TABLE 2.5-15

MEDIAN 10^{-5} UNIFORM HAZARD RESPONSE SPECTRUM FOR ROCK

Frequency (Hz)	Spectral Acceleration (g)
0.5	0.075
1	0.104
2.5	0.179
5	0.210
10	0.217
25	0.232
Peak Ground Acceleration	0.109

TABLE 2.5-16

ESTIMATED CONTROLLING EARTHQUAKES FOR THE GGNS ESP SITE

Frequency (Hz)	Controlling Earthquakes	
	Magnitude (M)	Distance (km)
1 – 2.5*	7.55	386.4
1 – 2.5**	7.68	470
5 – 10	6.94	175.5

* All events.
** Controlling event at distances greater than 100 km.

TABLE 2.5-17

MEDIAN RESPONSE SPECTRA: Case 1 – Mc = 6.94 Rc (km) = 175.5

Frequency (Hz)	Scaled S_a (5-10Hz)
0.5	0.047
1	0.087
1.75	0.115
2.5	0.142
5	0.214
7.5	0.214
10	0.214
25	0.190
100	0.103

TABLE 2.5-18

MEDIAN RESPONSE SPECTRA: Case 2 – Mc = 7.55 Rc (km) = 386.4

Frequency (Hz)	Scaled S_a (1-2.5Hz)
0.5	0.049
1	0.092
1.75	0.141
2.5	0.191
5	0.233
7.5	0.230
10	0.226
25	0.184
100	0.113

TABLE 2.5-19

MEDIAN RESPONSE SPECTRA: Case 3 – Mc = 7.68 Rc (km) = 470

Frequency (Hz)	Scaled S_a (1-2.5Hz)
0.5	0.047
1	0.094
1.75	0.141
2.5	0.189
5	0.204
7.5	0.200
10	0.196
25	0.173
100	0.094

TABLE 2.5-20

SUMMARY OF BORINGS AND CPT SURROUNDING

Boring No.	P-S Velocity Survey?	Top of Boring Elevation (ft)	Total Depth (ft)	Dates Drilled	Drilling Company	Logged By
B-1	yes	133.2	185.5	07/24/02 -07/30/02	Miller Drilling	JGH/JLB
B-2	no	133.6	141.5	07/30/02 - 08/02/02	Miller Drilling	JGH/JLB
B-2a	yes	133.7	238.0	08/09/02 - 08/19/02	Miller Drilling	JGH/JLB
B-3	yes	154.8	181.0	08/12/02 - 08/15/02	Miller Drilling	JGH
CPT-1	no	133.2	95.3	07/31/02	Eustis Engineering	JLB
CPT-2	no	133.9	79.0	08/01/02	Eustis Engineering	JLB
CPT-3	no	157.6	88.5	08/01/02	Eustis Engineering	JLB
CPT-4	no	155.2	84.5	08/01/02	Eustis Engineering	JLB

TABLE 2.5-21

SUMMARY OF SUBSURFACE GEOLOGIC UNITS FROM BORING

Boring No.	Loess				Upland Complex Alluvium				Upland Complex Old Alluvium				Catahoula Formation				Ground Water (estimated from Geophysics)	
	Depth Interval (feet)		Elevation Interval (feet)		Depth Interval (feet)		Elevation Interval (feet)		Depth Interval (feet)		Elevation Interval (feet)		Depth Interval (feet)		Elevation Interval (feet)		Depth (feet)	Elevation (feet)
WLA-B-1	0	58	133	75	58	120	75	13	120	> 185.5	13	< -52.5	NE	NE	NE	NE	70	63
WLA-B-2	0	64	134	70	64	109.5	70	24	109.5	> 141.5	24	< -7.5	NE	NE	NE	NE	ND	ND
WLA-B-2a	0	64	134	70	64	109.5	70	24	109.5	199.5	24	-66	199.5	> 238	-66	< -104	75.5	58.5
WLA-B-3	0	80.5	155	74.5	80.5	170	74.5	-15	170	> 181	-15	< -26	NE	NE	NE	NE	99.5	56.5
WLA-CPT-1	0	58	133	75	58	> 95	75	< 38	NE	NE	NE	NE	NE	NE	NE	NE	ND	ND
WLA-CPT-2	0	64	134	70	64	> 79	70	< 55	NE	NE	NE	NE	NE	NE	NE	NE	ND	ND
WLA-CPT-3	0	86	158	72	86	> 88	72	< 69.5	NE	NE	NE	NE	NE	NE	NE	NE	ND	ND
WLA-CPT-4	0	81	155	74	81	> 84.5	74	< 70.5	NE	NE	NE	NE	NE	NE	NE	NE	ND	ND

NOTES:

1. NE - Not Encountered (contact below depths of sounding)
2. ND - Not Determined

TABLE 2.5-22

COMPARISON BETWEEN ESP SITE AND UFSAR BORING SPT

Material – ESP Study	**ESP SPT Summary**	**UFSAR SPT Summary**
Loess	5 to 13, avg. 8	2 to 57, avg. 20
Upland Complex Alluvium	20 to 85, avg. 48.5	6 to >111, avg. 53 (“Terrace Alluvium”)
Upland Complex Old Alluvium	19 to >85, avg. 47	15 to >145, avg. 86 (“Catahoula Formation”)
Catahoula Formation	82	-same as above-

TABLE 2.5-23

COMPARISON BETWEEN ESP SITE AND UFSAR SHEAR WAVE VELOCITY

Material	ESP Vs (fps)	UFSAR Vs (fps)
Loess	590 to 1,450	670
Upland Complex Alluvium	740 to 1,750	1,100 to 1,600
Upland Complex Old Alluvium	530 to 3,360	1,640 to 1,720
Catahoula Formation	1,500 to 2,830	1,640 to 1,720

TABLE 2.5-24

STATIC LABORATORY TESTING SUMMARY SHEET, BORING WLA B-1 FORMAT CONSISTENT TO OTHER TABLES

Boring Sample	Sample Depth (ft.)	Sample Elevation (ft.)	Sample Type (1)	Geologic unit	Classifi -cation	USCS (2)	Water Content (%)	Dry Density (pcf)	Wet Density (pcf)	Atterberg Indicies (4)			Mechanical Sieve			Hydrometer		Triaxial CU (6)			
										LL	PL	PI	Gravel %	Sand %	Fines %	Silt %	Clay %	Consolid-ation Pressure (psi)	Peak Strength (psi)	C' (psf)	Φ'
1-4A	11-12.5	120	Bag	Loess	Silty Clay	CL	25.6			28	15	13	0	0.7	99.3	—	—	—	—	N/A	N/A
1-8A	22.5-23	109	CM	Loess	Clayey Silt	ML	19.6	93.1	114.4	—	—	—	0	0.3	—	89.1	10.6	—	—	N/A	N/A
1-8B	22-22.5	108	CM	Loess	Clayey Silt	ML	20.2	97.5	117.2	—	—	—	—	—	—	—	—	—	—	N/A	N/A
1-8C	21.5-22	107	Bag	Loess	Clayey Silt	ML	22.3	—	—	—	—	—	0	0.9	99.1	—	—	—	—	N/A	N/A
1-10	30	102	Shelby	Loess	Clayey Silt	ML	27.3	85.8	109.2	30	27	3	—	—	98	—	—	—	—	N/A	N/A
1-12	36-38	95	SPT	Loess	Silty Clay	CL	26.1	—	—	26	17	9	0	1.4	98.6	—	—	—	—	N/A	N/A
1-14A	45.5-46	87	CM	Loess	Silty Clay	ML	29.5	89.1	115.4	—	—	—	—	—	—	—	—	34.7	75	0	33
1-14B	45-45.5	86.5	CM	Loess	Silty Clay	ML	28.1	90.6	116.1	—	—	—	—	—	—	—	—	65.2	113.8	0	33
1-14C	44.5-45	86	CM	Loess	Silty Clay	ML	25.6	93.7	117.7	—	—	—	—	—	—	—	—	87.5	220.8	0	33
1-15	46-48	85	SPT	Loess	Clayey Silt	ML	24.2	—	—	—	—	—	0	2.6	—	89.2	8.2	—	—	N/A	N/A
1-18	56-57.5	75	SPT	Loess	Clayey Silt w/Sand	SP-SM (ML)	19.6	—	—	—	—	—	0	26.8	73.2	—	—	—	—	N/A	N/A
1-21	65	67	Shelby	Alluvium	Silty Sand	SM	17	107	125.2	22	—	NP	0	—	34	—	—	—	—	N/A	N/A

TABLE 2.5-24 (Continued)

1-22	66-67.5	65	SPT	Alluvium	Fine Sand w/Silt	SP-SM	24.9	—	—	—	—	—	0	88.3	—	9.5	2.2	—	—	N/A	N/A
1-26	75.1-76.3	57	SPT	Alluvium	Fine Sand	SP	25.5	—	—	—	—	—	0	95.3	4.7	—	—	—	—	N/A	N/A
1-27A	86-86.5	46	CM	Alluvium	Silty Sand w/Clay lenses	SP (SM)	20.3	106.5	128.1	—	—	—	0	62.9	—	26.5	10.6	68	201.3	0	40
1-27B	85.5-86	46	CM	Alluvium	Silty Sand w/Clay lenses	SP	22.2	105.8	129.3	—	—	—	0	84.2	—	11.7	4.1	123.6	348.6	0	40
1-28	86.5-88	45	SPT	Alluvium	Sand w/Clay	SM	22.1	—	—	—	—	—	0	75.9	—	16.1	8	—	—	N/A	N/A
1-30	95.3-96.7	36	SPT	Alluvium	Silty Sand w/Gravel	SM	19.4	—	—	—	—	—	4.4	83.5	12.1	—	—	—	—	N/A	N/A
1-32	105.6-107	26	SPT	Alluvium	Coarse to Fine Sand w/Gravel	SP (SM)	16.5	—	—	—	—	—	24.3	71.3	4.4	—	—	—	—	N/A	N/A
1-33A	115-115.5	17.5	CM	Alluvium	Coarse to Fine Sand w/Gravel	SP-SM	20.2	—	—	—	—	—	0	82	8	—	—	—	—	N/A	N/A
1-33B	114.5-115	17	CM	Alluvium	Coarse to Fine Sand w/Trace of Gravel	SP	19.9	101.8	122.1	—	—	—	0	2	92	—	—	77.7	236.1	0	41

TABLE 2.5-24 (Continued)

1-33C	114-114.5	17	CM	Alluvium	Coarse to Fine Sand w/Gravel	SW-SP	14.5	—	—	—	—	—	0	6	80	—	—	—	—	N/A	N/A
1-34	115.5-117	16	SPT	Alluvium	Coarse to Fine Sand w/Silt and Gravel	SP	15.2	—	—	—	—	—	4.5	87.6	—	5.1	2.8	—	—	N/A	N/A
1-36	124.2-125.8	7	SPT	Old alluvium	Clayey Sand	SC	24.7	—	—	24	14	10	—	—	—	—	—	—	—	N/A	N/A
1-41A	155-155.5	-23	CM	Old alluvium	Clayey Sand	ML	33.4	85.5	114.1	—	—	—	0	0	100	—	—	—	—	Test not completed (3)	Test not completed (3)
1-41B	154.5-155	-23.5	CM	Old alluvium	Clayey Sand	ML	38.4	77.9	107.8	—	—	—	0	0	3	—	—	—	—		
1-42	154-154.5	-24	SPT	Old alluvium	Sandy Clay	CL	35.1	—	—	40	25	15	—	—	—	—	—	—	—	N/A	N/A
1-43	165	-33	Shelby	Old alluvium	Silty Sand	SM (CL-ML)	28.6	89.3	113.6	29	—	NP	—	—	27	—	—	—	—	N/A	N/A
1-44	166-167.5	-33.5	SPT	Old alluvium	Silt w/Claystone	ML	31.5	—	—	—	—	—	0	21.4	—	68.6	10	—	—	N/A	N/A
1-46	175.5-177	-44	SPT	Old alluvium	Silty Clay w/Claystone	CL	29.8	—	—	37	21	16	0.3	21.3	78.4	—	—	—	—	N/A	N/A
1-47	184-185.5	-53	SPT	Old alluvium	Silt w/Claystone	ML	36.1	—	—	—	—	—	0.2	24.8	—	62.8	12.2	—	—	N/A	N/A

TABLE 2.5-24 (Continued)

NOTES:
See Figure 2.5-71 for sample locations

1. CM = California Modified Sampler, 3" diameter brass sleeve SPT = Standard Petroleum Test bag sample
2. Combined field and laboratory Uniform Soil Classification System (USCS), where the field and laboratory are different, the field classification is listed in parentheses
3. CU test could not be performed. Laboratory equipment had sufficient confining pressure to saturate the sample
4. LL = Liquefied Limit; PL = Plastic Limit; PI = Plasticity Index
5. pcf = Pounds per Cubic Foot; psi = Pounds per Square Inch
6. C' = effective stress cohesion intercept; Φ' = effective stress angle of internal friction

TABLE 2.5-25

STATIC LABORATORY TESTING SUMMARY, BORING WLA B-2, B-2A, B-3

Boring Sample	Sample Depth (ft.)	Sample Elevation (ft.)	Sample Type (1)	Geologic unit	Classifi -cation	USCS (2)	Water Content (%)	Dry Density (PCF)	Wet Density (PCF)	Atterberg Indices (4)			Mechanical Sieve			Hydrometer		Triaxial CU (6)			
										LL	PL	PI	Gravel	Sand	Fines	Silt	Clay	Consolid-ation Pressure (psi)	Peak Strength (psi)	C' (psf)	Φ'
2-1A	4.5-5	129.5	CM	Loess	Clayey Silt	ML	15.7	92.8	107.4	—	—	—	0.4	0.6	99	—	—	—	—	N/A	N/A
2-3	13.5-15	120	SPT	Loess	Clayey Silt	ML	24.8	—	—	—	—	—	0	0.8	99.2	—	—	—	—	N/A	N/A
2-4A	19.5-20	114	CM	Loess	Silty Clay	CL (ML)	16.4	96.1	111.8	29	18	11	0	0.2	—	90.2	9.6	—	—	N/A	N/A
2-6A	29.5-30	104	CM	Loess	Clayey Silt	ML	17.3	96.1	112.7	—	—	—	0	0.4	99.6	—	—	—	—	N/A	N/A
2-6B	29-29.5	103.5	CM	Loess	Clayey Silt	ML	20	97	116.4	—	—	—	—	—	—	—	—	—	—	N/A	N/A
2-9A	44.5-45	89.5	CM	Loess	Clayey Silt	ML	22.6	96.6	118.4	—	—	—	—	—	—	—	—	39.4	99	0	34
2-9B	44-44.5	90	CM	Loess	Clayey Silt	ML	22.5	—	—	—	—	—	—	—	—	—	—	—	—	N/A	N/A
2-10	48.5-50	85	SPT	Loess	Silty Clay w/claystone	CL (ML)	24.2	—	—	25	16	9	0	1.1	98.9	—	—	—	—	N/A	N/A
2-11	60	74	Shelby	Loess/Alluvium	Lean Clay	CL	22.2	104.7	127.9	32	—	13	—	—	98	—	—	—	—	N/A	N/A
2-12A	69.5-70	64	CM	Alluvium	Silty Sand w/Clay lenses	SP (SM)	16.5	113	131.7	—	—	—	0	55.8	—	35.9	8.3	66.6	195.8	0	36

TABLE 2.5-25 (Continued)

2-12B	69-69.5	64.5	CM	Alluvium	Silty Sand w/Clay lenses	SP	17	111.8	130.8	—	—	—	0	55.8	—	35.9	8.3	118	294.4	0	36
2-13	78.5-80	55	SPT	Alluvium	Clayey Sand w/Trace of Gravel	SC (SM)	16.7	—	—	—	—	—	2.8	85	12.2	—	—	—	—	N/A	N/A
2-15	98.5-100	35	SPT	Alluvium	Coarse to Fine Sand w/Silt and gravel	SP-SM	16.1	—	—	—	—	—	5	86.2	8.8	—	—	—	—	N/A	N/A
2-16	109	25	Shelby	Old alluvium	Lean Clay	CL	27.2	94.9	120.7	33	—	12	—	—	99	—	—	—		N/A	N/A
2-29	121.5-122.1	12.5	HQ	Old alluvium	Sandy Claystone	CL	5.6	—	—	—	—	—	8.5	13.3	78.2	—	—	—	—	N/A	N/A
2-31	122.7-123.6	11	HQ	Old alluvium	Silty Sand w/Clay	SM	5.6	—	—	17	16	1	0	67.3	32.7	—	—	—	—	N/A	N/A
2-32	126.5-127.5	7	HQ	Old alluvium	Silty Sand w/Clay	SM	8.4	—	—	—	—	—	0	73.3	—	20.5	6.2	—	—	N/A	N/A
2-33	128-128.9	5.5	HQ	Old alluvium	Clayey Silt w/Sand & Organic Matter	ML	12.5	—	—	—	—	—	0	14.4	85.6	—	—	—	—	N/A	N/A
2A-2	173-174	-39.5	SPT	Old alluvium	Clayey Sand w/Claystone	SC (SM)	35.2	—	—	—	—	—	22	48.5	29.5	—	—	—	—	—	—

TABLE 2.5-25 (Continued)

2A-3	202-203	-68.5	SPT	Catahoula formation bedrock	Hard Clay w/Claystone	CH	21.5	—	—	54	19	35	0.4	19	80.6	—	—	—	—	—	—
3-3A	16-16.5	140	CM	Loess	Silty Clay	CL	22.9	94.1	115.7	32	17	16	0	0.2	99.8	—	—	—	—	N/A	N/A
3-3B	15.5-16	140.5	CM	Loess	Clayey Silt	ML	23.9	—	—	—	—	—	0	0.5	99.5	—	—	—	—	N/A	N/A
3-5	25-26.5	130	SPT	Loess	Clayey Silt	ML	24.2	—	—	—	—	—	0	0.8	—	89.1	10.1	—	—	N/A	N/A
3-9	45-46.5	110	SPT	Loess	Silty Clay	CL	26.3	—	—	28	18	10	—	—	—	—	—	—	—	N/A	N/A
3-10A	51-51.5	105	CM	Loess	Clayey Silt	ML	20.1	99.5	119.4	—	—	—	0	0.2	—	88.7	11.1	—	—	N/A	N/A
3-10B	50.5-51	104.5	CM	Loess	Clayey Silt	ML	23.3	—	—	—	—	—	0	0.9	99.1	—	—	—	—	N/A	N/A
3-13	81	75	Shelby	Alluvium	Sandy Silt	ML (SC-CL)	19	108.7	129.4	22	—	4	—	—	54	—	—	—	—	N/A	N/A
3-14A	90.5-91	65	CM	Alluvium	Fine to Medium Sand	SP	23.2	93.2	114.8	—	—	—	—	—	—	—	—	84.7	300	0	39
3-14B	90-90.5	65.5	CM	Alluvium	Loose Clayey Sand	SC	22.9	—	—	—	—	—	—	—	—	—	—	—	—	N/A	N/A
3-16	110-111.5	46	SPT	Alluvium	Coarse to Fine Sand w/Silt and Gravel	SP-SM	9.9	—	—	—	—	—	41.6	51.7	6.7	—	—	—	—	N/A	N/A

TABLE 2.5-25 (Continued)

3-17	150-151.5	6	SPT	Alluvium	Light Brown Medium to Fine Sand w/Silt	SP-SM	21	—	—	—	—	—	0	92.9	7.1	—	—	—	—	N/A	N/A
3-18A	180.5-181	-24	CM	Old alluvium	Brown Fine Sand w/Clay	SP	24.9	—	—	—	—	—	0	89.2	10.8	—	—	—	—	N/A	N/A
3-18B	180-180.5	-23.5	CM	Old alluvium	Very Soft Tan Sandy Clay	CL	—	—	—	—	—	—	—	—	—	—	—	—	—	N/A	N/A
3-18C	181-181.5	-24.5	CM	Old alluvium	Brown Fine Sand w/Clay	SP	24.9	—	—	—	—	—	0	89.2	10.8	—	—	—	—	N/A	N/A

NOTES:

See Figure 2.5-72, 2.5-73, and 2.5-74 for sample locations

1. CM = California Modified Sampler; 3-inch diameter brass sleeve SPT = Standard Penetration Test bag sample
2. Combined field and laboratory Uniform Soil Classification System (USCS), where the field and laboratory are different, the field classification is listed in parentheses
3. CU test could not be performed. Laboratory equipment had sufficient confining pressure to saturate the sample
4. LL = Liquefied Limit; PL = Plastic Limit; PI = Plasticity Index
5. pcf = Pounds per Cubic Foot; psi = Pounds per Square Inch
6. C' = effective stress cohesion intercept; Φ' = effective stress angle of internal friction

TABLE 2.5-26

DYNAMIC SOIL TEST SPECIMENS AND PROPERTIES

Geologic Material Unit	WLA Sample No.	UTEXAS Sample Letter	UTEXAS Sample No.	Sample Depth (ft)	Confining Pressure (psf)	Assumed Ko	USCS	PI	Percent Fines	Lab to Field Velocity Ratio	Lab to Field Modulus Ratio
Loess	B-1-10	UTA-33-B	1	30	2304	0.5	CL	3	98	0.69	0.48
Loess, at contact with Upland Complex Alluvium	B-2-11	UTA-33-A	2	60	4320	0.5	ML	13	98	0.65	0.42
Upland Complex Alluvium	B-1-21	UTA-33-C	3	65	7920	1.0	SM	NP	34	0.86	0.74
Upland Complex Alluvium	B-3-13	UTA-33-D	4	81	8640	1.0	CL-ML	4	54	0.73	0.53

TABLE 2.5-26 (Continued)

Geologic Material Unit	WLA Sample No.	UTEXAS Sample Letter	UTEXAS Sample No.	Sample Depth (ft)	Confining Pressure (psf)	Assumed Ko	USCS	PI	Percent Fines	Lab to Field Velocity Ratio	Lab to Field Modulus Ratio
Upland Complex Old Alluvium	B-2-16	UTA-33-F	5	109	10370	1.0	CL	12	99	1.0	1.0
Upland Complex Old Alluvium	B-1-43	UTA-33-E	6	165	12960	1.0	SM	NP	27	0.58	0.34

NOTES:
1. Dynamic soils tests conducted at University of Texas, (UTEXAS) under the direction of Dr. Kenneth Stokoe
2. NP = Non-plastic