

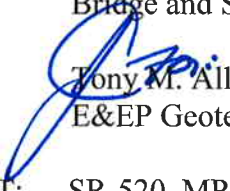


**Washington State
Department of Transportation**

MEMORANDUM

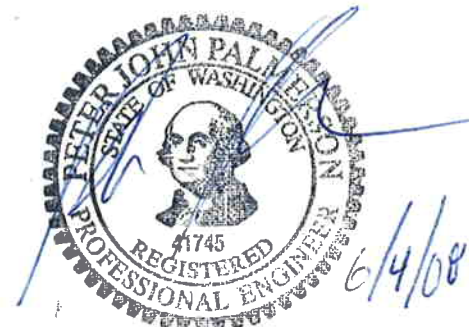
June 4, 2008

TO: Bijan Khaleghi /Mark Anderson
Bridge and Structures, MS 47340

FROM:  Tony M. Allen/Donald A. Williams
E&EP Geotechnical Division, MS 47365

SUBJECT: SR-520, MP 11.8, XL-2028
West Lake Sammamish Parkway to SR-202
RNE Bridge and Bridge 520/42 S Widening
Addendum 1 to Geotechnical Design Recommendations

As requested, we are supplying the P-Y Curve Soil Data for the widening of Bridge 520/42 S. We have revised the SIL-Shaft Input Data from our previous report dated April 16, 2008 to the P-Y format. It is our understanding that P-Y format is need to evaluate the existing bridge timber pile foundation.



EXPIRES 1/27/10

Donald A. Williams

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Geotechnical Engineer

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Approval Authority: Tony Allen
State Geotechnical Engineer

TMA: DAW

cc: Brian Aldrich, Bridge and Structures, MS 4734

SR-520 West Lake Sammamish Parkway to SR-202 - Bridge 520/42S Widening

P-Y CURVE SOIL DATA for LPILE Program

Applies to Pier: 1

Ground Surface Elevation (ft): 68.0

(Bottom of Pile Cap Elevation at elevation 62.8 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	STATIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in ³	pcf	psi	psf			
1	5	63	Sand	4	0.074	128				38	210
2	15	53	Sand	4	0.067	115				33	110
3	25	43	Sand	4	0.072	125				34	130
4	30	38	Sand	4	0.075	130				38	210
5	35	33	Sand	4	0.072	125				34	130
6	41	27	Sand	4	0.061	105				28	10
7	45	23	Sand	4	0.034	58				37	110
8	50	18	Sand	4	0.031	53				36	100
9	75	-7	Sand	4	0.045	78				45	180
10	100	-32	Sand	4	0.045	78				45	180

Applies to Piers: 2

Ground Surface Elevation (ft): 40.2

(Bottom of Pile Cap Elevation at elevation 33.6 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	STATIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in ³	pcf	psi	psf			
1	12	29	Soft Clay	1	0.061	105	5.55	800	0.015		
2	14	26	Soft Clay	1	0.030	52	6.94	1000	0.010		
3	19	21	Sand	4	0.034	58				31	745
4	24	16	Sand	4	0.034	58				40	145
5	58	-18	Sand	4	0.045	78				42	160
6	63	-23	Sand	4	0.039	68				35	90
7	74	-34	Sand	4	0.039	68				37	110
8	84	-44	Sand	4	0.028	48				30	30
9	94	-54	Sand	4	0.042	73				43	170
10	100	-60	Sand	4	0.039	68				40	145

Applies to Pier: 2

Ground Surface Elevation (ft): 40.2

(Bottom of Pile Cap Elevation at elevation 33.6 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	DYNAMIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in ³	pcf	psi	psf			
1	12	29	Soft Clay	1	0.061	105	2.43	350	0.020		
2	14	26	Soft Clay	1	0.030	52	2.43	350	0.020		
3	19	21	Soft Clay	1	0.034	58	12.49	1800	0.005		
4	24	16	Sand	4	0.034	58				40	145
5	58	-18	Sand	4	0.045	78				42	160
6	63	-23	Soft Clay	1	0.039	68	9.02	1300	0.005		
7	74	-34	Soft Clay	1	0.039	68	13.88	2000	0.005		
8	84	-44	Soft Clay	1	0.028	48	6.94	1000	0.015		
9	94	-54	Sand	4	0.042	73				43	170
10	100	-60	Sand	4	0.039	68				40	145

FIGURE D-16A : P-Y CURVE SOIL DATA

SR-520 West Lake Sammamish Parkway to SR-202 - Bridge 520/42S Widening

P-Y CURVE SOIL DATA for LPILE Program

Applies to Pier: 3

Ground Surface Elevation (ft): 41.7

(Bottom of Pile Cap Elevation at elevation 30.6 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	STATIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in3	pcf	psi	psf		(deg)	pci
1	13	29	Soft Clay	1	0.061	105	5.55	800	0.015		
2	20	22	Sand	4	0.022	38				28	10
3	25	17	Sand	4	0.039	68				40	145
4	40	2	Sand	4	0.042	72				42	160
5	50	-8	Sand	4	0.045	78				43	170
6	55	-13	Sand	4	0.028	48				34	80
7	65	-23	Sand	4	0.045	78				45	180
8	70	-28	Sand	4	0.042	73				40	145
9	74	-32	Sand	4	0.031	53				33	70
10	90	-48	Sand	4	0.036	63				39	135

Applies to Pier: 3

Ground Surface Elevation (ft): 41.7

(Bottom of Pile Cap Elevation at elevation 30.6 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	DYNAMIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in3	pcf	psi	psf		(deg)	pci
1	13	29	Soft Clay	1	0.061	105	4.16	600	0.015		
2	20	22	Sand	4	0.022	38				28	10
3	25	17	Sand	4	0.039	68				40	145
4	40	2	Sand	4	0.042	72				42	10
5	50	-8	Sand	4	0.045	78				43	170
6	55	-13	Soft Clay	1	0.028	48	6.94	1000	0.015		
7	65	-23	Sand	4	0.045	78				45	180
8	70	-28	Sand	4	0.042	73				40	145
9	74	-32	Sand	4	0.031	53				33	70
10	90	-48	Sand	4	0.036	63				39	135

Applies to Pier: 4

Ground Surface Elevation (ft): 41.2

(Bottom of Pile Cap Elevation at elevation 19.6 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	STATIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in3	pcf	psi	psf		(deg)	pci
1	13	28	Soft Clay	1	0.061	105	4.16	600	0.015		
2	20	21	Sand	4	0.025	43				28	10
3	46	-5	Sand	4	0.042	73				30	40
4	61	-20	Sand	4	0.042	73				38	120
5	66	-25	Sand	4	0.039	68				38	120
6	71	-30	Sand	4	0.036	63				35	90
7	101	-60	Sand	4	0.039	68				40	145

FIGURE D-17A : P-Y CURVE SOIL DATA

SR-520 West Lake Sammamish Parkway to SR-202 - Bridge 520/42S Widening

P-Y CURVE SOIL DATA for LPILE Program

Applies to Pier: 4

Ground Surface Elevation (ft): 41.2

(Bottom of Pile Cap Elevation at elevation 19.6 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	DYNAMIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in ³	pcf	psi	psf			
ft	ft				lb/in ³	pcf	psi	psf		(deg)	pci
1	13	28	Soft Clay	1	0.061	105	4.16	600	0.015		
2	20	21	Sand	4	0.025	43				28	10
3	46	-5	Sand	4	0.042	73				30	40
4	61	-20	Sand	4	0.042	73				38	120
5	66	-25	Sand	4	0.039	68				38	120
6	71	-30	Soft Clay	1	0.036	63	13.88	2000	0.010		
7	101	-60	Sand	4	0.039	68				40	145

Applies to Pier: 5

Ground Surface Elevation (ft): 53.0

(Bottom of Pile Cap Elevation at elevation 46.2 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	STATIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in ³	pcf	psi	psf			
ft	ft	ft			lb/in ³	pcf	psi	psf		(deg)	pci
1	19	34	Sand	4	0.072	125				35	160
2	24	29	Soft Clay	4	0.061	105	4.16	600	0.015		
3	32	21	Sand	1	0.025	43				28	10
4	58	-5	Sand	4	0.042	73				30	40
5	73	-20	Sand	1	0.042	73				38	120
6	78	-25	Sand	1	0.039	68				38	120
7	83	-30	Sand	1	0.036	63				35	90
8	113	-60	Sand	1	0.039	68				40	145

Applies to Pier: 5

Ground Surface Elevation (ft): 53.0

(Bottom of Pile Cap Elevation at elevation 46.2 ft corrected to NAV 88 Datum)

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	DYNAMIC ANALYSIS						
					Effective Unit Weight of Soil		Cohesion		Axial Strain ϵ_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
					lb/in ³	pcf	psi	psf			
ft	ft	ft			lb/in ³	pcf	psi	psf		(deg)	pci
1	19	34	Sand	1	0.072	125				35	160
2	24	29	Soft Clay	4	0.061	105	4.16	600	0.015		
3	32	21	Sand	4	0.025	43				28	10
4	58	-5	Sand	4	0.042	73				30	40
5	73	-20	Sand	4	0.042	73				38	120
6	78	-25	Sand	4	0.039	68				38	120
7	83	-30	Soft Clay	4	0.036	63	13.88	2000	0.010		
8	113	-60	Sand	4	0.039	68				40	145

FIGURE D-17B : P-Y CURVE SOIL DATA