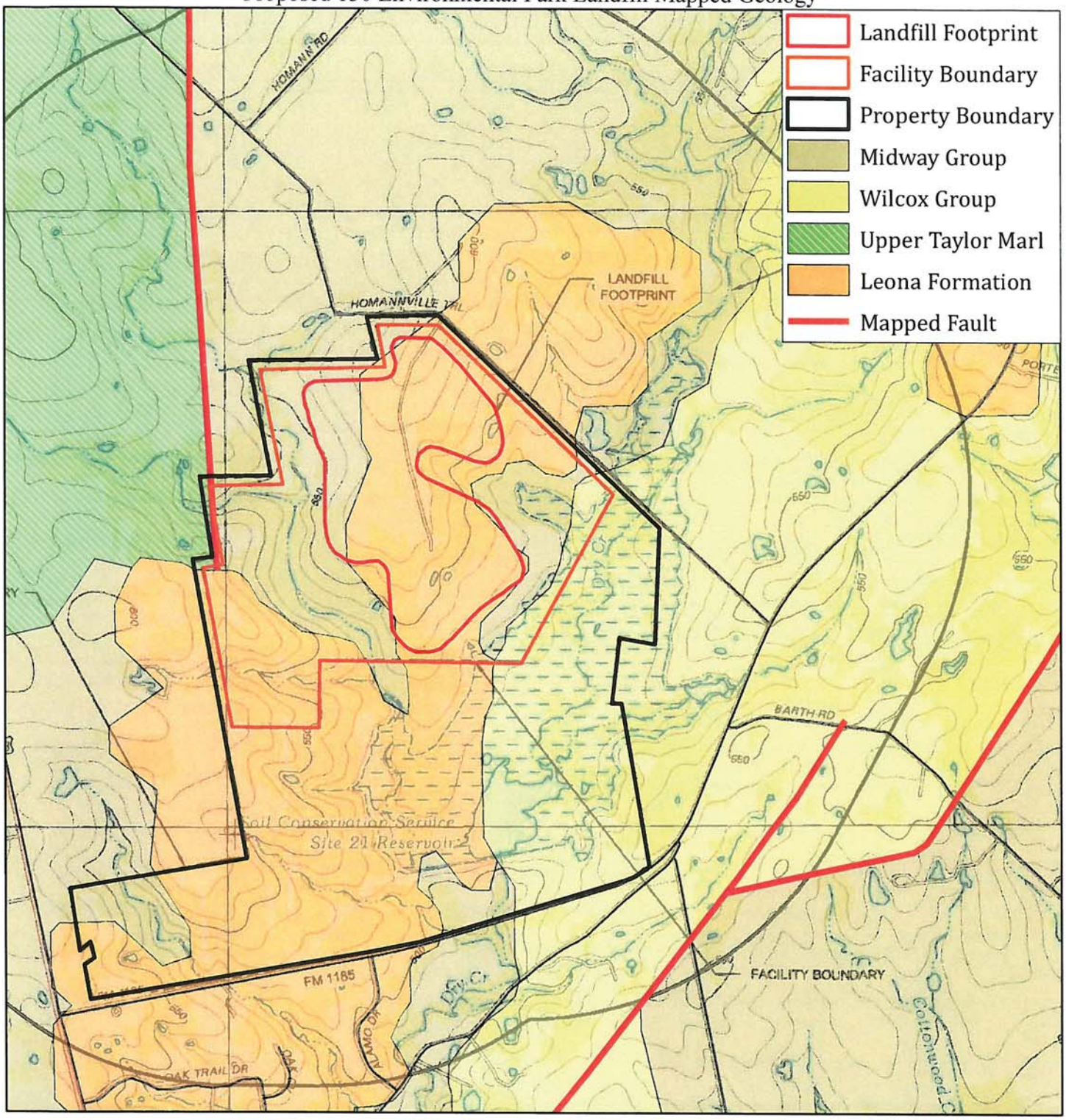
Protestants' Exhibit 5-1:

Proposed 130 Environmental Park Landfill Mapped Geology



GLENROSE ENGINEERING

N W E S

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED
PROFESSIONAL ENGINEER
June 26, 2016

0 0.25 0.5 1 Miles

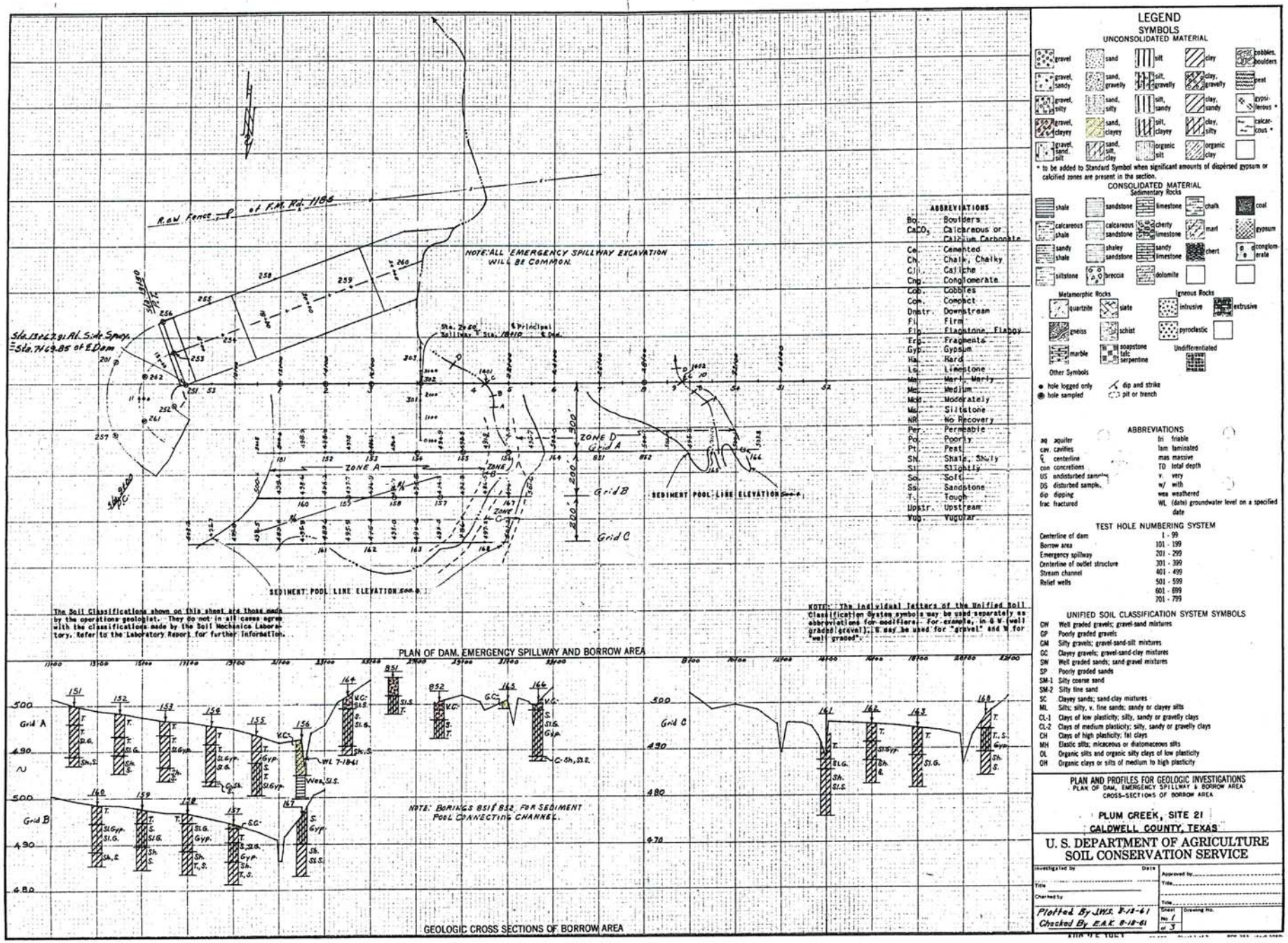
Proposed 130 Environmental Park Landfill
Mapped Geology

TBPE Firm No. F4092

Geology based on USGS: Geologic Database of Texas, December 26, 2007.

Landfill location based on Biggs & Mathews Environmental Consulting Engineers, 130 Environmental Park General Topographic Map, Drawing IA.3, August 30, 2013.

June 26, 2016



LEGEND

SYMBOLS

UNCONSOLIDATED MATERIAL

gravel; sand; silt; clay; cobbles, boulders
gravel, sandy; sand, gravelly; silt, gravelly; clay, gravelly; peat
gravel, silty; sand, silty; silt, sandy; clay, sandy; gypsiferous *
gravel, clayey; sand, clayey; silt, clayey; clay, silty; calcareous *
gravel, sand, silt; sand, silt, clay; organic silt; organic clay

* to be added to Standard Symbol when significant amounts of dispersed gypsum or calcified zones are present in the section.

CONSOLIDATED MATERIAL

Sedimentary Rocks

shale; sandstone; limestone; chalk; coal
calcareous shale; calcareous sandstone; cherty limestone; marl; gypsum
sandy shale; shaley sandstone; sandy limestone; chert; conglomerate
siltstone; breccia; dolomite

Metamorphic Rocks

quartzite; slate

Igneous Rocks

intrusive; extrusive

gneiss; schist; pyroclastic

marble; soapstone talc serpentine

Undifferentiated

Other Symbols

hole logged only
hole sampled
dip and strike
pit or trench

ABBREVIATIONS

Bo.	Boulders
$CaCO_3$	Calcareous or Calcium Carbonate
Ce.	Cemented
Ch.	Chalk, Chalky
Cli.	Caliche
Cng.	Conglomerate
Cob.	Cobbles
Com.	Compact
Dnstr.	Downstream
Fi.	Firm
Flg.	Flagstone, Flaggy
Frg.	Fragments
Gyp.	Gypsum
Ha.	Hard
Ls.	Limestone
Mar.	Marl, Marly
Mc.	Medium
Mdt.	Moderately
Ms.	Siltstone
NR	No Recovery
Per.	Permeable
Po.	Poorly
Pt.	Peat
Sh.	Shale, Shaly
Sl.	Slightly
Sof.	Soft
Ss.	Sandstone
T.	Tough
Upstr.	Upstream
Vug.	Vuggular

ABBREVIATIONS

aq	aquifer
cav.	cavities
℄	centerline
con	concretions
US	undisturbed sample
DS	disturbed sample
dip	dipping
frac	fractured
fri	friable
lam	laminated
mas	massive
TD	total depth
v.	very
w/	with
wea	weathered
WL	(date) groundwater level on a specified date

TEST HOLE NUMBERING SYSTEM

Centerline of dam	1 - 99
Borrow area	101 - 199
Emergency spillway	201 - 299
Centerline of outlet structure	301 - 399
Stream channel	401 - 499
Relief wells	501 - 599
	601 - 699
	701 - 799

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

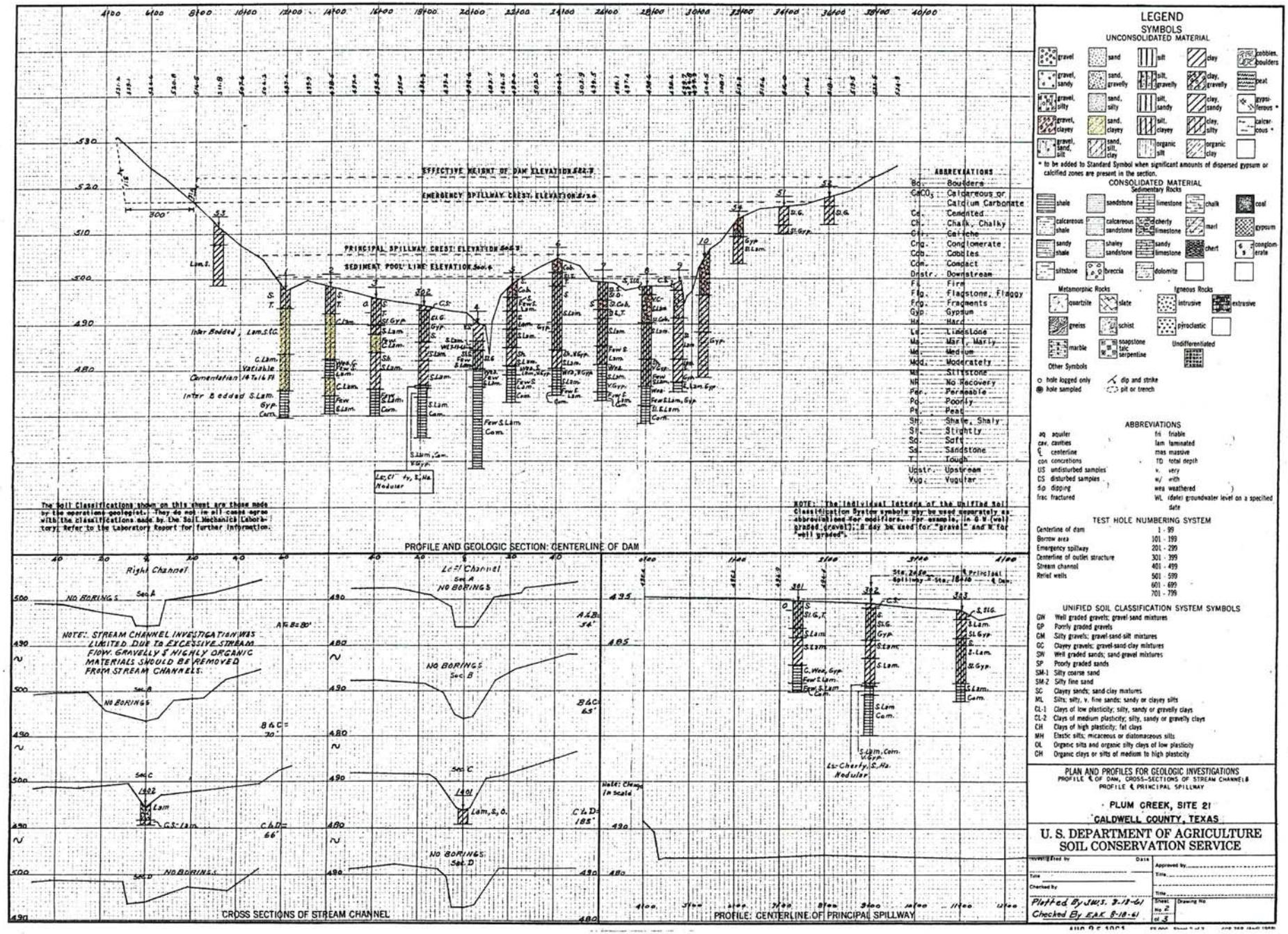
GW	Well graded gravels; gravel-sand mixtures
GP	Poorly graded gravels
GM	Silty gravels; gravel-sand-silt mixtures
GC	Clayey gravels; gravel-sand-clay mixtures
SW	Well graded sands; sand-gravel mixtures
SP	Poorly graded sands
SM-1	Silty coarse sand
SM-2	Silty fine sand
SC	Clayey sands; sand-clay mixtures
ML	Silts; silty, v. fine sands; sandy or clayey silts
CL-1	Clays of low plasticity; silty, sandy or gravelly clays
CL-2	Clays of medium plasticity; silty, sandy or gravelly clays
CH	Clays of high plasticity; fat clays
MH	Elastic silts; micaceous or diatomaceous silts
OL	Organic silts and organic silty clays of low plasticity
OH	Organic clays or silts of medium to high plasticity

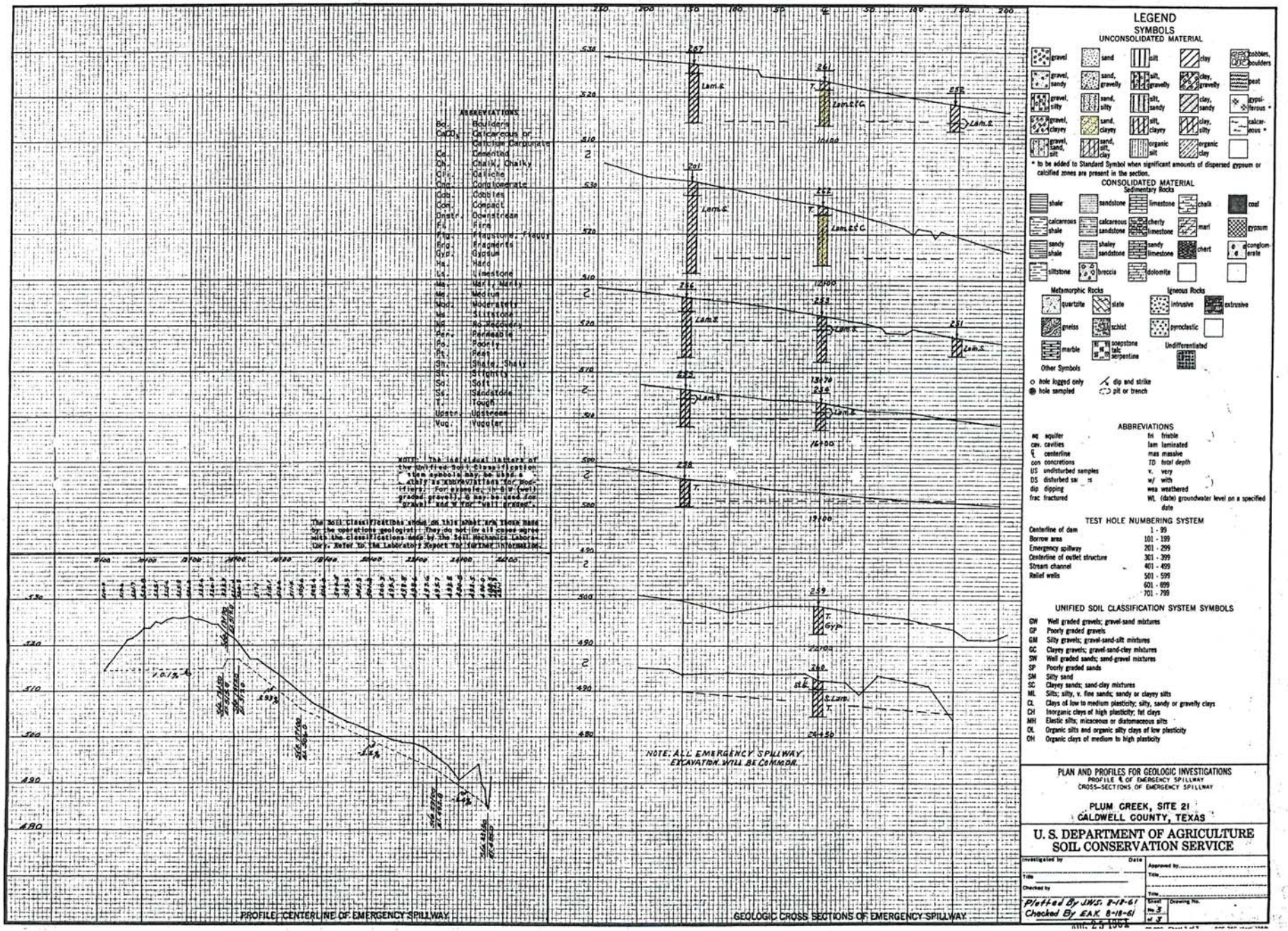
PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
PLAN OF DAM, EMERGENCY SPILLWAY & BORROW AREA
CROSS-SECTIONS OF BORROW AREA

PLUM CREEK, SITE 21
CALDWELL COUNTY, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Investigated by _____ Date _____
Title _____
Checked by _____
Title _____
Approved by _____
Title _____
Plotted By J.W.S. 8-18-61
Checked By E.A.K. 8-18-61
Sheet No. 1 of 3
Drawing No.


EFFECTIVE HEIGHT OF DAM ELEVATION 522.7
EMERGENCY SPILLWAY CREST ELEVATION 512.0
PRINCIPAL SPILLWAY CREST ELEVATION 500.7
SEDIMENT POOL LINE ELEVATION 500.0
PROFILE AND GEOLOGIC SECTION: CENTERLINE OF DAM
CROSS SECTIONS OF STREAM CHANNEL
PROFILE: CENTERLINE OF PRINCIPAL SPILLWAY
LEGEND
SYMBOLS
UNCONSOLIDATED MATERIAL
CONSOLIDATED MATERIAL
Sedimentary Rocks
Metamorphic Rocks
Igneous Rocks
Undifferentiated
Other Symbols
ABBREVIATIONS
TEST HOLE NUMBERING SYSTEM
UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS
PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
PLUM CREEK, SITE 21
CALDWELL COUNTY, TEXAS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Plotted By JWJ. 3-13-61
Checked By EAK 8-18-61

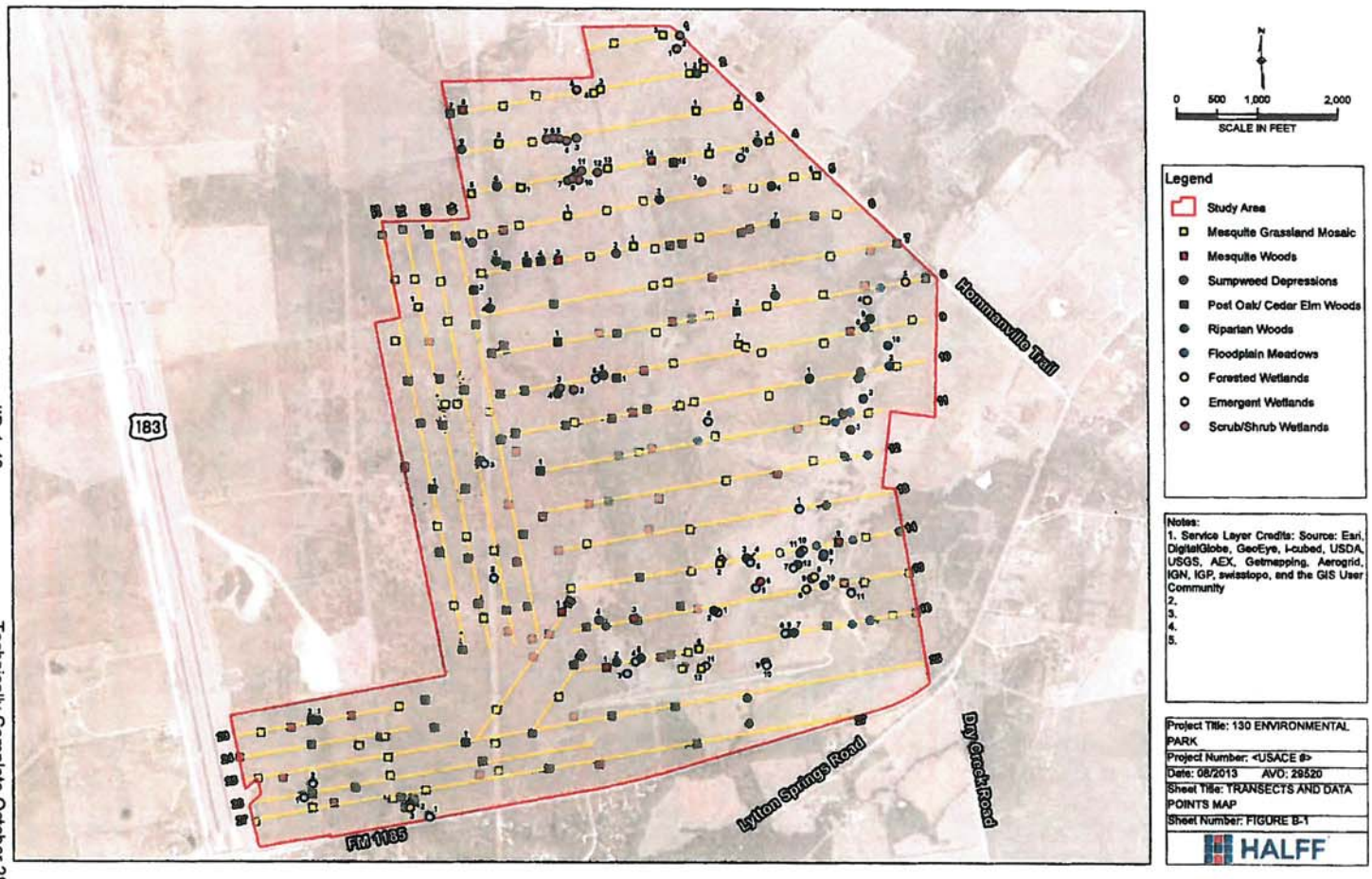

LEGEND
SYMBOLS
UNCONSOLIDATED MATERIAL
gravel
sand
silt
clay
cobbles, boulders
gravel, sandy
sand, gravelly
silt, gravelly
clay, gravelly
peat
gravel, silty
sand, silty
silt, sandy
clay, sandy
gypsiferous *
gravel, clayey
sand, clayey
silt, clayey
clay, silty
calcareous *
gravel, sand, silt
sand, silt, clay
organic silt
organic clay
* to be added to Standard Symbol when significant amounts of dispersed gypsum or calcified zones are present in the section.
CONSOLIDATED MATERIAL
Sedimentary Rocks
shale
sandstone
limestone
chalk
coal
calcareous shale
calcareous sandstone
cherty limestone
marl
gypsum
sandy shale
shaley sandstone
sandy limestone
chert
conglomerate
siltstone
breccia
dolomite
Metamorphic Rocks
quartzite
slate
gneiss
schist
marble
soapstone talc serpentine
Igneous Rocks
intrusive
extrusive
pyroclastic
Undifferentiated
Other Symbols
hole logged only
hole sampled
dip and strike
pit or trench
ABBREVIATIONS
aq aquifer
cav. cavities
℄ centerline
con concretions
US undisturbed samples
DS disturbed samples
dip dipping
frac fractured
fri friable
lam laminated
mas massive
TD total depth
v. very
w/ with
wea weathered
WL (date) groundwater level on a specified date
TEST HOLE NUMBERING SYSTEM
Centerline of dam 1 - 99
Borrow area 101 - 199
Emergency spillway 201 - 299
Centerline of outlet structure 301 - 399
Stream channel 401 - 499
Relief wells 501 - 599
601 - 699
701 - 799
UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS
GW Well graded gravels; gravel-sand mixtures
GP Poorly graded gravels
GM Silty gravels; gravel-sand-silt mixtures
GC Clayey gravels; gravel-sand-clay mixtures
SW Well graded sands; sand-gravel mixtures
SP Poorly graded sands
SM Silty sand
SC Clayey sands; sand-clay mixtures
ML Silts; silty, v. fine sands; sandy or clayey silts
CL Clays of low to medium plasticity; silty, sandy or gravelly clays
CH Inorganic clays of high plasticity; fat clays
MH Elastic silts; micaceous or diatomaceous silts
OL Organic silts and organic silty clays of low plasticity
OH Organic clays of medium to high plasticity
ABBREVIATIONS
Bd. Boulders
CaCO3 Calcareous or Calcium Carbonate
Cd. Cemented
Ch. Chalky, Chalky
Clr. Caliche
Cng. Conglomerate
Cbb. Cobbles
Com. Compact
Dnstr. Downstream
Fr. Firm
Frg. Fragments, Frags
Gyp. Gypsum
Hd. Hard
Ls. Limestone
Mrl. Marl, Marly
Md. Medium
Mod. Moderately
Ms. Siltstone
No. No Recovery
Perm. Permeable
Po. Poorly
Pt. Peat
Sh. Shale, Shaly
Sl. Slightly
Sd. Soft
Ss. Sandstone
T. Tough
Ustr. Upstream
Vug. Vuggy
NOTE: The individual letters of the Unified Soil Classification system symbols may be used as adjectives for modifiers. For example, sh-GW (well graded gravel), a may be used for "gravel" and W for "well graded".
The Soil Classifications shown on this sheet are those made by the operations geologist. They do not in all cases agree with the classifications made by the Soil Mechanics Laboratory. Refer to the Laboratory Report for further information.
NOTE: ALL EMERGENCY SPILLWAY EXCAVATION WILL BE COMMON.
PROFILE CENTERLINE OF EMERGENCY SPILLWAY
GEOLOGIC CROSS SECTIONS OF EMERGENCY SPILLWAY
PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
PROFILE ℄ OF EMERGENCY SPILLWAY
CROSS-SECTIONS OF EMERGENCY SPILLWAY
PLUM CREEK, SITE 21
CALDWELL COUNTY, TEXAS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Investigated by
Date
Title
Checked by
Plotted By JWS. 8-18-61
Checked By EAK 8-18-61
Approved by
Sheet No. 3 of 3
Drawing No.

Protestants' Exhibit 5-K:
Table of Application Wetland Determination Sampling Points
Indicating Cobble in the Subsurface and Map

Sampling Point	Restriction	Depth to Restriction (inches)	Reference
T4-DP7	Cobble	5	Page IID.1-116
T4-DP7 (or 8?)	Cobble	5	Page IID.1-118
T4-DP9	Cobble	4	Page IID.1-120
T4-DP10	Cobble	5	Page IID.1-122
T4-DP11	Cobble	5	Page IID.1-124
T4-DP12	Cobble	5	Page IID.1-126
T4-DP15	Cobble	6	Page IID.1-132
T5-DP4	Cobble	4	Page IID.1-152
T6-DP4	Cobble/Clay Pan	8	Page IID.1-166
T6-DP5	Cobble/Clay Pan	8	Page IID.1-168
T6-DP7	Cobble/Clay Pan	4	Page IID.1-172
T8-DP2	Cobble	5	Page IID.1-186
T9-DP1	Cobble	4	Page IID.1-196
T9-DP3	Cobble	6	Page IID.1-200
T16-DP11	Cobble	4	Page IID.1-324
T16-DP12	Cobble	4	Page IID.1-326
T20-DP3	Cobble	5	Page IID.1-348
T23-DP1	Cobble	4	Page IID.1-362
T27-DP1	Cobble	8	Page IID.1-378

June 26, 2016

Protestants' Exhibit 5-K:
Table of Application Wetland Determination Sampling Points
Indicating Cobble in the Subsurface and Map



Glenrose Engineering, Inc.
TBPE # F4092
4K_TableOfWetlandDeterminationsWithCobbles.pdf

Protestants' Exhibit 5-L:
Summary of Archeological Shovel Test
Descriptions and Map

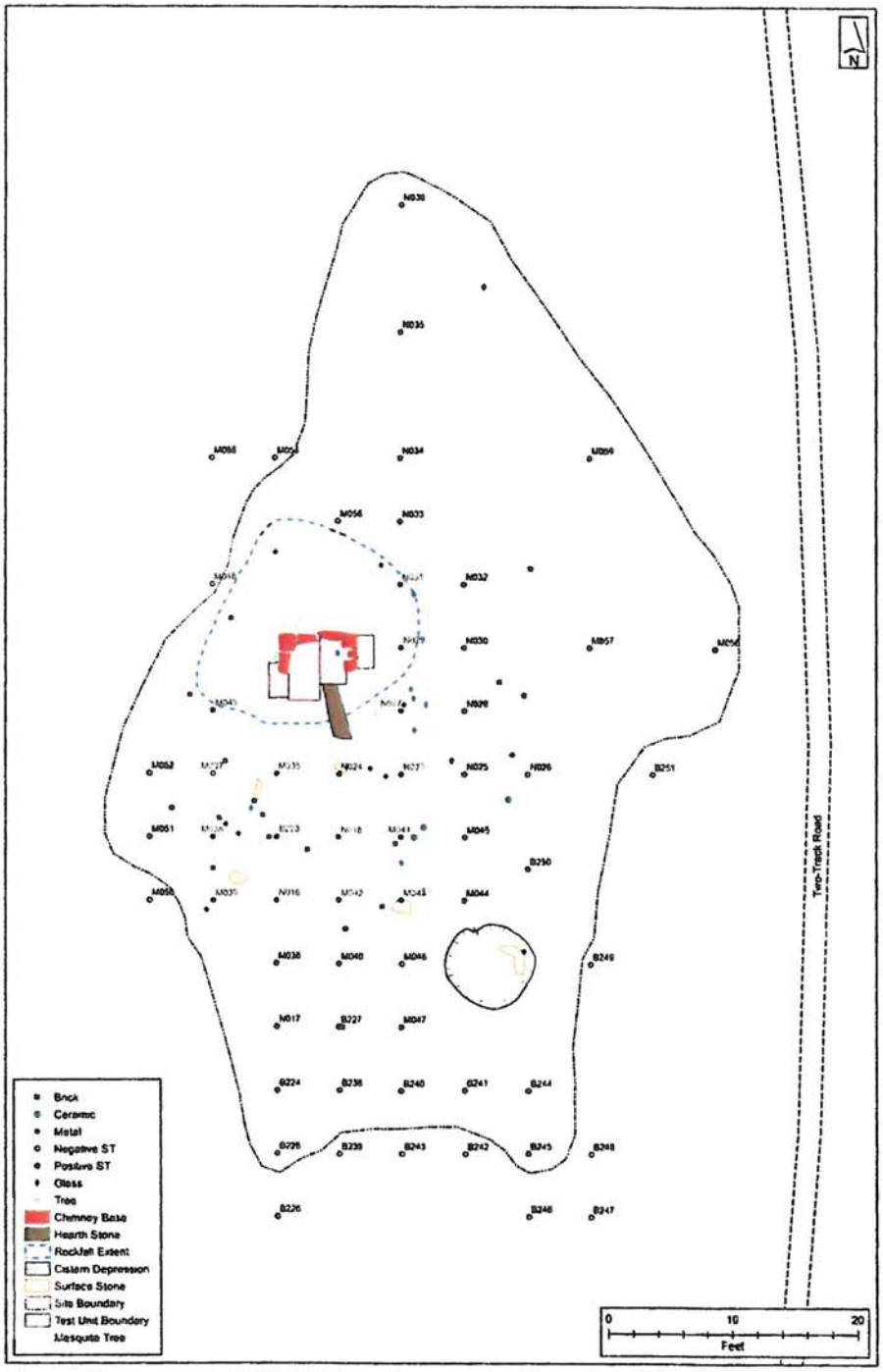


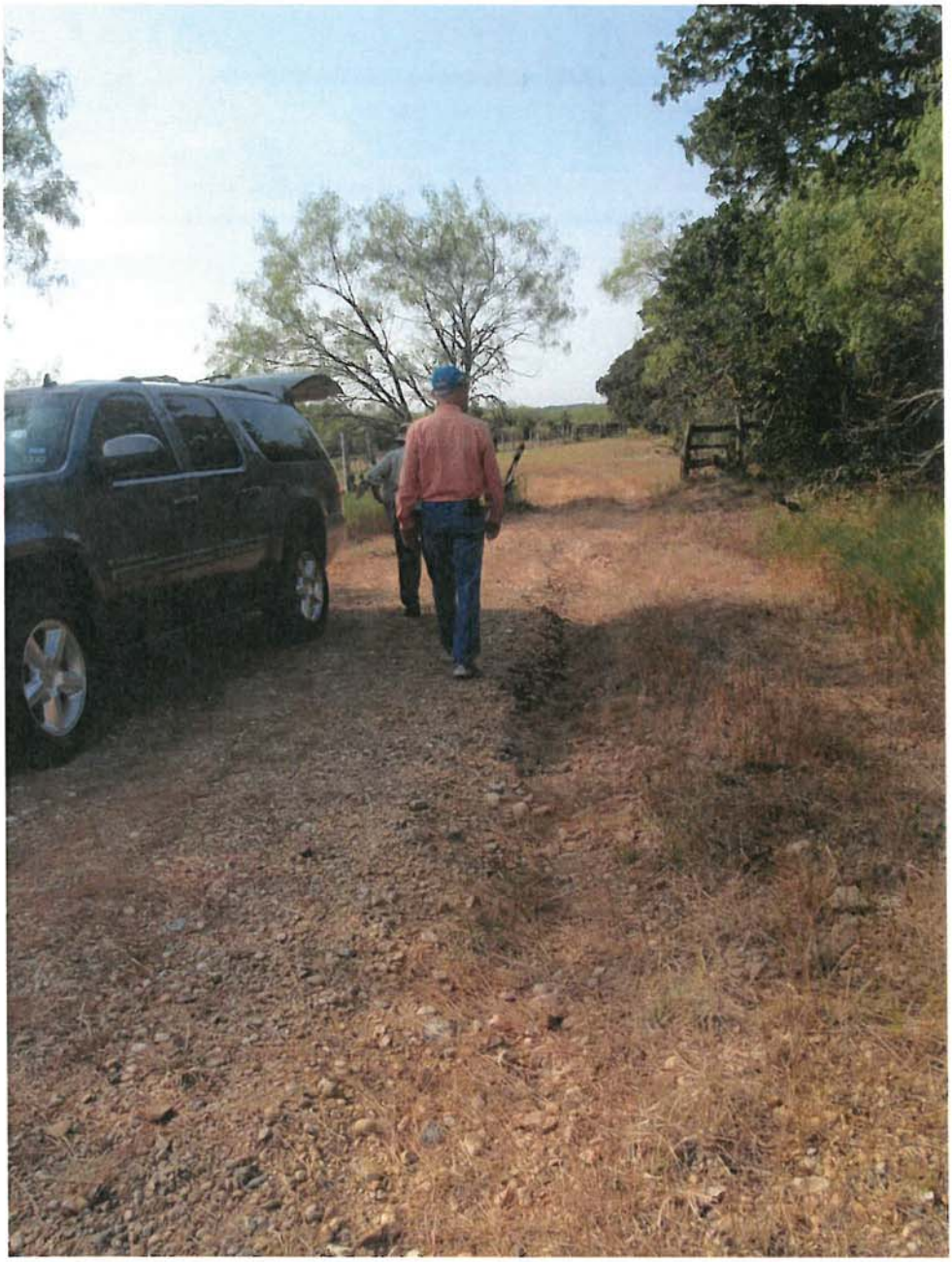
Figure 17. Plan map of 41CW157 showing structural remains, shovel tests, test units, and surface artifacts.

Table 3. 41CW157 Shovel Test Descriptions.

ST#	Depth (cm)	Matrix Description	Comments/Artifacts
M035	0-22 22+	Dark grayish brown (10YR4/2) sandy loam Gravel	0-10: metal, glass, ceramic
M036	0-17 17+	Very dark gray (10YR3/1) sandy loam Gravel	0-10: nails, glass 10-20: nails, glass
M038	0-10 10+	Very dark gray (10YR3/1) sandy loam Gravel	0-10: nails, metal, glass
M039	0-10 10+	Very dark gray (10YR3/1) sandy loam Gravel	0-10: glass, ceramic, nails
M040	0-15 15+	Very dark grayish brown (10YR3/2) sandy loam Gravel	0-10: glass, nail
M041	0-15 15+	Very dark grayish brown (10YR3/2) sandy loam Gravel	0-10: glass
N016	0-35 35+	Very dark grayish brown (10YR3/2) dry loam, with 2-3% gravel Gravel	0-10: whiteware, metal, glass, nails, ceramics 10-20: metal, nails, glass
N017	0-20 20+	Dark gray (10YR4/1) loam, with 20-25% gravel Gravel	0-10: glass, metal
N018	0-30 30+	Very dark grayish brown (10YR3/2) dry loam, with 5-10% gravel Gravel	0-10: whiteware, glass, metal, nail, glass marble 10-20: glass, whiteware, metal, bone, brick 20-30: glass, metal, nails, shell button
B223	0-20 20-40 40+	Dark grayish brown (10YR4/2) sandy loam, with gravel Very dark grayish brown (10YR3/2) sandy loam with gravel Gravel	0-10: glass, ceramic 10-20: glass, ceramic, metal 20-30: glass, ceramic
B224	0-15 15+	Dark grayish brown (10YR4/2) sandy loam, with gravel Gravel	0-10: glass
B225	0-10 10-15 15+	Very dark grayish brown (10YR3/2) sandy loam, with gravel Very dark brown (10YR2/2) clay/clay loam, with gravel Gravel	0-10: glass
B227	0-10 10+	Dark grayish brown (10YR4/2) sandy loam, with 80% gravel Gravel	0-10: glass
M042	0-30 30+	Very dark brown (10YR2/2) clay, with 70% gravel Gravel	0-10: ceramics, metal pin 10-20: ceramics, nail
M043	0-15 15+	Very dark grayish brown (10YR3/2) clay, with 80% gravel Gravel	0-10: brick 10-20: glass
M044	0-15 15+	Very dark grayish brown (10YR3/2) clay, with 80% gravel Gravel	10-20: glass
M045	0-23 23+	Very dark grayish brown (10YR3/2) clay Gravel	10-20: glass
M047	0-16 16+	Very dark brown (10YR2/2) clay Gravel	10-20: glass
M049	0-17 17+	Very dark brown (10YR2/2) clay loam, with 90% gravel Gravel	10-20: glass, ceramic
M051	0-20 20+	Black (10YR2/1) loam Gravel	10-20: glass
M057	0-17 17+	Very dark brown (10YR2/2) loam, with 80% gravel Gravel	0-10: glass
M058	0-12 12+	Very dark grayish brown (10YR3/2) loam Gravel	0-10: glass
M059	0-10 10+	Very dark grayish brown (10YR3/2) loam Gravel	0-10: ceramic
N023	0-25 25+	Very dark grayish brown (10YR3/2) loam, with gravel Gravel	0-10: nail 10-20: metal, glass
N024	0-12 12-24 24+	Very dark grayish brown (10YR3/2) loam, with gravel Very dark grayish brown (10YR3/2) loam, with gravel Gravel	0-10: metal, glass, whiteware, nail 10-20: nail, glass, ceramic 20-30: glass

ST#	Depth (cm)	Matrix Description	Comments/Artifacts
N025	0-12 12+	Very dark gray (10YR3/1) loam, with abundant gravel Gravel	0-10: glass, nail
N026	0-16 16+	Very dark grayish brown (10YR3/2) loam, with abundant gravel Gravel	0-10: glass, wire, stoneware
N028	0-8 8+	Very dark gray (10YR3/1) loam, with abundant gravel Gravel	0-10: glass, metal, wire, nail
N029	0-11 11+	Very dark gray (10YR3/1) loam, with abundant gravel Gravel	0-10: glass, mortar from chimney
N030	0-15 15+	Very dark gray (10YR3/1) loam, with abundant gravel Gravel	0-10: glass
N031	0-13 13+	Very dark gray (10YR3/1) loam, with abundant gravel Gravel	0-10: glass, metal
N032	0-15 15+	Very dark gray (10YR3/1) loam, with abundant gravel Gravel	0-10: glass, metal, nail
N033	0-13 13+	Very dark grayish brown (10YR3/2) loam, with abundant gravel Gravel	0-10: glass, metal, wire, nails
N034	0-8 8+	Very dark grayish brown (10YR3/2) loam, with abundant gravel Gravel	0-10:clear glass, metal, whiteware
N035	0-9 9+	Very dark grayish brown (10YR3/2) loam, with abundant gravel Gravel	0-10: glass, stoneware
N036	0-8 8+	Very dark grayish brown (10YR3/2) loam, with abundant gravel Gravel	0-10: whiteware
B238	0-20 20+	Very dark brown (10YR2/2) clay loam, with 30% gravel Gravel	0-10: nail
B240	0-25 25+	Very dark brown (10YR2/2) clay loam, with 40% gravel Gravel	0-10: glass, ceramic
B241	0-25 25+	Very dark brown (10YR2/2) clay loam, with 40% gravel Gravel	0-10: glass, metal, ceramic
B244	0-25 25+	Very dark brown (10YR2/2) sandy loam, with 50% gravel Gravel	0-10: glass, metal
B245	0-15 15+	Very dark brown (10YR2/2) sandy loam, with 50% gravel Gravel	0-10: nail
B250	0-20 20+	Very dark brown (10YR2/2) sandy loam, with 40% gravel Gravel	0-10: glass, metal

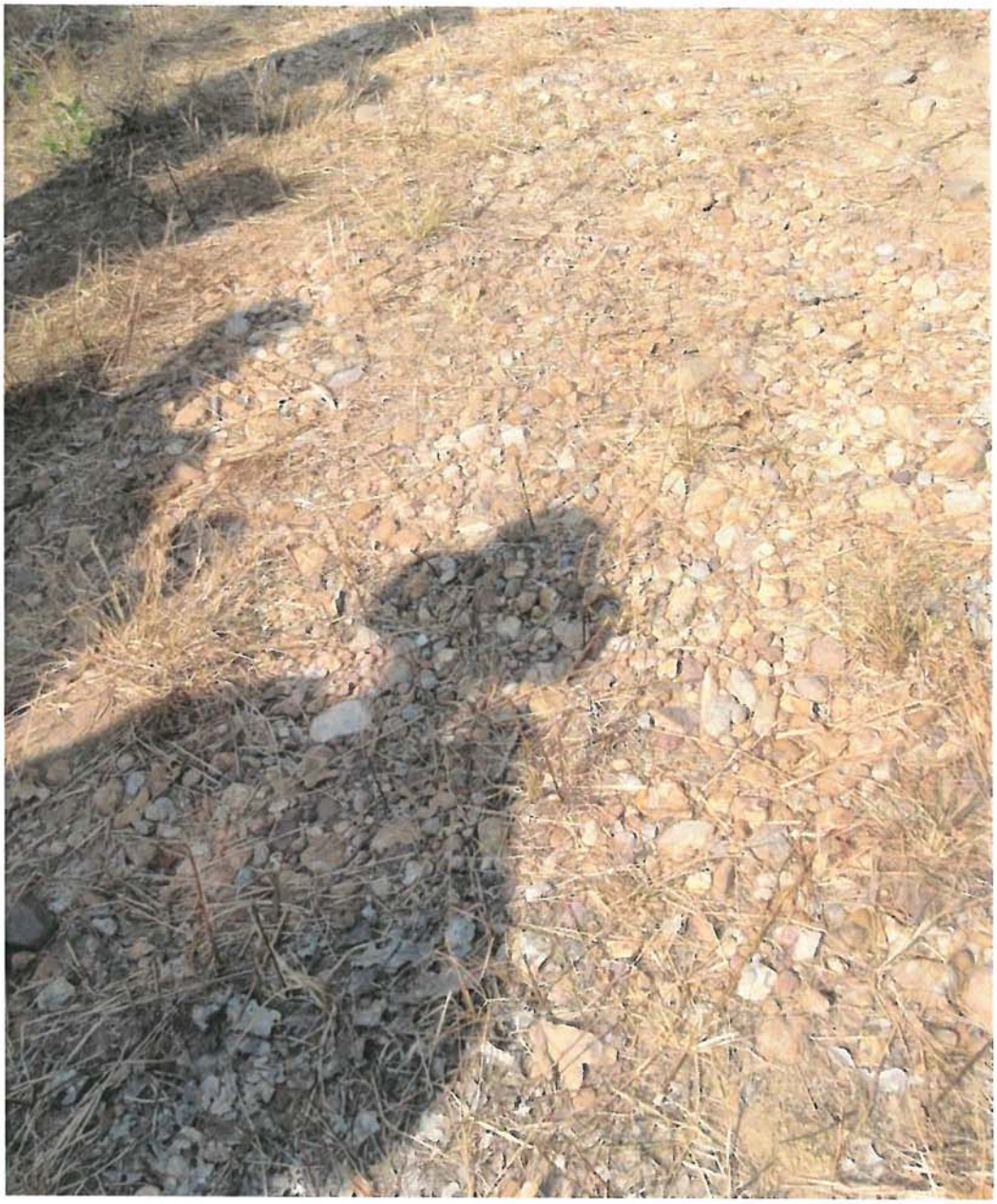
The artifacts recovered from the surface, shovel tests, and hearth test units helped to identify the occupation period of the structure as the late 1800s through early to mid-1900s. Almost 100 pieces of ceramics, mostly whiteware, were found (Figure 20). Some pieces of porcelain and glazed stoneware were also identified (Figures 20 and 21). Some of the whiteware and porcelain fragments exhibited decorative techniques including painting, decal, molded relief, and applied designs. None of these sherds can be definitively assigned to ceramic types, such as pearlware, which is generally identified by an overall blueish cast and dates to as late as the 1860s (Price 1979:14). Unfortunately, no makers' marks could be identified to help narrow the time period. One glass marble and one ceramic marble were found (Figure 22). Ceramic marbles were common until the 1920s (Zapata 1997: 108). Additionally, two two-hole, shell buttons were found (Figure 23); utilitarian buttons made of shell became common after 1855. Based on the lack of design, both buttons are likely made from fresh water shell (Luscomb 2006:177).



Photograph 14
by D. Lauren Ross, Ph.D., P.E. on August 27, 2015

Photograph 15
by D. Lauren Ross, Ph.D., P.E. on August 27, 2015

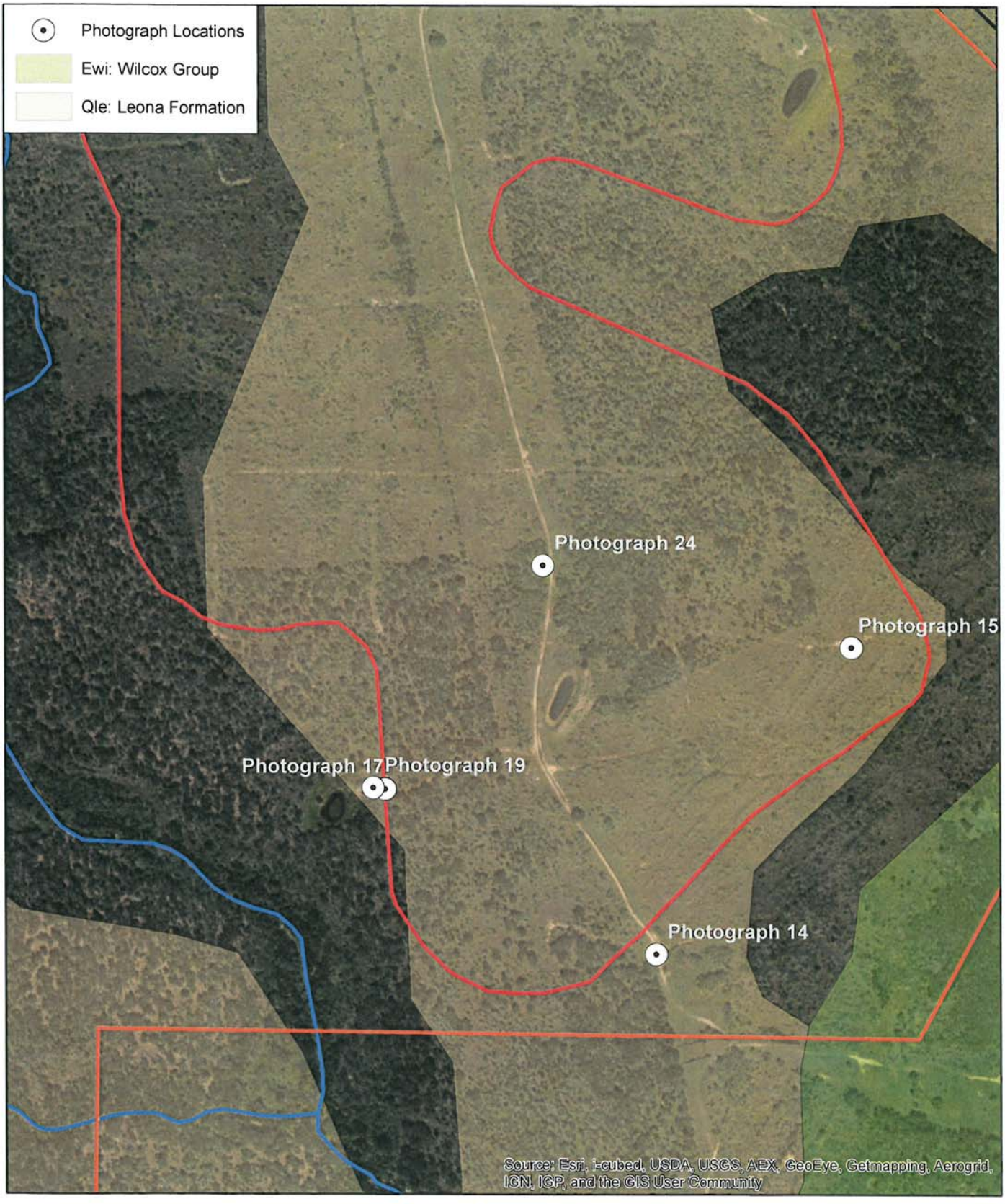
Photograph 17
by D. Lauren Ross, Ph.D., P.E. on August 27, 2015



Photograph 19
by D. Lauren Ross, Ph.D., P.E. on August 27, 2015

Photograph 24
by D. Lauren Ross, Ph.D., P.E. on August 27, 2015

Protestants' Exhibit 5-M:
Ross Photographs of Surface Gravel and Map



GLENROSE ENGINEERING

N W E S

Geology based on USGS: Geologic Database of Texas
December 26, 2007.

0 250 500 1,000 Feet

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED
PROFESSIONAL ENGINEER
June 26, 2016

Texas Board of Professional Engineers License F4092

Attachment F:
Location of Photographs
November 13, 2015

Protestants' Exhibit 5-N:
Photographs Illustrating Lithologic Discontinuities Not Represented in the October 2014 Technically Complete Permit Application

Photograph of Applicant's Boring BME 39, 7 to 8 feet
by D. Lauren Ross, Ph.D., P.E. on January 13, 2016 at 4:53 pm

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED
PROFESSIONAL ENGINEER

June 26, 2016

Protestants' Exhibit 5-N:
Photographs Illustrating Lithologic Discontinuities Not Represented in the October 2014 Technically Complete Permit Application

Photograph of Protestants' Boring IV-3, 45 to 50 feet
By D. Lauren Ross, Ph.D., P.E. on February 26, 2106 @ 5:31 pm

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED
PROFESSIONAL ENGINEER

June 26, 2016

Protestants' Exhibit 5-O: Summary of Laboratory Test Results for Protestants' Borings

SUMMARY OF LABORATORY TEST RESULTS

CALDWELL COUNTY LANDFILL
CALDWELL COUNTY, TEXAS
RETL Project No.: G216156
March 30, 2016

Boring No.	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)	Moist. (%)	Atterberg Limits LL	PL	PI	Hydraulic Conductivity k (cm/sec)	Sieve Analysis, % Passing 1"	3/4"	1/2"	3/8"	#4	#8	#30	#50	#100	#200
IV-2A	7-8	Reddish-Brown Clayey Sand with Gravel (SC)	5	43	13	30		100	100	94.8	91.7	72.0	52.2	36.8	33.8	30.7	27.4
MP-1	16.5-17	Light Brown/Light Gray Lean Clay with Sand (CL)	18.5	49	18	31	1.68E-07	100	100	100	100	98.1	97.0	96.6	96.4	94.6	82.9
	20-21	Light Brown Lean Clay with Sand (CL)	14.3	48	18	30		100	100	100	100	99.6	99.6	99.4	99.0	96.0	78.5
	25-26	Light Brown Lean Clay (CL)	14.9	45	20	25		100	100	100	100	100	99.9	99.5	99.2	97.0	89.7
	31-32	Light Brown Fat Clay (CH)	20.6	67	22	45		100	100	100	100	100	99.8	99.6	99.5	97.9	94.4
	44-45	Light Brown Silt with Sand (ML)	18	45	28	17		100	100	100	100	100	100	100	99.7	98.4	81.2
MP-1A	43-44	Light Brown Lean Clay with Sand (CL)	22	48	26	22	1.19E-06	100	100	100	100	100	100	99.9	99.5	97.7	83.0
	45-45.5	Light Gray Sandstone	3.8	24	15	9		100	100	93.2	87.9	65.5	52.5	41.1	38.0	35.2	31.8
	45.5-46	Grayish-Brown Lean Clay (CL)	19.4	47	20	27		100	100	100	100	100	99.6	99.0	98.6	96.1	87.1
MP-2	26-27	Light Brown Lean Clay with Sand (CL)	12	46	18	28		100	100	100	100	98.1	97.2	96.0	95.4	93.7	84.3
MP-3	38-38.5	Reddish-Brown Laminated Claystone	21.1	69	23	46		100	91.2	76.7	56.4	47.9	43.5	39.2	38.5	36.8	35.3
T2-2	1.3	Brown Clayey Gravel (GC)	5.5	55	18	37		68.6	56.1	43.1	30.1	20.8	17.3	15.9	15.7	14.1	12.4
T5-3	3.0	Brown Clayey Gravel (GC)	6.1	52	18	34		54.0	44.8	35.6	32.0	27.5	24.6	22.0	20.9	19.0	17.5

Note: T2-2 Sample % Passing 2" Sieve = 100%, % Passing 1½" Sieve = 86.7%
T5-3 Sample % Passing 2" Sieve = 100%, % Passing 1½" Sieve = 71.7%

STATE OF TEXAS
KYLE D HAMMOCK
72963
LICENSED
PROFESSIONAL ENGINEER

03/30/16

Kyle D. Hammock, P.E.
TXPE # 72963
Vice President - San Antonio

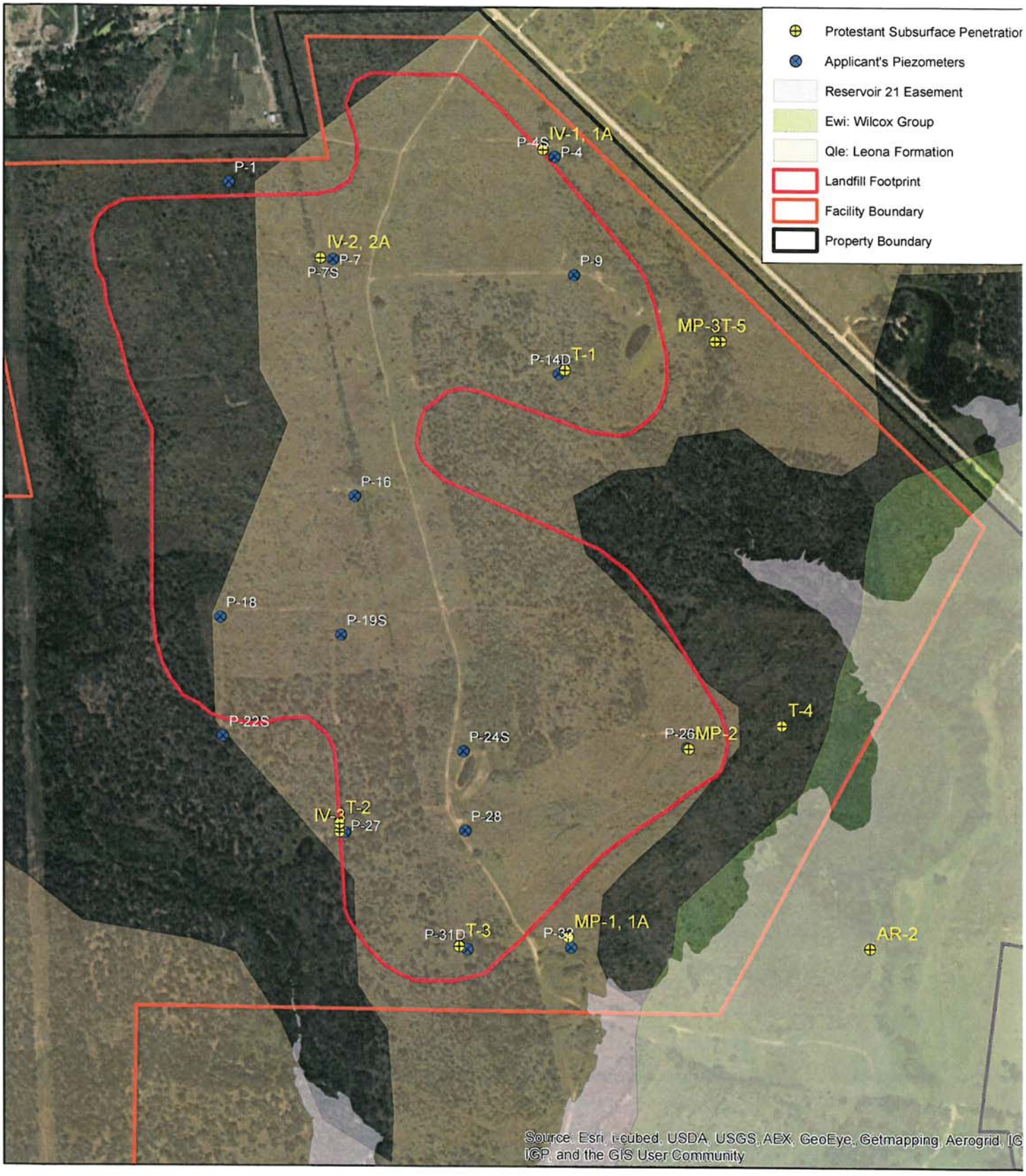
ROCK ENGINEERING AND TESTING LABORATORY, INC.
TXPE FIRM #2101
10856 VANDALE STREET
SAN ANTONIO, TX 78216
(210) 495-8000

Protestants' Exhibit 5-P:
Summary of Fractures and Fissures Observed in Protestants' and Applicant's Supplementary Boreholes

Drilling Program	Boring	Depth (feet)	Secondary Feature Description	Total Depth
Protestants'	MP-1	10 TO 32.4	none	50
Protestants'	MP-1A	50.8 to 55	rare fissures of iron-oxide	55
Protestants'	MP-2	37 to 46.5	occasional to frequent gypsum fissures	
Protestants'	MP-2	46.5 to 50	fissures of gypsum	50
Protestants'	MP-3	25 to 30	frequent vertical iron fissures	
Protestants'	MP-3	30 to 35	rare iron fissures	
Protestants'	MP-3	45 to 50	vertical gypsum and iron fissures abundant	
Protestants'	MP-3	48	none	55
Protestants'	IV-1	0-1.0	none	1
Protestants'	IV-1A	35 to 48	frequent silty iron fissures	67
Protestants'	IV-2	0.8 to 1.1	calcite/gypsum fissures and lenses	
Protestants'	IV-2	2.5-8.0	frequent gypsum/calcite fissures and lenses	
Protestants'	IV-2	8 to 10.3	calcite/gypsum fissures and lenses	18.5
Protestants'	IV-2A	18 to 29.2	occasional to frequent fissures	70
Protestants'	IV-3	25	iron oxide filled fissures	
Protestants'	IV-3	35 to 40	rare gypsum fissures	
Protestants'	IV-3	30 to 40	frequent iron oxide fissures	
Protestants'	IV-3	40 to 44	frequent gypsum fissures	
Protestants'	IV-3	49.9 to 55	frequent silt fissures	55
Protestants'	AR-2	11 to 15	rare gypsum fissures	
Protestants'	AR-2	20 to 25	frequent laminated iron layers, fissures	35
Applicant's	BME-7A	39	fracture	
Applicant's	BME-7A	46	fracture	66
Applicant's	BME-14A	21	with small fracture at 21'	
Applicant's	BME-14A	37	fracture	
Applicant's	BME-14A	46	fracture	80
Applicant's	BME-37	27	fracture	
Applicant's	BME-37	33	fracture at 33'	
Applicant's	BME-37	48	gypsum fracture at 48'	
Applicant's	BME-37	64	small fracture at 64'	
Applicant's	BME-37	70	small fracture	80
Applicant's	BME-38	0 to 48	none	48
Applicant's	BME-39	0 to 64	none	64
Applicant's	BME-40	0 to 48	none	48
Applicant's	BME-41	32	fracture	54
Applicant's	BME-42	0 to 64	none	64
Applicant's	BME-43	16	fracture	
Applicant's	BME-43	19	fracture	
Applicant's	BME-43	36	fracture	
Applicant's	BME-43	42	fracture	
Applicant's	BME-43	47	fracture	
Applicant's	BME-43	51	fracture at 51'	56
Applicant's	BME-44	26	none	
Applicant's	BME-44	32.5	none	
Applicant's	BME-44	35	fracture	
Applicant's	BME-44	38	none	
Applicant's	BME-44	46	fracture	60
For Applicant:				
Number of Fractures		**22**		
Applicant's				**620**
Frequency: Number of Features / 100 feet observed	3.548			
Combined length of 2013 borings (feet)	2957			
Expected Number of Fractures in 2013 Borings	105			
Probability of Observing no Fractures in 2013 Borings	4E-47			

June 26, 2016

Protestants' Exhibit 5-Q: Protestants' 2016 Field Investigation (map)



GLENROSE ENGINEERING

Texas Board of Professional Engineers License F4092

N W E S

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED PROFESSIONAL ENGINEER
June 26, 2016

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Proposed 130 Environmental Park Lanc
Protestant's 2016 Field Investigat

June 18, 2

Proposed 130 Environmental Park Landfill Protestant's 2016 Field Investigation Report

Prepared for

Marisa Perales, Attorney

Prepared by

June 26, 2016

Dr. Lauren Ross, Ph. D., P.E.
Glenrose Engineering, Inc.
Texas Board of Professional Engineers F4092

June 2016

Contents

Introduction

This report documents field procedures and protocols implemented by Protestants of the proposed 130 Environmental Park Landfill. The field investigation was conducted on January 20 and February 15 through March 1, 2016. The scope of Protestant's fieldwork included:

1. Locating trenches and borings;
2. Conducting gamma and conductivity geophysical logs of Applicant's temporary piezometers P1, P4, P4-S, P7, P7-S, P9, P14, P16, P18, P19-S, P22-S, P24-S,[1] P26, P27, P28, P31, and P32;[2]
3. Excavating and sampling five trenches to a maximum depth of four feet seven inches using a backhoe;
4. Drilling and sampling ten borings;
5. Measuring water levels in Protestants' borings and Applicant's temporary piezometers;
6. Installing and deconstructing one temporary piezometer;
7. Conducting gamma and conductivity geophysical logs of Protestant's temporary boring MP-1A and temporary piezometer MP-1;
8. A field test of hydraulic conductivity; and
9. Selecting and submitting samples for laboratory geotechnical characterization.

Protestant's technical staff were Mark Rubinov, P.G., Scott Courtney, P.G., and Lauren Ross, Ph.D., P.E. Robert Bechnal and Adam Roberts, representing GeoCam conducted the geophysical logging. Brian Kern, driller, and Thomas King, driller's helper, from Total Support Services conducted the drilling. Additional persons on the site for the Protestants during some or all of the field investigation were Marisa Perales, attorney, Brad Rockwell, attorney, and Dennis Hobbs, TJFA representative.

[1] Based on my Field Investigation Records for February 15, 2016.
[2] Based on Mike Rubinov's Daily Report for February 16, 2016.

Personnel on the site representing the Applicant were Stefan Stamoulis, P.G., Mack Reynolds, Greg Adams, P.E., Alfonso Sufuentes, Mike Snyder, P.G., Ernest Kaufman and David Greene. Persons on the site representing the landowners were Mr. and Mrs. Hunter.

Health and Safety

Health and Safety

Field investigations carry a measure of unavoidable risk. Protestants' field staff were provided with site-specific health and safety information. A short meeting was held prior to beginning field activities to review health and safety protocols on each day that involved different activities than the previous day. Forms documenting meeting participation are attached to this report.

Field staff were experienced professionals and assumed responsibility for personal health and safety during this sampling event, including being familiar with potential hazards.

Quality Assurance/ Quality Control

Quality assurance and quality control procedures were conducted in compliance with the standards of:

- Texas Commission on Environmental Quality, Texas Administrative Code (TAC) Title 30 Part 1 Chapter 330, Subchapter F: Analytical Quality Assurance and Quality Control;
- TAC Title 22 Part 39 Chapter 851;
- Texas Board of Professional Geoscientists Licensing and Enforcement Rules, Subchapter C, Code of Professional Conduct Rule §851.106 "Responsibility to the Regulation of the Geoscience Profession and Public Protection";
- The State of Texas Engineering Practice Act and Rules Concerning the Practice of Engineering and Professional Engineering Licensure, §137.63 "Engineer's Responsibility to the Profession";
- American Society for Testing and Materials (ASTM) D3740-12a, "Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering design and Construction".

Field Data Sheets

Field investigation records were completed by Protestants' professional staff for each day of fieldwork. Locations and unique identification of soil samples collected from soil borings were recorded.

Chain-Of-Custody Procedures

Samples were maintained under chain-of-custody. Written documentation is attached of transfers of sample custody.

Decontamination

Based on the site history represented in the 130 Environmental Park landfill permit application, there is no indication of historical activities on the site requiring chemical decontamination. In addition to procedures described below, ordinary site good-housekeeping practices were implemented.

Personnel Decontamination

Disposable gloves were worn during water level sampling in temporary piezometers.

Cleaning of Well Casing Materials

Well casing materials were sealed in individual airtight plastic bags by the factory. They were maintained on the site in clean condition until installation.

Subsurface Investigation by Trenching

Five trenches were excavated with a backhoe as part of Protestants' field investigation on February 160, 2016. Figure 1 is a map showing trench locations and a schedule of the trenches and samples is shown in Table 1.

The backhoe was operated by Scott Courtney, P.G. and samples were collected by Lauren Ross, Ph.D., P.E. Samples were collected from the backhoe bucket without entering the excavation and placed into gallon plastic bags. Information regarding the trench identification, time, date, sampler, and sampling interval were recorded.

Table 1. Protestant's Completed Trenches Schedule

ID	Date Begun	Date Completed	Penetration Depth (ft)	Samples
T-1	2/16/2016	2/16/2016	1.7	T1-1 @ 0 to 7 inches T1-2 @ 1.25 feet
T-2	2/16/2016	2/16/2016	2.3	T2-1 @ 0 to 12 inches T2-2 @ 16 inches
T-3	2/16/2016	2/16/2016	2.5	T3-1 @ 1.1 to 1.4 feet T3-2 @ 1.9 to 2.3 feet
T-4	2/16/2016	2/16/2016	2.5	None
T-5	2/16/2016	2/16/2016	4.6	T5-1 @ 0 to 10 inches T5-2 @ 2.5 feet T5-3 @ 3 feet T5-4 @ 4 feet

Drilling and Destruction of Soil Borings

Drilling and destruction of borings was conducted in compliance with the standards of ASTM D6274/D5784M-13, "Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices."

Figure 1 is a map showing boring locations and a schedule of the borings is shown in Table 2.

Table 2. Protestant's Completed Boring Schedule

ID	Date Begun	Date Completed	Penetration Depth (ft)	Notes
AR-2	2/27/2016	2/27/2016	35	completed
IV-1	2/24/2016	2/24/2016	10	Abandoned due to poor recovery
IV-1A	2/24/2016	2/24/2016	67	completed
IV-2	2/22/2016	2/22/2016	20	Abandoned due to poor recovery and refusal
IV-2A	2/22/2016	2/23/2016	70	supplement for IV-2
IV-3	2/26/2016	2/26/2016	55	completed
MP-1	2/24/2016	2/25/2016	50	core barrel stuck in auger at 45 to 50 feet
MP-1A	2/25/2016	2/26/2016	55	completed
MP-2	2/29/2016	3/1/2016	50	completed
MP-3	2/29/2016	2/29/2016	55	completed

Soil borings were drilled using hollow stem auger and a mobile drilling rig. Where they can be used, hollow stem auger methods are preferred to wet rotary methods because borings can often be completed without introducing drilling fluid.

The hollow stem auger also creates a cased hole during sampling. This temporary casing reduces the incidence of material dragged to deeper levels during drilling and sampling. Because of the extensive presence of gravel and cobbles in the shallow subsurface at the proposed landfill site, this benefit is particularly important. The resulting lithologic record is clearer than with rotary drilling. All of Protestants' borings were drilled without introducing fluids into the borehole.

An estimated depth of each soil boring was determined before drilling. Adjustments to boring depths were made based on sample recovery, sample characteristics, and the estimated depth of the landfill bottom. Final boring depths are recorded in Table 2.

The field geologist specified to the drill rig operator the depth of soil sample collection, method of sample retrieval, and other matters pertaining to the satisfactory completion of the borings. Project technical staff observed all aspects of the drilling and sampling.

After drilling, boreholes were typically left open for 24 hours to test for the presence of water. After 24 hours, the boreholes were plugged and abandoned by filling with bentonite grout. The depth of the borehole was measured prior to filling and the number of bags of bentonite used was recorded to ensure against bridging and to assure adequate amounts were used to fill the borehole.

Soil Sampling for Geotechnical Analyses

Soil sampling for geotechnical analysis was conducted in compliance with the standards of:

- ASTM D5434-12, "Standard Guide for Field Logging of Subsurface Explorations of Soil and Rock";
- ASTM D6274/D5784M-13, "Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices"; and
- ASTM D6640-01, "Standard Practice for Collection and Handling of Soils Obtained in Core Barrel Samplers for Environmental Investigations."

Borings were continuously cored except for intervals where a previous boring at an adjacent location had been sampled by Protestants. Samples were extracted from the borehole using a continuous core barrel, Shelby tube, or split spoon sampler, as appropriate.

The field geologist/engineer recorded relevant information pertaining to the rate of penetration, drive-hammer blow count, coring smoothness, and sample recovery. The split-barrel sampler was opened or else Shelby tube samples were extruded for observation and field logging of the retrieved core.

Samples were retained for future review and preserved for physical testing. The samples were wrapped, stored, and labeled to show the project, boring identification, and cored interval denoted by depth.

The field geologist/engineer observed drill cuttings return for lithologic information to supplement discrete sampling. Where other sampling methods failed to retrieve gravel, samples were obtained from drill cuttings.

Original field logs have been retained for review.

Water Level Measurements

Water levels were measured in compliance with the standards of ASTM D4750-87, "Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well). (withdrawn without replacement)"

Water level measurements in the Protestant's borings and temporary piezometer MP-1, and in the Applicant's piezometers were made using an electric line. Measurements in cased piezometers were made from the top of the PVC casing. Measurements in uncased boreholes were made relative to the adjacent ground surface. All depths to water were recorded to the nearest one-hundredth (0.01) foot.

During the field permeability test, water level, water pressure and temperature were measured automatically using a Level TROLL 700 Data Logger connected to a pressure transducer. Pressure transducer measurements were verified with periodic measurements using an electric line.

Installation and Destruction of Temporary Piezometers

A temporary piezometer was installed in borehole MP-1 using methods consistent with standards of ASTM D6274/D5784M-13, "Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices."

The borehole was sounded to verify total depth. The well was constructed of threaded Schedule 40 polyvinyl chloride (PVC) casing, screen, and well point. No solvents were used to fasten casing joints, screen joints, or the well point. The inside well diameter was two

inches to permit easy passage of a water-level probe. The well screen consisted of machine-slotted PVC.

Thirty feet of blank casing, 20 feet of well screen, and a half-foot well point were assembled and lowered into the borehole. The well assembly was designed so that the well screen was opposite the target groundwater zone from 29.5 to 49.5 feet below grade.

After the casing was lowered into the borehole, a filter pack of industrial quartz sand was installed in the annulus from the borehole bottom to a depth of 27 feet below top of casing. Bentonite was installed on top of the filter pack to seal the annulus to a depth of 22.5 feet below top of casing. The remaining annulus was left open, except that a weighted bucket was placed over the half-foot casing stick-up to protect the casing and prevent interactions between the open annulus and animals.

Because of the limited available time for water level stabilization and conducting a field permeability test, and because no fluids were introduced during drilling, the temporary piezometer was not developed. Any bias in the results of the field test of permeability due to a lack of well development would be toward lower permeabilities than if the well had been developed.

Once the field test of permeability was completed, casing, screen, and well point were extracted from the borehole. All remaining sand and bentonite were drilled from the borehole and then it was plugged using bentonite pellets.

Geophysical Logs

Gamma and conductivity geophysical logs were conducted in Applicant's temporary piezometers P1, P4, P4-S, P7, P7-S, P9, P14, P16, P18, P19-S, P22-S, P24-S, P26, P27, P28, P31, and P32. In piezometer P4-S the geotechnical probe could not be lowered in the casing below 12 feet. Gamma and conductivity geophysical logs were also completed in the boring MP-1A and the temporary piezometer MP-1.

Aquifer Testing for Hydraulic Conductivity

Field procedures for aquifer testing were consistent with ASTM D4044-96, "Standard Test Method (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers."

An automated pressure transducer and data logger were installed in temporary piezometer MP-1 to establish the presence of any water level trend prior to initiation of the field test for hydraulic conductivity. The data logger began at 13:58 on February 29, 2016 and recorded water levels at 15-minute intervals until 8:13 on March 1, 2016.

Two gallons of water were poured into the top of the casing of temporary piezometer MP-1 at 8:30 on March 1, 2016 over a period of 21 seconds. Water levels within the temporary piezometer were measured using a pressure transducer and data logger from 8:30 until 14:02. Supplementary depth-to-water-below-top-of-casing measurements were made during the same period using an electric line. After five hours and 38 minutes, a plot of the water level decline versus time was determined to be approximately linear and the field test of hydraulic conductivity was ended.

Samples Identified and Split for Laboratory Characterization

Based on field notes and visual examination, 13 samples from boreholes and trenches were identified by Protestants' field staff for laboratory measurements of weight, moisture content, Atterberg limits, and sieve analysis. Two of the 13 samples were identified for laboratory measurement of saturated hydraulic conductivity.

Of the 13 samples, two had been collected from trenches excavated using a backhoe. Applicant's representatives had collected split samples directly from the backhoe. Protestants' other 11 samples identified for testing were removed from storage and transported under custody to Marisa Perales' office for splitting with Applicant's representatives.

Present during sample splitting were Mike Rubinov, P.G., Scott Courtney, P.G., Lauren Ross, P.E. Brad Rockwell, attorney, and Dennis Hobbs representing TJFA. Present for the Applicant were Mack Reynolds, Greg Adams, P.E., and John Moore. A videographic record of the proceedings was made by Jeremy Garett and Ted Marchut.

The geotechnical laboratory requested the following amounts of material for each test:

- Moisture: 50 grams;
- Atterberg Limits: 200 grams;
- Sieve Analysis: 500 grams; and
- Saturated Hydraulic Conductivity: 4 inches.

A total of 750 grams was needed for each sample, plus an additional four inches of sample for tests of saturated hydraulic conductivity.

Each sample was placed upon the table and approximately 750 grams were split for Protestants' laboratory analysis. A record of the amounts in each split was recorded and is presented in the chain-of-custody form attached. For samples MP-1, 16.5 to 17 feet and MP-1A 43 to 44 feet, for which permeability tests were desired, and for MP-3, 38 to 38.5 feet there was insufficient sample for a complete suite of analyses by both Protestants and the Applicant. Protestants' representatives submitted their split samples for analysis and Applicant's representatives received sample material for testing at a later date.

References

ASTM D653-14, "Standard Terminology Relating to Soil, Rock and Contained Fluids."

ASTM D2488-09a, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)."

ASTM D3740-12A, "Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction."

ASTM D4044-96, "Standard Test Method (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers."

ASTM D5434-12, "Standard Guide for Field Logging of Subsurface Explorations of Soil and Rock."

ASTM D5092-04(2010)e1, "Standard Practice for Design and Installation of Groundwater Monitoring Wells."

ASTM D5753-05(2010), "Standard Guide for Planning and Conducting Borehole Geophysical Logging."

ASTM D5912-96, "Standard Test Method for (Analytical Procedure) Determining Hydraulic Conductivity of an Unconfined Aquifer by Overdamped Well Response to Instantaneous Change in Head (Slug)." (withdrawn, no replacement)

ASTM D6274-10, "Standard Guide for Conducting Borehole Geophysical Logging - Gamma."

ASTM D5784/D5784M-13, "Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices."

ASTM D6640-01, "Standard Practice for Collection and Handling of Soils Obtained in Core Barrel Samplers for Environmental Investigations."

Driscoll, F.G., 1986, *Groundwater and Wells: A comprehensive study of groundwater and the technologies used to locate, extract, treat, and protect this resource.* Second Edition. NRC015, Submitted: 8/25/2014. Johnson Screens, St. Paul, Minnesota.

Safety Form

Geographic Location:	**Latitude:** 29.979241° **Longitude:** -97.656384°
EMS	Call 911
Go/No Go Criteria:	**NO GO:** Activities at the site will be curtailed when conditions represent an unacceptable threat to human health or equipment. If thunder is audible, activities will pause for 30 minutes. Heavy rains or a prediction of heavy rains within 4 hours that present a risk of flooding will require evacuation of personnel and equipment from portions of the site within the 100-year flood plain. No work will proceed beyond civil twilight without supplement lighting.
Directions to site	See attached map.
Parking Areas:	**Primary:** At site location. **Secondary:** Base Camp on the main road through the property.
Assembly Areas:	**Primary:** Base Camp on the main road through the property
Expected temperature/weather:	Possible cold or warm weather or rain.
Drinking water availability:	Bottled water provided.
Access to Shade/Shelter:	Temporary Canopy/Tarp, Vehicle
Personal Protective Equipment :	**Required:** Boots, safety glasses, hardhats, ear protection, long pants and sleeves.
Cell phone coverage:	Over most of the site.
-Nearby services:	Gas station at Hwy 130 and FM 1185.
Field Team/ Participants:	Lauren Ross, Ph.D., P.E. 512-431-7988 Scott Courtney, P.G. 210-823-2193 Mike Rubinov, P.G. 267-808-3351 Dennis Hobbs 512-619-9103 Marisa Perales 512-296-6440 **Representing the Applicant:** Brent Ryan Stefan Stamoulis Mack Reynolds Alfonso Sufuentes
First Aid Training	**Trained in 1st Aid:** Lauren Ross **Location of group medical/first aid kit:** Lauren Ross

First Aid Reference

First Aid Reference – Signs & Symptoms of Heat Illness		
Signs & Symptoms	**Treatment**	**Response Action:**
HEAT EXHAUSTION • Dizziness, headache • Rapid heart rate • Pale, cool, clammy or flushed skin • Nausea and/or vomiting • Fatigue, thirst, muscle cramps	1. Stop all exertion. 2. Move to a cool shaded place. 3. Hydrate with cool water.	Heat exhaustion is the most common type of heat illness. Initiate treatment. If no improvement, call 911 or seek medical help. Do not return to work in the sun. Heat exhaustion can progress to heat stroke.
HEAT STROKE • Disoriented, irritable, combative, unconscious. • Hallucinations, seizures, poor balance. • Rapid heart rate. • Hot, dry and red skin • Fever, body temperature above 104° F.	1. Move (gently) to a cooler spot in shade. 2. Loosen clothing and spray clothes and exposed skin with water and fan. 3. Cool by placing ice or cold packs along neck, chest, armpits and groin (Do not place ice directly on skin).	**Call 911 or seek medical help immediately.** **Heat stroke is a life threatening medical emergency. A victim can die within minutes if not properly treated. Efforts to reduce body temperature must begin immediately!**

Field Investigation Records

Chain-of-Custody Records

Protestants' Exhibit 5-S:
Applicant's 2013 Borings BME-07, BME-26, BME-27 and BME-32
Compared to Protestants' Geotechnical Results in Nearby Borings

LOG OF BORING NO. BME-07

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2392999.981 N 13904800.029**

Surface El.: **585.95 ft. msl**
Completion Depth: **127.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/7/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	U1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)	4.5+						
	U2		581.95	4.5+						
5	U3		CLAY, SILTY, tan and brown, hard, w/ferrous stains, calcareous nodules and traces of gypsum, moist, (CH)	4.5+						
	U4			4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+	27.5		84	32	52	99
20	U11			4.5+						
	U12			4.5+						
25	U13			4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17		- w/silt partings	4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22		- w/small shell fragments	4.5+						
45	U23			4.5+						
	U24			4.5+						
	U25			4.5+						
50										

compare to laboratory analysis of Protestant's field boring IV-2A:
7 to 8 feet, Reddish-Brown Clayey Sand with Gravel (SC)

June 26, 2016
sealed only for my additions in red.

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-07
PAGE 1 OF 3

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-07

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Project Description: **130 Environmental Park**
Lockhart, Texas

Location: **E 2392999.981 N 13904800.029**

Surface El.: **585.95 ft. msl**
Completion Depth: **127.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/7/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
55	U26		CLAY, SILTY, tan and brown, hard, w/ferrous stains, calcareous nodules and traces of gypsum, moist, (CH) *(continued)*	4.5+						
			530.95							
60	U27		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)	4.5+						
			524.95							
65	U28		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
70	U29			4.5+						
75	U30			4.5+						
80	U31			4.5+						
85	U32			4.5+						
90	U33			4.5+						
95	U34			4.5+						
100	U35			4.5+						

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-07

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Project Description: **130 Environmental Park**
Lockhart, Texas

Location: **E 2392999.981 N 13904800.029**

Surface El.: **585.95 ft. msl**
Completion Depth: **127.0 ft.**
Date Boring Started: **9/6/13**
Date Boring Completed: **9/7/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
105	U36			4.5+						
110	U37			4.5+						
	U38			4.5+						
115	U39			4.5+						
120	U40			4.5+						
125	U41			4.5+						
			458.95							
130										
135										
140										
145										
150										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

The stratification lines represent approximate strata boundaries.
In situ, the transition may be gradual.

Protestants' Exhibit 5-S:
Applicant's 2013 Borings BME-07, BME-26, BME-27 and BME-32
Compared to Protestants' Geotechnical Results in Nearby Borings

LOG OF BORING NO. BME-26

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Project Description: **130 Environmental Park**
Lockhart, Texas

Location: **E 2394800.006 N 13902399.962**

Surface El.: **532.72 ft. msl**
Completion Depth: **48.0 ft.**
Date Boring Started: **8/31/13**
Date Boring Completed: **8/31/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	U2									
5	U3			4.5+						
			526.72							
	U4		CLAY, SILTY, tan, hard, w/ferrous stains, moist, (CH)	4.5+						
	U5			4.5+						
10	U6			4.5+						
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
			514.72							
	U10		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains, slightly blocky, moist, (CH)	4.5+						
20	U11			4.5+						
	U12			4.5+						
25	U13		compare to laboratory results for Protestant's Boring MP-2: 26-27 feet, Light Brown Lean Clay with Sand (CL)	4.5+						
	U14			4.5+						
	U15			4.5+						
30	U16			4.5+						
	U17			4.5+						
35	U18			4.5+						
	U19			4.5+						
	U20			4.5+						
40	U21			4.5+						
	U22			4.5+						
			489.72							
45	U23		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+						
	U24			4.5+						
			484.72							
50										

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED
PROFESSIONAL ENGINEER
June 26, 2016
sealed only for my additions in red.

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed during the drilling of this boring and no water was introduced during drilling.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-26
PAGE 1 OF 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF BORING NO. BME-27

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Project Description: **130 Environmental Park**
Lockhart, Texas

Location: **E 2393000.019 N 13901899.990**

Surface El.: **549.95 ft. msl**
Completion Depth: **92.0 ft.**
Date Boring Started: **8/20/13**
Date Boring Completed: **8/21/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles and cobbles, dry, (CH)							
	A2		compare to laboratory results for Protestant's Trench T2: 1.3 feet, Brown Clayey Gravel (GC)							
5	U3		544.95	4.5+						
			CLAY, SILTY, tan and brown, hard, limonitic, w/ferrous stains, moist, (CH)							
	U4			4.5+						
	U5			4.5+	23.5		72	25	47	93
10	U6		537.95	4.5+						
			CLAY, SILTY, gray and tan mottled, hard, limonitic, w/ferrous stains and traces of gypsum, slightly blocky, moist, (CH)							
	U7			4.5+						
15	U8			4.5+						
	U9			4.5+						
	U10			4.5+	24.9		67	24	43	99
20	U11			4.5+						
	U12			4.5+						
25	U13									
	S14			4.5+						
	S15			4.5+						
30	S16			4.5+						
	S17			4.5+						
35	S18			4.5+						
	S19			4.5+	26.3		74	28	46	100
	S20			4.5+						
40	S21			4.5+						
	S22			4.5+						
45	S23			4.5+	25.5		73	28	45	99
	S24			4.5+						
			501.95							
50	S25		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)							

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED
PROFESSIONAL ENGINEER
June 26, 2016
sealed only for my additions in red.

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube/Split Barrel**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Where a split barrel sampler was used to obtain the sample, the standard penetration test was not performed because the soils are cohesive. Groundwater was not observed prior to introduction of drilling fluid at approximately 55'.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-27
PAGE 1 OF 2

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

Protestants' Exhibit 5-S:
Applicant's 2013 Borings BME-07, BME-26, BME-27 and BME-32
Compared to Protestants' Geotechnical Results in Nearby Borings

LOG OF BORING NO. BME-32

Project Description: **130 Environmental Park**
Lockhart, Texas

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Location: **E 2394199.984 N 13901299.985**

Surface El.: **526.12 ft. msl**
Completion Depth: **67.0 ft.**
Date Boring Started: **8/28/13**
Date Boring Completed: **8/29/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
	A1		CLAY, SILTY, dark brown, very stiff to hard, w/pebbles, dry, (CH)							
	U2		522.12							
5	U3		CLAY, SILTY, tan and brown, hard, limonitic, w/ferrous stains and calcareous nodules, moist, (CH)	4.5+						
	U4			4.5+						
	U5		516.12	4.5+	15.2		54	20	34	78
10	U6		CLAY, SILTY, gray and tan mottled, hard, w/ferrous stains and calcareous nodules, slightly blocky, moist, (CH)	4.5+						
	U7			4.5+						
	U8			4.5+						
15	U9		compare to Protestant's Boring MP-1: 16.5-17 feet, Light Brown/Light Gray Lean Clay with Sand (CL)	4.5+						
	U10			4.5+	17.8		59	25	34	96
20	U11		compare to Protestant's Boring MP-1: 20-21 feet, Light Brown/ Lean Clay with Sand (CL)	4.5+						
	U12		- w/silt partings	4.5+						
25	U13		compare to Protestant's Boring MP-1: 25-26 feet, Light Brown/ Lean Clay (CL)	4.5+						
	U14									
	U15									
30	U16		compare to Protestant's Boring MP-1A: 43-44 feet, Light Brown Lean Clay with Sand (CL)							
	U17									
35	U18		compare to Protestant's Boring MP-1: 44-45 feet, Light Brown Silt with Sand (ML)							
	U19									
	U20									
40	U21		compare to Protestant's Boring MP-1A: 45-45.5 feet, Light Gray Sandstone	4.5+						
	U22			4.5+	23.7		57	26	31	98
45	U23		compare to Protestant's Boring MP-1A: 45.5-46 feet, Grayish-Brown Lean Clay (CL)	4.5+						
	U24		476.12	4.5+						
	U25		CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH)	4.5+	22.7		57	24	33	95
50										

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED PROFESSIONAL ENGINEER

June 26, 2016
sealed only for my additions in red.

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

Remarks: Borehole grouted upon completion. Groundwater was not observed during the drilling of the boring and no water was introduced during drilling.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-32
PAGE 1 OF 2

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. BME-32

Biggs and Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, TX 76063
Phone: 817-563-1144
Fax: 817-563-1224

Project Description: **130 Environmental Park**
Lockhart, Texas

Location: **E 2394199.984 N 13901299.985**

Surface El.: **526.12 ft. msl**
Completion Depth: **67.0 ft.**
Date Boring Started: **8/28/13**
Date Boring Completed: **8/29/13**

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			CLAY, SILTY, dark gray, hard, w/small shell fragments, moist, (CH) *(continued)*							
55	U26			4.5+						
60	U27			4.5+						
65	U28			4.5+	21.4		68	27	41	99
			459.12							
70										
75										
80										
85										
90										
95										
100										

Drilling Contractor: **H/ET**
Drilling Method: **Wet Rotary**
Sampling Method: **Thin Wall Tube**
Geologist/Engineer: **S. Stamoulis**
Project No.: **129.06.102**

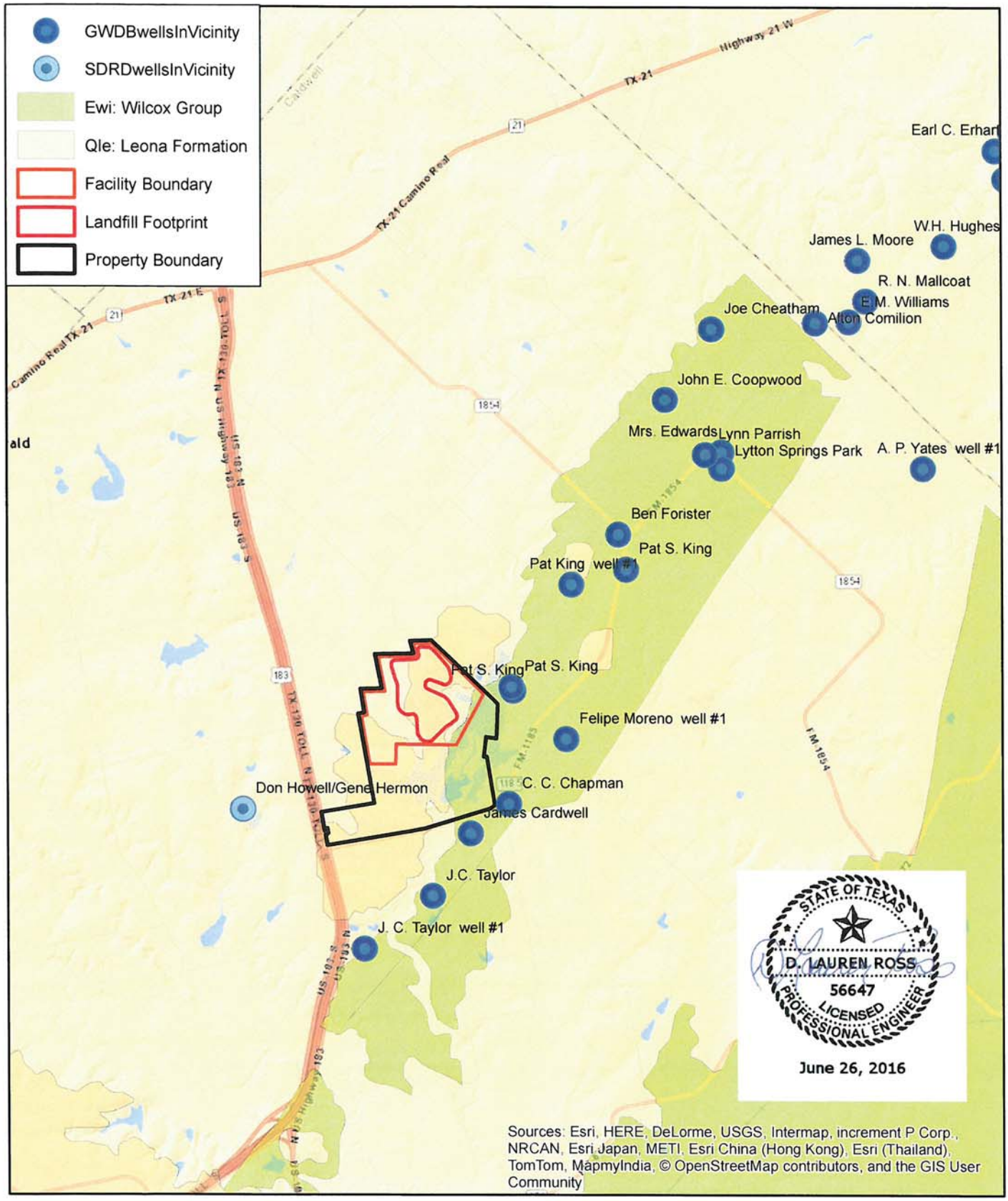
Remarks: Borehole grouted upon completion. Groundwater was not observed during the drilling of the boring and no water was introduced during drilling.

BME LOG FORMATED FOR 130 EP 130 ENVIRONMENTAL PARK.GPJ B&M DATA TEMPLATE.GDT 1/10/14

LOG OF BORING NO. BME-32
PAGE 2 OF 2

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

Protestants' Exhibit 5-T: Wells in the Vicinity of the Proposed 130 Environmental Park Landfill



GLENROSE ENGINEERING

N W E S

Well data obtained from GIS files maintained by the Texas Water Development Board.

0 0.5 1 2 Miles

Wells in the Vicnity of
The Proposed 130 Environmental Park Landfill

Texas Board of Professional Engineers License F4092

December 15, 2015

Protestants' Exhibit 5-U:

Table of Borings in Close Proximity with Weathered/ Unweathered Contact Elevation Differences

Location 1				
Boring	BME-4	BME-4B	IV-1A	Maximum Difference (ft)
Contact Elevation (ft msl)	514.89	527.99	532.00	17.11

Location 2				
Boring	BME-7	BME-7A	IV-2A	Maximum Difference (ft)
Contact Elevation (ft msl)	524.95	531.86	529.00	6.91

Location 3			
Boring	BME-43	MP-3	Maximum Difference (ft)
Contact Elevation (ft msl)	504.62	494.50	10.12

Location 4			
Boring	BME-14	BME-14A	Maximum Difference (ft)
Contact Elevation (ft msl)	504.59	509.02	4.43

Location 5			
Boring	BME-27	IV-3	Maximum Difference (ft)
Contact Elevation (ft msl)	501.95	507.00	5.05

Location 6			
Boring	BME-26	MP-2	Maximum Difference (ft)
Contact Elevation (ft msl)	489.72	482.50	7.22

June 26, 2016

Glenrose Engineering, Inc.
TBPE # F4092
4U_WeatheredUnweatheredContactDifferences.xlsx
Sheet1 6/23/2016 2:45 PM

SOAH DOCKET NO. 582-15-2082

TCEQ DOCKET NO. 2015-0069-MSW

APPLICATION OF 130 ENVIRONMENTAL PARK, LLC FOR PROPOSED PERMIT NO. 2383) STATE OFFICE OF ADMINISTRATIVE HEARINGS

ORAL VIDEOTAPED DEPOSITION OF

STEFAN STAMOULIS

VOLUME 2

April 18, 2016

ORAL VIDEOTAPED DEPOSITION of STEFAN STAMOULIS, produced as a witness at the instance of the Protestants and duly sworn, was taken in the above-styled and numbered cause on April 18, 2016, from 9:17 a.m. to 12:42 p.m., before Steven Stogel, Certified Shorthand Reporter in and for the State of Texas, reported by computerized stenotype machine at the offices of Frederick, Perales, Allmon & Rockwell, P.C., 707 Rio Grande, Suite 200, Austin, Texas 78701, pursuant to the Texas Rules of Civil Procedure and the provisions stated on the record or attached hereto.

APPEARANCES

FOR 130 ENVIRONMENTAL PARK, LLC:

Mr. Brent W. Ryan
McELROY, SULLIVAN, MILLER, WEBER & OLMSTEAD, LLP
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Austin, Texas 78746
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email: bryan@msmtx.com

FOR THE WITNESS:
Mr. John A. Buckley, Jr.
GREER, HERZ & ADAMS, L.L.P.
One Moody Plaza, 18th Floor
Galveston, Texas 77550
Telephone: 409-797-3230 - Fax: 866-409-7178
email: jbuckley@greerherz.com

FOR TJFA, LP, AND ENVIRONMENTAL PROTECTION IN THE INTEREST OF CALDWELL COUNTY:
Ms. Marisa Perales
FREDERICK, PERALES, ALLMON & ROCKWELL, P.C.
707 Rio Grande, Suite 200
Austin, Texas 78701
Telephone: 512-469-6000 - Fax: 512-482-9346
email: marisa@lf-lawfirm.com

FOR THE OFFICE OF PUBLIC INTEREST COUNSEL OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY:
Mr. Aaron Tucker
12100 Park 35 Circle, Building F
Austin, Texas 78753
Telephone: 512-239-6823 - Fax: 512-239-3300
email: aaron.tucker@tceq.texas.gov

ALSO PRESENT:
Ms. Lauren Ross
Mr. Mike Rubinov
Mr. David Green
Mr. Mike Snyder
Mr. Dennis Hobbs
Mr. Ted Marchet - Videographer

TABLE OF CONTENTS

STAMOULIS DEPOSITION EXHIBITS

(Exhibit No. 9 marked)

THE VIDEOGRAPHER: It is April 16th, 2016, at 9:17 a.m., and we are on the record.

MS. ROSS: No, it's not April 16th.

THE VIDEOGRAPHER: It's not.

THE WITNESS: It's the 18th.

THE VIDEOGRAPHER: April 18th, 2016, at 9:17 a.m., and we are on the record.

THE REPORTER: Sir, I'll remind you you are still under oath.

THE WITNESS: Thank you very much.

MS. PERALES: So before we get started, Brent, did you want to tell me about the --

MR. RYAN: Oh.

MS. PERALES: -- documents you've produced?

MR. RYAN: Yeah. In addition to the documents that Mr. Stamoulis brought with him, I provided you with a flash drive that has revised well registration forms and revised state well reports for piezometers at the site, and it also has recent survey data for five locations on the site. And those are -- the locations are labeled and identified in relation to wells or piezometers.

MS. PERALES: And are these documents --

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are they being produced as part of -- in response to Mr. Stamoulis' document request, or are they supplemental to something else?

MR. RYAN: I would say that they're probably -- well, some of them are being -- the revised state well reports are responsive to his.

MS. PERALES: Uh-huh.

MR. RYAN: And we'll also provide those to you with a formal supplementation.

MS. PERALES: Okay. And so it will -- if there are any documents that are not part of Mr. Stamoulis' document production, those will be noted and labeled as --

MR. RYAN: Well, we'll Bates label everything that's on there.

MS. PERALES: Uh-huh.

MR. RYAN: Okay?

MS. PERALES: Okay. But you'll tie it -- like let's say the survey data. You'll tie that to the appropriate witness?

MR. RYAN: I think what you'll see there is there's an email from Jon Hodde, our surveyor.

MS. PERALES: Okay.

MR. RYAN: And the survey data is attached to that email.

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MS. PERALES: And it will say it's to Mike Snyder or Bill --

MR. RYAN: Yeah?

MS. PERALES: -- Adams?

MR. RYAN: Yeah.

MS. PERALES: Okay.

MR. RYAN: It says it was -- I think it was to Bill Hodges and Mike Snyder --

MS. PERALES: Okay.

MR. RYAN: -- from Jon Hodde.

MS. PERALES: Okay. Great.

STEFAN STAMOULIS,

having been previously sworn, continued to testify as follows:

FURTHER EXAMINATION

BY MS. PERALES:

Q So, after all of that --

A Yeah.

Q So I think you know the ground rules for the deposition. I'll ask a question, and if you will wait for me to finish the question --

A Then I can answer?

Q -- before you answer --

A Yeah.

Q And I'll try to wait for you to finish your

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answer before I ask the next question. That way, we'll have a clean record.

A Sure.

Q Any time you need a break, let me know, and we'll --

A Appreciate it.

Q -- take a break.

A Yeah. Thanks.

Q If you don't understand my question, let me know, and I'll try to rephrase it in a way that makes sense.

And let's see. Audible responses, so no nodding or shaking your head. Right. Exactly. And that's about it.

A Okay.

Q So we'll start with this document --

A Yes, ma'am.

Q -- which has been labeled Stamoulis Exhibit 9. Do you recognize that document?

A I do.

Q And can you describe it?

A Yeah. It was a document sent to me by Brent Ryan saying that you were requesting me to show up here today.

Q And attached to this document on Page 4 is an

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Exhibit A. Do you see that?

A I do. Yes, ma'am.

Q And this is a list of documents that we've requested that you bring with you today.

A Uh-huh.

Q Did you bring the documents that are responsive to this request?

A I did.

Q So I've looked through what you've provided, and I've got a copy of the notice. I've got some invoices --

A Uh-huh.

Q -- with the header that says, "Hydrogeologic/Environmental Testing."

Is that your company?

A It is.

Q Okay. I've got some emails with Mike Snyder that has a dig test ticket --

A Uh-huh.

Q -- 8/11?

A Right.

Q Let's see. A site plan with some proposed boring locations, and -- and boring numbers?

A Yeah.

Q And then it looks like a series of emails from

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Brent Ryan. Is that everything that you've produced here today?

A Yeah. And those don't have the -- the PDF files attached.

Q Okay.

A It was just the -- you know, the transmittal letter or the whatchamacallit.

Q Okay.

A You know. Because y'all had those, and some of them wouldn't open and -- so anyway.

Q So does that cover all of the communications between you and Brent Ryan, Ernest Kaufmann, David Green, Mack Reynolds, Alfonso Sifuentes, Jim Blackburn, Larry Dunbar, Mike Snyder, anyone affiliated with Biggs & Mathews?

A Yes.

Q So I should have everything that's responsive to No. 4?

A Yes.

Q Okay. Do I have all of the documents containing or referencing any communication about the field investigation work contemplated or performed in 2016?

A Yes.

Q Do I have all your notes, records, logs,

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photographs, and any other record of work performed by you regarding field investigation work in 2016?

A Yes. They weren't in that stack. They were given to Snyder, and they should have given them to you.

Q Okay. So didn't bring them with you today?

A I don't have them.

Q Okay. Because you gave them -- you handed them off?

A Right.

Q And you didn't maintain a copy?

A Correct.

Q Okay. And it looks like I have your invoices?

A Uh-huh.

Q And do I have any -- do I have all agreements between you and Biggs & Mathews, 130 Environmental Park, or Green Group Holdings?

A There weren't any, so, yeah.

Q Okay. Okay. Great. Thank you.

A Yes, ma'am. Is this the official one?

Q That's the official one.

THE WITNESS: That's yours.

Q (BY MS. PERALES) So we're here today to take your deposition about fieldwork that was done in 2016 on the proposed 130 Environmental Park site.

A Uh-huh.

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Q Is that your understanding?

A Yes, ma'am.

Q Okay. So when were you first informed that additional borings were being contemplated for the proposed sites?

A Sometime right before we went out there to drill.

Q And when did you go out there to drill?

A Sometime in January.

Q Could it have been January 11th?

A Could have been.

Q Could it have been January 8th?

A Don't know.

Q Do you remember what day of the week it was?

A No, I don't.

Q Do you recall how many days in advance of the drilling that you were notified?

A I just remember them saying, "Let's get a rig and get out there as soon as we can," so I don't know how many days, but --

Q So what were the details that were provided to you about going out there with a rig?

A It was up in the air, but I was sent that email saying, "Hey, there -- these are probably the borings we're going to do. We don't know."

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Q Who -- who was it that contacted you about additional borings?

A Mike Snyder.

Q Were you told anything else besides, "Here's a list of some additional borings"?

A No.

Q So what was the -- what was your understanding of your scope of work for January 2016?

A That we go out there and drill some additional borings.

Q Was it your understanding that you would also drill any piezometers?

A No.

Q So after you got this message that you were going to be going out and drilling more borings as soon as possible, what was your next step?

A I called to see, you know, when I could get a rig available.

Q Who did you call?

A I called -- at the time, it was my manager, Steven Fairley, at a little geotechnical drilling company to see if we had a rig available.

Q And so were you able to obtain a rig?

A They had to change some schedules around, but he was able to provide a rig.

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Q And did you use only one rig?
A In January?
Q Yes.
A In January, yes.
Q Because the first time you did -- or maybe I guess -- the time you did the more comprehensive boring work, there were two rigs on site. Is that right?
A Actually there were more, but, yeah.
Q Oh, okay. How many were there?
A Three.
Q Okay. So -- so why were there -- why did you arrange for only one rig this time? Was that all that was available?
A They just said, "Get a rig," so I didn't think we needed more than one.
Q So after you got the rig, then, what was next?
A I don't know. I mean --
Q Did you have to scope out any boring locations?
A You know, they sent that email, and I met the -- I met the surveyor out there, and we staked locations. I didn't call the surveyor. They did. They just said, "The guy will be out there on such and such date," so --
Q Do you recall whether you met the surveyor on the site the same day that you started drilling borings?

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A I don't understand the question.
Q In other words, did you spend one day with the surveyor staking out locations and then the next day go out there or a couple of days later go out there with the rig, or was it all in one day?
A No, no. I think it was separate days. I think we were out there -- I seem to recall we met the surveyors -- no, we did. We staked the locations before we drilled. We weren't doing it simultaneously.
Q Do you remember how many locations?
A I do not.
Q So on the day that you staked locations, you were out there with the surveyor. Was anybody else with you?
A I think Mack was there, and I think there was -- I don't know if it was the first day, but I think a dozer dude came out.
Q A dozer dude?
A Yeah. Some dude on a dozer.
Q Did you arrange for that?
A No.
Q Okay. Who arranged for that?
A I guess Mack or -- I guess Mack. I don't know.
Q And why was there a dozer coming out onto the site?

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A Do you remember those nice roads we had? That dozer did those for us.
Q Okay.
A So they made roads to the locations.
Q Okay. So on that first day that you were staking out locations, the surveyor was there, Mack was there, and perhaps a dozer dude?
A Dozer dude may have come in the next day. I don't know if he was there the first day.
Q Okay.
A Yeah, something like that.
Q Okay.
A Yeah.
Q I'm really just trying to get a chronology.
A No, no. I understand, but it's -- yeah. Yeah.
Q So -- so after this surveying, then the next day maybe that's when the dozer dude came out. So was the next day a day for dozing those roads? Or what happened next? You tell me. You surveyed the locations, and then what?
A I guess Mack coordinated with him to figure out how to get from, you know, the easiest path from location to location, so -- I didn't have anything to do with the dozing part of the deal.
Q Okay. So the roads were already there when you

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showed up on site with the rigs?
A I had seen him doze some, but I think they were -- I know the dozer guy was still there when we were drilling because they had to pull us to one location, so maybe he came in a couple of days afterwards. Because he was still there, because he -- I think he fixed a road for us, if I remember, while we were on site because the site conditions were a little wet, so we had him assist the rig.
Q So after you staked out the locations, the next day did you show up with the rig as far as you recall?
A I can't remember how many days in between.
Q Okay. Well, do you recall doing anything yourself between the staking out of locations and then drilling borings?
A No.
Q Okay. So you show up with the rig, and what kind of drilling method are you using?
A We were using a wet rotary rig, and we were sampling with split spoons -- I think we used a couple of split spoons, but maybe Shelby -- mainly Shelby tubes.
Q So mainly Shelby tubes. Is that right?
A Mainly, yes, ma'am.
Q Do you recall who was on site with you the

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first day that you started drilling?
A As far as?
Q Everyone who was on site with you.
A The first day?
Q Yes.
A I believe I was there. I believe the drill crew were there. I believe Mr. Ryan was there, Mack. And I think at the afternoon day, Lauren and Dennis Hobbs and Mike -- I don't remember if you were there, but maybe you were. I don't know.
Q Was that Mike Rubinov or Mike Snyder?
A Mike Rubinov. Sorry.
Q Was Mike Snyder there?
A The first day?
Q Yes.
A I don't recall.
Q What about Gregg Adams?
A I don't recall.
Q Okay. Did you take any field notes during that --
A Just boring logs.
Q And as I recall, you don't typically take field notes when you're out on a site. Is that right?
A No, ma'am.
Q So could you tell me the name of the drilling

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company you used?
A Jet-Core Drilling.
Q So you know -- well, let's see.
Did you record your observations on field logs of all of the samples that came up?
A I did.
Q And did you take photos while you were out there on site?
A While I was drilling?
Q Yes.
A No.
Q So you had no photos of any of the samples that you pulled up?
A Can you read that back? I think I just said "no."
Q Just making sure.
A No. I know. It's no. Yeah, no.
Q Okay. And you didn't take samples the time before either. Is that right -- I mean you didn't take photos the time before?
A I did not.
Q And is that standard? You just don't take photos while you're out supervising a drilling operation?
A It's not part of the thing. I don't take

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photos.
Q It's not part of the --
A Yeah. It's not -- it's not part of what I do.
Q Okay. Do you remember how many days you were out there drilling the borings in January 2016?
A I do not.
Q Could it have been two weeks?
A I don't think so.
Q Could it have been one week?
A I think it was a week.
Q Okay. Do you recall how many borings were drilled?
A I want to say 11, but I can't remember.
Q Do you recall whether all of the borings that had been -- all of the boring locations that had been staked out, were all of those drilled?
A No.
Q So there were some that were not drilled. Is that right?
A Correct.
Q Were you part of the decision-making process as to which ones would be drilled and which would not?
A No.
Q So you were just given your instructions on where to start?

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A Yeah.
Q Where to move on to next?
A Pretty much.
Q And when to stop?
A Pretty much.
Q Okay. Were you curious at all as to why you were being asked to go back onto the same site and drill more borings?
A Was I curious?
Q Sure.
A No.
Q So you didn't ask any questions about it?
A It wouldn't have done any good, but, no.
Q Why wouldn't it have done any good?
A I didn't think we needed them.
Q You didn't think we needed more borings?
A I didn't, yes, ma'am.
Q So you had reached a conclusion that the borings you had drilled earlier were sufficient?
A I thought so.
Q Based on what?
A Based on I drilled them and I knew what was there, and I was fine with them.
Q And why did you -- why is it that you didn't think that any more would be necessary?

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A It was just a personal -- it was a personal deal. I just didn't think we needed any.

MS. PERALES: Can I get that one marked?

(Exhibit No. 10 marked)

MS. PERALES: Can you hand one to Dennis, too?

Q (BY MS. PERALES) So I have handed you a document --

A Yes, ma'am.

Q -- labeled Exhibit 10.

A Yes, ma'am.

Q Can you tell me whether you recognize that document?

A I -- I don't recognize this document. I mean, I recognize what it is, but I don't recognize -- I don't think I saw this document.

Q Okay. What is it?

A It is a proposed boring location of the borings out at the site.

Q So this is not the document that was given to you to describe the boring locations?

A I don't think so. I thought mine was different, but --

Q Can you -- can you tell from looking at this if this includes the borings -- the borings that were

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drilled by you in January 2016?

A If it includes them?

Q Yeah. Does this include the locations of the borings that you drilled in January 2016?

A We drilled some of them on this -- this drawing right here.

Q Okay. Well, which ones did you drill?

A I think -- I think we drilled four, seven, 14, 37, 38, 39, 40, 41, and 43, I think.

Q So the BME-7A, what does the A represent?

A I don't know.

Q In other words, why isn't it just BME-7?

A I don't know.

Q Could it be because it is next to an existing boring?

A I don't know. Because down here in the legend it says BME-4A, and there's no BME-4A there, so I don't know -- I didn't come up with the designation. I'm sorry.

Q Okay.

A I don't know.

(Exhibit No. 11 marked)

Q (BY MS. PERALES) So I've handed you a document labeled Exhibit 11.

A Uh-huh.

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Q Do you recognize this document?

A This looks like the one I was given for the field.

Q For the field --

A Yeah. I think this was the one I was -- that was sent to me.

Q Okay.

A I think I -- this is the one I had out in the field I think when we were looking at locations and when we were drilling.

Q Okay. So would this be more helpful in helping you recall which ones you drilled?

A Yeah.

Q Okay. Can you list those again?

A Yeah. BME-4A, 7A, 14A, 37, 38, 39, 40, 41, 42, and 43 I think were the ones we drilled.

Q So the -- the ones that you just listed, those are indicated with a -- a circle that isn't filled in?

A Correct, yes, ma'am.

Q And there are some other circles that are not filled in but that you didn't list. Is that right?

A Correct.

Q Because you didn't drill those. Is that right?

A Correct.

Q Okay. But they were proposed at some time?

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A They were proposed.

Q And you have no idea about why you weren't asked to drill those. Is that right?

A Yeah. Correct.

Q So you mentioned that you used wet rotary rig --

A Methods.

Q Uh-huh. Did you have to introduce fluids into some of the borings?

A We did.

Q Do you recall which ones?

A It should be noted on the logs, but I don't -- I don't know if we did any dry all the way to TD.

Q Okay. And TD is?

A Total depth.

Q Did you notice anything different when you did these latest borings as compared to the first -- or the second round of borings you did back in -- I guess it was 2013?

A No.

Q So everything seemed pretty consist with your recollection of the borings you had done earlier?

A Pretty much, yeah.

Q So after you -- you mentioned that you used Shelby tubes and split spoons to collect samples?

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A We did. Uh-huh.
Q And after you collected the samples, what did you do?
A We bagged them, described them, labeled them, boxed them.
Q When you say "we," who are you talking about?
A I'm sorry. Me mainly. I had -- I think one of my employees was out there with me towards the end of the thing, but -- so me.
Q Okay. And who is your employee?
A John. John Valere.
Q Is John a geologist?
A No.
Q So you observed them. You described them on field logs?
A Correct.
Q You bagged them and stored them and then --
A Boxed them.
Q Boxed them up?
A Uh-huh.
Q And then what was done with them?
A They were picked up -- they were either -- I think at one time they were transported with someone that was on site. I think it was Gregg Adams, and then one time they -- they sent someone down to pick them up.

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Q Do you have a chain of custody?
A You know, I don't -- I don't -- I thought we signed something, but maybe not.
Q If there had been a chain of custody, is that something that you would have maintained a copy of?
A Yeah, maybe. I don't know.
Q So the beginning of this deposition, Mr. Ryan described for me some documents that have been produced in electronic form that were described as revised well registration forms and revised state well reports for piezometers. Were those revisions done by you?
A State again what you just --
Q Sure. Revised well registration forms and revised state well reports for piezometers.
A I did the state well reports for the piezometers.
Q So you -- you did some revised state well reports for piezometers?
A I did.
Q When were those done?
A (No audible response)
Q A month?
A Yeah. You know, sometime in January, I think.
Q In January?
A Yeah, I think so.

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Q Okay. And why was it that you revised state well reports for piezometers?
A Because when they were inserted, the dates were -- a couple of the dates were wrong, and they used to have a function where you could just take one and just -- like a template and keep going, and the girl made a couple of mistakes on the installation method, so that was corrected.
Q What girl?
A The girl that was working for me, the secretary.
Q Oh, okay.
A Yeah. The lady in the office. I'm sorry. I didn't mean girl. The lady in the office that was working for me.
Q Okay. So you noticed that there were some mistakes with regard to dates and the installation methods on some of the reports?
A Right. Correct.
Q And so what -- how was it that you caught those mistakes?
A It was brought to my attention.
Q By who?
A Mr. Snyder.
Q Okay. In January? Is that right?

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A I think it was in January, uh-huh.
Q And revised well registration forms, that's not you?
A I don't know which ones you're referring to. I only did one set of -- of whatever, because I didn't see what he gave.
Q Okay. Me neither, so --
A Yeah.
Q Okay.
A So I don't know what those are. I --
Q So let's see. Can you describe -- I know you described for me during the first deposition, but I want to make sure I get this right.
A Yes, ma'am.
Q Can you tell me when it is you used Shelby tubes versus split spoon?
A We push Shelby tubes in clays.
Q When do you use split spoon?
A You normally will use a split spoon -- you can do it for a number of reasons. If you don't get recovery or if you want to verify something or in granular soils.
Q Do you recall what conditions made you switch to split spoon during your January 2016 drilling operation?

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A To verify some soil.
Q So what kind of soils were you needing to verify with the split spoon?
A Didn't know. That's why I was trying to verify them.
Q Okay. But you didn't do that for all of the samples collected?
A I didn't.
Q So how did you determine when you were going to need to verify with split spoon?
A I felt the soil, and I felt like I should at least try to grab a sample with a split spoon.
Q And what does a split spoon sample give you that you don't get from the Shelby tube?
A A smaller sample.
Q Okay. And that -- the smaller sample is what you use to verify?
A No. You just asked what it gave you, and that was one of the things it gives you.
Q I'm trying to determine why you would use a split sample to -- what is it that you're verifying with it?
A If there's a possibility that the soil is granular.
Q Okay. Do you recall whether you ever had --

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you ever had your Shel- -- your split spoons -- oops -- your Shelby tubes bent?
A On a number of -- yeah.
Q And what causes bent Shelby tubes?
A It could be a number of reasons. Rocks that fell in the hole or -- I think some of them were bent up because it lifted the rig up. So I think some of them were bent that way.
Q And some were bent because of rocks in the hole?
A Because rocks fell down the hole.
Q Okay. Do you recall whether Mike Snyder was out on the site with you during your January 2016 drilling operation?
A He was.
Q How many times?
A I don't know.
Q Was he there every day?
A No.
Q Was he there more than once?
A Yes. He was alternating.
Q Alternating with --
A Gregg Adams.
Q Okay. So every day either Mike Snyder or Gregg Adams was there?

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A Maybe there were some days neither one of them were there, but I think they were there pretty much of the time.
Q And that's different from the last field investigation or drilling program that you had on the site, isn't it? I mean, weren't there several days when neither Mr. Adams nor Mr. Snyder were out there with you?
A Correct.
MR. RYAN: Objection to the form of the question.
Q (BY MS. PERALES) Go ahead. You can answer.
A Say it again.
Q During the last drilling operation --
A Yeah.
Q -- there were several days when neither Mr. Snyder nor Mr. Adams were out on the site with you. Isn't that right?
A Correct.
Q Okay. So this time, what was it that Mr. Snyder was doing while he was out on site with you?
A Observing.
Q And that was it?
A Yeah. He was observing the operation.
Q Okay. Was he taking photos?

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A Could have been.
Q Was he taking any notes?
A I don't recall.
Q Do you recall whether he was picking up or touching any of the samples?
A I think he did touch some samples, yes, ma'am.
Q Okay. What about --
A I don't think he was picking them up.
Q Okay. What about Mr. Adams? What was his role while he was out on --
A Same thing, observing, looking at the drilling operation, looking at samples.
Q Do you recall whether he took photos?
A I don't recall.
Q Do you recall whether he took any notes?
A I don't recall.
Q Okay. Do you recall whether he was touching the soil samples?
A I think he touched them.
Q But you were still the one that was labeling them and bagging them and putting them in the boxes. Is that right?
A In the field, yes, ma'am.
Q Okay. Do you recall whether you lost circulation in any of the borings?

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A We did lose circulation in one boring.
Q Do you recall which one that was?
A I think it was 44.
Q So can you describe what that means, when you lose circulation?
A Just lost water, and water isn't coming back out of the annulus.
Q Okay. What causes that, typically?
A A change in consolidation of soils.
Q Is it your opinion that that's what caused the lost circulation at Boring 44 at this site?
A I don't know.
Q Okay. So you don't have an opinion about what caused the lost circulation?
A My job was to drill and regain circulation, so -- you know, I don't know.
Q Okay. Is it unusual to lose circulation?
A I think we only did it once on this site, but I don't think it's unusual.
Q Had it happened before on this site?
A No.
Q So after you finished drilling these borings that we identified earlier, you were then also present for the protestants -- and by "protestants," I mean the parties who are protesting this proposed landfill

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site -- their consultants' field investigation work. Is that right?
A Yes, ma'am.
Q And what was your understanding of your role when joining us on the site?
A To observe and to bring doughnuts.
Q Great.
A Yeah.
MR. HOBBS: Sometimes.
MS. PERALES: Sometimes.
Q (BY MS. PERALES) And were you taking notes during your observations of the field investigation work done by the protestants' consultants?
A Yes, ma'am. You have those notes.
Q Were you taking photos?
A You have those photos.
Q And were you taking notes because that was part of your understanding of your scope of work?
A I was asked to take notes and take photos.
Q You were asked by who?
A Mike Snyder.
Q Were you asked to do anything else besides observe, take notes and take photos and bring doughnuts?
A Other than the doughnuts, no.
Q Okay.

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A No.
Q And what were you being asked to observe? Anything specific?
A Just the operation, drilling.
Q Were you providing reports?
A Just notes.
Q Okay. Were you sending them back to Mr. Snyder?
A You know, I think they were shuttling them back and forth as they were rotating out.
Q Who is "they"?
A Snyder and Mr. Adams.
Q So during your observations of the field investigation work that was going on --
A Yes, ma'am.
Q -- by the protestants' consultants, there was -- there were geophysical loggings. Is that right?
A Uh-huh.
Q Is that yes?
A Yes, ma'am. Yes, ma'am.
Q Okay. And have you observed that type of operation before?
A Yes, ma'am.
Q So you're familiar with geophysical probing?
A I wouldn't call it probing, but yes.

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Q Okay. Geophysical --
A Logging.
Q Logging. Okay. And had you worked with -- have you ever worked with GeoCam before?
A No.
Q So when -- how many times would you say you have been part of -- or observed a geophysical logging operation?
A How many times have I observed?
Q Yes.
A At one of my former companies, I used to run the tool.
Q Okay.
A And when I worked offshore, we ran a logging tool that was an MWD tool, so -- we were doing measurement while drilling, so they were logging as we were drilling.
Q Okay. So have you looked at any of the logs that were produced or prepared by GeoCam?
A I have not.
Q Okay. Did you observe any of the logs as they were being done on the site?
A I stuck my head in and looked, but they wouldn't let me look at them. I didn't look at them.
Q Okay. Did you talk to anyone affiliated with

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GeoCam?
A Just briefly.
Q Did you talk to them about the fieldwork?
A No. I just said, "How are things going?"
Q So you don't recall any conversations you might have had about the geophysical logging?
A About the methodology?
Q Anything related to the geophysical logging.
A I don't understand that question.
Q Did you speak to anyone from GeoCam about the geophysical logging work that was going on on site?
A Just the guy on site.
Q Okay. But the guy on site, did you talk to him at all about any of the geophysical logging that was being done?
A About how it was being done?
Q Anything related to the geophysical logging that was being done on the site?
A No, not specifically, but just in, you know, normal conversation.
Q Okay. So did he express to you any concerns or opinions about what he was seeing?
A You know, I asked him how things were going, and he said it looks like clay.
Q Okay. Anything else?

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A Not that I recall.
Q Okay. So you were also present during the trenching operations on the site. Is that right?
A Part of it.
Q Part of it? Okay.
A Yeah. Not all of it.
Q So how many trenches did you observe?
A You know, maybe one. I was doing the geophysical when they were doing the trenching.
Q So was it the last trench that you observed?
A It was the last trench.
Q Did you take any samples from that last trench?
A No.
Q Do you recall whether Mike Snyder or Gregg Adams took any samples?
A I think Gregg Adams took samples of all the trenches.
Q Okay. Do you recall any -- well, do you recall what you observed when you -- when you witnessed that last trench?
A Yeah. I -- I couldn't believe they were letting that guy run the backhoe.
Q About the soils.
A Pardon me?
Q The soils. Do you recall anything about the

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soils that you observed?
A No.
Q So did you look at them?
A You know, I looked in the trench that they were digging, and I think I loaned them a measuring tape, but nothing really specific.
Q Okay. Did you take any notes regarding that trench?
A No. No.
Q Any photos?
A I don't think I took photos of the trench deal. I think Gregg took -- that was his operation. I was just -- we were waiting to finish -- I think finish for the day. That's the reason I went over there.
Q Okay. So the borings that were drilled by the protestants' consultants, do you recall what kind of drilling method was used?
A Yeah. They used a hollow-stem auger.
THE WITNESS: And I'm going to go to the restroom. I'll be right back.
MS. PERALES: Okay. Let's take a five-minute break.
THE VIDEOGRAPHER: It is 10:04 a.m., and we are off the record.
(Recess from 10:04 a.m. to 10:11 a.m.)

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THE VIDEOGRAPHER: It is 10:11 a.m., and we are back on the record.
A Hey, before we go to that question, can I ask you a question? Can you -- can you tell me which boring I said we lost circulation on?
Q (BY MS. PERALES) I can tell you what my notes say, and --
A Yeah. Because I was looking at this during break time, and --
Q I think I had 44.
A I -- it might have been 43, so I don't --
Q Okay.
A I don't know. I may -- because I was looking at this deal, and I think it was -- it might have been 43.
Q Okay.
A Okay.
Q So I think where we had left off was I had asked you what the drilling method that was used by the protesting parties' consultants, and you said hollow-stem auger. Is that right?
A Correct.
Q So how does that differ from the wet rotary that you were using?
A The process advances augers into the ground

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versus having an open annulus.
Q Does the hollow-stem auger, does it require the use of fluids or --
A It does not.
Q Okay. Do you have any criticism of the use of the hollow-stem auger?
A Ask the question in another manner. I mean, did I criticize the hollow-stem auger?
Q I'm asking if you have any criticism for the use of the hollow-stem auger for drilling borings?
A In this formation?
Q Sure.
A Yes.
Q What -- what are your criticisms?
A I didn't think it was the method to use in this formation.
Q Why is that?
A Because I think the Shelby tube and split spoon and wet rotary method was better.
Q I'm trying to understand why it is that -- that this formation is not the -- why it is that you would use the wet rotary versus hollow-stem auger in this formation. What is it about this formation?
A I thought it was better to use the method I used than hollow-stem auger.

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Q Well, what factors would you consider in deciding between those two methods?
A The formation.
Q What about the formation?
A It was clay.
Q So are you saying that the presence of clay is what determines the type of drilling method you should use?
A No, I wouldn't say that.
Q Okay. But hollow-stem auger is not an appropriate drilling method when there's clay in the formation?
A I didn't think it was for this formation.
Q Other than the fact that there's clay, is there any other factor that led you to conclude or opine that hollow-stem auger was not appropriate for this formation?
A I was -- I was asked to dictate -- or not dictate, but to choose the drilling method, and I thought that the method using hollow stem -- I mean wet rotary, Shelby tubes, and split spoons was more appropriate for this location.
Q Okay. I get that. But I think I heard you testify also that you had some criticism of the use of the hollow-stem auger for this formation, and I'm trying

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to determine what is the basis for that criticism other than the presence of clay?
A I believe that you can get more representative samples with thin wall Shelby tubes.
Q And what is it about the presence of clay that makes hollow-stem augers less desirable or inappropriate?
A Depth limitation, you know, generally disturbing the samples more than being able to get an in situ sample.
Q So tell me what you mean by "depth limitation"?
A Well, you can only drill to a maximum depth with hollow-stem augers.
Q Okay. And that maximum depth?
A Well, it probably depends on really the rig, but, you know, most of them have a real hard time, you know, below 80, 100 foot.
Q Okay. So --
A Unless you're on the coast, but --
Q Okay. So if we were planning to go below 80 or 100 foot, then the hollow-stem auger would not be appropriate?
A That and some other things, yeah.
Q Okay. But I'm talking -- if we're focusing on the factor of depth limitation, if we're not going to 80

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or 100 feet, then depth limitation isn't so much of a factor. Is that right?
A And the abundance of clay in this -- in this particular formation -- or at this particular site.
Q Okay. I'm going to try to separate out the factors that I heard you mention.
A Okay.
Q One is the presence of clay or abundance of clay, the depth limitation, the disturbing of samples, and generally Shelby tubes provide more representative samples. Does that sound right?
A I think that's what I said, uh-huh.
Q So if we focus only first on depth limitation, if -- if we are not going below 80 feet, is depth limitation still a factor?
A If we're not going below 80?
Q Yes.
A Is depth limitation a factor? Is that the question?
Q Is depth limitation a factor in determining whether to use a hollow-stem auger?
A I think the reason I determined not to use it was because of the clay in this formation.
Q Okay. So not really depth limitation?
A When we originally did the original program, we

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went to deeper than -- okay?
Q Sure. And I want to be clear that I'm not asking you about your drilling method, because I -- you know, I think I've asked you some questions, and you determined that you decided that wet rotary made sense, but I then asked you if you had any criticism about the drilling method that was used by protestants' consultants, the hollow-stem auger, and I'm trying to focus on that, on your criticism.
A Oh, okay. All right.
Q So the presence of clay is one of the factors that you took into consideration --
A When I decided.
Q -- when you were coming up with your criticism of the use of the hollow-stem auger? It's something you listed. Right?
A Say that again. I'm sorry, Marisa.
Q One of the factors you listed when I asked you whether you had criticism of the use of the hollow-stem auger was the presence of clay in the formation. Is that right? That's one of the reasons that you're critical of the use of the hollow-stem auger?
A One of them.
Q Another reason you were critical of the use of the hollow-stem auger by the protestants' consultants is

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because of the nature of the samples. They provide disturbed samples. Is that right?
A Correct.
Q The depth limitations of the hollow-stem auger, is that another reason that you were critical of the use of a --
A Of theirs?
Q Yes.
A No.
Q Okay. Are there any other reasons that you were critical of the use of the hollow-stem auger by the protestants' consultants on the site?
A Other than disturbing the samples in the clay -- and what was the other one? We didn't say depth.
Q That's all -- we got rid of depth limitation.
A Okay. So they -- so -- yes.
Q Okay. Got it. So what is it about the wet rotary that provides a better or more representative sample than the hollow-stem auger?
A You saw our samples, and you saw theirs.
Q I didn't see your samples, actually.
A Well, you saw pictures of them.
Q Okay. Let's assume I didn't.
A Okay. I'm sorry.

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Q So can you describe for me the difference between the types of samples?
A Yeah. They weren't disturbed.
Q The ones from the wet rotary were not -- or from the Shelby tubes were not disturbed. Is that right?
A Correct.
Q And that provides a more representative sample. Is that what you're saying?
A Yes.
Q Do you have an opinion as to how or why the hollow-stem auger results in more disturbed samples?
A In this case?
Q Yes.
A They didn't have it set upright.
Q "They" meaning --
A The operation -- the protestants.
Q Okay. How was it not set upright?
A They were missing a part in the five-foot continuous sampler.
Q What part were they missing?
A The catcher.
Q What's a catcher?
A It's a piece that -- that keeps granular soils in the sample, but without it you provide a gap between

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the shoe and the tube.
Q Okay. I'm going to need you to describe that a little bit more for me. The shoe, the tube and the catcher, how do they all fit together?
A The -- the five-foot catcher is a little split apparatus that's put together, and then the -- you're supposed to have a catcher in between there, and then you screw on the shoe.
Q In between -- when you say "in between there," in between what? You have the catcher --
A Oh, yeah. There's a gap in between the catcher -- I mean, there's a gap in between the split barrel -- the five-foot continuous split barrel and the shoe.
Q And so the catcher goes between this split barrel and the shoe? It goes in the gap. Is that right?
A Yeah, uh-huh.
Q Okay. And the catcher was missing?
A It was.
Q And -- and that's what, in your mind, resulted in more disturbed samples?
A Disturbed samples.
Q In disturbed samples?
A I think that and the -- for the thing to work

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right, I don't think they had the -- I don't think they had it set correctly, because there was evidence of -- of the sample spinning inside of the barrel.

Q Do you use hollow-stem augers for your drilling operations ever?

A Mainly for installing shallow monitoring wells.

Q Okay. But you don't use it typically for borings?

A Not typically.

Q And does it matter what formation you're in when you determine not to use -- when you determine to use some other drilling method versus hollow-stem auger? In other words, is there a formation where you would say hollow-stem auger is the preferred method for this formation?

A Specifically, no.

Q Okay. Is there -- well, I think we went over the reasons that you wouldn't use it.

Can you describe for me what you mean when you use the term "disturbed samples"?

A Samples that come out not intact, samples that the structure had been, you know, altered.

Q Structure has been altered by what?

A By the way it was, you know, put into the tube.

Q Okay. So you said -- I wrote down that you

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said it was not set correctly. What does that mean?

A I -- I believe that they didn't -- they didn't configure it correctly.

Q Configure what?

A The inside of the tube with the hollow stem.

Q So this is something other than what you described earlier where the catcher was missing?

A I think they had more -- multiple -- multiple reasons things were disturbed, yes.

Q Okay. Well, let's go over those reasons. So the catcher was missing?

A Uh-huh.

Q The inside of the tube was not set correctly with the hollow stem?

A Uh-huh.

Q What else?

A They were dropping samples. They were dropping the five-foot continuous sampler, and they were beating on it with a hammer.

Q So dropping the sampler. How many times did that occur?

A Often.

Q How often?

A Often.

Q At every boring?

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A I didn't count them.

Q What about beating on it with a hammer? How often did that occur?

A Often.

Q At every boring?

A Pretty much.

Q What other reasons, if any?

A That --

Q That's it?

A Pretty much.

Q Okay.

A That I can remember, yeah.

Q So is it your opinion that a disturbed sample is not appropriate?

A Rephrase the question.

Q What's wrong with a disturbed sample?

A I think you limit yourself.

Q How so?

A I think you limit yourself in describing what you see, and I think you limit yourself on the testing that you can perform on the sample.

Q And is that what you observed while you were out on the site and you saw these disturbed samples, a limit in how you -- did it limit how you could describe them?

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A I didn't describe your sample.

Q If you had to, would you be limited in how you could describe them?

A Yes.

Q And how does it impact or how does it limit the -- the lab testing that you can do?

A There's some tests that you have to have samples that are intact to be able to run tests on.

Q Like which ones?

A Probably permeability and strength tests, probably unconfined compression tests.

Q So do you -- do you know whether -- when Biggs & Mathews sends a sample to the lab, are they making sure that they're sending only undisturbed samples?

A Rephrase the question.

Q Do you know whether Biggs & Mathews, when they send samples to the lab, are they sending only undisturbed samples?

A I preserve samples and send them to them. I don't make the lab test. So to answer your question, I don't know.

Q Okay. But it would be your opinion or your suggestion that undisturbed samples are what should be sent to the lab. Is that right?

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A I think if I would have sent -- yes, I think. Yeah.

Q So did we cover all of your criticisms regarding the use of the hollow-stem auger in this -- at this particular site?

A I think so.

Q Okay. Is the hollow-stem auger, do you know whether that's an approved method for drilling borings?

A I think there's an ASTM standard, yes.

Q Okay. Did you have any other criticisms that we have not covered regarding the drilling and sampling operation by the protestants' consultants?

A I think they were all in my notes.

Q Okay.

MS. PERALES: Is this 12?

THE REPORTER: Yep.

THE WITNESS: Are we done with these?

MS. PERALES: Well --

THE WITNESS: No? Okay.

MS. PERALES: -- we're not done, but --

THE WITNESS: Okay. I'll leave them there.

(Exhibit No. 12 marked)

MS. PERALES: Oops. I wrote on that for you.

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MR. RYAN: Oh. Thank you.

THE WITNESS: Thank you.

Q (BY MS. PERALES) So I've handed you a stack of papers --

A Uh-huh.

Q -- with the label Exhibit 12.

A Uh-huh.

Q Can you flip through those and see if you recognize them?

A That looks like my chicken scratch.

Q And can you go through all of those pages to make sure they're all your chicken scratch?

A The email transmission deals are not.

Q Okay.

A Okay.

Q Are they all your chicken scratch?

A I don't know if all of them are there, but it looks like all my chicken scratch except for the fax transmittal deal.

Q Okay. Great. So if we turn to page -- at the very bottom, you'll see a bunch of numbers.

A Yes, ma'am.

Q And I'm going to just skip the 130EP and refer to the last few numbers.

A Uh-huh.

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Q Can you turn to 77880?

A 880?

Q Yes.

A 880.

Q And so on that page, you have Day 6?

A Day 6.

Q "Crew continues to used five-foot sampler" --

A Yeah.

Q -- "and continues to obtain disturbed samples." Is that right?

A Uh-huh. Correct.

Q And is that a reference to what you described to us earlier? Is that -- when you have "continues to used five-foot sampler" --

A Yeah. It should have said "use," but yeah.

Q -- "and continues to obtain disturbed samples," the disturbed samples were a function of the criticisms you described earlier. Is that right?

A Correct.

Q Down a little bit further down on that page it says, "When Mikey obtained a TD."

A Uh-huh, total depth.

Q And Mikey is?

A Mike Rubinov.

Q Okay. I just didn't know that he was referred to as Mikey.

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Then on Page 882 --

A 882.

Q 77882. Sorry.

A Yeah, yeah. No, just say the 88s. That's fine. Yes, ma'am.

Q So about midway down, you have a note here that says, "Auger cuttings display less disruption than samples in five-foot sampler."

A Uh-huh.

Q Do you see that?

A Yeah.

Q So what does that mean?

A It meant that they took an auger sample, and they disrupted the sample less than what they were getting with the five-foot continuous sampler.

Q Okay. And that's based on your observation?

A It was.

Q Then below that you have, "Crew continues to allow samples to stay in direct sunlight for prolonged periods of time."

A Correct.

Q Is that another -- is that a criticism of the operation?

A Yeah, pretty much. I bag my samples and get

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them out of the sunlight so they don't sweat inside of the thing, yeah.

Q So the reason that you noted this -- and this being that the crew allowed the sample to stay in the direct sunlight -- is because that impacts the moisture of the sample. Is that right?

A Correct.

Q Okay. So that's why you would not leave it out in the sun?

A Correct.

Q Is there any other consequence, in your opinion, of leaving the samples out in the sun?

A Not that I can think of.

Q So on Page 77886 --

A Yes, ma'am.

Q -- towards the bottom, the second bullet point from the bottom, it looks like it says, "Unable to understand why pocket pens readings are being taken on disturbed sample and at obtuse angles."

A Uh-huh.

Q Can you describe what you mean by that?

A Well, to be able to take a pocket penetrometer, you're looking at compressive strength, so I've never seen it done at angles other than perpendicular to the sample.

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Q And were you observing something other than perpendicular?

A Yeah. Obtuse angles.

Q How often?

A Often.

Q Okay. And so you have not seen it done that way. Do you know whether -- or what consequence there is to using the pen?

A Yeah. I don't think there's validity to it.

Q Okay. Do you -- did you use a pocket penetrometer? Is that how you say that, pocket penetrometer?

A Pocket penetrometer.

Q Penetrometer. Did you use one during your fieldwork?

A Yes.

Q Okay. And is there any -- do you recall whether you noted that in your field logs?

A That I used a pocket penetrometer?

Q Yes.

A I think the readings are on the field logs, yes, ma'am.

Q Okay. So do you know whether there's a standard -- maybe an ASTM standard for using pocket penetrometers in the field?

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A I'm sure there is. I don't know.

Q Okay. So you're just not familiar with it if it exists?

A I'm not familiar with it if it exists.

Q Did you observe the samples sweating in the bag?

A Yes.

Q So you observed moisture in the bag?

A Yes.

Q And were you regularly checking for that?

A I noted it, and I think I took some pictures.

Q Some pictures of the sweating in the bag?

A Uh-huh. Yes.

Q So other than the criticisms that we've gone over, do you recall any other criticisms you have of the drilling and sampling operation by the protestants' consultants?

A They're in the notes.

Q Do you want to flip through the notes to see if you can come up with any others?

A (No audible response)

Q What about on Page 77892.

A 77892?

Q Yes.

A What does it say?

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Q Do you have it -- are there notes in here indicating that you have some criticisms of MP1?

A Where -- where are you talking about?

Q On Page 77892?

A 77892. What does it say?

Q Well, let's see. "Set up to pull and overdrill MP-1."

A Yeah.

Q "Pulled well from bore hole. Filter sand" --

A Uh-huh.

Q -- "stuck in slots."

A Uh-huh.

Q "Example of lack of development."

A Uh-huh.

Q So what does that mean?

A They never developed their well.

Q Okay. So when you say they never developed their well, what's your understanding of what was expected to be done versus what was done?

A What?

Q Well, what does that mean, never developed a well?

A They didn't develop the well.

Q What was it that they didn't do? There was a well there, wasn't there?

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A There was a well there.
Q Okay. So what does "develop the well" mean? What was missing?
A They did not develop the well.
Q Okay. Why does the well need to be developed?
A Well, you need to develop a well to be able to get an accurate water level reading and accurate testing.
Q What kind of testing?
A What kind of testing did y'all do?
Q What kind of testing are you talking about when you testify about needing a developed well for testing?
A Well, we develop every well.
Q And my question is: What kind of testing is expected with a developed well?
A Well, in this case, y'all did water levels, and you took -- you did some kind of slug test in that well, so you did aquifer testing.
Q And that's what you needed the developed well for? You needed to develop the well for the slug test and the water level readings?
A Yes.
Q So let's see. Let's look at Page 77897.
A 7789 --
Q 7.

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A -- 7. Yep.
Q So you have a number of notes here.
A Uh-huh.
Q If we start at the bottom, "Allowed samples to be exposed to UV rays for long periods of time."
A Yes.
Q So what is the problem in your opinion with regard to exposing the samples to UV rays?
A I'm sorry. I meant the sun.
Q Okay.
A Yeah, the sun.
Q And then "hand pen on split spoons." Is that a criticism?
A Read further down.
Q Go ahead.
A Go ahead what?
Q Read further down.
A Is that a question?
Q Well, my question is: Is "hand pen on split spoons," is that a criticism?
A Taken on the side of the samples and on non-trimmed samples, yes.
Q Okay. So what is wrong with -- what is it that you're describing here? What is it that is -- that is wrong with what you've described?

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A What's wrong with what I described?
Q Sure.
A Nothing.
Q Why is it that taking hand pens on side of samples and hand pens on non-trimmed samples, why is that inappropriate, or why did you note it as a criticism?
A I thought there was no validity to what they were doing.
Q Okay. Why is it that taking hand pens on the side of a sample makes it invalid?
A Because it's not -- because it's not valid.
Q But you can't tell me why?
A Well, I think this -- I think the test measures compressive strength, and if you do something to the side of something, I don't think you're measuring the compressiveness of it.
Q Okay.
A If that's the right term.
Q Hand pens on non-trimmed samples --
A Yeah.
Q -- why -- why is that invalid?
A Because if you had something that fell in, it's not representative of the -- what you just did. It was like fall-in. So it's not -- it's not -- you know, it's

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not part of that interval.
Q Okay.
A Yeah.
Q So you're concerned that it's not a representative sample?
A Correct.
Q Okay. So what -- can you turn to 77899?
A 77899.
Q So you have a number of notes there again, and I'm going to direct you to No. 3 where it says, "Broke up sample on table."
Do you see --
A Yeah.
Q -- that?
A Uh-huh.
Q So who is it that broke up a sample on the table?
A Mainly Mikey.
Q And how did he do that?
A Took a knife and broke them up further than they were.
Q So he took a knife and banged it?
A No, no. Cut them open.
Q Okay. Cut it open?
A Uh-huh.

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Q And that's -- is that a criticism that you're noting there?
A It is.
Q And why is it that it's inappropriate for him to cut the sample on the table?
A You wouldn't be able to test that sample.
Q So there should have been no cutting of the sample?
A I don't think so.
Q Okay. Do you have any idea why it is that he cut the sample?
A No idea.
Q That's just not something that you would generally do?
A I don't.
Q Sir, can you turn to Page 77902?
A 77902.
Q Second bullet point down, "Crew continues to swab up and down hole."
A Oh, yeah. I forgot about that one.
Q So what does that mean?
A That means when he got down to the bottom of that interval that he just drilled, in order to get his cuttings, I guess, out of the hole, he went up and down with the augers.

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Q Uh-huh.
A Which pulls the sampler up and down and just keeps shoving it back into the ground -- or the open hole. But, you know, things can fall in, so I didn't understand why he was swabbing it up and down.
Q Okay. So the concern there is that it -- it can cause soils to fall in and, therefore, maybe not collect a representative sample?
A That and disturbing the sample.
Q Okay. So when you are describing the samples in your field logs and you're not cutting them -- so the descriptions, how are those reflective of the -- of the inner part of the core?
A They're not.
Q Okay. So you're just not describing it, the inner part of the core. Is that right?
A That's done in the lab.
Q Okay. So if -- would it be appropriate to look for secondary features out in the field?
A I keep the sample intact, preserve it, and send it to the office, and they open them up in the lab and look for stuff.
Q Okay. So you're not looking for secondary features?
A I'm describing what I see without disturbing the sample any further.

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Q Okay. And when you say you're describing what you see, that means the outer part of the sample. Right?
A Or the part I cut off.
Q Okay. So earlier when we talked about developing the well, I'm still -- I still don't have a clear understanding of what that means. What do you mean when you say developing the well? What is it that was missing?
A Ask your consultants.
Q I'm asking you.
A I don't think they developed the well, so it wasn't representative.
Q And I'm asking you what you mean when you use the term "develop" -- "develop the well."
A Clean the well out and make sure it's working.
Q Okay. And so how is it that what you just described impacts the accuracy of the water level readings?
A How do you know it's valid?
Q How do you know what's valid?
A The water level.
Q So you're saying that what you described as developing the well is necessary to determine whether the water level readings are valid?
A Correct.
Q So tie that up for me. Describe that for me. What is it about not developing the well that could invalidate the water level readings?
A There could be formation -- I mean filter sand stuck in the -- in the slots, which there were.
Q Okay.
A So the water level in that -- in those type situations isn't valid until you clean the well, until you flush it out and make sure that clean water is working and that your screen and your slots are working.
Q Okay. So while -- during the protesting parties' consultants' field investigation, they also went back and looked at water levels in all of the piezometers. Is that right?
A Correct.
Q And as I recall, you insisted on the use of gloves during those water level measurement readings. Is that right?
A Correct.
Q And none of these wells are water quality wells. Isn't that right?
A Define water quality.
Q Well, are these piezometers designed to measure

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water levels or water quality or both?
A I put mine in to monitor well standards, and we take water level readings with gloves on, so that's why I insisted on it.
Q Okay. So the only data that I've seen from you or Biggs & Mathews from these piezometers is water level data. Isn't that right?
A Correct.
Q So not water quality data. Right?
A Correct.
Q Okay. I just want to make sure I understand that these are not water quality wells. Right?
A I guess.
Q Do you use WD-40 on the wells?
A Do we use WD-40 on the wells?
Q On the structures of the wells?
A I think they put some on the hinges, yes.
Q Did you put some on the hinges?
A I don't know if I did, but my guys may have.
Q Okay. Do you recall whether they used gloves when they did that?
A I recall that they used gloves when they take water level readings.
Q Uh-huh. And I'm asking about the WD-40.
A I don't -- I don't know.

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Q So after the protesting parties' consultants finished their field investigation work, did you then -- were you then instructed to drill additional borings?
A I was asked to go back and drill one boring.
Q Just one?
A Just one.
Q Do you know which one that was?
A No. 4. BME-4, and I think we named it BME-4B. I don't think it's on there.
Q Okay. And --
THE WITNESS: Somebody dropped a credit card.
MR. SNYDER: No. It's my room key.
THE WITNESS: Oh, it is?
MS. PERALES: Why don't we take a short break. It sounds like we need to switch out the tape.
THE VIDEOGRAPHER: It is 11:00 a.m., and we are off the record.
(Recess from 11:00 a.m. to 11:09 a.m.)
THE VIDEOGRAPHER: This is the start of Tape 2. It is 11:09 a.m., and we are back on the record.
Q (BY MS. PERALES) Mr. Stamoulis, I think before we took a break you were telling us about the last boring that you drilled, and you described it or

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identified it as 4B. Is that right?
A I believe, yes, ma'am.
Q And you had already drilled a boring in 2016 at that -- in that general location, isn't that right?
A Correct.
Q So why did you drill another boring?
A Got call from Mr. Snyder -- we knew there was some confusion -- one of the samples got mislabeled, and there were two samples with the same label deal, so they said go back and drill it.
Q One of the samples that was collected from that boring was mislabeled? Is that what you're saying?
A I think we had two of the same ones, I think is what it was.
Q So when you say "two of the same ones," do you mean you had two bags of samples that were labeled for the same interval?
A I believe so, yeah. We had discovered it in the field, but we didn't resolve it, and it never got resolved, so they said just drill another one.
Q Okay. So how was that discovered? You said you discovered it in the field, and --
A Yeah. Mikey and I were comparing intervals and I was off, so I stopped and said, "Hey, there's something wrong here." And I thought I had it fixed,

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but I didn't. We continued drilling, and then -- in the lab they said this isn't right, so --
Q Okay. When you say "Mikey," do you mean Mike Rubinov?
A I'm sorry. Mike Rubinov, yeah.
Q So Mike Rubinov noticed that something was amiss in the -- in the intervals in the samples?
A We were confirming intervals. I said, "Hey are you at so-and-so," and he said, "No, I'm at so-and-so," so I said, "Something is wrong."
Q Okay. When he said, "No, I'm at so-and-so," was he referring to his field notes?
A I believe so, yeah.
Q Okay. I see what you're saying now. So there was a discrepancy between the interval that he was noting and the interval that you were noting?
A Correct.
Q And you couldn't reconcile it there out in the field. Is that right?
A Correct.
Q And then the lab confirmed that something was wrong?
A Correct.
Q So you had to go back and do a new one?
A Correct.

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Q And that's the only boring that you've drilled since -- since the protesting parties' consultants were on the site?
A At that site?
Q At that site.
A Yes. I've drilled other borings, but not --
Q So -- in Caldwell County?
A No.
Q Okay. So do you know whether you will be drilling any more borings on the site?
A Monitoring wells.
Q Are there monitoring wells?
A Pardon me?
Q You don't know whether you'll be drilling monitoring wells?
A I do. When we get the permit, we'll be drilling monitoring wells, and probably gas probes, yeah.
Q So when you say, "we get the permit," does that mean you're part of the permitting team?
A No.
Q Okay. So other than monitoring wells and gas probes, do you anticipate drilling any more borings?
A I haven't been told. I don't know. I really don't.

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MS. PERALES: What number are we on?
THE REPORTER: 13.
(Exhibit No. 13 marked)
Q (BY MS. PERALES) So I've handed you a document that's been marked Exhibit 13.
A Uh-huh.
Q Have you seen this document before?
A Yeah, yeah. I sent this to -- I haven't seen this document, but I think we did the little box deal, yeah.
Q Okay. Did you provide a copy of this document with the stack of papers you gave me earlier this morning?
A You know, I don't think I did.
Q Okay. Do you know whether you searched your emails?
A And I did search for Gregg. I searched for everybody on that list.
Q Do you delete your emails?
A No. But I don't know why I didn't see this one. It looks like it was sent from my iPhone, but it should have gone into that thing, but -- I don't know if I did this one.
Q Okay. Okay. So can you describe for me what this email is about?

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A Yeah. They asked me to do a -- a little -- how many boxes and the logs that I gave to Gregg when he left.
Q When he left the site?
A When he left the site. He took these with him.
Q Okay. And BME-39, it says, "Two boxes, partial, no logs."
Do you see that?
A Yeah, uh-huh.
Q So why were there no logs with BME-39?
A I think he left and we weren't finished with that boring or something.
Q Okay. So --
A See, it's partial, so it doesn't look like -- I'm just -- it doesn't look like the boring was finished, so he didn't take the log.
Q Okay. I see. But he took the samples that were available from that boring. Right?
A Correct.
Q Okay.
A I think that -- yeah.
Q Okay.
A Yeah, I don't --
MS. PERALES: Can I get this marked?
(Exhibit No. 14 marked)

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MS. PERALES: Here's two more.
MR. RYAN: Okay.
Q (BY MS. PERALES) Okay. I've handed you a document -- or a stapled stack of documents that have been labeled Exhibit 14.
A Correct.
Q Do you recognize these documents?
A These look like invoices.
Q And are they invoices from you?
A They are.
Q And are they related to the proposed landfill site that we've been talking about?
A So far.
Q And were these sent to Biggs & Mathews? Is that right?
A They were.
Q So can you take a look at Page 70876?
A 8 -- 708 --
Q 76.
A -- 76. 87 -- uh-huh.
Q So the description there reads, "The cost associated with the site visit at the Lockhart EP-130 facility, January 8, 2016."
Do you see that?
A Uh-huh.

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Q So does that mean that you were on the site on January 8th, 2016?
A I guess so.
Q And 1,050, that is -- that's an amount that are reflected on a number of these invoices. So if you turn the page, you'll see 1,050, the cost associated with measurement of the piezometers.
A Uh-huh.
Q So my question to you is: On January 8, do you recall what it is that you did on the site that resulted in the $1,050 charge?
A Site visit.
Q Okay. So it could have been anything?
A Yeah. I mean, that's a daily rate.
Q Okay. That's what I was wondering.
A Yeah. So I don't know -- I don't know --
Q That's good enough.
A Yeah.
Q I just was wondering if there was -- if there had been anything else -- like if there had been drilling, for instance, that would have been more than 1,050, or that would have been reflected in some other way on this invoice. Is that right?
A Correct.
Q Okay. So on January 8, you were on the site,

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but there was no drilling. Is that fair to say?
A Correct.
Q Okay. And then the next page, 70877 --
A Correct.
Q -- the description is, "The cost associated with the measurement of the sites piezometers" --
A Uh-huh.
Q -- December 17th, 2015?
A Correct.
Q So you were still taking water level measurements as late as December 2015. Is that right?
A Correct.
Q So have you been regularly taking water level measurements since the piezometers were first installed?
A Yes.
Q At regular intervals?
A I think monthly.
Q Okay. And so that hasn't ceased at all?
A No.
Q Okay. And that's because Biggs & Mathews has asked you to continue to take water level measurement readings every month?
A They haven't told me to stop, uh-huh.
Q Okay. So are you still doing that?
A Yes, ma'am.

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Q Every month you go out there and take water level -- water level readings?
A Uh-huh.
Q Okay.
A Yes.
(Exhibit No. 15 marked)
Q (BY MS. PERALES) So I've handed you a document labeled Exhibit 15. Have you seen this before?
A No.
Q Okay. So it appears to be two emails. Isn't that right?
A Yes.
Q So there's an email at the top that's dated January 24th, and then beneath that there's one that says, "Sent: January 23rd."
Do you see that?
A Correct.
Q So the January 23rd email -- first of all, do you know who Clint Courson is?
A I don't know him, but he works for -- I don't know him, no.
Q Okay. You do know Mack Reynolds, though. Right?
A I do know Mack.
Q So this described a schedule for the week

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following January 23rd, doesn't it? Do you see the schedule --
A January 23rd, uh-huh, 2014.
Q And it Mack and -- it says, "GGH: Mack and team will be on site periodically."
Do you see that?
A Yeah.
Q And then, "Driller: Stefan will be on site one day for water level readings."
Do you see that?
A Yep.
Q So do you have any idea about what Mack and team were on site for periodically other than water level readings that you were doing?
A No.
Q So when you were there collecting water level readings, was there anybody else on the site with you doing other things on the site?
A On this date?
Q Roughly in 2014.
A Not that I recall.
Q By 2014, you had already drilled all your borings. Right?
A Okay.
Q Installed all your piezometers?

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A Okay.
Q And you were going back at least once a month to collect more water level readings. Right?
A Correct.
Q So in 2014, do you recall other work being done on the site while you were there?
A No.
Q Okay. Is that something you might have noticed, if others were on the site doing other work while you were taking water level readings?
A Other consultants?
Q Sure.
A I mean, if I saw somebody on site, I may notice it, but --
Q Okay.
A I mean, I don't know what you're asking. If there was someone else on site, I probably would have noticed them.
Q And you just don't recall seeing Mack and team --
A I don't recall.
Q -- on site?
A I don't recall.
Q Okay.
MS. PERALES: Exhibit 16?

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THE REPORTER: Yes.
(Exhibit No. 16 marked)
Q (BY MS. PERALES) I've handed you now a stack of photos that have been stapled together and labeled Exhibit 16.
Have you seen these photos before?
A No.
Q Is this the first time you've seen these photos?
A Yes.
Q So the first page has the identifier BME-14A. Do you see that?
A Yes.
Q So is that a reference to one of the borings that was drilled in January 2016 by you?
A Yes.
Q Okay. Do you recall who was taking photos during -- for Biggs & Mathews during your January 2016 field investigation?
A Mikey. Mike Rubinov.
Q Well, anybody from --
A And Lauren.
Q -- Biggs & Mathews?
A Oh, I don't -- maybe Mike or -- Mike Snyder or Gregg Adams, but --

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Q So you -- you can't -- you don't know who took these photos, basically. Is that right?
A I don't know who took these photos.
Q Can you tell whether these photos were taken in the field?
A I don't think they were.
Q Okay. If we just flip to -- let's -- let's see. Let's pick -- let's say -- the staple gets in the way, but see if you can find 71197.
A 71197.
Q So this is -- well, can you tell me what does this photo appear to represent?
A It represents a sample from the boring 14A. It was Sample No. U13 from 22 to 24 foot.
Q Okay. And has that sample been -- as far as you recall, has that sample been modified from how it was when you labeled and wrapped it?
A Define "modified."
Q Is that how it looked when you wrapped it?
A Is that how it looked when I wrapped it?
Q Has it been cut?
A I don't know.
Q Okay. So you don't know?
A I don't know.
Q So it could have been like this out in the

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field, in three pieces like this out in the field?
A It could have been.
Q Okay. So the sample -- or the soil that's farthest to the right, it looks to be stained. Do you see that?
A Okay.
Q And what -- does that have any significance to you?
A It appears to be iron staining, but, you know --
Q Is that something you would have noted in your field logs?
A Possibly.
Q Only if you could have seen the inner part, isn't that right, or if it was showing on the outer part?
A I guess.
Q And do you have any opinion at all about what that -- what that might signify, the iron staining?
A I don't have an opinion.
Q Okay. Can you turn to Page 71186?
A 86?
Q 86.
A 86.
Q Would you describe that as a disturbed sample

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or an undisturbed sample?
A I don't know if the picture looks distorted here, but this -- this thing looks -- this part here looks deformed, so --
Q Which part? Are you --
A Yeah.
Q What are you pointing to?
A I mean, I can't see these pictures very well. Are you on four to six foot?
Q Yes.
A Okay. The one to the right doesn't look round.
Q Okay. And so that indicates to you what?
A The tube could have been bent.
Q Okay. When you were taking photos of the protestants' fieldwork --
A Uh-huh.
Q -- what is it that you were trying to capture with your photos?
A Just making observations.
Q Were you focusing on the -- on the samples?
A The operation.
Q Okay. Did you have any instructions from Biggs & Mathews, Mike Snyder, Gregg Adams on what you should be photographing?
A No.

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Q Do you use any ASTM standards? Do you rely on any ASTM standards in developing the protocol for your boring work?
A I'm sure there's ASTM standards on taking Shelby tubes and split spoons, yeah.
Q Do you rely on any?
A I know they exist out there and, you know -- yeah.
Q Did you refer to any ASTM standards as you were developing your boring program for this --
A No.
Q Okay.
A No.
Q So you didn't refer to any ASTM standards?
A No.
Q Did you use any -- did you use different procedures, any different field procedures, methods, or protocols for your 2016 boring work that are different from the procedures, protocols, or methods that you used in your earlier boring work -- I think 2013 boring work? Was there any difference?
A I think the main difference was the 2000 -- the previous one, we weren't -- I mean, we were looking for water, so we went dry as far as we could. On this one here, we just, at will, you know, would set up and start

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drilling with water.
Q So you said that was the main difference. Were there other differences that you recall?
A Not that I recall.
Q Okay. So you were -- you used fluids in your drilling more frequently in the 2016 borings?
A I don't know about more frequently.
Q Okay.
A I mean, we weren't required to go -- we weren't required to go to a certain depth before we could set up and wash.
Q And you also -- you mentioned earlier that you had three rigs on site during the earlier boring operation and one rig on site during the 2016 boring operation. Is that right?
A Correct.
Q So did that have an impact or alter your procedures?
A No.
Q Okay. When you had the three rigs, were they all operating at the same time?
A No.
Q Were two rigs operating at the same time?
A Yes.
Q So you would sometimes have to go back and

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forth between two different boring locations. Right?
A Yes, ma'am.
Q And in 2016, you were able to observe all of the borings being drilled. Is that right?
A Correct.
Q You're a certified geologist. Is that right?
A It's professional geologist. I mean, I don't know if it's --
Q Okay.
A -- certified or --
Q Or registered or --
A Registered, yeah.
Q Okay.
A Okay.
Q So are you familiar with the Texas Board of Professional Geoscientist regulations?
A Yes, ma'am.
Q Do you -- do you adhere to those regulations?
A Yes, ma'am.
Q Including when you're out doing boring -- field boring work?
A Yes, ma'am.
Q Do you recall whether those regulations include any requirement about maintaining records when doing geology work?

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A **State that again.**
Q Do you recall whether the -- the rules that govern your profession --
A **Uh-huh.**
Q -- include any requirement regarding retention of records?
A **Do I know that there's a rule that says you're -- you're supposed to retain records?**
Q Yes.
A **Yes.**
Q And do you follow that rule?
A **Yes, I do.**
Q So -- but you don't have any copies or records of your field logs. Isn't that true?
A **Correct.**
Q And so that, in your mind, is still complying with the geoscientist rules?
A **I wasn't out there as a geoscientist.**
Q Oh, you weren't?
A **No.**
Q So what were you out there as?
A **A field geologist grabbing samples.**
Q And that's different from a geoscientist?
A **I wasn't rendering any opinions.**
Q Okay. So just to make sure I understand,

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the -- are you testifying that the geoscientist rules are triggered when you're rendering a geologist opinion?
A **Yes.**
Q And so when you're out on the site and you're recording your observations and producing field logs, you're not providing any professional geologist opinion. Is that what you're saying?
A **Correct.**
Q And so, therefore, the geoscientist rules don't apply to you?
A **In those instances.**
Q While you're out on the site and supervising the drilling of borings, the geoscientist rules don't apply to you?
A **When I'm working for another geologist, not as a geologist, yes.**
Q Right. And that's what I'm trying to make sure that I am understanding.
When you're out on the site supervising the drilling of the borings, in your mind, you're not there as a geologist; and, therefore, the geoscientist rules don't apply to you?
A **Not "in my mind."**
Q In your opinion?
A **In my opinion.**

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Q Okay. So do you have any opinion regarding the potential of the material that you observed -- the soil samples that you observed to transmit groundwater?
A **No.**
Q Because you don't form those types of opinions?
A **I don't form those types of opinions.**
Q Do you have any opinion regarding the variability of the subsurface material at the proposed landfill site?
A **Ask that again, Marisa.**
Q Do you have an opinion regarding the variability of the subsurface materials at the landfill site?
A **The variability?**
Q Yes.
A **No.**
Q Do you -- how is it that you determined that the earlier drilling operation had a sufficient number of borings?
A **I didn't.**
Q Okay. I thought I heard you testify to that earlier this morning.
A **A sufficient number?**
Q I thought I heard you testify that you felt that you had already drilled enough borings during that

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earlier boring investigation.
A **I think it's a waste of time to come back and drill these borings.**
Q Okay.
A **That's what I meant.**
Q Okay. But that's not a professional geoscientist opinion? That's --
A **That was my opinion, yeah.**
Q Okay. Do you have -- do you have a -- do you have an opinion about what caused the lost circulation in BME-43?
A **If I knew that, I would be rich.**
Q So you're not rich?
A **No. Not by a long shot.**
Q So do you have an opinion about what the presence of iron stains means, if anything, when you observed those on the samples?
A **I don't have an opinion.**
Q Do you have an opinion about the significance of broken samples?
A **Define "broken samples."**
Q Well, many of the samples, as you described, that came up during the protestants' field investigation, you described them as undisturbed --
A **No. Disturbed.**

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Q I'm sorry. Disturbed. Do you have an opinion on the significance of that?
A I probably would have not been paid by my client if I would have given him those samples.
Q Because you're expected to produce samples of a particular type or --
A Samples that can be described in the lab and tested.
Q Okay. And is there any particular standard, such as an ASTM standard, that you refer to to determine whether the sample that you're pulling up can be described and tested?
A I didn't have a complaint for a client, so -- from the client, so I guess they were adequate.
Q Okay.
MS. PERALES: Can we take a five-minute break?
THE WITNESS: We can.
THE VIDEOGRAPHER: It is 11:44 a.m., and we are off the record.
(Recess from 11:44 a.m. to 11:58 a.m.)
THE VIDEOGRAPHER: It is 11:58 a.m., and we are back on the record.
Q (BY MS. PERALES) Okay, Mr. Stamoulis. I have just a few more questions.

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First I want to -- I want to go back a little bit to the wet rotary versus the hollow-stem auger --
A Yes, ma'am.
Q -- drilling methods.
So with the wet rotary, how -- how do you know what interval you're at with the wet rotary? How do you know where you are?
A The kelly has markings on it to measure it.
Q The what?
A The kelly.
Q And what's the kelly?
A That little rod that goes down the middle that you put the apparatus in the drill pipe on.
Q Okay. It has markings?
A It does.
Q And that -- and that's -- so is it like a measuring stick?
A I guess you could call it a measuring stick.
Q Okay. Did you measure the stick-up when you were collecting your samples?
A Did I measure the stick-up for what?
MS. PERALES: Am I saying that right?
Q (BY MS. PERALES) So the -- you know, the part that sticks up, the stick-up.

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A No.
Q No? Do you know what I'm talking about.
A No.
Q Okay. The distance between the ground level and the kelly, did you measure that?
A The distance between the ground level and the kelly? That doesn't make sense. No.
Q No? And you testified earlier that you introduced drilling fluids during your drilling operation. Is that right.
A Correct.
Q And you don't need to introduce -- or we -- let me back up.
When the protestants drilled their borings, were there any drilling fluids introduced?
A No.
Q So -- and how does the introduction of drilling fluids, how does -- or does that impact your collection of samples in your boring operation?
A How does it impact it?
Q Sure. How does it impact the samples you're collecting, the descriptions you're making on your field logs? Does it have an impact?
A No.
Q So earlier you testified that during the last

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round of borings that you were drilling, you were more careful about introducing drilling fluids because you were looking for the presence of groundwater. Isn't that right?
A Correct.
Q And so when you introduce drilling fluids, that has an impact on your observations of groundwater. Isn't that right?
A Ask that again.
Q Can you accurately observe -- or tell where groundwater might be present if you're introducing drilling fluids?
A Before you identify the groundwater?
Q Yes.
A You can't see it.
Q Okay. So -- and that's my question.
So the drilling fluids, that has an impact on your ability to determine where -- where you might have groundwater. Isn't that right?
A If there's groundwater there, yes.
Q Could it also have an impact on the moisture content of the samples that you're collecting?
A No.
Q No?
A No.

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Q And why is that?
A The Shelby tube or split spoon is being pushed into the soil ahead of the water column.
Q Okay. Okay. So -- so when you are introducing fluids, that's just -- that's not going to have any impact whatsoever on the samples that you're collecting. Is that what you're telling me?
A Correct.
Q Okay. Are the samples affected at all by the smearing of the Shelby tubes?
A Are they affected?
Q Sure. Does it affect the quality or the character of the sample, the smearing of the Shelby tubes?
A No.
Q No?
A No.
Q It's not compromised in any way or impacted in any way by the Shelby tubes.
A The sample?
Q Sure.
A No.
Q And so I think I got -- I think I pretty much covered how you described your role during the drilling operations that were being done for 130 EP or Biggs &

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Mathews.
When you were out observing the field investigation by the protesting parties' consultants, were you there as a geoscientist?
A I was there observing an operation by other people.
Q Okay. So was it your understanding that you would be providing any sort of professional geoscientist opinion based on your observations?
A No.
Q Okay. And that's why you didn't maintain a copy of your field notes. Is that right?
A Correct.
Q Because if you had been out there as a professional geoscientist, then the -- rendering a geoscientist opinion, then the geoscientist rules would have applied to you. Isn't that right?
A I wasn't out there as a geoscientist.
Q Okay. So earlier when you testified about the -- about how the way that the penetrometer was being used rendered it invalid, that wasn't a professional geoscientist opinion, was it?
A You know, I think technicians use pocket penetrometers all the time, so it was a -- an opinion from experience.

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Q Okay. Was it an opinion based on any ASTM standard?
A No.
Q Do you know whether any ASTM standard exists?
A I don't know.
Q Okay. When was the last time you reviewed ASTM standards related to field investigations?
A I don't know.
Q Has it been over five years?
A I don't know.
Q Could it be a decade ago?
A I don't know.
Q You just don't regularly resort to ASTM standards?
A I haven't, no.
Q Okay. Do you have an opinion -- well, I'm going to change topics to the -- to the slug test or the water permeability test that Dr. Ross conducted on one of the wells. Do you recall that?
A I do. But can we -- can I clarify something?
Q Yes.
A Okay. When we were talking earlier about why we went back out and did MW-4B --
Q Okay.
A Okay? The confusion -- and I want to make it

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clear. The confusion was in the Boring 4A, not 4B. It was --
Q Right.
A Did y'all understand that? I mean --
Q I think --
A -- is that what you understood?
Q That was my understanding.
A Because after we left here, I was confused on whether we were -- whether you were talking about 4B or 4A. Okay?
Q So 4 -- my understanding -- and correct me if I'm wrong -- is that 4B was drilled to address the confusion regarding 4A.
A Correct. That's what it was. Okay.
Q Okay.
A Go ahead.
Q Well, thank you for that.
A Yeah. Yeah.
Q Okay. So back to Dr. Ross' slug test?
A Yes, ma'am.
Q So --
A Is that what that was?
Q I don't really know. I'm not a geoscientist.
So a transducer was used. Isn't that right?

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A **Uh-huh.**
Q And that transducer -- that collects water level readings. Is that right?
A **It does.**
Q Do you regularly use transducers?
A **Periodically.**
Q Okay. Why would one need the native files associated with a transducer?
A **The what?**
Q Native files.
A **I have no idea.**
Q Okay. So how does the transducer work as far as creating output? What is it that you -- that you are looking to get from the transducer? Is it just water level readings? This isn't a trick question. I'm just trying to --
A **Okay. Yeah. I'm trying to follow your question.**
Q Is it just water level readings?
A **I think it can be in PSI or other units, but -- yeah.**
Q Okay.
MS. PERALES: Okay. I think those are all my questions. Thank you. Pass the witness.
MR. TUCKER: I have no questions.

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THE WITNESS: Is it lunchtime?
MR. RYAN: Not quite.
MS. PERALES: Yes.
MR. RYAN: While I've got you under oath here -- no. I just have a few questions.

FURTHER EXAMINATION

BY MR. RYAN:
Q My first one has to do with using a knife --
A **In a gun fight?**
Q -- while you're out in the field.
A **Yes, sir.**
Q Do you ever use a knife while you're working with materials that have been pulled from a boring in the field?
A **Yes, sir.**
Q For what purpose?
A **To trim off fall-in and to trim an edge to take a pocket penetrometer reading.**
Q Okay. Do you consider that cutting the actual sample, or are you just -- is that part of preparing the sample?
A **Trimming and preparing.**
Q Okay. Okay. You talked about the water level readings that are done out on the site on a continuing basis. Are you the person who does that, or sometimes

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is it somebody else from your company?
A **Either me or somebody else. The company does it, so it's either me or one of the technicians.**
Q Okay. I want to ask you about Exhibit 12, if you will get that out of the stack there.
A **That's why I kept the stack here. Yes, sir.**
Q Let's see. If you would, turn to Page 07782 [sic].
A **007 -- no. 077?**
Q Yeah. 872.
A **872.**
Q Do you see that?
A **Uh-huh.**
Q Does what's written on there include criticism of the methodologies that you observed in the field?
A **It was an observation, yes, sir.**
Q And is that a criticism?
A **Yes.**
Q Okay. So in addition to the specific matters that Ms. Perales asked you about, there are places in Exhibit 12 where you have taken notes that include other criticism -- criticisms that you had about fieldwork being done by the protestants' representatives. Is that correct?
A **Correct.**

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MR. RYAN: Pass the witness.
MS. PERALES: Short break.
THE VIDEOGRAPHER: It is 12:11 p.m., and we are off the record.
(Recess from 12:11 p.m. to 12:24 p.m.)
THE VIDEOGRAPHER: It is 12:24 p.m., and we are back on the record.

FURTHER EXAMINATION

BY MS. PERALES:
Q All right. Since we got back into Exhibit 12, can you pull that back out, please?
A **I guess. What page?**
Q Page -- let's start with 77870?
A **8 -- 8 -- no. 077?**
Q 870.
A **870. Okay.**
Q So close to the bottom next to the number three, it says there, "Small - looks like ant parts in bottom of well."
A **Uh-huh.**
Q So how did you know that those were ant parts?
A **We looked at them.**
Q And they looked like ant bodies or ants to you?
A **That's what it looked like.**
Q Is there any significance to that, to

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encountering ants or ant parts?
A No.
Q So it didn't mean anything to you at all?
A Not that it looked like just ant bodies.
Q Okay. On Page 77872?
A 077872. Okay.
Q So can you tell me what it is that you are criticizing or what it is that's wrong or inappropriate to you from this note?
A Yeah. The ProTip tip was never actually dried. The last sentence.
Q Okay. And what significance does that have, that it was not dried?
A It was an observation.
Q Well, what is the consequence for not having dried the ProTip?
A The significance was that it wasn't dry and that there could have been a possibility that the little water level indicator deal that they had, that y'all were using, would get -- get stuff off the bottom and make a noise like there was water there.
Q I see. So the concern is that it would give an improper water level reading?
A A false reading.
Q Okay. And did that happen, as you recall?

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A You know, I think at that one where the little ant bodies were, the stuff was jammed up in there, and it looked moist, but, you know, I don't know if the thing went off because the junk got jammed up in there and it made some kind of contact or if the little bodies had moisture on them.
Q Okay.
A But, you know -- so it was just an observation, you know.
Q Can you turn to 77873?
A 77873.
Q Let's see. At the time interval 9:23 to 9:30?
A 9:23, 9:30. Yeah.
Q It says, "During run, the tool cable was rubbing against the chain on the tripod?
A Uh-huh.
Q Is that a criticism?
A It's an observation.
Q But is that -- is that an observation of something that's inappropriate?
A I didn't know. I was just observing.
Q Did you draw any conclusion from that observation?
A No.
Q Okay. Does -- did it cause you any concern at

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all?
A I didn't know. I was just making an observation.
Q Okay. Let's turn to Page 77896.
A 89 --
Q 6.
A 896. Uh-huh.
Q So this is a summary day one --
A Yep.
Q -- at the bottom part, and next to No. 2, it says, "Logging crew have no idea of top versus bottom of sample" --
A Yeah.
Q -- "after extrusion."
A Uh-huh.
Q So what led you to that observation?
A I saw them turn the samples around a couple of times.
Q Okay. And did you hear any comments that -- that also reflected that they had no idea of top versus bottom of sample?
A Say that again.
Q Did you hear any comments that reflected that they didn't know the top versus the bottom?
A Huh-uh, no.

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Q So it was just your observation of them turning the sample around a few times?
A Just an observation.
Q Okay. So three, "Push were not plumb, and driller would lift sample and push multiple push on the same interval. The problem arises when you left between pushes."
What does --
A Yeah. Yeah.
Q -- that mean?
A So I think this was with the -- when he was drilling down with the hollow-stem auger and he was lifting -- like the swabbing deal. This was what we equated to swabbing. So he was lifting the whole thing up off the ground and pushing it back down into the ground.
Q Okay. And that is -- and that's your observation?
A That's an observation.
Q And is that inappropriate?
A I think the key -- I think to be able to keep an undisturbed sample, yes.
Q So your concern there is that it would impact the integrity of the sample. Is that right?
A I think we saw that, yes, ma'am.

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Q Okay. The next page, 8 -- 77897.
A 77897. This is that UV one again.
Q Well, right. That's the UV one.
A Okay.
Q But up above that, No. 6 --
A Uh-huh.
Q I wonder if you could just explain what that means, "On the that they did" --
A Oh, wow.
Q -- "recover."
MR. HOBBS: Bad English?
THE WITNESS: Horrible English.
A You're an English major. Right? I figured you'd catch that.
You know, I don't -- I don't --
Q (BY MS. PERALES) Okay.
A Yeah. Horrible English. Sorry.
Q And then 77899?
A 778 --
Q 99.
A -- 99. Yes, ma'am.
Q Let's see. Number -- Comment No. 7, "Randomly selected bagged samples."
A Uh-huh.
Q What is that referring to?

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A When the -- when the samples were being bagged -- when the samples were being bagged, it didn't appear to me that all of it was being bagged. Some of it was not being bagged.
Q So are you saying that there -- there were materials from a particular interval that were left out of the bag for that interval?
A Correct.
Q Okay. Okay. And randomly selected -- so does that -- does that indicate that it looked to you like there was no rhyme or reason behind how the materials were being selected to be put in the bag?
A It's -- maybe I worded that wrong, but some of it was left out.
Q Okay.
A I was trying to get the point across that some of it was being left out.
Q Okay.
A Maybe "randomly selected" probably wasn't the right word, but it was probably in between naps.
Q Okay. So I want to -- I have just a few clarifying questions --
A Yes, ma'am.
Q -- about the Shelby tubes.
A Yes, ma'am.

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Q So my understanding from my notes is that when you have bent Shelby tubes, you testified that it's because rocks have fallen in. Is that right?
A One of the reasons, yes, ma'am.
Q At this particular site during your drilling operation, you had a number of bent Shelby tubes. Isn't that right?
A Correct.
Q Did you have bent Shelby tubes at every hole?
A I don't remember.
Q Is that possible?
A I don't remember.
Q Do you have an opinion as to whether the bent Shelby tubes were caused by rocks having fallen in every time you had a bent Shelby tube here?
A I think I testified that it was bent Shelby tubes and from lifting the rig up --
Q Okay.
A -- and moving it over. So it was probably one of the two.
Q Okay. So how do you know that rocks have fallen in when you have a bent Shelby tube?
A Some of them were in the -- in the -- some of them were in the sample.
Q Is it possible that you could have hit rocky

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soil, and that could have bent the Shelby tube?
A Since we tried to prevent that from happening by putting casing in the upper portion of the boring, the rock had to fall from somewhere up above, and it was probably from the upper level, yeah.
Q When you say you tried to prevent that from happening, what do you mean?
A Tried to prevent the rocks from falling in.
Q Okay. So if you tried to prevent the rocks from falling in and you still got a bent Shelby tube, isn't it possible that you just hit rocky soil?
A If we concluded that it fell from the top, then to answer your question, no. But if there was nothing in there, then it had to be from, you know, lifting the rig up and moving it some.
Q Okay. So it sounds to me like in your opinion that you didn't have Shelby -- bent Shelby tubes as a consequence of hitting rocky soil. Is that right? Is that what you're saying?
A That's not what I -- say that again.
Q Well, I asked you whether it's possible that you could have had a bent Shelby tube because you hit rocky soil at this site during your drilling operations in 2016.
A We did bend tubes at the very top on some of

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them hitting rocks and cobbles, yes.

Q Okay. So would you say that Shelby tubes can provide pretty accurate recovery for large pieces of gravel? Can you use Shelby tubes to recover large pieces of gravel?

A That question doesn't make sense. Gravel?

Q Sure. Or cobbles.

A I still don't answer -- I still don't understand the question. If it's in the matrix, yes.

Q If it's in the ma- -- okay. So when you say "if it's in the matrix," do you mean if there are just some -- some gravel or some cobble within the clay?

A It's mixed with clay.

Q Okay. If it's not mixed with clay, can -- do Shelby tubes allow for accurate recovery of large pieces a gravel?

A No.

Q No, they don't?

A I mean, I think it's a hit or miss deal, so, no.

Q Okay. So is it possible that rocky soil caused the bent Shelby tubes in lower intervals below the ten feet?

A Is it possible that rocky soils caused --

Q The bent Shelby tubes.

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A If they fell from the top? Yes.

Q Is -- if you -- if the Shelby tubes hit rocky soils below ten feet, at lower intervals, could that have caused bent Shelby tubes?

A If it fell in, yes.

Q So only if it fell in?

A I mean, you're asking some hypothetical question that I really don't understand what you're trying to get at, but --

Q Well, I'm not asking a hypothetical. I'm asking whether it's a possibility. I'm asking you whether it's possible that you encountered -- that you ended up with bent Shelby tubes because you encountered rocky soil at lower intervals.

A We did bend some tubes at lower intervals. And could it have been a possibility of rocks? Yes.

Q Of encountering rocks at the lower intervals, not falling from the top?

A No.

Q It's not possible?

A No.

Q Okay.

A I don't think so.

Q Okay. And can you just explain to me why that is, why that's not possible? Is it because -- so I

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guess I'm trying to understand: Is it not possible that you encountered rocky soils at the lower intervals, or is it not possible that if you did they bent the Shelby tubes? What part of it is not possible?

A I think the rocks that we encountered came from the top.

Q Right.

A Okay? So did it bend the Shelby tubes below? I think I answered yes to that. Now I'm confused.

Q Right. You did answer yes to that, but then I also asked you whether it was possible that you encountered rocky soils that resulted in the bent Shelby tubes, rocky soils at lower intervals that resulted in the bent Shelby tubes. Is that possible?

A No.

Q And why not?

A I don't think there were rocks in the lower -- you know, you didn't tell me what depth, but I don't think there were rocks --

Q Below ten feet?

A -- below ten feet.

Q Okay. Okay.

MS. PERALES: I'll pass the witness.

MR. TUCKER: No questions.

MR. RYAN: No questions.

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MR. HOBBS: Does the court reporter have everybody's name?

THE REPORTER: Yes, sir.

MR. HOBBS: Okay. Thank you.

THE VIDEOGRAPHER: It is 12:42 p.m., and we are off the record.

(Deposition concluded at 12:42 p.m.)

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CHANGES AND SIGNATURE

WITNESS NAME: STEFAN STAMOULIS DATE: April 18, 2016

PAGE	LINE	CHANGE	REASON

223

I, STEFAN STAMOULIS, have read the foregoing deposition and hereby affix my signature that same is true and correct, except as noted above.

_____

STEFAN STAMOULIS

THE STATE OF _____)

COUNTY OF _____)

Before me, _____, on this day personally appeared STEFAN STAMOULIS, known to me or proved to me on the oath of _____ or through _____ (description of identity card or other document) to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he/she executed the same for the purpose and consideration therein expressed.

Given under my hand and seal of office on this _____ day of _____ 2016.

_____

NOTARY PUBLIC IN AND FOR

THE STATE OF _____

My Commission Expires: _____

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SOAH DOCKET NO. 582-15-2082

TCEQ DOCKET NO. 2015-0069-MSW

APPLICATION OF 130 ENVIRONMENTAL PARK, LLC FOR PROPOSED PERMIT NO. 2383) STATE OFFICE OF ADMINISTRATIVE HEARINGS

REPORTER'S CERTIFICATION

ORAL VIDEOTAPED DEPOSITION OF STEFAN STAMOULIS

VOLUME 2

April 18, 2016

I, Steven Stogel, Certified Shorthand Reporter in and for the State of Texas, hereby certify to the following:

That the witness, STEFAN STAMOULIS, was duly sworn and that the transcript of the deposition is a true record of the testimony given by the witness;

That the deposition transcript was duly submitted on April 28, 2016 to the witness or to the attorney for the witness for examination, signature, and returned to me by May 18, 2016;

That pursuant to information given to the deposition officer at the time said testimony was taken, the following includes all parties of record and the amount of time used by each party at the time of the

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deposition:

Mr. Brent Ryan (0h7m)
Attorney for 130 Environmental Park, LLC

Ms. Marisa Perales (4h48m)
Attorney for TJFA, LP, and Environmental Protection in the Interest of Caldwell County

Mr. Aaron Tucker (0h0m)
Attorney for the Office of Public Interest Counsel of the Texas Commission on Environmental Quality

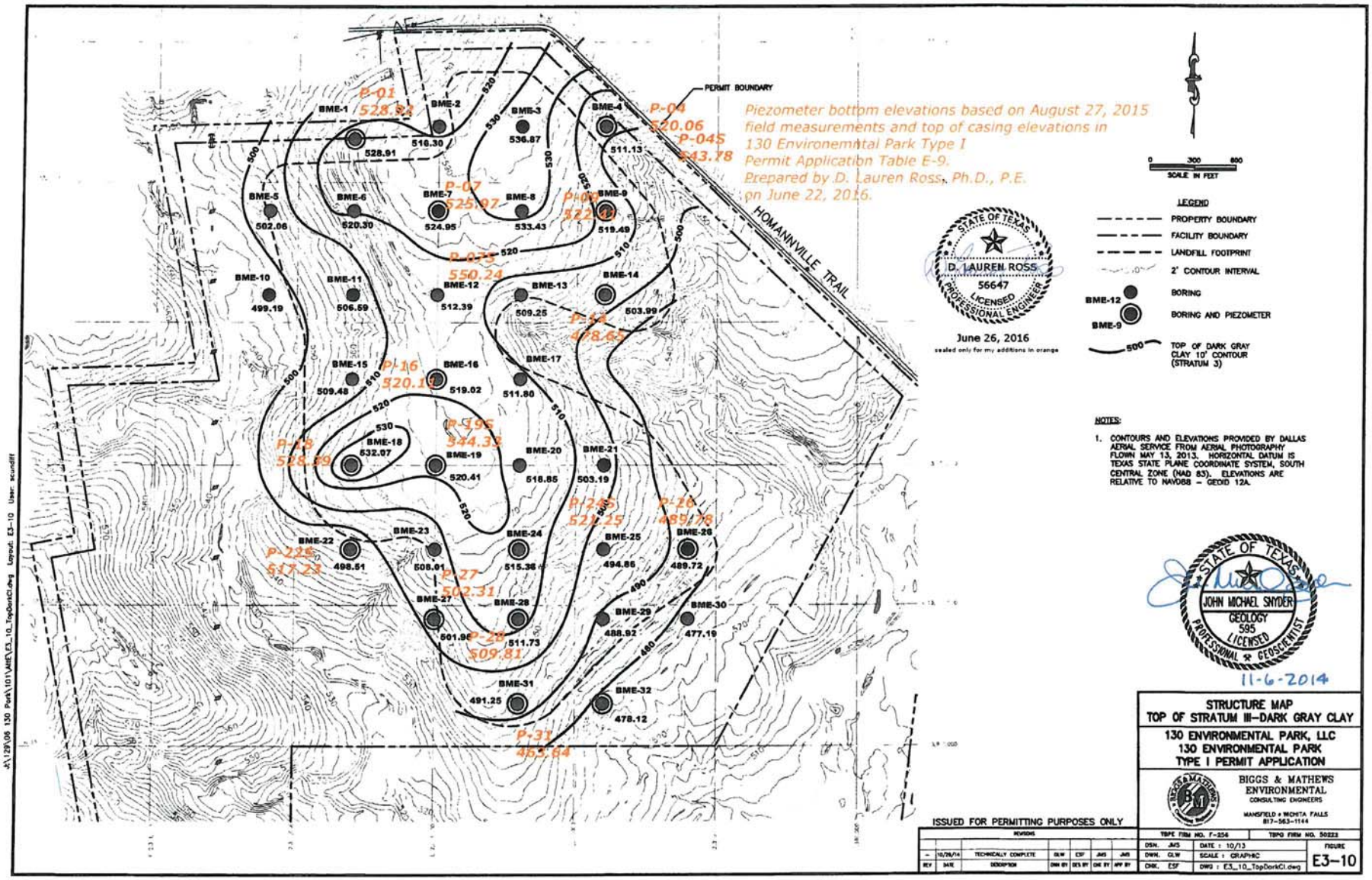
I further certify that I am neither counsel for, related to, nor employed by any of the parties in the action in which this proceeding was taken, and further that I am not financially or otherwise interested in the outcome of this action.

Certified to by me on this 27th day of April, 2016.

Steven Stogel
Certified Shorthand Reporter
CSR No. 6174 - Expires 12/31/2016

Firm Certification No. 276
Kennedy Reporting Service, Inc.
555 Round Rock West Drive
Building E, Suite 202
Round Rock, Texas 78681
512.474.2233

Protestants' Exhibit 5-W: Map of Piezometer Bottom Elevations Based on Ross Field Measurements on August 27, 2015



Dam Assessment Report
Plum Creek Watershed
Floodwater Retarding Structure No. 21
Caldwell County, Texas

Sponsoring Local Organizations
Caldwell-Travis Soil and Water Conservation District
Hays County Soil and Water Conservation District
Plum Creek Conservation District

USDA - Natural Resources Conservation Service
Temple, Texas
October 2010

James L. Hailey
(Signature)

Date: 10-8-10

James L. Hailey, P.E.
M&E Consultants – F-4324

Introduction

Background: The original Plum Creek Watershed work plan was prepared, and works of improvement were installed under the authority of Watershed Protection and Flood Prevention Act (PL-566, 83rd Congress, 68 Stat. 666) as amended. The watershed work plan was developed in April 1960. The evaluated life of the project was 50 years. Eighteen of the 21 planned Floodwater Retarding Structures (FRS) of the Plum Creek Watershed were constructed during 1962 through 1975. The Sponsoring Local Organizations (SLOs) of the project are the Caldwell-Travis Soil and Water Conservation District (SWCD), Hays County Soil and Water Conservation District (SWCD), and Plum Creek Conservation District (CD).

Plum Creek FRS No. 21 is a single purpose dam that was designed and constructed as a low hazard dam. FRS No. 21 was constructed in 1962 on Dry Creek, a tributary of Plum Creek, 5 miles north northeast of Lockhart, Caldwell County, Texas. The National Inventory of Dams Identification number is TX03428. FRS No. 21 is shown on the "Lockhart North" United States Geological Survey (USGS) quadrangle maps at coordinates Latitude 29.96° and Longitude
-97.65°.

No major repairs have been required to FRS No. 21. In 1968 the inlet of the principal spillway was modified. The orifice plates with 16" dia. holes and the vent were removed. Four ports, 16"x25", were added to the structure. Routine maintenance includes spraying brush, fertilizing the grass, and maintaining the fences.

A storm in November 1985 did cause the auxiliary spillway to flow. No damage to the dam or spillway was found.

Scope of Assessment: The purpose of this report is to provide the SLOs of the Plum Creek Watershed an assessment of FRS No. 21. The report is intended to be utilized by the Natural Resources Conservation Service (NRCS) and SLOs to identify high priority watershed rehabilitation projects as well as to aid in identifying short term needs requiring action.

This report provides a description of the condition of the existing dam and appurtenances, the status of operation and maintenance of the dam, original and current NRCS hazard classification, a breach inundation map for the existing dam, a determination of the eligibility for assistance under the Watershed Rehabilitation Program, estimates for failure index, risk index, and population at risk, potential scope of rehabilitation alternatives including estimated costs, and the potential for addressing other resource concerns during rehabilitation of the dam. This information should assist the SLOs in determining future actions concerning potential rehabilitation of this dam.

Original Design Summary

Year Constructed	1962
Purpose	Flood Control
Designed Hazard Classification	Low
Evaluated Life	50 years
Drainage Area	5,536 acres (8.65 mi^2)*
Storage Capacities	
Sediment Storage	733 acre-feet
Detention Storage	2,550 acre-feet
Maximum Storage	3,283 acre-feet (at auxiliary spillway crest)
Pool Surface Areas	
Sediment Pool	57 acres (200 ac ft pool), 139 acres at projected sediment pool level
Detention Pool	331 acres
Critical Elevations (Mean Sea Level)	
Top of Dam	522.3
Effective Top of Dam	522.3
Auxiliary Spillway Crest	517.0
Principal Spillway Crest	505.3
Dam Construction	Homogeneous earthfill, 2.5:1 front slope, 2.5:1 back slope
Maximum Height of Dam	30 feet
Length of Dam	2,982 feet
Volume of Embankment Fill	207,350 yds^3
Principal Spillway Type	Drop inlet (30" X 100" X 12'-1") with four 8" X 10" ports at el. 500.4 and four 16" X 25" ports at el. 498.14. 230 feet of 30-inch dia. Prestressed, Concrete Lined, Steel Cylinder Pipe with 6 anti-seep collars. Note: the orifice plates and vent were removed and the four 16" X 25" ports added in 1968.
Auxiliary Spillway	300 feet wide with protective vegetative cover
Maximum Auxiliary Spillway Discharge	8,512 cfs
Principal Spillway Discharge	112 cfs (at auxiliary spillway crest)

*As part of the assessment the watershed boundary was re-evaluated. The drainage area was determined to be 5,075 acres (7.93 mi^2)

Site Inspection Summary

No inspection of this dam by a state agency was noted.

M&E Consultants (consulting engineers for NRCS) and a representative of the Plum Creek CD conducted an inspection of FRS No. 21 on November 3, 2009. Existing conditions of FRS No. 21 were:

- The grass cover was poor due to drought and grazing, but was improving.
- All ports on the inlet structure were open.
- The Auxiliary Spillway grass cover is recovering from drought and grazing.
- The outlet channel banks have scoured out just past the rock riprap in the stilling basin.

Operation and Maintenance

Operation & Maintenance (O&M) inspections have been conducted annually by the Caldwell-Travis SWCD, Hays County SWCD, and Plum Creek CD, and an NRCS representative. A Report of Maintenance Inspection (TX-PDM-291) was last prepared on October 9, 2008. The report noted that brush needed spraying, the grass needed fertilizing, and the gate valve on the inlet structure needed repairing. Work performed included spraying brush, fertilizing the grass, and replacing the gate slides and angle iron frame at a cost of $4,741.71.

Based on the findings by M&E Consultants and NRCS during the site visits, O&M on FRS No. 21 is considered adequate.

Hydrology and Hydraulic Analyses

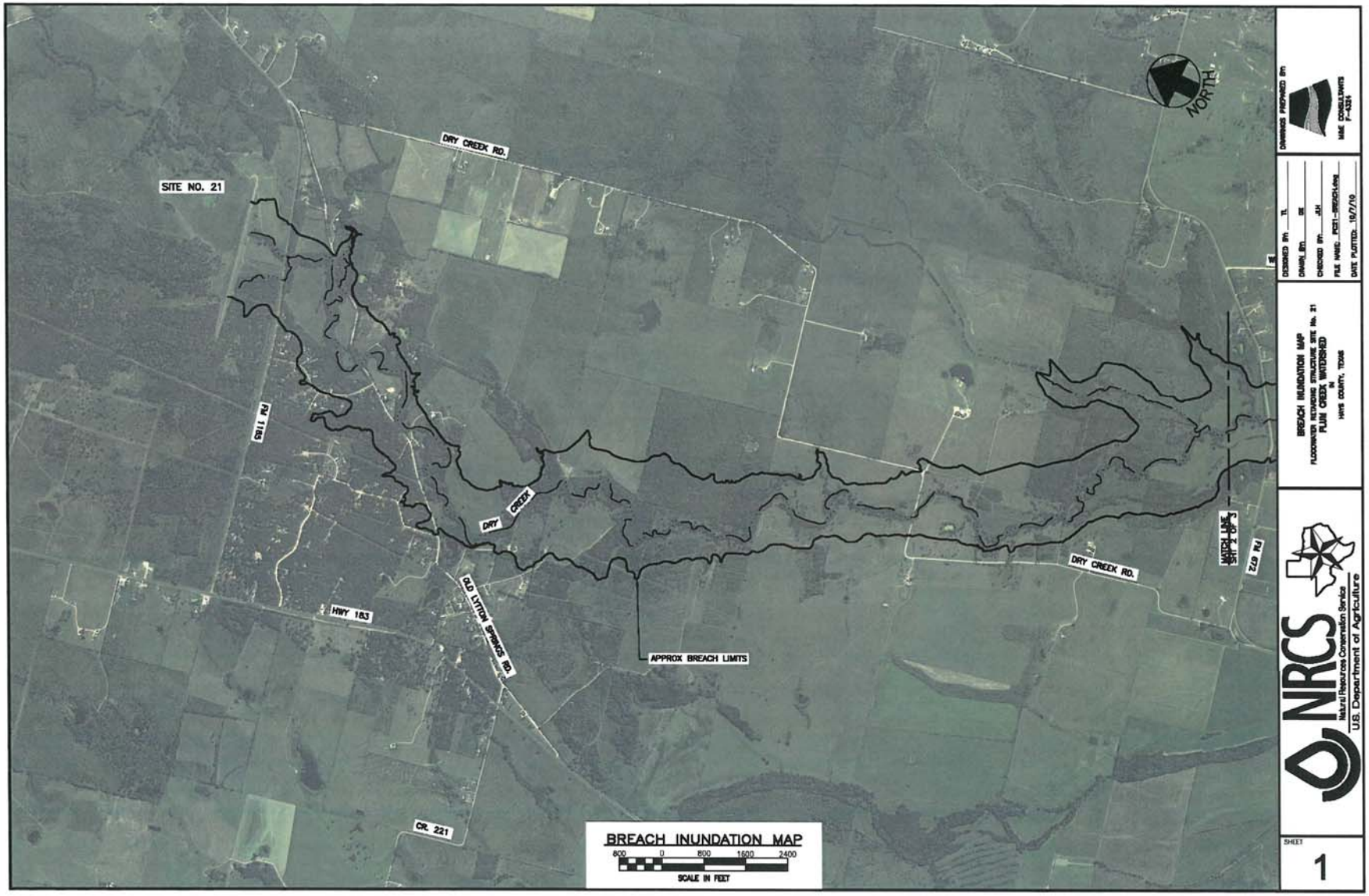
FRS No. 21 was originally designed for low hazard (Class A) conditions where potential breach of the dam may impact agricultural land and facilities, but not result in the potential for loss of life. The dam and reservoir was originally designed to temporarily store 5.45 inches of runoff with no flow through the earthen auxiliary spillway. This was determined in accordance with Soil Conservation Service National and State criteria in effect at the time of planning and design, and is based on 25 year frequency rainfall amounts. FRS No. 21 is currently performing as originally designed and is expected to continue to perform into the future. However, due to encroachment by urban development downstream, the dam has been reclassified as high hazard, and fails to meet dam safety and performance criteria for that classification. Current criteria, for the high hazard classification, requires FRS No. 21 to temporarily store the 100 year 10 day storm runoff without flow through earthen auxiliary spillways, drawdown at least 85% of the temporary storage within 10 days, and to pass the runoff from the Probable Maximum Precipitation (PMP) storm without overtopping the embankment, all of which cannot currently be met. The possibility of a storm of the magnitude of the PMP occurring is very low, but if it does, flow will occur in the current auxiliary spillways at a depth that exceeds capacity for a long duration, and the dam will be overtopped. These conditions could lead to the possible breaching of the auxiliary spillway, the embankment, or both. Therefore, the potential for FRS No. 21 to fail due to a deficiency in hydrologic capacity is judged to be high.

Hazard Classification Summary

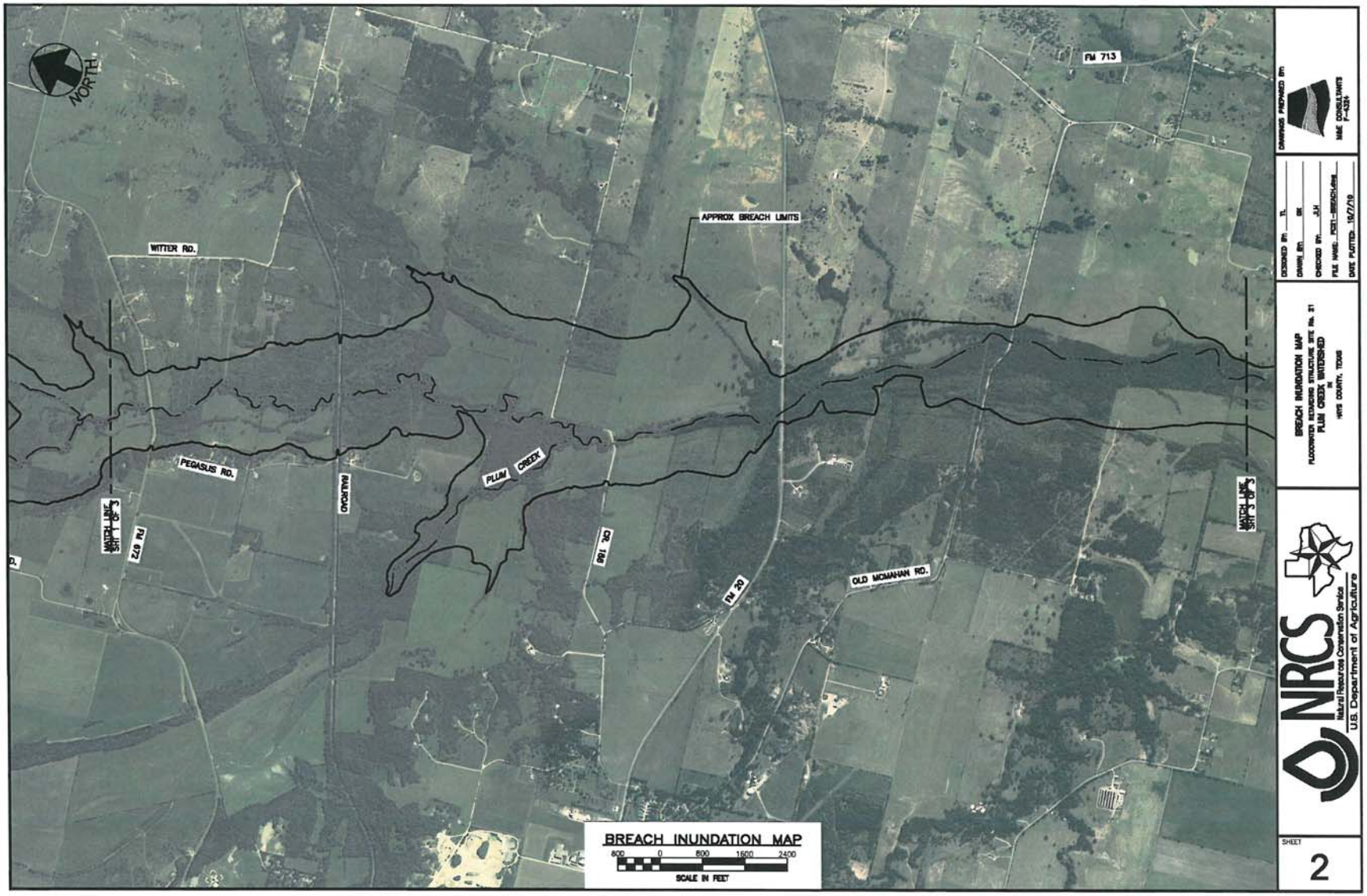
FRS No. 21 does not meet current dam design and safety requirements. The NRCS and the Texas Commission on Environmental Quality, Dam Safety Program, both agreed on the current classification of the structure as "high hazard" due to the risk of loss of life downstream should the dam breach. An Emergency Action Plan for FRS No. 21 has not been completed.

The Texas Commission on Environmental Quality (TCEQ) Simplified Breach method was used to determine breach discharges and inundation length. Fair weather conditions were assumed to develop the breach hydrograph. The reservoir pool elevation was static at top of dam with non-storm conditions downstream. The height of the breach flood wave at the dam site would be 21 feet and the maximum discharge would be 54,660 cubic feet per second (cfs). Breach studies indicate that 26 houses, three Farm-to-Market (FM) roads and three county roads are at risk from a catastrophic breach of FRS No. 21. Over 6,000 vehicles utilize the six secondary roads daily. See the Breach Inundation Map.

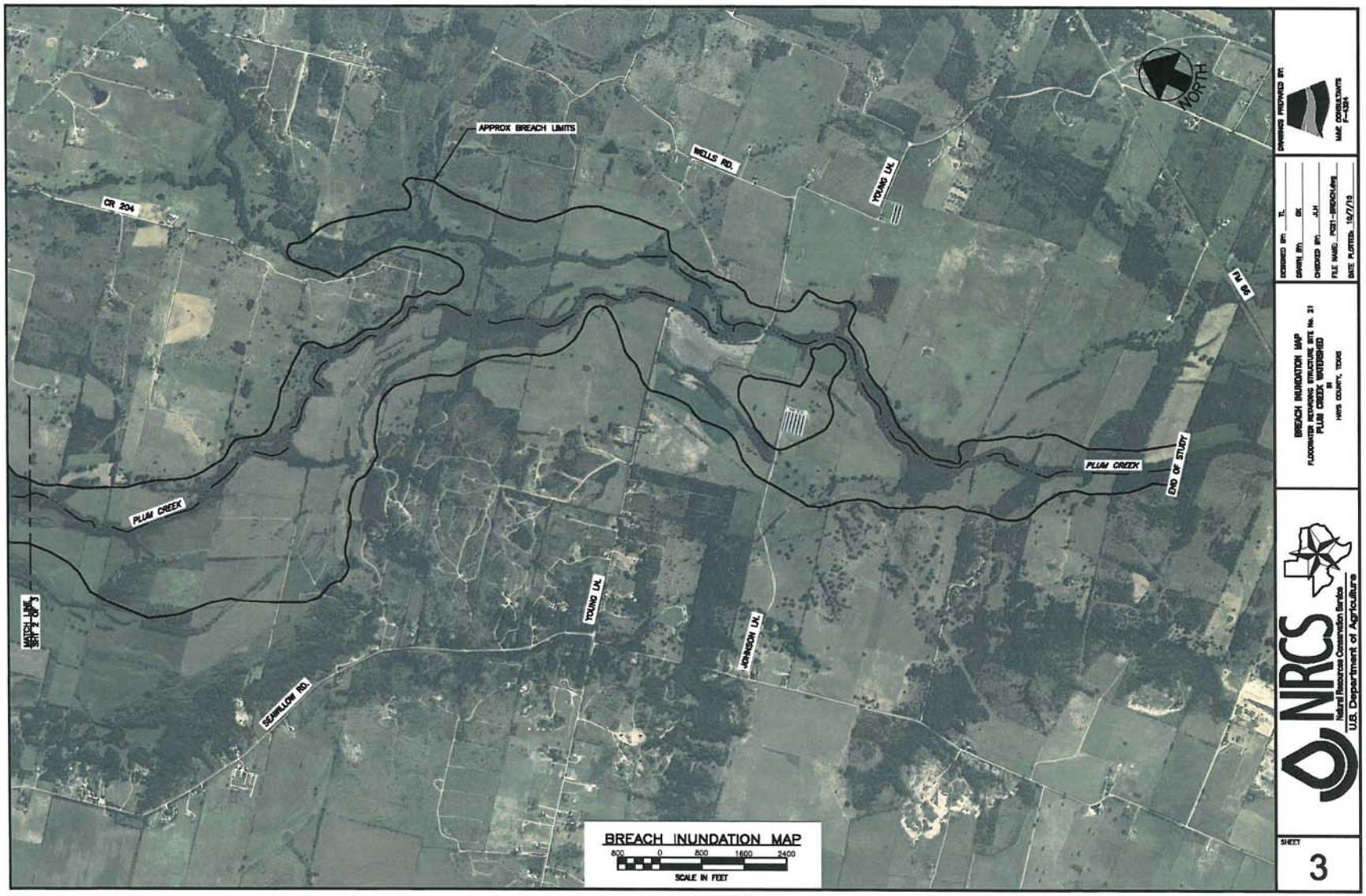
Protestants' Exhibit 5-X:
Plum Creek Watershed Floodwater Retarding Structure No. 21 Dam Assessment Report



Protestants' Exhibit 5-X:
Plum Creek Watershed Floodwater Retarding Structure No. 21 Dam Assessment Report



Protestants' Exhibit 5-X:
Plum Creek Watershed Floodwater Retarding Structure No. 21 Dam Assessment Report



Failure and Risk Indexes

Plum Creek FRS No. 21 has been evaluated utilizing the process prescribed by the worksheet "Evaluation of Potential Rehabilitation Projects" (Exhibit 508.1 of the National Watershed Manual) and the following failure and risk indexes have been computed:

- The potential dam failure index is **158**.
- The potential loss of life (Maximum Population-at-Risk {PAR}) is **318.**
- The Total Risk Index is **301**.

Design Criteria

NRCS Technical Release 60 (TR-60) establishes minimum criteria for a high hazard dam. Spillway capacity is required to pass 100 percent of the Probable Maximum Precipitation (PMP) without overtopping the dam, and safely contain runoff from the 100-year, 10-day storm (detention storage) without flowing over the crest of the earthen auxiliary spillway. Structural rehabilitation to upgrade the dam to meet high hazard criteria includes (but is not limited to) the following or a combination thereof: extend the service life of FRS No. 21 for a minimum of 50 years by providing adequate sediment storage; replace the inlet/outlet principal spillway structures; raise and/or modify the dam; widen or modify the auxiliary spillway; and other measures as appropriate.

Environmental Considerations

Under current regulations of the National Environmental Policy Act (NEPA), if FRS No. 21 is selected for rehabilitation in the future, it will need to have an Environmental Evaluation Worksheet (Form NRCS-CPA-52) completed by an interdisciplinary team to determine the level of NEPA documentation required. The worksheet will document the presence or absence of "extraordinary circumstances" and insure compliance with NEPA and with any other applicable NRCS policies and environmental laws, such as the Endangered Species Act, the National Historic Preservation Act, Executive Orders, etc., included in the NRCS list of Special Environmental Concerns. Coordination efforts will be undertaken as appropriate with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department to identify inventories, potential permitting requirements, analyses, etc. needed to assess the resources and watershed characterization.

The U.S. Fish and Wildlife Service (USFWS) lists 2 bird species in Caldwell County, Texas.

Common Name	Scientific Name	Species Group	Listing Status	Species Image	Species Distribution Map	Critical Habitat	More Info
bald eagle	*Haliaeetus leucocephalus*	Birds	DM				P
whooping crane	*Grus americana*	Birds	E, EXPN				

The review of the Texas Archeological Sites Atlas Maps did not indicate the presence of any known cultural resource sites listed for the area in or around FRS No. 21.

Potential of FRS No. 21 as a Rehabilitation Project

Eligibility for Rehabilitation Assistance: Plum Creek FRS No. 21 is eligible for NRCS rehabilitation assistance since the dam was originally constructed under the authority of Watershed Protection and Flood Prevention Act (PL-566, 83rd Congress, 68 Stat. 666) as amended. O&M for FRS No. 21 is determined to be adequate and up to date. The potential risk to loss of life due to a dam breach supports action to rehabilitate the dam to meet current performance and safety standards.

Potential Scope of a Rehabilitation Project: Breach studies indicate that 26 houses, three Farm-to-Market roads and three county roads are at risk from a catastrophic breach of FRS No. 21. The three FM roads are well traveled arterial roadways. To address the potential loss of life issue, one of the following could be considered: make necessary repairs and upgrade FRS No. 21 to meet current safety and performance standards for a high hazard dam; remove enough of the dam so that water cannot be impounded; or relocate and/or floodproof at-risk downstream facilities, purchase deed restrictions to eliminate development in the at-risk inundation area, and make necessary repairs to the dam to maintain it as a low hazard dam.

Site Specific Restraints: Specific restraints which would impose limitations on the potential structural alternatives for rehabilitation may be present at this site. These site specific issues, concerns, and restraints include but may not be limited to the following:

- Sediment survey is needed to determine quantity and quality of sediment stored in FRS No. 21 and the remaining sediment storage capacity of the site.
- Low plastic clay and sandy clay soils with questionable erosion resistance are present in the auxiliary spillway profile imposing limitations on auxiliary spillway layout.

Existing development and associated utility infrastructure in the vicinity of FRS No. 21 could impose restrictions on some rehabilitation alternatives.

Potential Rehabilitation Alternatives and Cost Estimates: In order to adequately analyze a wide range of potential rehabilitation alternatives; some alternatives, if selected for implementation, may include the need to secure a variance to the minimum design criteria from the NRCS national design engineer. Alternatives in which the dam is removed or breached to eliminate storage of water in the reservoir will result in the loss of flood control and likely subject some properties to more frequent flooding than experienced with the dam in place. Potential rehabilitation alternatives considered are:

- Alternative No. 1 - Control breach of the dam without federal assistance to remove the risk of a catastrophic breach and stabilize the stored sediment. Estimated cost of $900,000 includes removal of a portion of the dam and stabilization of the sediment with vegetation.
- Alternative No. 2 - Control breach of the dam to remove the risk of a catastrophic breach, stabilize the stored sediment and restore the riparian zone. The estimated cost of $1,700,000 includes removal of a portion of the dam, stabilization of sediment and re-establishment of the channels and adjacent riparian area within the sediment pool.
- Alternative No. 3 - Modify the existing embankment, principal spillway and auxiliary spillway to meet performance and safety standards for a high hazard dam. Replace the

existing principal spillway inlet, 30 inch diameter conduit and outlet structure with a 42 inch diameter principal spillway conduit, inlet and outlet. Use existing crest elevation of the auxiliary spillway providing 100 year detention storage, add 200 feet wide spillway on the right abutment and install a roller compacted concrete barrier to prevent flow breaching through the spillway. Raise the dam approximately 2 feet adding fill to flatten the downstream embankment slope to 3:1. Estimated cost $3,200,000.

- Alternative No. 4 – Repair / rehabilitate the dam and appurtenances as necessary to meet low hazard criteria, reclassify dam to low hazard, relocate at-risk facilities, and purchase deed restrictions downstream. The existing principal spillway at the dam requires replacement to meet current low hazard criteria. Approximately 26 residences are at-risk. Farm to Market road crossings need modification to eliminate effects of deep flow over the roadway from the breach. A roughly estimated cost is in excess of $8,000,000 so it was concluded this alternative could not be viable at this site and more detailed cost estimates were not made.

Cost estimates include eligible and non-eligible costs concerning federal cost-share. Also, federal assistance would require ensuring a minimum of 50 years of sediment capacity remaining in FRS No. 21.

Conclusions and Recommendations

Conclusions: FRS No. 21 was designed and constructed according to low hazard criteria and is now classified as a high hazard dam that does not meet current safety and performance standards. The dam has been evaluated and meets the eligibility requirements for the Watershed Rehabilitation Program. The dam and appurtenances exhibit hydraulic and structural deficiencies that could be upgraded to meet current safety and performance standards through the rehabilitation program.

Recommendations: Due to the hydraulic deficiencies of FRS No. 21 and the liability that this poses for the SLOs, it is recommended that the SLOs make application for assistance for upgrading this dam through the watershed rehabilitation program. If the application ranks high enough and is selected as a rehabilitation project, NRCS may provide funding for 65 percent of the total eligible rehabilitation project costs, and the SLOs would fund the remaining 35 percent plus any ineligible costs.

Appendix A
Design Data Sheet
Floodwater Retarding Structure

Watershed:	Plum Creek	**Prepared By:**	GK
Site No:	21	**Date:**	2009/10
County:	Caldwell	**Checked By:**	SLW
		Date:	11/3/2009

CN WHE 11/23/2009

Hydrologic Data

1. Drainage area	5075	acres	7.93	sq. mi.
2. Non Contributing Area	0	acres	0.00	sq. mi.
3. Time of concentration, Tc (or use TR55)			2.53	hrs.
Length of watershed or travel distance (L)	4.85	mi.		
Elevation difference (H)	122	ft.		
$Tc=[(11.9L^3/H)]^{0.385}$ =	2.53	hrs.		
4. AMC curve number II from TR55 or other [work plan 1960]		(II)	84	
4A. AMC curve number I from 210-18-TX1 Table 3			68	
5. Average AMC curve number (210-18-TX1 Fig. 5A)	I+(.50*(II-I))		76	
6. Dry freeboard curve no. (210-18-TX1 Pg. 1-2), none high hazard only			-	
7. Structure hazard classification (TR-60 Pg. 1-1)			high	

Principal Spillway Design (TR60 Table 2-2)

	25 yr	50 yr	100 yr	
8. One-day rainfall (210-18-TX2 Plates 5-7 or TP40)	7.8	8.9	10.0	in.
9. Areal adjustment factor (210-18-TX2 Table 21.1 or TR60 Table 2-3)	1	1	1	
10. Adjusted rainfall (8 x 9) (applies only to drainage area > 10 sq. miles)	7.8	8.9	10.0	in.
11. Ten-day rainfall (210-18-TX2 Plates 8-10 or TP40)	13.0	14.6	16.2	in.
12. Areal adjustment factor (210-18-TX2 Table 21.1 or TR60 Table 2-3)	1	1	1	
13. Adjusted rainfall (11 x 12) (applies only to drainage area > 10 sq. miles)	13.0	14.6	16.2	in.

Auxiliary Spillway and Freeboard Design (TR60 Table 2-5)

14. P_{100}, 6 hr (210-18-TX1 Fig. 1)	7.2	in.
15. P_{100}, 24 hr (210-18-TX2 Plate 7 or TP40)	10.0	in.
16. PMP, 6 hr (210-18-TX1 Fig. 2)	30.8	in.
17. PMP, 12 hr (HMR 51)	37.3	in.
18. PMP, 24 hr (HMR 51)	44.4	in.
19. Stability Spillway Hydrograph factor, SDH (TR60 Table 2-5)	0.26	
Class A: 0, 0.06 or 0.12 Class B: 0.12 Class C: 0.26		
20. Freeboard Hydrograph factor, FBH (TR60 Table 2-5)	1.00	
Class A: 0.12, 0.26 or 0.40 Class B: 0.40 Class C: 1.00		

	6 hr		24 hr	
Stability Hydrograph Rainfall = P_{100} + SDH factor(PMP - P_{100})	13.3	in.		
Freeboard Hydrograph Rainfall = P_{100} + FBH factor(PMP - P_{100})	30.8	in.	44.4	in.

Appendix B

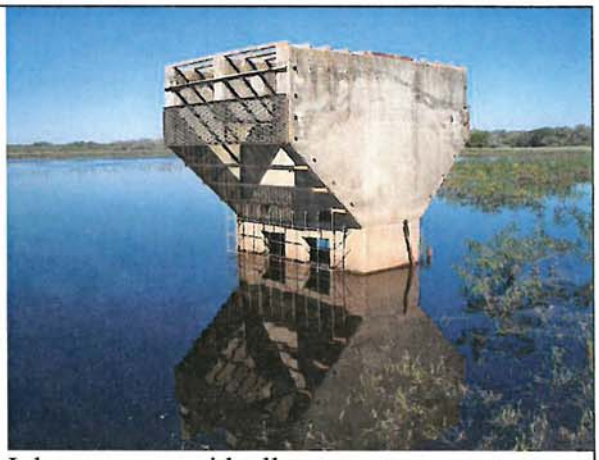
SITES Run Summaries

Plum Creek FRS 21	Run # 1	Run # 2	Run # 3	Run # 4
Watershed Runoff Curve Number	76	76	76	76
Total Watershed Drainage Area (Sq.Miles)	7.93	7.93	7.93	7.93
Watershed Time of Concentration (Hours)	2.53	2.53	2.53	2.53
SDH Rainfall Total (Inches)	N/A	13.3	N/A	13.3
SDH Rainfall Duration (Hours)	N/A	24	N/A	6
FBH or Storm Rainfall Total (Inches)	N/A	44.4	N/A	30.8
FBH or Storm Rainfall Duration (Hours)	N/A	24	N/A	6
SDH Inflow Peak (CFS)	N/A	6961.8	N/A	15239.6
FBH or Storm Inflow Peak (CFS)	N/A	25703.6	N/A	41255.4
Initial Reservoir Elevation (Feet)	512.69	505.9	505.9	505.9
Maximum WS SDH (Feet)	N/A	518.69	N/A	519.38
Maximum WS FBH or Storm (Feet)	N/A	526.45	N/A	524.27
Storage at Max. WS FBH or Storm (Acre-Ft)	N/A	7201.2	N/A	6213
Top Dam (Feet)	N/A	526.45	N/A	524.27
Storage, Top Dam (Acre-Ft)	N/A	7203	N/A	6212
Emb. Yardage (CY)	N/A	N/A	N/A	N/A
PSH Drawdown (Days)	14.35	N/A	6.23	N/A
378 Drawdown (Days)	N/A	N/A	N/A	N/A
PS Crest (Feet)	505.3	505.3	505.3	505.3
PS Number of Conduits	1	1	1	1
PS Conduit Diameter (Inches)	30	30	42	42
PS Conduit Height (Feet)	N/A	N/A	N/A	N/A
PS Conduit Width (Feet)	N/A	N/A	N/A	N/A
PS Conduit Area (Sq. Feet)	4.91	4.91	9.62	9.62
Storage, PS Crest (Acre-Ft)	653	653	653	653
PS Discharge at AS Crest (CFS)	120.3	111.8	352.8	230.8
PS Discharge for SDH (CFS)	N/A	114.9	N/A	239.8
PS Discharge FBH or Storm (CFS)	N/A	127.9	N/A	257.2
AS Crest (Feet)	521.82	517	517.1	517
Storage, AS Crest (Acre-Ft)	5120	3283.2	3337.1	3283.2
AS Width (Feet)	N/A	300	N/A	500
AS Exit Slope (%)	N/A	4	N/A	4
AS Ret. Curve Index	N/A	0.04	N/A	0.04
AS Veg. Cover Factor	N/A	0.87	N/A	0.8
AS Maintenance Code	N/A	2	N/A	2
AS Max. Head SDH (Feet)	N/A	1.69	N/A	2.38
AS Peak Discharge SDH/Storm (CFS)	N/A	1356.2	N/A	3991.7
AS Exit Velocity SDH or Storm (Ft/S)	N/A	6.05	N/A	7.61
AS Stress SDH or Storm (Lb./Sq.Ft.)	N/A	0.281	N/A	0.396
Hp FBH or Storm (Feet)	N/A	9.45	N/A	7.27
AS Peak Discharge FBH/Storm (CFS)	N/A	21532	N/A	24502
AS Integ. Dist. FBH or Storm (Feet)	N/A	N/A	N/A	49
Oe/B FBH or Storm (Acre-Ft/Ft)	N/A	47.6	N/A	17.2
Uncontrolled Drainage Area (Sq.Miles)	7.93	7.93	7.93	7.93

Run # 1 - 100yr PSH, Existing Conditions, 10 day drawdown and detention capacity requirements not met
Run # 2 - High Hazard FBH, Existing Conditions, Dam overtopped
Run # 3 - 100 yr PSH, New 42" P.S., 10 day drawdown and detention capacity requirements met
Run # 4 - High Hazard FBH, 42 " P.S., existing 300 ft plus new 200 ft Auxiliary Spillways

APPENDIX C
PLUM CREEK WATERSHED FRS NO. 21

Crown of dam with grass recovering from drought.



Inlet structure with all ports open.

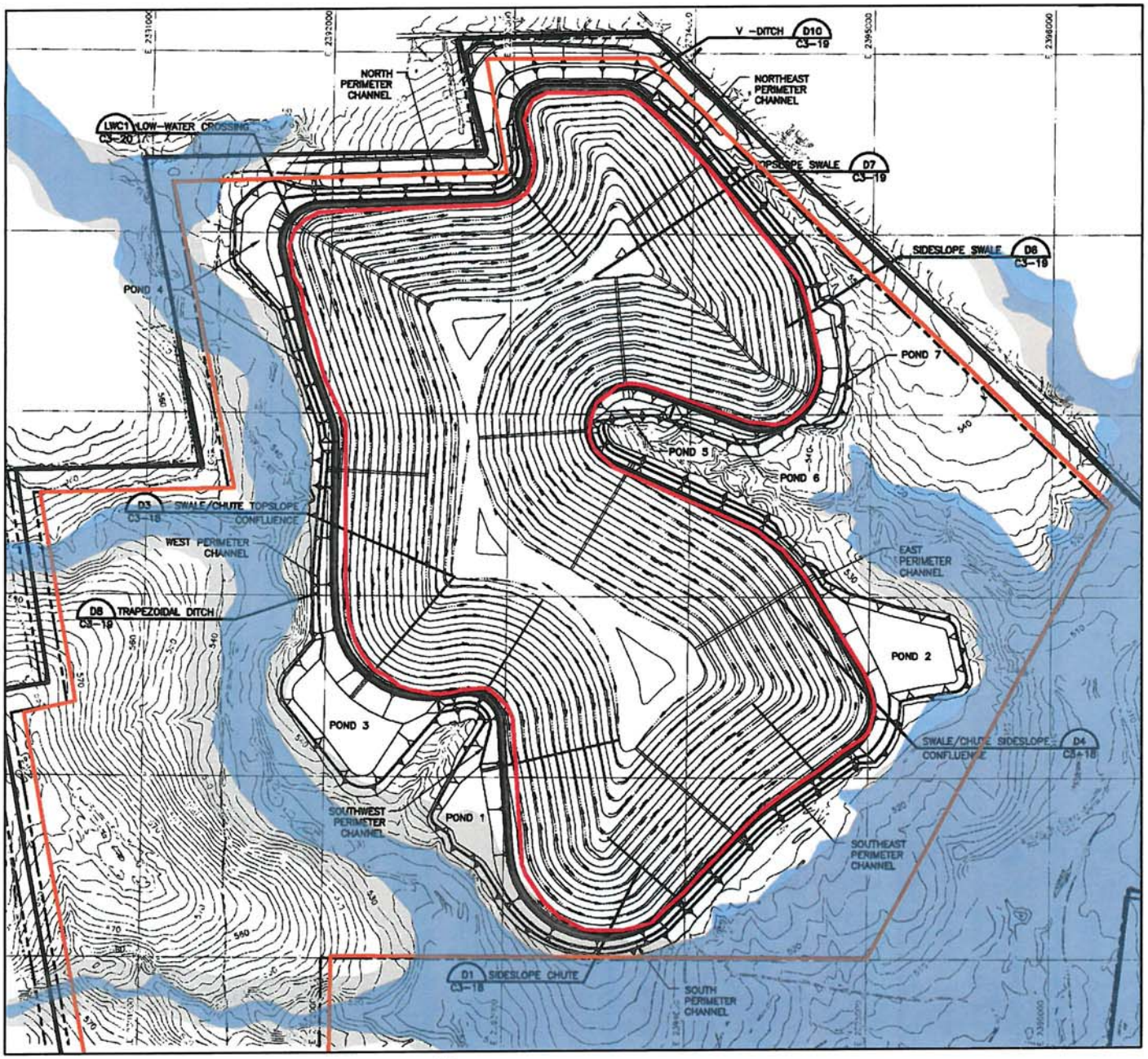
Front slope of dam, inlet structure and reservoir.

Exit section of the auxiliary spillway.

Outlet pipe..

Outlet pipe, stilling basin, and outlet channel. Scour erosion on both sides of channel just past the rock riprap.

Protestants' Exhibit 5-Y: Proposed Drainage Structure Plan and 100-year Floodplain



CAPCOG 100-year Floodplain, March 30, 2010

FEMA 100-year Floodplain

Facility Boundary

Landfill Footprint

Property Boundary

Floodplain based on FEMA National Flood Hazard Layer incorporating the Flood Insurance Rate Map database and any Letters of Map Revision. Published 1/28/2016. Obtained through TNRIS.

Drainage Structure Plan submitted as Drawing C3-1 of 130 Environmental Park Type I Permit Application. Sealed by T. Traw on 11-6-14.

N

W E

S

0 500 1,000 2,000 Feet

GLENROSE ENGINEERING

Texas Board of Professional Engineers License F4092

STATE OF TEXAS
D. LAUREN ROSS
56647
LICENSED PROFESSIONAL ENGINEER
June 26, 2016

Proposed 130 Environmental Park Landfill

Proposed Drainage Structure Plan and 100-year Floodplain

June 25, 2016

Comparison of Detention Pond Berm Elevations and Adjacent 100-Year Flood Water Elevations

Detention Pond	100-Year, 24-Hour Back-to-Back Maximum Water Surface Elevation* (ft)	Perimeter Pond Berm Elevation* (ft)	100-Year Water Elevation in Adjacent Streams** (ft)	Berm Elevations minus 100-Year Water Elevations (ft)
Pond 1	539.7	540.9	527.0	13.9
Pond 2	531.8	532.0	518.5	13.5
Pond 3	543.5	544.8	537.0	7.8
Pond 4	549.5	551.8	548.0	3.8
Pond 5	565.9	568.0	519.0	49.0
Pond 6	556.4	558.6	519.0	39.6
Pond 7	540.9	542.0	519.0	23.0

* 130 Environmental Park LLC Landfill Permit Application page C1-D-3 (970/2177 of pdf).

** Interpolated for 130 Environmental Park LLC Landfill Permit Application Drawing C2-A-3 (1060/2177 of pdf)

June 26, 2016

Glenrose Engineering, Inc.
TBPE # F4092
5Y_ComparisonOfDetentionPondBermElevationsAnd100YrWaterElevations.xlsx Sheet1
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