Shoring of Historic Site in U. S. Capital Washington, D.C.

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RENOVATION OF MILKEN CENTER
WASHINGTON DC



Demo upper level and replaced by 2 new levels



SITE LOCATION



Basement lowered by 4.5 ft - 20 ft in various locations



Temporary Shoring Historic Vault Door



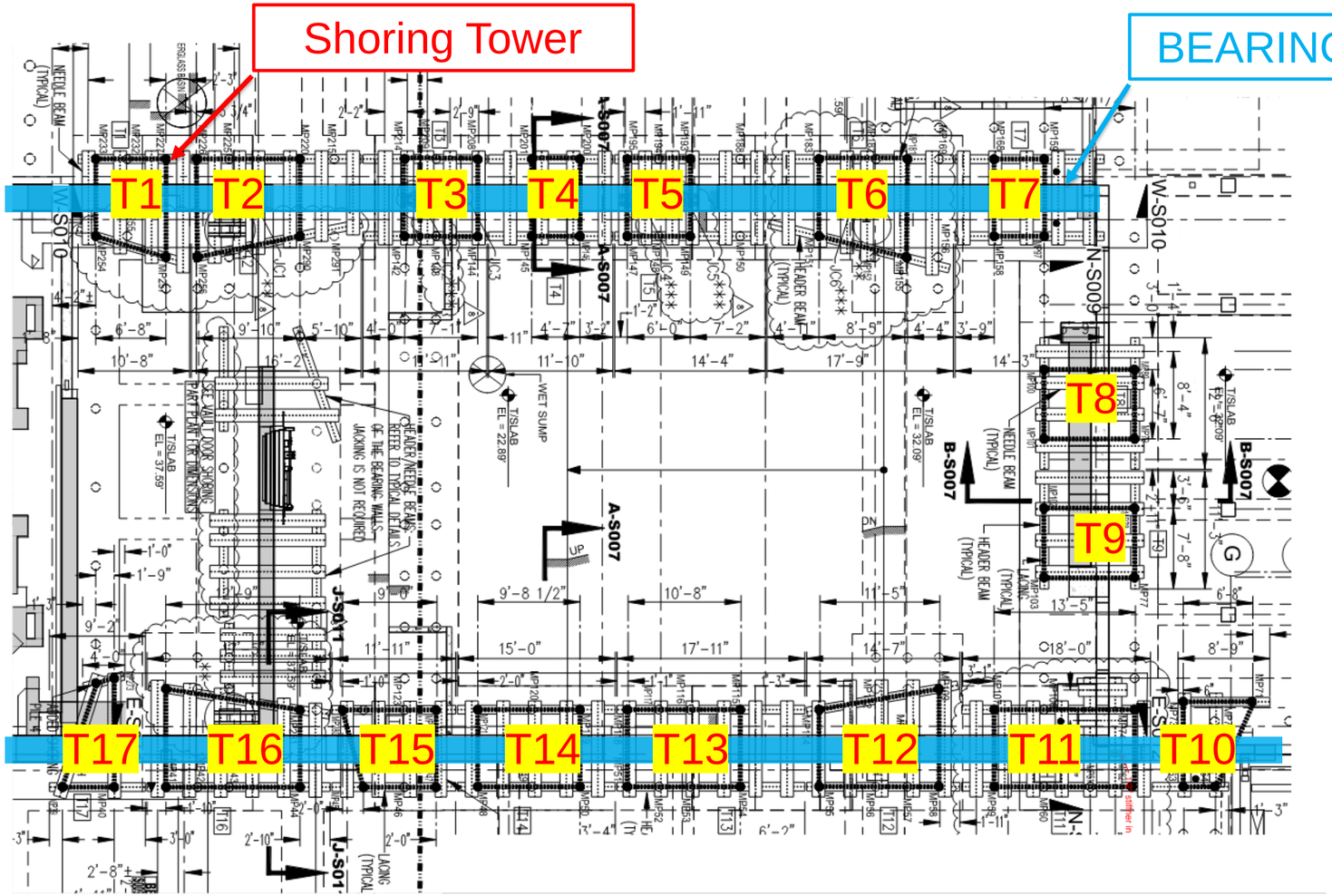
TEMPORARY SUPPORT OF INTERIOR BEARING WALL

- More than 300 micropile:
- 9-7/8 in. casing(148ton),11-7/8 in. casing(183ton)
- 8.5 ft low head-room condition, difficult access
- 3 ft / 5 ft unit length of casing used



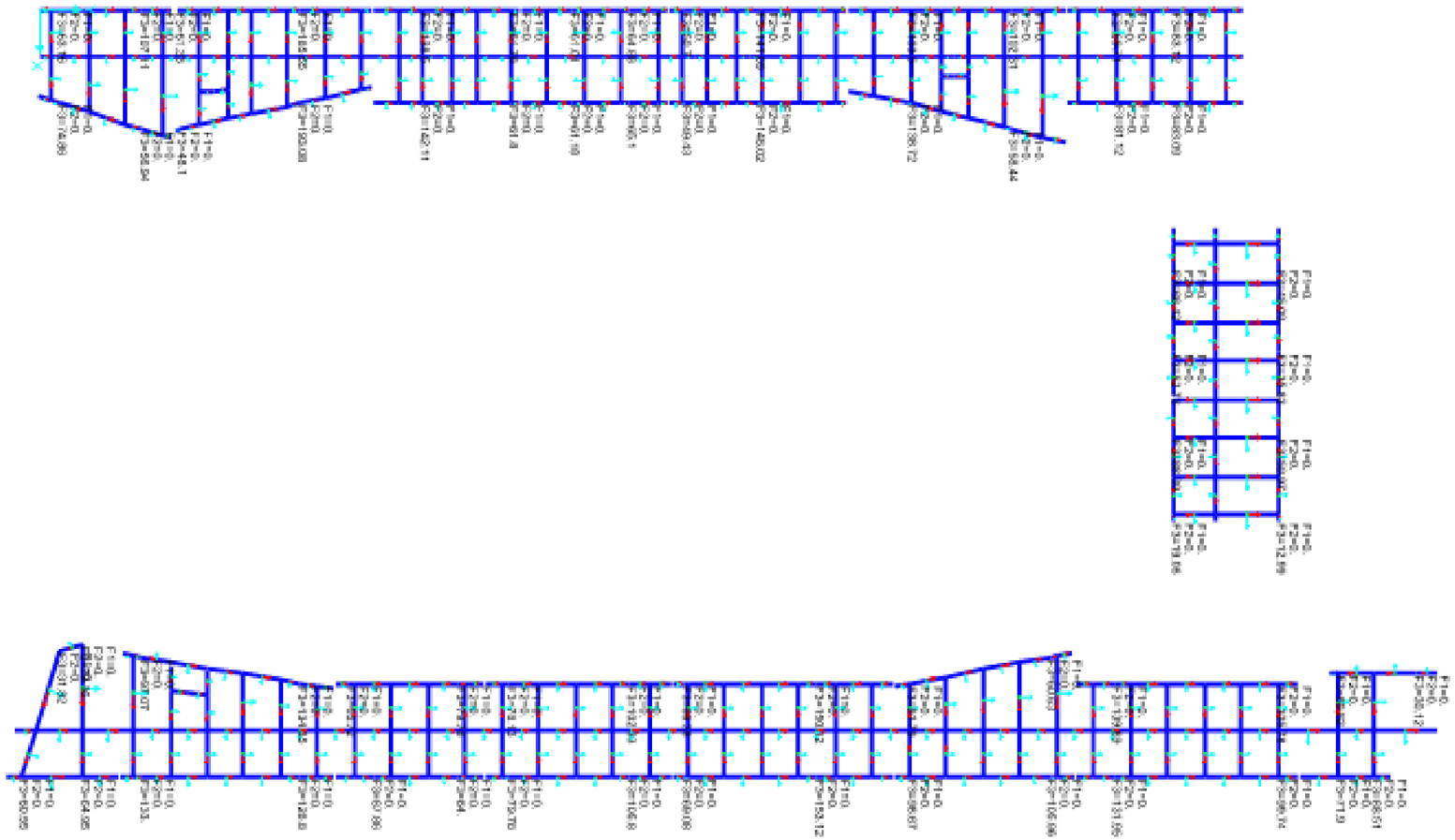
TEMPORARY SUPPORT OF INTERIOR BEARING WALL

- Needle Beams: W14x120 @ 3 ft max. spacing
- Transfer Beams: W30x116



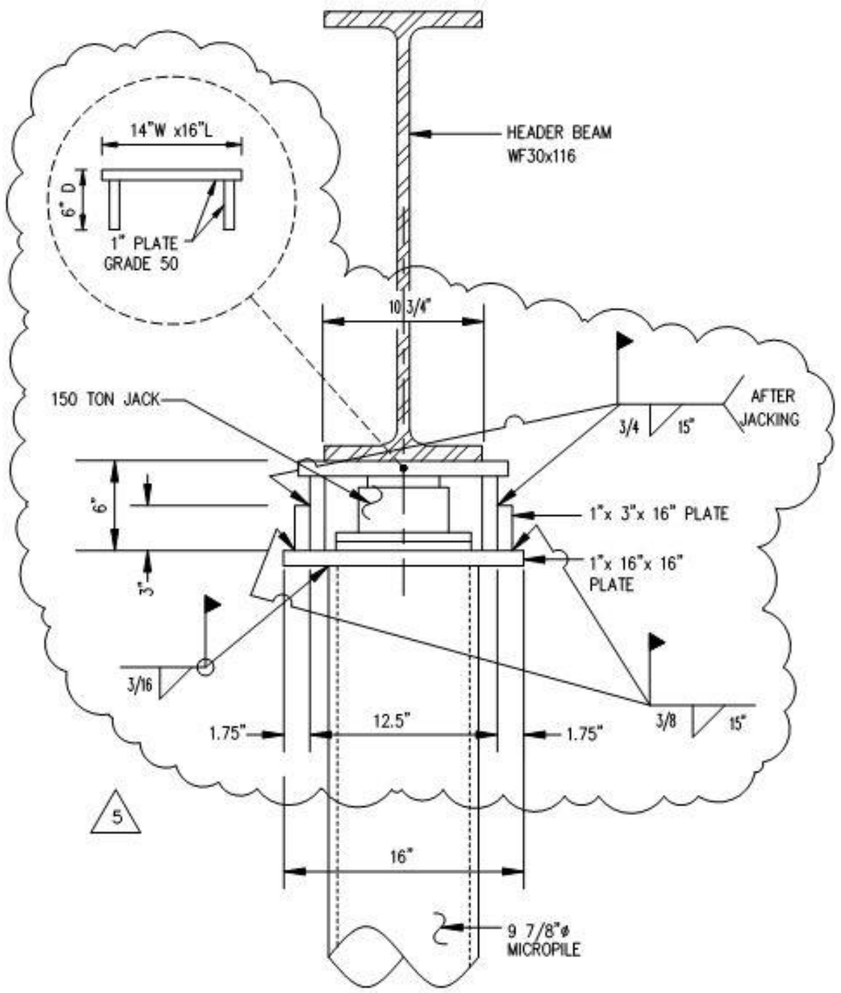
TEMPORARY SUPPORT OF INTERIOR BEARING WALL

- Needle Beams: W14x120 @ 3 ft max. spacing
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- 17 temporary shoring towers: utilized 4 permanent micropiles



WALL LOAD TRANSFER: Preloading in Bearing Wall

- Jacking Forces analyzed by SAP analyses
- 75% of Dead Load of Walls and Columns





WALL LOAD TRANSFER: Preloading

- Jacking Bracket with 150 ton low height, “pan-cake” jack

Bearing Wall Shoring Jacking Schedule (revised on 2/12/2

Tower Location	Jacking Sequence	Pile Number	Jacking Load (kips)	Tower Location	Jacking Sequence	Pile Number	Jacking Load (kips)
T1	2	233	64				
		227	108				
		257	57				
		254	75				
T2	4	226	62	T11	12	107	170
		220	186			74	138
		290	193			61	166
		256	48			59	101
T3	6	214	139	T12	14	114	96
		208	62			109	64
		144	62			58	110
		142	142			55	102
T4	7	201	62	T13	16	118	66
		200	65			115	151
		146	65			54	154
		145	61			51	69
T5	5	195	51	T14	15	121	79
		193	141			119	103
		149	148			50	106
		147	50			48	80
T6	3	183	134	T15	13	280	66
		181	102			122	80
		155	53			47	64
		151	150			45	88
T7	1	168	70	T16	11	279	97
		159	83			281	135
		97	83			44	127
		158	81			41	133
T8	8	80	46	T17	9	ADD Pile 4	32
		79	36			273	30
		101	53			40	65
		100	67			39	61
T9	10	78	60				
		77	13				
		103	20				
		102	89				

NOTE
1. 75% of DEAD LOAD(WALL LOADS AND COLUMN LOADS) SHOWN ON EXISTING CONSTRUCTION SERVICE LOAD S0008_02 AND 100% OF TRUSS DEAD LOAD REACTIONS ARE USED TO DETERMINE JACKING FORCE.
2. SEQUENCE OF SHORING TOWER JACKING IS SHOWN IN THE SHORING TOWE JACKING SCHEDULE.
3. CONFIRM MINIMUM STRENGTH 500PSI OF DRYPACK INSTALLED BETWEEN NEEDLE BEAMS AND EXISTING WALL. AT LEAST WAIT FOR 24 HOURS AFTER DRYPACK INSTALLATION.

PRELOADING Sequential SCHEDULE

- Sequential jacking: avoid load concentration in existing bearing wall



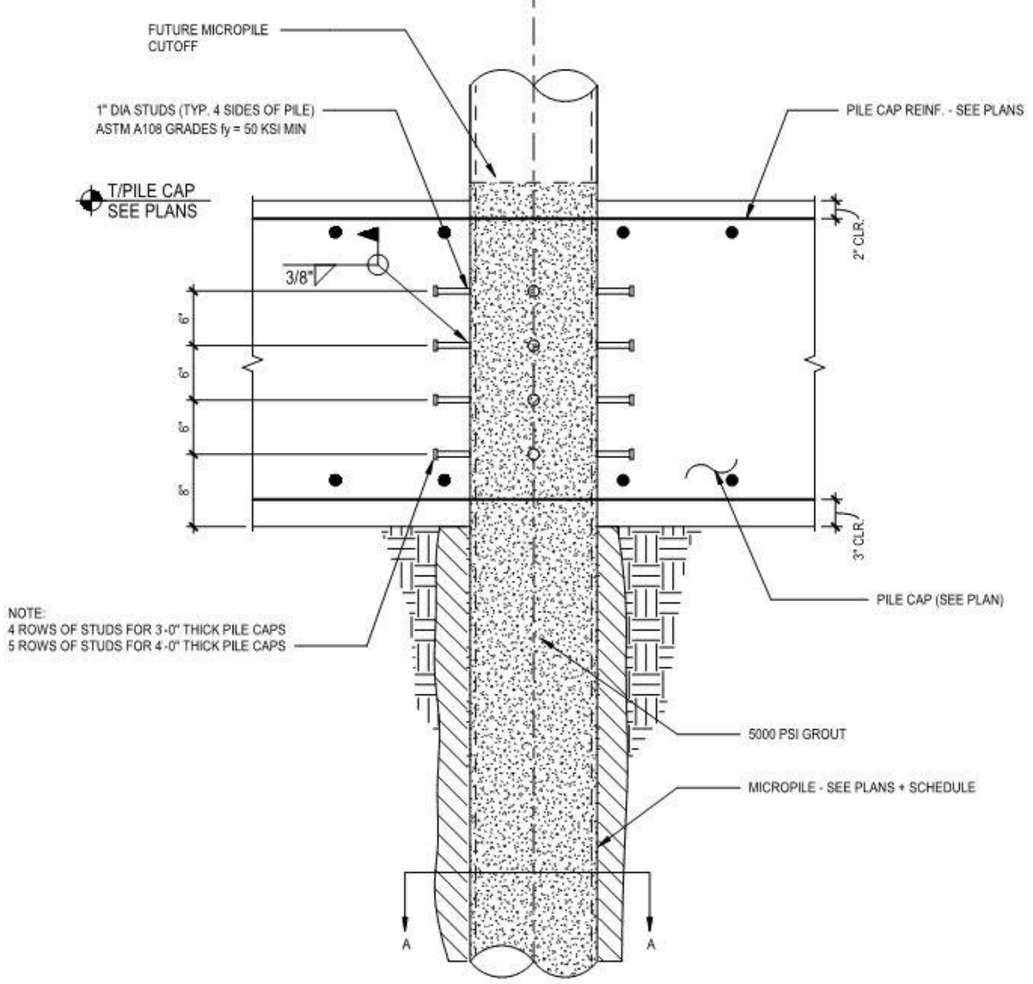
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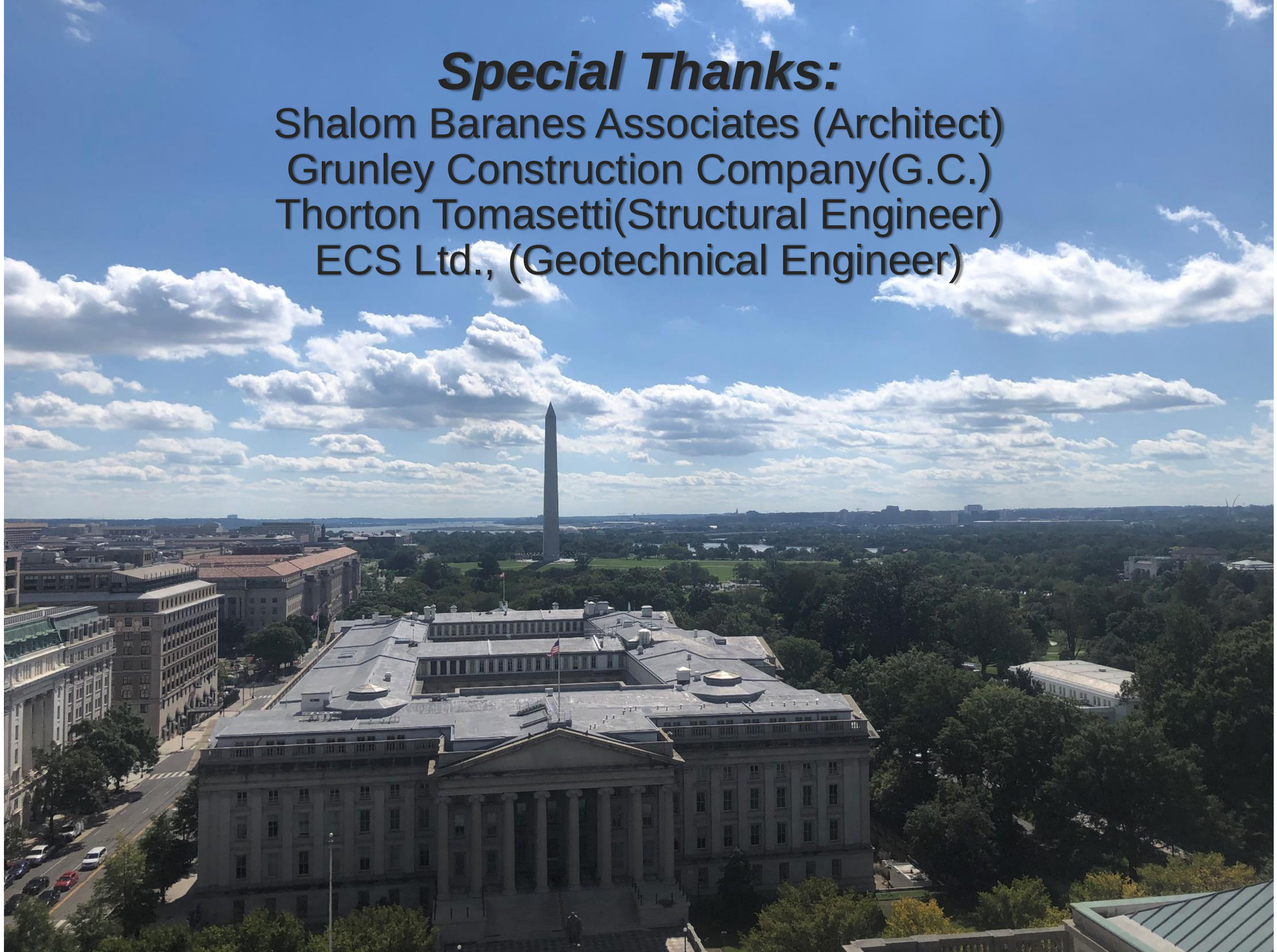


Permanent Pile Top Connection



WALL LOAD TRANSFER: Permanent Foundations

- Micropiles to New pile caps
- 16 or 20 Headed Studs: Shear Connector



Special Thanks:

Shalom Baranes Associates (Architect)
Grunley Construction Company(G.C.)
Thorton Tomasetti(Structural Engineer)
ECS Ltd., (Geotechnical Engineer)