

CH 2 (Tick Ridge Road - FAS 937)  
 over Post Creek Cut-Off  
 Section 12-00071-00-BR  
 Pulaski County  
 Ex. SN 077-3000

**Note: B5 and B6 were not drilled**

**Project:**  
 Post Creek Cut Off Bridge Replacement  
 Pulaski County, Illinois

**Client:**  
 HMG Engineering, Inc.  
 Breese, Illinois

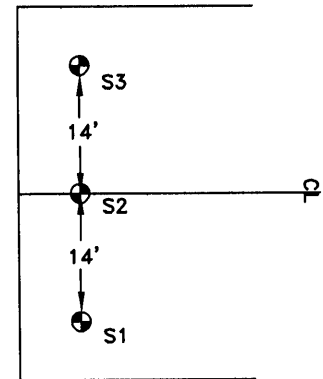
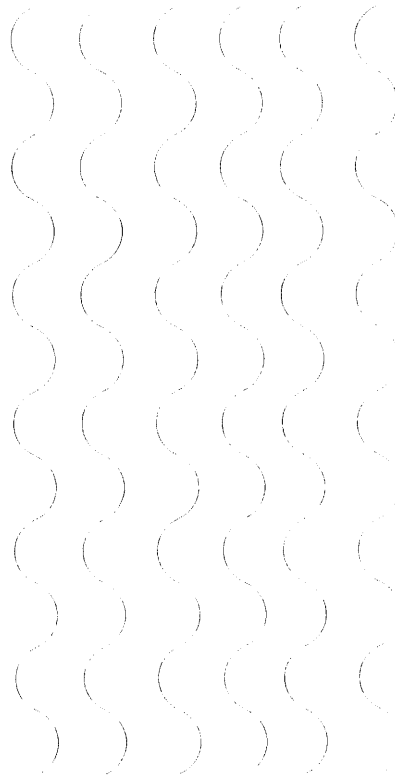
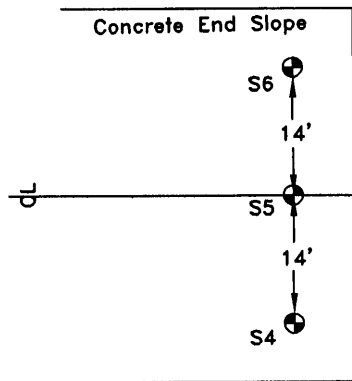
## Boring Location Diagram

**Project No. H-19149**

North

**Not to Scale**

**September 4, 2019**



Sounding Results	
Test	Depth
S1	5'
S2	3'
S3	5'
S4	9'11"
S5	2'9"
S6	5'2"

S1 to S3 Approximate Elevation = 314.45  
 S4 to S6 Approximate Elevation = 313.95

# Bedrock Sounding Tests

Scale Not to Scale



Project: Post Creek Cut Off Bridge Replacement  
 Pulaski County, Illinois

Date of Boring  
 September 4, 2019

Client: HMG Engineering, Inc.  
 Breese, Illinois

Project No.  
 H-19049

HOLCOMB FOUNDATION ENGINEERING INC.

393 Wood Road  
Carbondale, Il. 62901

618-529-5262  
618-457-8991 fax

Bridge Foundation Boring Log

Project: H-19049 Bridge Post Creek Cut Off Bridge Date: 6/4/2019  
 Section: 12-00071-00-BR Station \_\_\_\_\_  
 Structure: \_\_\_\_\_ Bored by: J. Carter  
 County: Pulaski Checked By: T. Holcomb

Boring No: <u>1</u>	Elevation	Z	Qu	tsf	w	%	Surface Water Elev. _____	Elevation	Z	Qu	tsf	w	%
Station: <u>31+64.17</u>							Ground Water Elev. _____						
Offset: _____							During Drilling <u>Dry</u>						
							Upon Completion <u>353.85</u>						

Ground Surface	363.85	0					silty clay (continued)						
18" Asphalt													
								340.35					
Brown Mottled Gray Silty CLAY (A-6)		9	3.0B	23			Brown Mottled Gray Silty SAND (A-2-4)	-25	11	1.4B	17		
		-5	5	3.8B	17				15	1.1S	18		
			3	0.9B	26			-30	31	--	23		
	355.35												
Gray Mottled Brown Silty CLAY (A-6)		-10	7	2.3S	26								
	352.85						Gray Silty CLAY to Sandy CLAY (A-6)	330.35					
Brown Mottled Gray Silty CLAY (A-6)			10	2.0S	26			-35	8	1.2B	22		
		-15	8	1.9S	26								
			8	2.9B	20			324.35	33	--	17		
	345.35						Brown Mottled Gray SAND (A-2-4)	-40					
Brown Silty CLAY (A-6)		-20	8	1.6B	20								
								320.35					
			10	1.3S	18		Gray LIMESTONE with Gray Sandy CLAY (A-6)		100	--	11		
									/2"				

N = Standard Penetration Test Blows per foot to drive 2" O.D. Split Spoon Sampler 12" with a 140 lbs. hammer falling 30"  
 Qu-Unconfined Compressive Strength in tons/sq.ft.  
 w-Water Content-percentage of oven dry weight-%  
 B = Bulge Failure  
 S = Shear Failure  
 E = Estimated Value  
 P = Penetrometer









# HOLCOMB FOUNDATION ENGINEERING INC.

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Carbondale, Il. 62901

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## Bridge Foundation Boring Log

Project: H-19049 Bridge Post Creek Cut Off Bridge Date: 6/4/2019  
 Section: 12-00071-00-BR Station: \_\_\_\_\_ Bored by: J. Carter  
 Structure: \_\_\_\_\_ Checked By: T. Holcomb  
 County: Pulaski

Boring No:	Station:	Offset:	Elevation	Z	Qu	tsf	w %	Surface Water Elev.	Elevation	Z	Qu	tsf	w %
<u>3</u>	<u>34+46.83</u>												
								Ground Water Elev. During Drilling	<u>306.66</u>				
								Upon Completion	<u>343.66</u>				
			<u>45</u>										
										<u>-70</u>			
			<u>315.16</u>										
Gray Sandy CLAY with limestone (A-6)													
			<u>-50</u>	<u>21</u>	<u>0.4S</u>	<u>25</u>							
										<u>-75</u>			
			<u>-55</u>	<u>19</u>	--	<u>19</u>							
			<u>306.16</u>							<u>-80</u>			
Gray LIMESTONE													
			<u>-60</u>										
										<u>-85</u>			
			<u>300.66</u>										
End of Boring @ -63.0'													
			<u>-65</u>										

N = Standard Penetration Test  
 Blows per foot to drive 2" O.D.  
 Split Spoon Sampler 12" with  
 a 140 lbs. hammer falling 30"

Qu - Unconfined Compressive  
 Strength in tons/sq.ft.  
 w - Water Content - percentage  
 of oven dry weight - %

B = Bulge Failure  
 S = Shear Failure  
 E = Estimated Value  
 P = Penetrometer







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Bridge Foundation Boring Log

Project: H-19049 Bridge Post Creek Cut Off Bridge Date: 6/3/2019  
 Section: 12-00071-00-BR Station: \_\_\_\_\_ Bored by: J. Carter  
 Structure: \_\_\_\_\_  
 County: Pulaski Checked By: T. Holcomb

Boring No: 7  
 Station: \_\_\_\_\_  
 Offset: \_\_\_\_\_

Surface Water Elev. \_\_\_\_\_  
 Ground Water Elev. \_\_\_\_\_  
 During Drilling Dry  
 Upon Completion Dry

Description	Elevation	N	Qu	tsf	w %	Surface Water Elev.	Ground Water Elev.	During Drilling	Upon Completion
Ground Surface	365.90	0							
15" Asphalt									
Brown CLAY (A-6)		6	1.4S	25					
		9	--	25					
	359.90								
Brown Mottled Gray CLAY (A-6)		8	1.9B	26					
	355.90	6	1.4S	24					
End of Boring @ -10.0'									

N = Standard Penetration Test Blows per foot to drive 2" O.D. Split Spoon Sampler 12" with a 140 lbs. hammer falling 30"  
 Qu - Unconfined Compressive Strength in tons/sq.ft.  
 w - Water Content - percentage of oven dry weight-%  
 B = Bulge Failure  
 S = Shear Failure  
 E = Estimated Value  
 P = Penetrometer



B1 Rock Core 50.5-55.5':



B3 Rock Core 58-63':





B4 Rock Core 44-54':



**Rock Core RQD Sheets**

Project: Post Creek Cut-Off Bridge

Project No: H-19049

<u>Boring</u>	<u>Depth (Ft)</u>	<u>Core Run Length (in)</u>	<u>Recovery (in)</u>	<u>RQD Length (in)</u>	<u>% Recovery</u>	<u>% RQD</u>
B-1	50.5-55.5	60	57	49	95	82
B-3	58-63	60	47.5	46.25	79	77
B-4	44-49	60	31	0	52	0
B-4	49-54	60	13	0	22	0

HOLCOMB FOUNDATION ENGINEERING COMPANY  
Rock Core Strength Tests

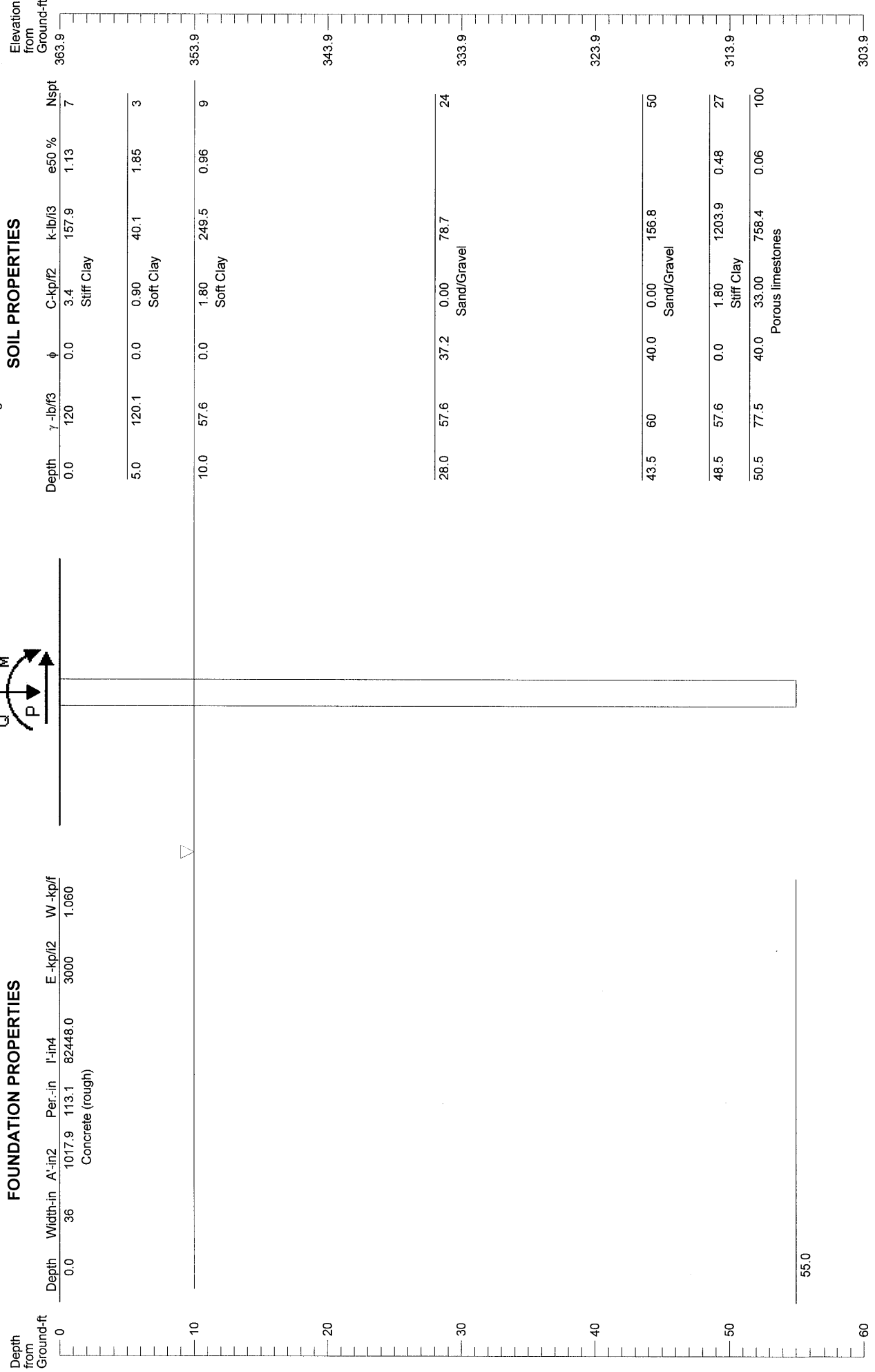
Project: Post Creek Cut-Off Bridge Core Diam.(In.) 1.97  
 Project No: H-19049  
 Date: 06/19/19

Boring	Depth(Ft.)	Length (In.)	L/D	L/D Corr.	Total Lbs.	PSI	Material Type
Boring #1	51-51.5'	4.260	2.16	1.014	119634	39799	Limestone
Boring #1	52.5-53'	4.196	2.13	1.010	100626	33343	Limestone
Boring #3	58.5-59'	4.137	2.10	1.007	80476	26587	Limestone
Boring #3	61-61.5'	4.205	2.13	1.011	71999	23881	Limestone



# FOUNDATION PROFILE & SOIL CONDITIONS

Diameter more than 24in (61cm).  
 For bell section, select "Bellied" in  
 Diameter Variation (Pile Section  
 Screen, Item 4).  
 Recommendation: 2 to 4 in Item 3  
 of Page F.



Batter Angle=0

(Pile diameter not to scale)

Surface Angle=0



CivilTech Software

H19049 Post Creek Cut Off Bridge  
 Boring #1

Figure 1

# FOUNDATION PROFILE & SOIL CONDITIONS

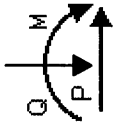
Diameter more than 24in (61cm).  
 For bell section, select "Belled" in  
 Diameter Variation (Pile Section  
 Screen, Item 4).  
 Recommendation: 2 to 4 in Item 3  
 of Page F.

## FOUNDATION PROPERTIES

Depth	Width-in	A-in <sup>2</sup>	Per-in	I-in <sup>4</sup>	E-kp/i <sup>2</sup>	W-kp/f
0.0	36	1017.9	113.1	82448.0	3000	1.060
Concrete (rough)						

## SOIL PROPERTIES

Depth	$\gamma$ -lb/f <sup>3</sup>	$\phi$	C-kp/f <sup>2</sup>	k-lb/i <sup>3</sup>	e50 %	Nspt	Elevation from Ground-ft
0.0	115.2	0.0	0.50	83.3	1.38	5	363.8
Soft Clay							
8.5	120	0.0	0.75	116.0	1.25	6	353.8
Soft Clay							
14.0	120	0.0	1.87	416.6	0.77	13	343.8
Stiff Clay							
38.5	59.6	35	0.00	76.7		23	323.8
Sand/Gravel							
48.5	57.6	0.0	2.40	905.6	0.55	22	313.8
Stiff Clay							
55.5	77.6	40.0	33	758.4	0.06	100	303.8
Porous limestones							



Depth from Ground-ft

Batter Angle=0

Surface Angle=0

(Pile diameter not to scale)

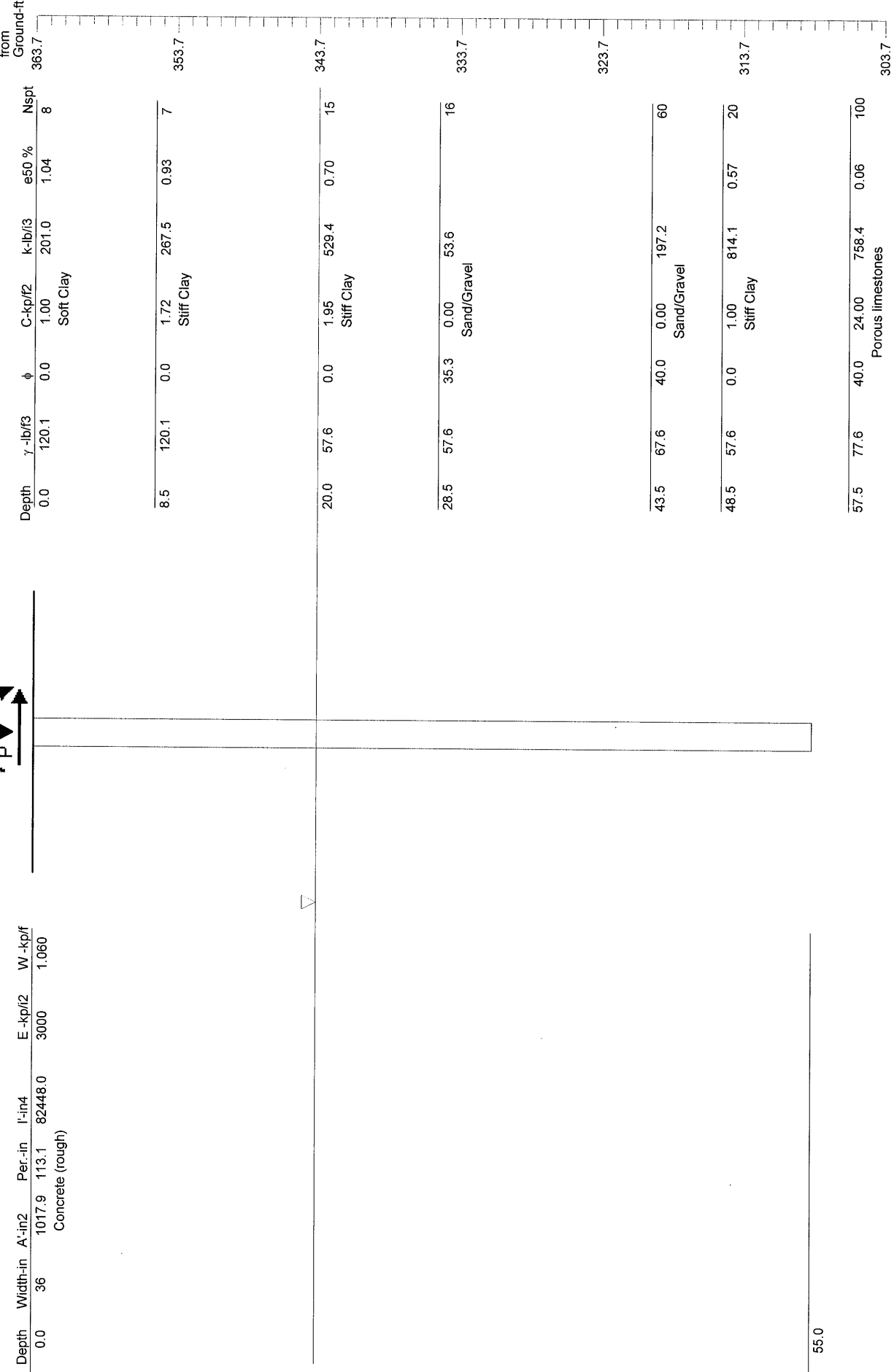
# FOUNDATION PROFILE & SOIL CONDITIONS

Diameter more than 24in (61cm).  
 For bell section, select "Belled" in  
 Diameter Variation (Pile Section  
 Screen, Item 4).  
 Recommendation: 2 to 4 in Item 3  
 of Page F.

## FOUNDATION PROPERTIES

Depth	Width-in	A-in <sup>2</sup>	Per-in	I-in <sup>4</sup>	E-kp/ft <sup>2</sup>	W-kp/ft
0.0	36	1017.9	113.1	82448.0	3000	1.060
Concrete (rough)						

## SOIL PROPERTIES



Batter Angle=0

(Pile diameter not to scale)

Surface Angle=0



**CivilTech  
Software**

**H19049 Post Creek Cut Off Bridge  
Boring #3**

**Figure 1**

# FOUNDATION PROFILE & SOIL CONDITIONS

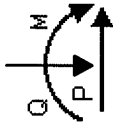
Diameter more than 24in (61cm).  
 For bell section, select "Bellied" in  
 Diameter Variation (Pile Section  
 Screen, Item 4).  
 Recommendation: 2 to 4 in Item 3  
 of Page F.

## FOUNDATION PROPERTIES

Depth	Width-in	A-in <sup>2</sup>	Per-in	I-in <sup>4</sup>	E-kp/f <sup>2</sup>	W-kp/f
0.0	36	1017.9	113.1	82448.0	3000	1.060
Concrete (rough)						

## SOIL PROPERTIES

Depth	$\gamma$ -lb/f <sup>3</sup>	$\phi$	C-kp/f <sup>2</sup>	k-lb/i <sup>3</sup>	e50 %	Nspt	Elevation from Ground-ft
0.0	120.1	0.0	1.27	95.5	1.33	5	363.7
Stiff Clay							
20.0	57.6	0.0	3.55	402.3	0.79	12	353.7
Stiff Clay							
26.0	57.6	35	0.00	71.5		21	343.7
Sand/Gravel							
38.5	57.6	0.0	0.70	625.5	0.65	16	333.7
Stiff Clay							
43.5	67.6	40.0	0.00	197.2		60	323.7
Sand/Gravel							
50.0	77.6	40.0	23.00	758.4	0.06	100	313.7
Porous limestones							
55.0							303.7



Surface Angle=0

(Pile diameter not to scale)

Batter Angle=0



Drilled Shaft Design Table for W. Abutment - Boring #1

Estimated Top of Rock Elevation: 313.35

(Page 1 of 2)

SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q <sub>C1</sub> (KIPS)	W <sub>C1</sub> (IN.)	W <sub>Rn</sub> (IN.)
<b>24 in. Diameter Drilled Shaft</b>							
1.25	312.1	183	92	SIDE + TIP	19	0.001	0.027
2.5	310.85	199	101	SIDE + TIP	35	0.002	0.029
3.75	309.6	324	165	SIDE + TIP	47	0.003	0.050
5	308.35	345	177	SIDE + TIP	59	0.003	0.053
6.25	307.1	367	189	SIDE + TIP	70	0.004	0.057
7.5	305.85	408	225	SIDE	68	0.004	0.448
8.75	304.6	474	261	SIDE	79	0.005	0.450
10	303.35	540	297	SIDE	90	0.005	0.452
11.25	302.1	606	333	SIDE	101	0.006	0.454
12.5	300.85	672	370	SIDE	113	0.007	0.456
13.75	299.6	738	406	SIDE	124	0.007	0.459
15	298.35	804	442	SIDE	135	0.008	0.462
16.25	297.1	870	479	SIDE	147	0.009	0.465
17.5	295.85	936	515	SIDE	158	0.009	0.468
18.75	294.6	1002	551	SIDE	169	0.010	0.472
20	293.35	1068	587	SIDE	181	0.011	0.476
21.25	292.1	1134	624	SIDE	192	0.011	0.481
22.5	290.85	1200	660	SIDE	203	0.012	0.486
<b>30 in. Diameter Drilled Shaft</b>							
1.25	312.1	278	140	SIDE + TIP	23	0.001	0.034
2.5	310.85	300	152	SIDE + TIP	45	0.002	0.035
3.75	309.6	328	167	SIDE + TIP	61	0.003	0.039
5	308.35	511	261	SIDE + TIP	76	0.004	0.063
6.25	307.1	538	275	SIDE + TIP	91	0.004	0.066
7.5	305.85	565	290	SIDE + TIP	104	0.005	0.070
8.75	304.6	594	306	SIDE + TIP	118	0.005	0.074
10	303.35	675	371	SIDE	112	0.005	0.563
11.25	302.1	758	417	SIDE	126	0.006	0.564
12.5	300.85	840	462	SIDE	140	0.007	0.566
13.75	299.6	923	508	SIDE	154	0.007	0.568
15	298.35	1005	553	SIDE	168	0.008	0.570
16.25	297.1	1088	598	SIDE	182	0.009	0.572
17.5	295.85	1170	644	SIDE	196	0.009	0.575
18.75	294.6	1253	689	SIDE	211	0.010	0.578
20	293.35	1335	734	SIDE	225	0.011	0.581
21.25	292.1	1418	780	SIDE	239	0.011	0.584
22.5	290.85	1500	825	SIDE	253	0.012	0.588
<b>36 in. Diameter Drilled Shaft</b>							
1.25	312.1	393	198	SIDE + TIP	26	0.001	0.040
2.5	310.85	420	213	SIDE + TIP	55	0.002	0.042
3.75	309.6	455	231	SIDE + TIP	76	0.003	0.045
5	308.35	710	361	SIDE + TIP	95	0.004	0.073
6.25	307.1	741	378	SIDE + TIP	112	0.004	0.076
7.5	305.85	773	396	SIDE + TIP	129	0.005	0.080
8.75	304.6	806	414	SIDE + TIP	146	0.006	0.083
10	303.35	840	433	SIDE + TIP	162	0.006	0.087
11.25	302.1	909	500	SIDE	150	0.006	0.676
12.5	300.85	1008	555	SIDE	167	0.007	0.677
13.75	299.6	1107	609	SIDE	183	0.007	0.679
15	298.35	1206	663	SIDE	200	0.008	0.680
16.25	297.1	1305	718	SIDE	217	0.009	0.682
17.5	295.85	1404	772	SIDE	234	0.009	0.684
18.75	294.6	1503	827	SIDE	251	0.010	0.686
20	293.35	1602	881	SIDE	268	0.010	0.689
21.25	292.1	1701	936	SIDE	285	0.011	0.691
22.5	290.85	1800	990	SIDE	302	0.012	0.694



Drilled Shaft Design Table for W. Abutment - Boring #1

Estimated Top of Rock Elevation: 313.35

(Page 2 of 2)

SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q <sub>C1</sub> (KIPS)	W <sub>C1</sub> (IN.)	W <sub>Rn</sub> (IN.)
<b>42 in. Diameter Drilled Shaft</b>							
1.25	312.1	528	266	SIDE + TIP	29	0.001	0.046
2.5	310.85	562	284	SIDE + TIP	65	0.002	0.048
3.75	309.6	603	306	SIDE + TIP	90	0.003	0.051
5	308.35	645	329	SIDE + TIP	113	0.004	0.055
6.25	307.1	977	497	SIDE + TIP	135	0.005	0.086
7.5	305.85	1013	517	SIDE + TIP	155	0.005	0.089
8.75	304.6	1050	537	SIDE + TIP	175	0.006	0.093
10	303.35	1089	559	SIDE + TIP	194	0.006	0.096
11.25	302.1	1128	580	SIDE + TIP	213	0.007	0.100
12.5	300.85	1176	647	SIDE	193	0.007	0.789
13.75	299.6	1292	711	SIDE	213	0.007	0.790
15	298.35	1407	774	SIDE	232	0.008	0.791
16.25	297.1	1523	838	SIDE	252	0.009	0.793
17.5	295.85	1638	901	SIDE	272	0.009	0.794
18.75	294.6	1754	965	SIDE	292	0.010	0.796
20	293.35	1869	1028	SIDE	311	0.010	0.798
21.25	292.1	1985	1092	SIDE	331	0.011	0.800
22.5	290.85	2100	1155	SIDE	351	0.012	0.802
<b>48 in. Diameter Drilled Shaft</b>							
1.25	312.1	683	343	SIDE + TIP	31	0.001	0.052
2.5	310.85	723	365	SIDE + TIP	74	0.002	0.054
3.75	309.6	772	391	SIDE + TIP	105	0.003	0.058
5	308.35	822	418	SIDE + TIP	132	0.004	0.061
6.25	307.1	1246	633	SIDE + TIP	157	0.005	0.096
7.5	305.85	1286	655	SIDE + TIP	182	0.005	0.099
8.75	304.6	1328	678	SIDE + TIP	205	0.006	0.103
10	303.35	1370	701	SIDE + TIP	228	0.007	0.106
11.25	302.1	1414	725	SIDE + TIP	250	0.007	0.110
12.5	300.85	1459	750	SIDE + TIP	272	0.008	0.114
13.75	299.6	1505	775	SIDE + TIP	293	0.008	0.117
15	298.35	1608	885	SIDE	265	0.008	0.903
16.25	297.1	1740	957	SIDE	287	0.009	0.904
17.5	295.85	1872	1030	SIDE	309	0.009	0.905
18.75	294.6	2004	1102	SIDE	332	0.010	0.907
20	293.35	2136	1175	SIDE	354	0.010	0.908
21.25	292.1	2268	1248	SIDE	377	0.011	0.910
22.5	290.85	2400	1320	SIDE	399	0.012	0.912
<b>54 in. Diameter Drilled Shaft</b>							
1.25	312.1	858	431	SIDE + TIP	32	0.000	0.058
2.5	310.85	905	456	SIDE + TIP	83	0.002	0.061
3.75	309.6	962	487	SIDE + TIP	119	0.003	0.064
5	308.35	1020	518	SIDE + TIP	151	0.004	0.068
6.25	307.1	1079	549	SIDE + TIP	181	0.005	0.071
7.5	305.85	1592	809	SIDE + TIP	209	0.006	0.109
8.75	304.6	1638	835	SIDE + TIP	236	0.006	0.112
10	303.35	1685	861	SIDE + TIP	262	0.007	0.116
11.25	302.1	1733	887	SIDE + TIP	287	0.007	0.119
12.5	300.85	1782	914	SIDE + TIP	312	0.008	0.123
13.75	299.6	1661	914	SIDE	272	0.008	1.013
15	298.35	1809	995	SIDE	297	0.008	1.015
16.25	297.1	1958	1077	SIDE	321	0.009	1.016
17.5	295.85	2106	1159	SIDE	346	0.009	1.017
18.75	294.6	2255	1240	SIDE	372	0.010	1.018
20	293.35	2403	1322	SIDE	397	0.011	1.020
21.25	292.1	2552	1404	SIDE	422	0.011	1.021
22.5	290.85	2700	1485	SIDE	447	0.012	1.023



Drilled Shaft Design Table for W. Abutment - Boring #2

Estimated Top of Rock Elevation: 308.30

(Page 1 of 2)

SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q <sub>C1</sub> (KIPS)	W <sub>C1</sub> (IN.)	W <sub>Rn</sub> (IN.)
<b>24 in. Diameter Drilled Shaft</b>							
1.25	307.05	223	112	SIDE + TIP	19	0.001	0.034
2.5	305.8	239	121	SIDE + TIP	35	0.002	0.036
3.75	304.55	324	165	SIDE + TIP	47	0.003	0.050
5	303.3	345	177	SIDE + TIP	59	0.003	0.053
6.25	302.05	367	189	SIDE + TIP	70	0.004	0.057
7.5	300.8	408	225	SIDE	68	0.004	0.448
8.75	299.55	474	261	SIDE	79	0.005	0.450
10	298.3	540	297	SIDE	90	0.005	0.452
11.25	297.05	606	333	SIDE	101	0.006	0.454
12.5	295.8	672	370	SIDE	113	0.007	0.456
13.75	294.55	738	406	SIDE	124	0.007	0.459
15	293.3	804	442	SIDE	135	0.008	0.462
16.25	292.05	870	479	SIDE	147	0.009	0.465
17.5	290.8	936	515	SIDE	158	0.009	0.468
18.75	289.55	1002	551	SIDE	169	0.010	0.472
20	288.3	1068	587	SIDE	181	0.011	0.476
21.25	287.05	1134	624	SIDE	192	0.011	0.481
22.5	285.8	1200	660	SIDE	203	0.012	0.486
<b>30 in. Diameter Drilled Shaft</b>							
1.25	307.05	340	171	SIDE + TIP	23	0.001	0.042
2.5	305.8	360	182	SIDE + TIP	45	0.002	0.043
3.75	304.55	388	198	SIDE + TIP	61	0.003	0.047
5	303.3	511	261	SIDE + TIP	76	0.004	0.063
6.25	302.05	538	275	SIDE + TIP	91	0.004	0.066
7.5	300.8	565	290	SIDE + TIP	104	0.005	0.070
8.75	299.55	594	306	SIDE + TIP	118	0.005	0.074
10	298.3	675	371	SIDE	112	0.005	0.563
11.25	297.05	758	417	SIDE	126	0.006	0.564
12.5	295.8	840	462	SIDE	140	0.007	0.566
13.75	294.55	923	508	SIDE	154	0.007	0.568
15	293.3	1005	553	SIDE	168	0.008	0.570
16.25	292.05	1088	598	SIDE	182	0.009	0.572
17.5	290.8	1170	644	SIDE	196	0.009	0.575
18.75	289.55	1253	689	SIDE	211	0.010	0.578
20	288.3	1335	734	SIDE	225	0.011	0.581
21.25	287.05	1418	780	SIDE	239	0.011	0.584
22.5	285.8	1500	825	SIDE	253	0.012	0.588
<b>36 in. Diameter Drilled Shaft</b>							
1.25	307.05	482	242	SIDE + TIP	26	0.001	0.049
2.5	305.8	507	256	SIDE + TIP	55	0.002	0.051
3.75	304.55	541	275	SIDE + TIP	76	0.003	0.054
5	303.3	710	361	SIDE + TIP	95	0.004	0.073
6.25	302.05	741	378	SIDE + TIP	112	0.004	0.076
7.5	300.8	773	396	SIDE + TIP	129	0.005	0.080
8.75	299.55	806	414	SIDE + TIP	146	0.006	0.083
10	298.3	840	433	SIDE + TIP	162	0.006	0.087
11.25	297.05	909	500	SIDE	150	0.006	0.676
12.5	295.8	1008	555	SIDE	167	0.007	0.677
13.75	294.55	1107	609	SIDE	183	0.007	0.679
15	293.3	1206	663	SIDE	200	0.008	0.680
16.25	292.05	1305	718	SIDE	217	0.009	0.682
17.5	290.8	1404	772	SIDE	234	0.009	0.684
18.75	289.55	1503	827	SIDE	251	0.010	0.686
20	288.3	1602	881	SIDE	268	0.010	0.689
21.25	287.05	1701	936	SIDE	285	0.011	0.691
22.5	285.8	1800	990	SIDE	302	0.012	0.694



Drilled Shaft Design Table for W. Abutment - Boring #2

Estimated Top of Rock Elevation: 308.30

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SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q <sub>C1</sub> (KIPS)	W <sub>C1</sub> (IN.)	W <sub>Rn</sub> (IN.)
<b>42 in. Diameter Drilled Shaft</b>							
1.25	307.05	649	326	SIDE + TIP	29	0.001	0.057
2.5	305.8	679	343	SIDE + TIP	65	0.002	0.059
3.75	304.55	719	364	SIDE + TIP	90	0.003	0.062
5	303.3	761	387	SIDE + TIP	113	0.004	0.066
6.25	302.05	977	497	SIDE + TIP	135	0.005	0.086
7.5	300.8	1013	517	SIDE + TIP	155	0.005	0.089
8.75	299.55	1050	537	SIDE + TIP	175	0.006	0.093
10	298.3	1089	559	SIDE + TIP	194	0.006	0.096
11.25	297.05	1128	580	SIDE + TIP	213	0.007	0.100
12.5	295.8	1176	647	SIDE	193	0.007	0.789
13.75	294.55	1292	711	SIDE	213	0.007	0.790
15	293.3	1407	774	SIDE	232	0.008	0.791
16.25	292.05	1523	838	SIDE	252	0.009	0.793
17.5	290.8	1638	901	SIDE	272	0.009	0.794
18.75	289.55	1754	965	SIDE	292	0.010	0.796
20	288.3	1869	1028	SIDE	311	0.010	0.798
21.25	287.05	1985	1092	SIDE	331	0.011	0.800
22.5	285.8	2100	1155	SIDE	351	0.012	0.802
<b>48 in. Diameter Drilled Shaft</b>							
1.25	307.05	840	422	SIDE + TIP	31	0.001	0.065
2.5	305.8	876	442	SIDE + TIP	74	0.002	0.067
3.75	304.55	923	467	SIDE + TIP	105	0.003	0.070
5	303.3	972	493	SIDE + TIP	132	0.004	0.073
6.25	302.05	1246	633	SIDE + TIP	157	0.005	0.096
7.5	300.8	1286	655	SIDE + TIP	182	0.005	0.099
8.75	299.55	1328	678	SIDE + TIP	205	0.006	0.103
10	298.3	1370	701	SIDE + TIP	228	0.007	0.106
11.25	297.05	1414	725	SIDE + TIP	250	0.007	0.110
12.5	295.8	1459	750	SIDE + TIP	272	0.008	0.114
13.75	294.55	1505	775	SIDE + TIP	293	0.008	0.117
15	293.3	1608	885	SIDE	265	0.008	0.903
16.25	292.05	1740	957	SIDE	287	0.009	0.904
17.5	290.8	1872	1030	SIDE	309	0.009	0.905
18.75	289.55	2004	1102	SIDE	332	0.010	0.907
20	288.3	2136	1175	SIDE	354	0.010	0.908
21.25	287.05	2268	1248	SIDE	377	0.011	0.910
22.5	285.8	2400	1320	SIDE	399	0.012	0.912
<b>54 in. Diameter Drilled Shaft</b>							
1.25	307.05	1055	530	SIDE + TIP	32	0.000	0.072
2.5	305.8	1098	553	SIDE + TIP	83	0.002	0.075
3.75	304.55	1153	583	SIDE + TIP	119	0.003	0.078
5	303.3	1208	612	SIDE + TIP	151	0.004	0.081
6.25	302.05	1265	643	SIDE + TIP	181	0.005	0.085
7.5	300.8	1592	809	SIDE + TIP	209	0.006	0.109
8.75	299.55	1638	835	SIDE + TIP	236	0.006	0.112
10	298.3	1685	861	SIDE + TIP	262	0.007	0.116
11.25	297.05	1733	887	SIDE + TIP	287	0.007	0.119
12.5	295.8	1782	914	SIDE + TIP	312	0.008	0.123
13.75	294.55	1661	914	SIDE	272	0.008	1.013
15	293.3	1809	995	SIDE	297	0.008	1.015
16.25	292.05	1958	1077	SIDE	321	0.009	1.016
17.5	290.8	2106	1159	SIDE	346	0.009	1.017
18.75	289.55	2255	1240	SIDE	372	0.010	1.018
20	288.3	2403	1322	SIDE	397	0.011	1.020
21.25	287.05	2552	1404	SIDE	422	0.011	1.021
22.5	285.8	2700	1485	SIDE	447	0.012	1.023





**DRILLED SHAFT AXIAL CAPACITY IN ROCK -  
DOLOMITE, LIMESTONE, SANDSTONE,  
AND HARD SHALE**

Drilled Shaft Design Table for E. Abutment - Boring #3

Estimated Top of Rock Elevation: 306.16

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SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q <sub>C1</sub> (KIPS)	W <sub>C1</sub> (IN.)	W <sub>Rn</sub> (IN.)
<b>24 in. Diameter Drilled Shaft</b>							
1.25	304.91	197	99	SIDE + TIP	14	0.001	0.035
2.5	303.66	210	106	SIDE + TIP	26	0.002	0.038
3.75	302.41	230	117	SIDE + TIP	36	0.002	0.041
5	301.16	245	125	SIDE + TIP	46	0.003	0.044
6.25	299.91	286	157	SIDE	44	0.003	0.551
7.5	298.66	342	188	SIDE	53	0.004	0.554
8.75	297.41	397	219	SIDE	61	0.004	0.557
10	296.16	453	249	SIDE	70	0.005	0.560
11.25	294.91	509	280	SIDE	79	0.005	0.562
12.5	293.66	565	311	SIDE	88	0.006	0.565
13.75	292.41	621	342	SIDE	97	0.006	0.567
15	291.16	677	372	SIDE	106	0.007	0.570
16.25	289.91	733	403	SIDE	115	0.007	0.573
17.5	288.66	789	434	SIDE	124	0.008	0.577
18.75	287.41	845	465	SIDE	132	0.009	0.580
20	286.16	901	495	SIDE	141	0.009	0.584
21.25	284.91	957	526	SIDE	150	0.010	0.588
22.5	283.66	1012	557	SIDE	159	0.010	0.593
<b>30 in. Diameter Drilled Shaft</b>							
1.25	304.91	302	152	SIDE + TIP	17	0.001	0.043
2.5	303.66	319	161	SIDE + TIP	34	0.002	0.046
3.75	302.41	340	173	SIDE + TIP	47	0.003	0.049
5	301.16	363	185	SIDE + TIP	59	0.003	0.052
6.25	299.91	382	195	SIDE + TIP	71	0.004	0.054
7.5	298.66	427	235	SIDE	66	0.004	0.692
8.75	297.41	497	273	SIDE	76	0.004	0.695
10	296.16	567	312	SIDE	87	0.005	0.697
11.25	294.91	637	350	SIDE	98	0.005	0.700
12.5	293.66	707	389	SIDE	109	0.006	0.702
13.75	292.41	776	427	SIDE	120	0.006	0.704
15	291.16	846	465	SIDE	132	0.007	0.707
16.25	289.91	916	504	SIDE	143	0.007	0.709
17.5	288.66	986	542	SIDE	154	0.008	0.712
18.75	287.41	1056	581	SIDE	165	0.008	0.714
20	286.16	1126	619	SIDE	176	0.009	0.717
21.25	284.91	1196	658	SIDE	187	0.010	0.721
22.5	283.66	1266	696	SIDE	198	0.010	0.724
<b>36 in. Diameter Drilled Shaft</b>							
1.25	304.91	430	216	SIDE + TIP	20	0.001	0.052
2.5	303.66	451	228	SIDE + TIP	41	0.002	0.054
3.75	302.41	477	242	SIDE + TIP	58	0.003	0.057
5	301.16	505	257	SIDE + TIP	73	0.003	0.060
6.25	299.91	527	269	SIDE + TIP	88	0.004	0.063
7.5	298.66	549	281	SIDE + TIP	101	0.004	0.065
8.75	297.41	596	328	SIDE	91	0.005	0.833
10	296.16	680	374	SIDE	104	0.005	0.836
11.25	294.91	764	420	SIDE	118	0.005	0.838
12.5	293.66	848	466	SIDE	131	0.006	0.840
13.75	292.41	932	512	SIDE	144	0.006	0.842
15	291.16	1016	559	SIDE	157	0.007	0.844
16.25	289.91	1099	605	SIDE	170	0.007	0.847
17.5	288.66	1183	651	SIDE	184	0.008	0.849
18.75	287.41	1267	697	SIDE	197	0.008	0.851
20	286.16	1351	743	SIDE	210	0.009	0.853
21.25	284.91	1435	789	SIDE	224	0.010	0.856
22.5	283.66	1519	835	SIDE	237	0.010	0.859



Drilled Shaft Design Table for E. Abutment - Boring #3

Estimated Top of Rock Elevation: 306.16

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SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q <sub>C1</sub> (KIPS)	W <sub>C1</sub> (IN.)	W <sub>Rn</sub> (IN.)
<b>42 in. Diameter Drilled Shaft</b>							
1.25	304.91	580	291	SIDE + TIP	22	0.001	0.060
2.5	303.66	606	305	SIDE + TIP	49	0.002	0.063
3.75	302.41	637	322	SIDE + TIP	69	0.003	0.065
5	301.16	668	339	SIDE + TIP	88	0.003	0.068
6.25	299.91	695	354	SIDE + TIP	105	0.004	0.071
7.5	298.66	721	368	SIDE + TIP	122	0.005	0.074
8.75	297.41	747	382	SIDE + TIP	138	0.005	0.076
10	296.16	793	436	SIDE	121	0.005	0.974
11.25	294.91	891	490	SIDE	137	0.006	0.977
12.5	293.66	989	544	SIDE	152	0.006	0.979
13.75	292.41	1087	598	SIDE	167	0.007	0.981
15	291.16	1185	652	SIDE	183	0.007	0.983
16.25	289.91	1283	705	SIDE	198	0.008	0.985
17.5	288.66	1380	759	SIDE	213	0.008	0.987
18.75	287.41	1478	813	SIDE	229	0.009	0.989
20	286.16	1576	867	SIDE	244	0.009	0.991
21.25	284.91	1674	921	SIDE	260	0.010	0.993
22.5	283.66	1772	974	SIDE	275	0.010	0.995
<b>48 in. Diameter Drilled Shaft</b>							
1.25	304.91	753	378	SIDE + TIP	23	0.001	0.068
2.5	303.66	784	395	SIDE + TIP	56	0.002	0.071
3.75	302.41	820	414	SIDE + TIP	80	0.003	0.074
5	301.16	857	434	SIDE + TIP	102	0.004	0.077
6.25	299.91	887	450	SIDE + TIP	123	0.004	0.080
7.5	298.66	916	466	SIDE + TIP	142	0.005	0.082
8.75	297.41	945	482	SIDE + TIP	161	0.005	0.084
10	296.16	974	498	SIDE + TIP	179	0.006	0.087
11.25	294.91	1019	560	SIDE	156	0.006	1.115
12.5	293.66	1130	622	SIDE	173	0.006	1.118
13.75	292.41	1242	683	SIDE	191	0.007	1.120
15	291.16	1354	745	SIDE	208	0.007	1.122
16.25	289.91	1466	806	SIDE	226	0.008	1.124
17.5	288.66	1578	868	SIDE	243	0.008	1.126
18.75	287.41	1689	929	SIDE	261	0.009	1.128
20	286.16	1801	991	SIDE	278	0.009	1.129
21.25	284.91	1913	1052	SIDE	296	0.010	1.131
22.5	283.66	2025	1114	SIDE	314	0.010	1.133
<b>54 in. Diameter Drilled Shaft</b>							
1.25	304.91	948	476	SIDE + TIP	24	0.000	0.076
2.5	303.66	984	495	SIDE + TIP	62	0.002	0.079
3.75	302.41	1026	518	SIDE + TIP	91	0.003	0.082
5	301.16	1068	540	SIDE + TIP	117	0.004	0.086
6.25	299.91	1103	559	SIDE + TIP	141	0.004	0.088
7.5	298.66	1134	576	SIDE + TIP	163	0.005	0.090
8.75	297.41	1166	594	SIDE + TIP	185	0.005	0.093
10	296.16	1199	612	SIDE + TIP	206	0.006	0.095
11.25	294.91	1233	631	SIDE + TIP	227	0.006	0.098
12.5	293.66	1272	699	SIDE	194	0.007	1.257
13.75	292.41	1397	769	SIDE	214	0.007	1.259
15	291.16	1523	838	SIDE	234	0.007	1.261
16.25	289.91	1649	907	SIDE	253	0.008	1.263
17.5	288.66	1775	976	SIDE	273	0.008	1.265
18.75	287.41	1901	1045	SIDE	293	0.009	1.267
20	286.16	2026	1115	SIDE	312	0.009	1.268
21.25	284.91	2152	1184	SIDE	332	0.010	1.270
22.5	283.66	2278	1253	SIDE	352	0.010	1.272



Drilled Shaft Design Table for E. Abutment - Boring #4

Estimated Top of Rock Elevation: 309.68

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SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q <sub>c1</sub> (KIPS)	W <sub>c1</sub> (IN.)	W <sub>Rn</sub> (IN.)
<b>24 in. Diameter Drilled Shaft</b>							
1.25	308.43	63	32	SIDE + TIP	13	0.007	0.079
2.5	307.18	112	61	SIDE	17	0.013	4.367
3.75	305.93	167	92	SIDE	25	0.016	4.386
5	304.68	223	123	SIDE	33	0.018	4.399
6.25	303.43	279	153	SIDE	42	0.020	4.409
7.5	302.18	335	184	SIDE	50	0.022	4.418
8.75	300.93	391	215	SIDE	59	0.023	4.426
10	299.68	446	245	SIDE	67	0.025	4.433
11.25	298.43	502	276	SIDE	75	0.026	4.439
12.5	297.18	588	320	SIDE + TIP	99	0.028	0.684
13.75	295.93	665	363	SIDE + TIP	108	0.029	0.771
15	294.68	697	382	SIDE + TIP	117	0.031	0.798
16.25	293.43	730	401	SIDE + TIP	125	0.032	0.825
17.5	292.18	781	430	SIDE	118	0.032	4.470
18.75	290.93	837	460	SIDE	126	0.034	4.476
20	289.68	893	491	SIDE	135	0.035	4.482
21.25	288.43	948	522	SIDE	143	0.036	4.489
22.5	287.18	1004	552	SIDE	152	0.038	4.496
<b>30 in. Diameter Drilled Shaft</b>							
1.25	308.43	95	48	SIDE + TIP	16	0.007	0.098
2.5	307.18	139	77	SIDE	21	0.013	5.446
3.75	305.93	209	115	SIDE	31	0.017	5.469
5	304.68	279	153	SIDE	42	0.020	5.486
6.25	303.43	349	192	SIDE	52	0.023	5.499
7.5	302.18	418	230	SIDE	63	0.025	5.509
8.75	300.93	488	268	SIDE	73	0.026	5.518
10	299.68	558	307	SIDE	84	0.028	5.527
11.25	298.43	628	345	SIDE	94	0.029	5.534
12.5	297.18	697	384	SIDE	105	0.031	5.541
13.75	295.93	767	422	SIDE	115	0.032	5.547
15	294.68	837	460	SIDE	126	0.033	5.554
16.25	293.43	907	499	SIDE	136	0.035	5.560
17.5	292.18	1038	565	SIDE + TIP	171	0.037	0.959
18.75	290.93	1046	575	SIDE	157	0.037	5.572
20	289.68	1116	614	SIDE	168	0.039	5.578
21.25	288.43	1186	652	SIDE	179	0.040	5.584
22.5	287.18	1255	690	SIDE	189	0.041	5.590
<b>36 in. Diameter Drilled Shaft</b>							
1.25	308.43	133	67	SIDE + TIP	19	0.006	0.118
2.5	307.18	167	92	SIDE	25	0.014	6.522
3.75	305.93	251	138	SIDE	38	0.019	6.550
5	304.68	335	184	SIDE	50	0.022	6.571
6.25	303.43	418	230	SIDE	63	0.025	6.586
7.5	302.18	502	276	SIDE	75	0.027	6.599
8.75	300.93	586	322	SIDE	88	0.029	6.609
10	299.68	669	368	SIDE	100	0.031	6.619
11.25	298.43	753	414	SIDE	113	0.033	6.627
12.5	297.18	837	460	SIDE	126	0.034	6.635
13.75	295.93	921	506	SIDE	138	0.036	6.642
15	294.68	1004	552	SIDE	151	0.037	6.649
16.25	293.43	1088	598	SIDE	163	0.038	6.656
17.5	292.18	1172	644	SIDE	176	0.040	6.662
18.75	290.93	1255	690	SIDE	189	0.041	6.668
20	289.68	1339	736	SIDE	201	0.042	6.674
21.25	288.43	1423	782	SIDE	214	0.043	6.680
22.5	287.18	1506	828	SIDE	227	0.045	6.686



Drilled Shaft Design Table for E. Abutment - Boring #4

Estimated Top of Rock Elevation: 309.68

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SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q <sub>c1</sub> (KIPS)	W <sub>c1</sub> (IN.)	W <sub>Rn</sub> (IN.)
<b>42 in. Diameter Drilled Shaft</b>							
1.25	308.43	179	90	SIDE + TIP	21	0.005	0.137
2.5	307.18	203	103	SIDE + TIP	46	0.014	0.145
3.75	305.93	293	161	SIDE	44	0.020	7.630
5	304.68	391	215	SIDE	59	0.024	7.653
6.25	303.43	488	268	SIDE	73	0.027	7.671
7.5	302.18	586	322	SIDE	88	0.029	7.686
8.75	300.93	683	376	SIDE	102	0.032	7.698
10	299.68	781	430	SIDE	117	0.034	7.709
11.25	298.43	879	483	SIDE	132	0.035	7.719
12.5	297.18	976	537	SIDE	147	0.037	7.728
13.75	295.93	1074	591	SIDE	161	0.039	7.736
15	294.68	1172	644	SIDE	176	0.040	7.743
16.25	293.43	1269	698	SIDE	191	0.042	7.750
17.5	292.18	1367	752	SIDE	205	0.043	7.757
18.75	290.93	1464	805	SIDE	220	0.044	7.764
20	289.68	1562	859	SIDE	235	0.046	7.770
21.25	288.43	1660	913	SIDE	250	0.047	7.776
22.5	287.18	1757	967	SIDE	264	0.048	7.783
<b>48 in. Diameter Drilled Shaft</b>							
1.25	308.43	231	116	SIDE + TIP	22	0.004	0.156
2.5	307.18	259	131	SIDE + TIP	53	0.014	0.165
3.75	305.93	335	184	SIDE	50	0.021	8.707
5	304.68	446	245	SIDE	67	0.025	8.734
6.25	303.43	558	307	SIDE	84	0.029	8.755
7.5	302.18	669	368	SIDE	100	0.031	8.772
8.75	300.93	781	430	SIDE	117	0.034	8.786
10	299.68	893	491	SIDE	134	0.036	8.798
11.25	298.43	1004	552	SIDE	151	0.038	8.809
12.5	297.18	1116	614	SIDE	167	0.040	8.819
13.75	295.93	1227	675	SIDE	184	0.042	8.828
15	294.68	1339	736	SIDE	201	0.043	8.836
16.25	293.43	1451	798	SIDE	218	0.045	8.844
17.5	292.18	1562	859	SIDE	235	0.046	8.851
18.75	290.93	1674	921	SIDE	251	0.048	8.858
20	289.68	1785	982	SIDE	268	0.049	8.865
21.25	288.43	1897	1043	SIDE	285	0.051	8.872
22.5	287.18	2008	1105	SIDE	302	0.052	8.878
<b>54 in. Diameter Drilled Shaft</b>							
1.25	308.43	289	146	SIDE + TIP	22	0.002	0.176
2.5	307.18	322	163	SIDE + TIP	59	0.014	0.185
3.75	305.93	377	207	SIDE	56	0.021	9.783
5	304.68	502	276	SIDE	75	0.026	9.813
6.25	303.43	628	345	SIDE	94	0.030	9.837
7.5	302.18	753	414	SIDE	113	0.033	9.856
8.75	300.93	879	483	SIDE	132	0.036	9.872
10	299.68	1004	552	SIDE	151	0.038	9.886
11.25	298.43	1130	621	SIDE	169	0.041	9.898
12.5	297.18	1255	690	SIDE	188	0.043	9.909
13.75	295.93	1381	759	SIDE	207	0.045	9.919
15	294.68	1506	828	SIDE	226	0.046	9.928
16.25	293.43	1632	898	SIDE	245	0.048	9.937
17.5	292.18	1757	967	SIDE	264	0.050	9.945
18.75	290.93	1883	1036	SIDE	283	0.051	9.952
20	289.68	2008	1105	SIDE	302	0.053	9.960
21.25	288.43	2134	1174	SIDE	320	0.054	9.967
22.5	287.18	2259	1243	SIDE	339	0.055	9.973