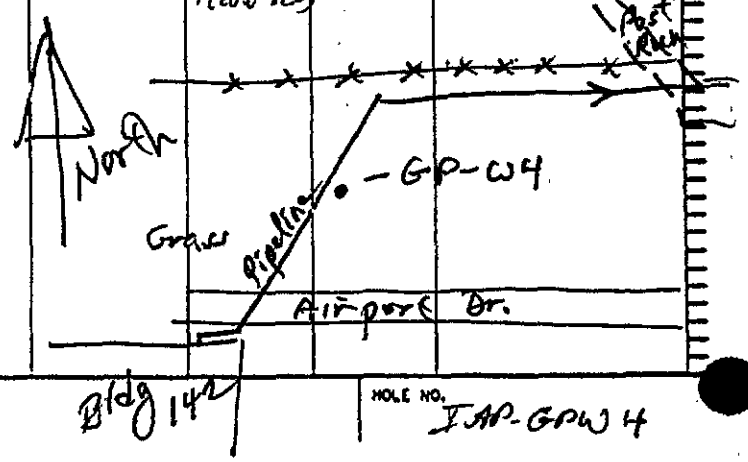
1. COMPANY NAME: EPM-PMC	2. DRILLING SUBCONTRACTOR: NCP- Analytical	SHEET 1 OF 1 SHEETS
3. PROJECT: HIA - Middletown	4. LOCATION: Middletown, PA	
5. NAME OF DRILLER: Randy Walley Dorf	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe®	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 5400; 3' long steel push rods w/ a 1" Dia. and a 1" wide samples screen 4404 type	8. HOLE LOCATION: See Separate Map	
	9. SURFACE ELEVATION: Not Surveyed	
	10. DATE STARTED: 7-18-94	11. DATE COMPLETED: 7-18-94
12. OVERBURDEN THICKNESS: 22.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ≅ 16.5'	
13. DEPTH DRILLED INTO ROCK: Drilled to bedrock at 22.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14. TOTAL DEPTH OF HOLE: 22.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
2 Samples	✓					NA %

22. DISPOSITION OF HOLES	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grouted	✓			Warren M. Fry

ELEV. a.	DEPTH b.	DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS d.	GEOTECH SAMPLE OR CORE BOX NO. e.	ANALYTICAL SAMPLE NO. f.	BLOW COUNTS g.	REMARKS h.
	0.0						
	4.0'	Rinsed Geoprobe Rods No Soil Samples Collected	No Odor	NS	NS	NA	loose soil to 22.0'
	8.0'						
	12.0'						
	16.0'	16.0'-18.0' Screened interval			16.5' IAP-GPW 2 (16.0-18.0)		Groundwater Samples
	20.0'	20.0-22.0 Screened interval			20.0' IAP-GPW 4 (20.0-22.0)		Push Rods Rejected
	24.0'	Bottom of bore Hole at 22.0' WNF 7-18-94					



PROJECT: HIA - Middletown | Bldg 142 | HOLE NO. IAP-GPW4