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Structural Resin Injection:

For Structural and Soil Stabilization Solutions

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URETEK HDPF History

1975 – URETEK Finland develops high-density polymers

1988 – URETEK USA, Inc. granted exclusive rights to United States and Mexico

2003 – Deep Injection Process patented

2004 – URETEK MA established in NC

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Introduction to Expanding Polyurethane

- Three Broad Categories
  - Hydrophilic, Hydrophobic and Hydroinsensitive (URETEK 486 Star)
- Two Component Polymerization Process
  - Injected as a liquid, chemical reaction expands and changes the liquid into a solid

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Advantages to Using URETEK Polymers

- **Minimal Disruption**
  - **No Digging / 5/8” diameter holes**
  - **Develops 90% strength in 15 minutes**
  - **Fully cured in 24 hours**
  - **Return to service in 1 hour**
- **Excellent Chemical Resistance**
- **Long Term Structural and Dimensional Stability**
- **Environmentally Benign**

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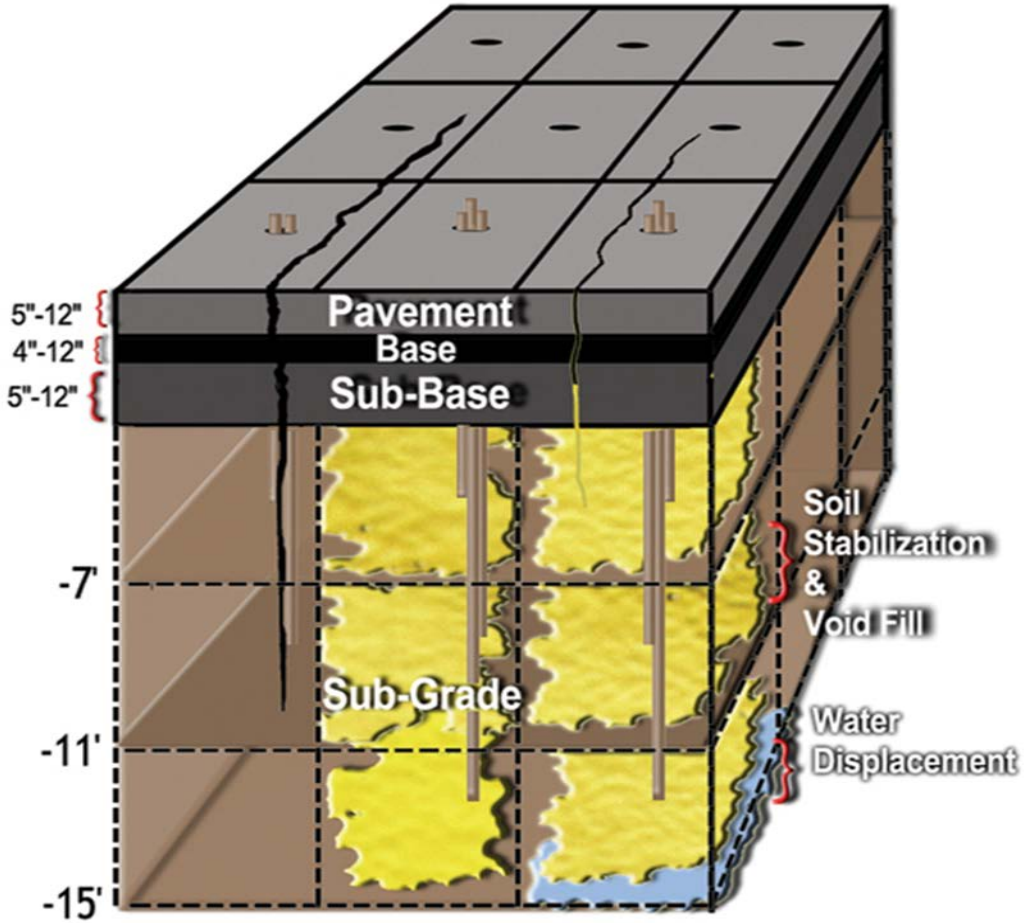
Typical URETEK Deep InjectionTM



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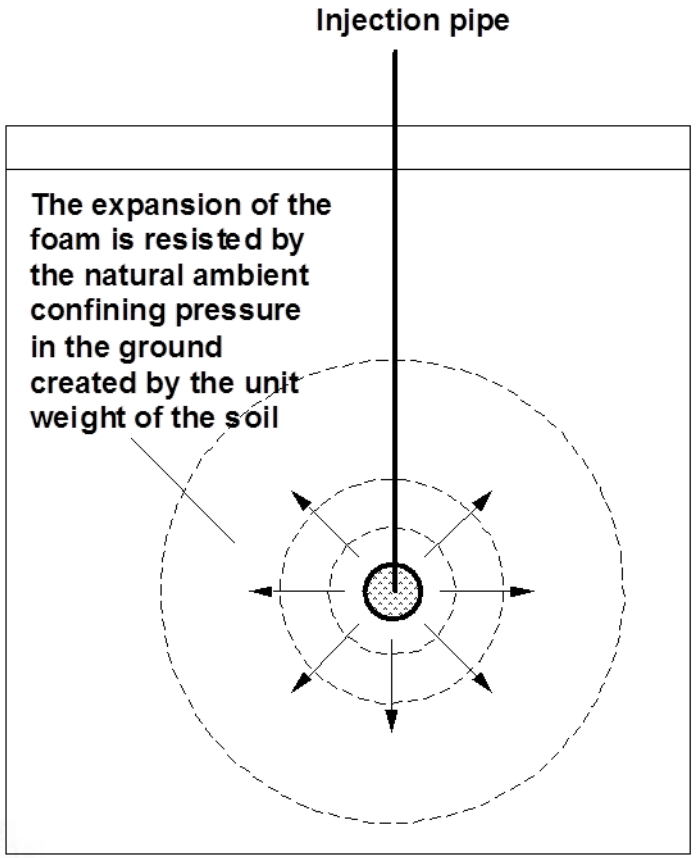
The HDPF Deep Injection™ process utilizes two separate mechanisms to achieve its objective.

Firstly, it uses confining pressure within the ground to resist the expansion of the foam node.

By resisting the foam, the soil comes under pressure, which drives out the water and compacts it.



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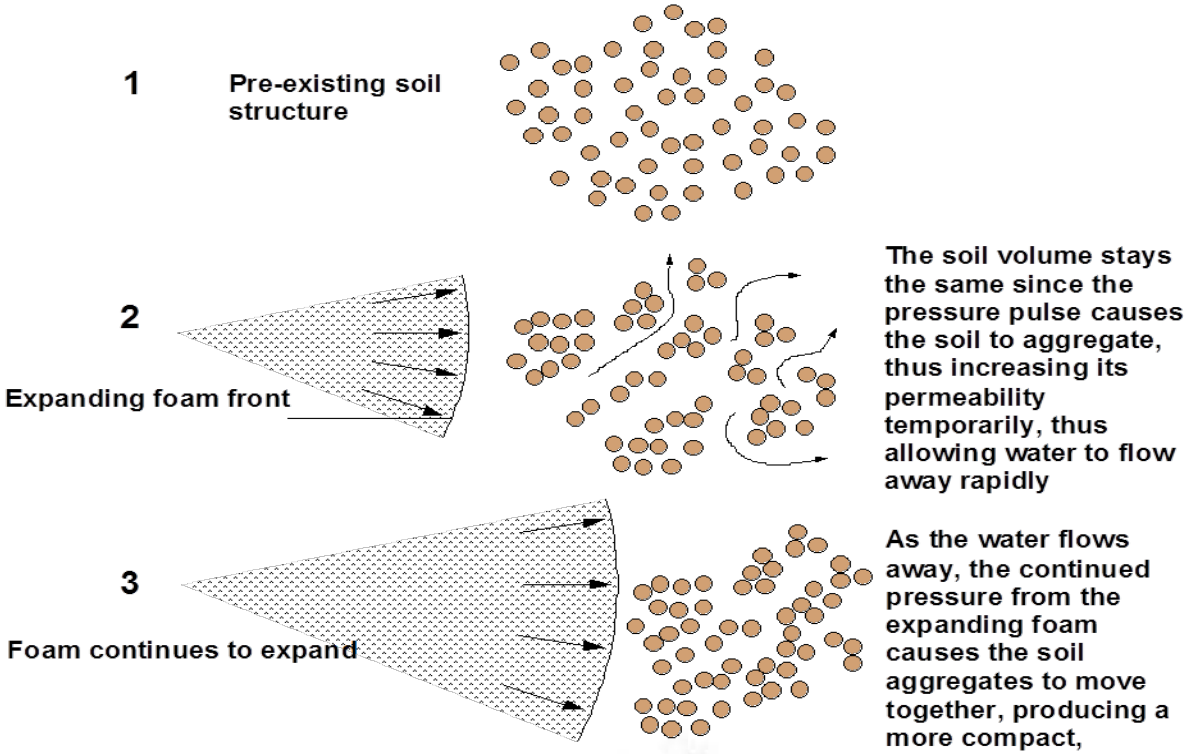
The Localized Pressure process for cohesionless soils expels water and makes the soil more compact



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NAVFAC Product Testing

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NAVFAC Product Testing

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NAVFAC Product Testing

Intact Extraction of the Stabilized Crater Repair

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Product Testing

Stabilization of Aggregate Subbase below the Basaltic Base of an Asphalt Pavement

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Product Testing

Excavation Revealing ISSBIP-Stabilized Sand

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Trench Stabilization Calhoun St. Columbia

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Product Testing
Rigid Airfield Pavements

Study of the impact on the performance of the repaired sections characterized by load transfer efficiency, joint stiffness and deformation energy dissipated through the pavement foundation

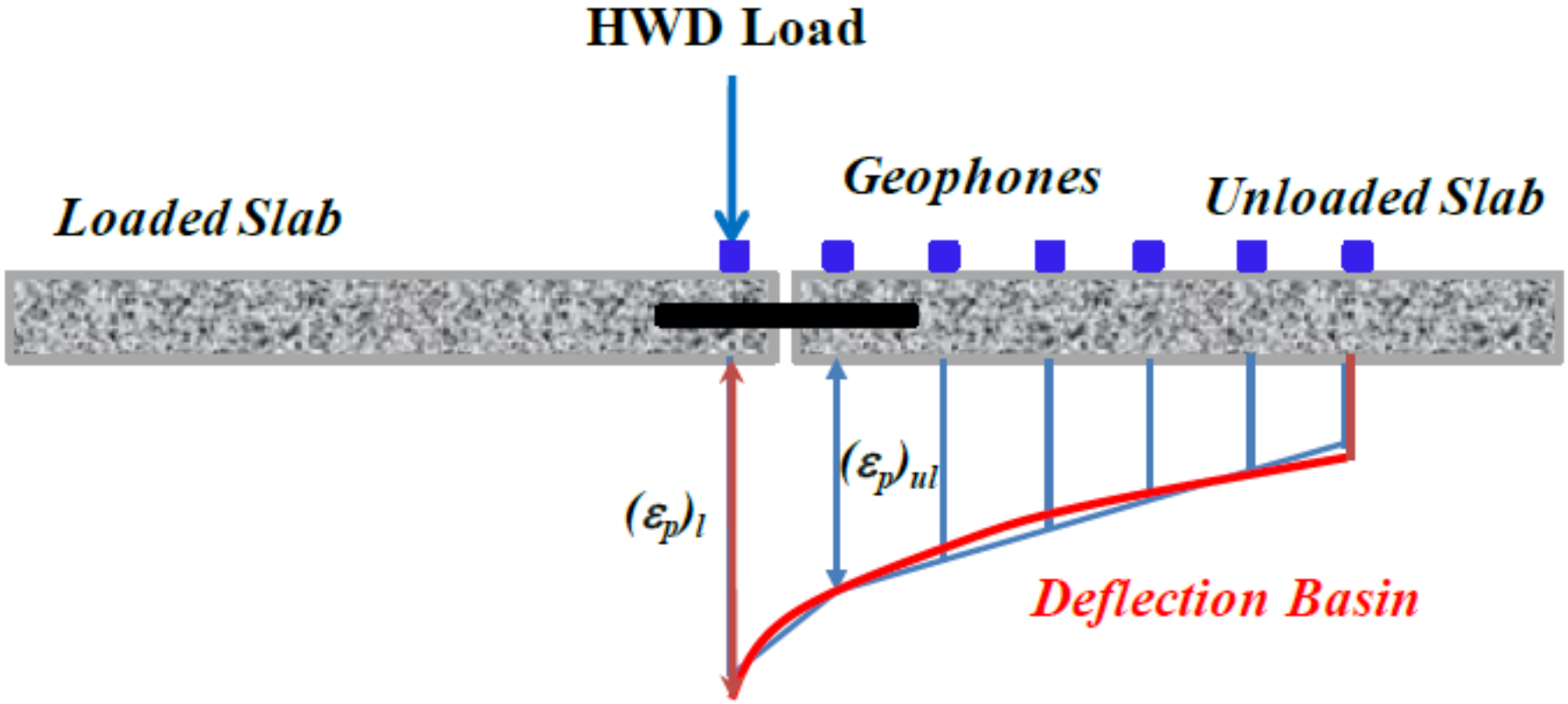

FIGURE 2 Deflection basin resulting from HWD loading system

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Accelerated loading and HWD testing of the repaired sections.

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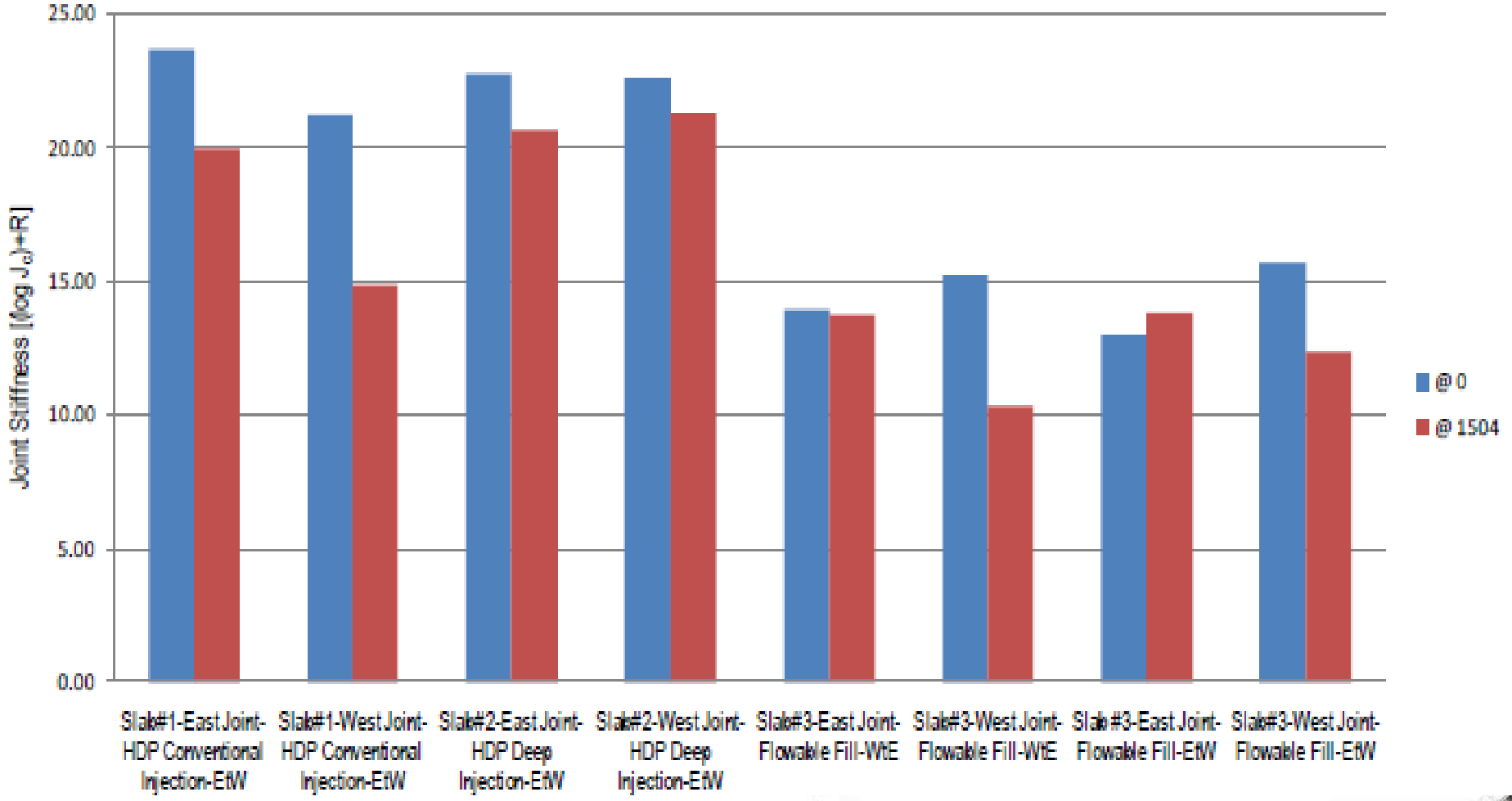

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SCDOT
SC-277S
MM-3.1

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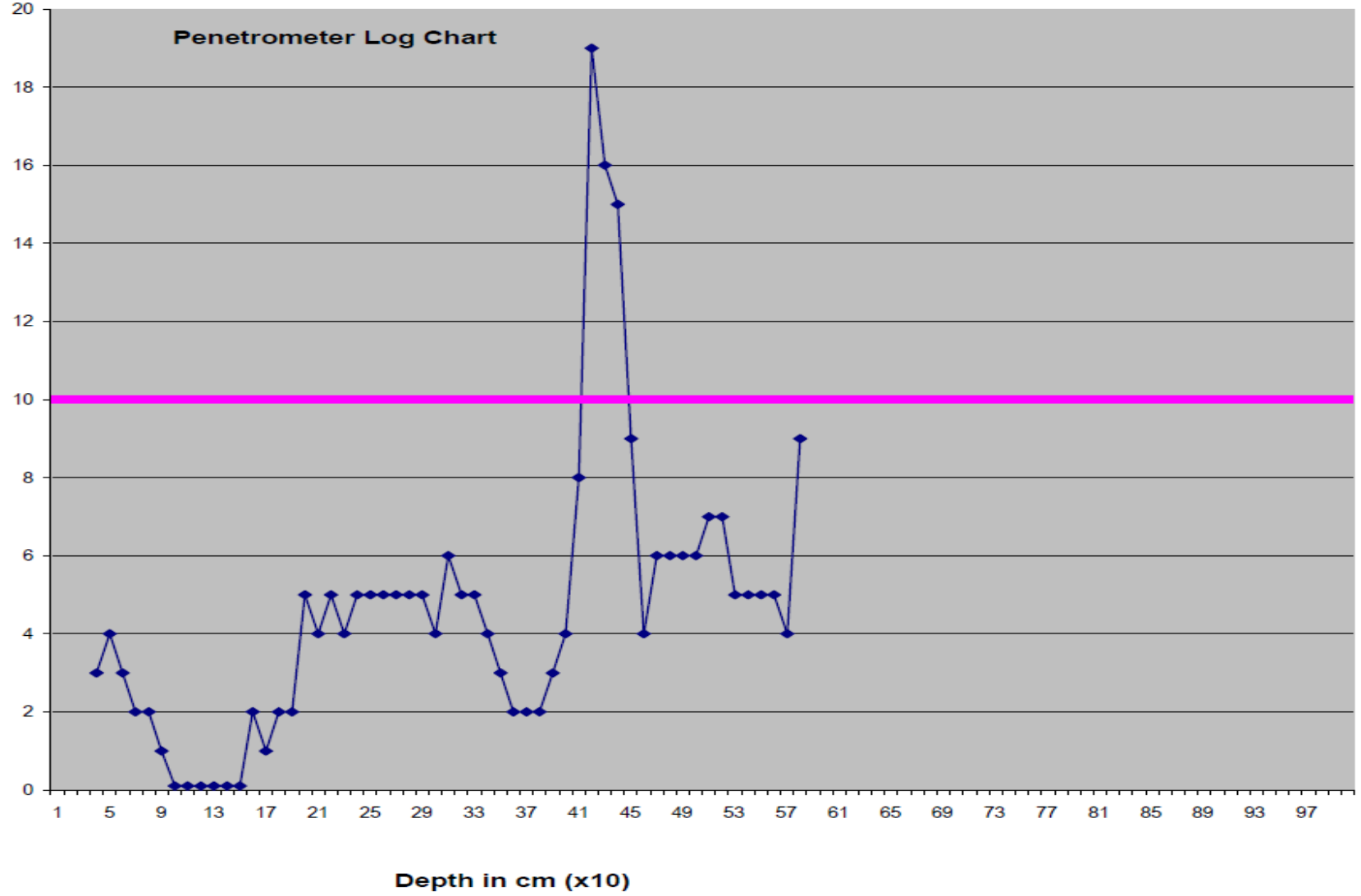

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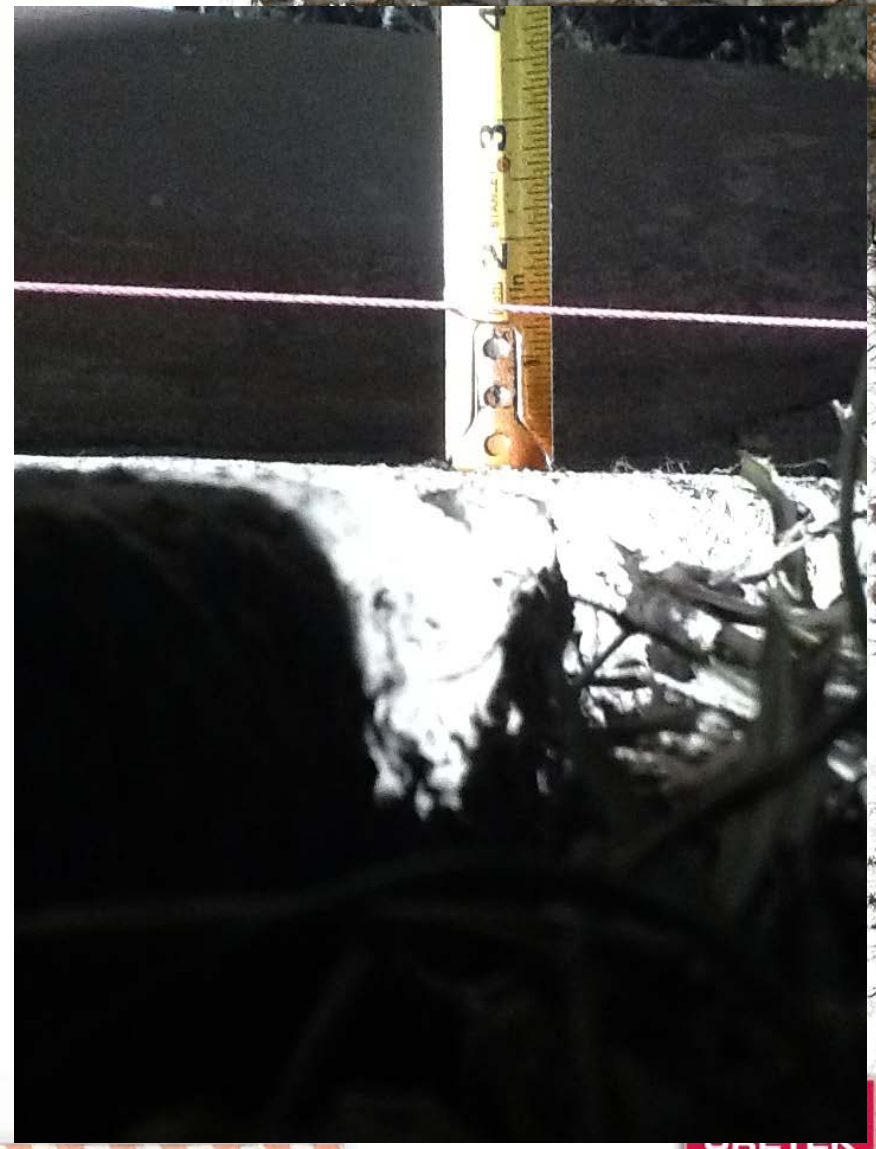

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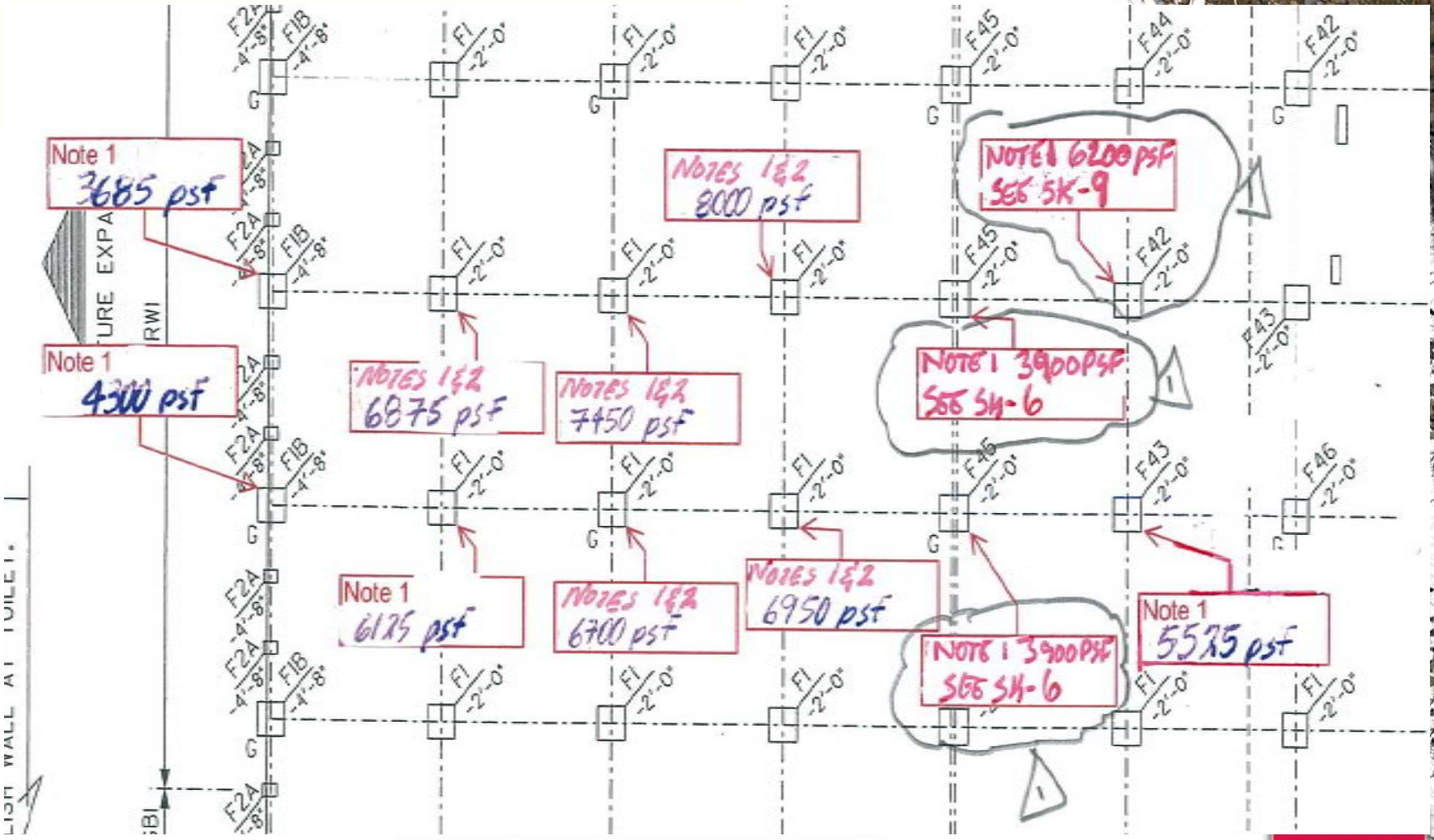

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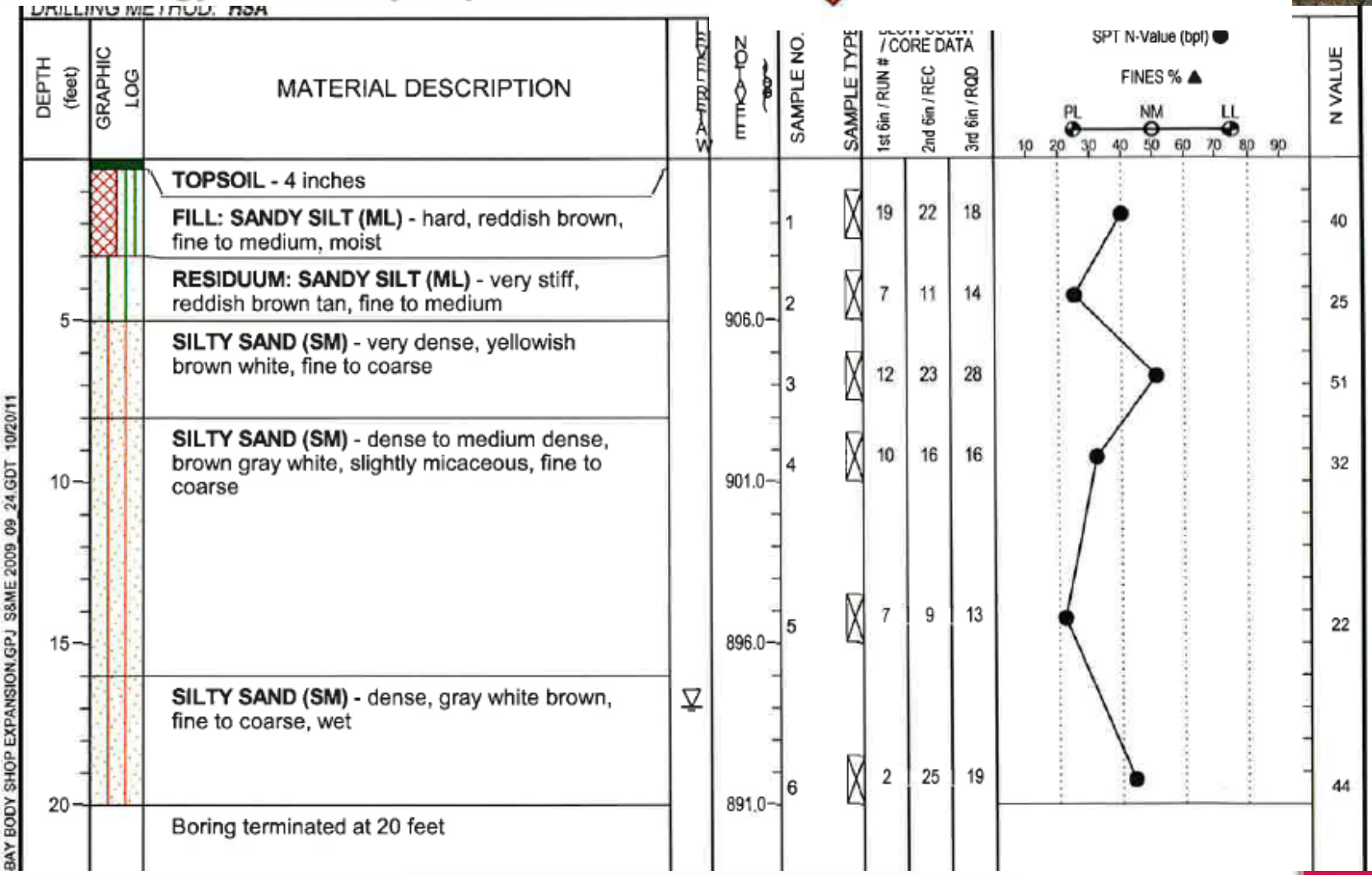
S&ME



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Column	Footing Width (ft)	Bottom of Footing (ft)	Required Bearing Pressure (psf)	Notes
A-21	8	3.5	7100	Inject Grout From BOF to at least 8 feet below slab
OA-19	8	3.5	5654	Inject Grout from BOF to at least 8.5 feet below slab
D-12	8	3.5	3569	Meets Required Bearing Pressure
E-10	8	3.5	4024	Not Enough Information
OB-27	9	3.8	3950	Inject Grout from BOF to at least 5.3 feet below slab
OB-30	9.5	3.8	3800	Inject Grout from BOF to at least 10 feet below slab
OB-31	9	3.8	3850	Inject Grout from BOF to at least 7 feet below slab

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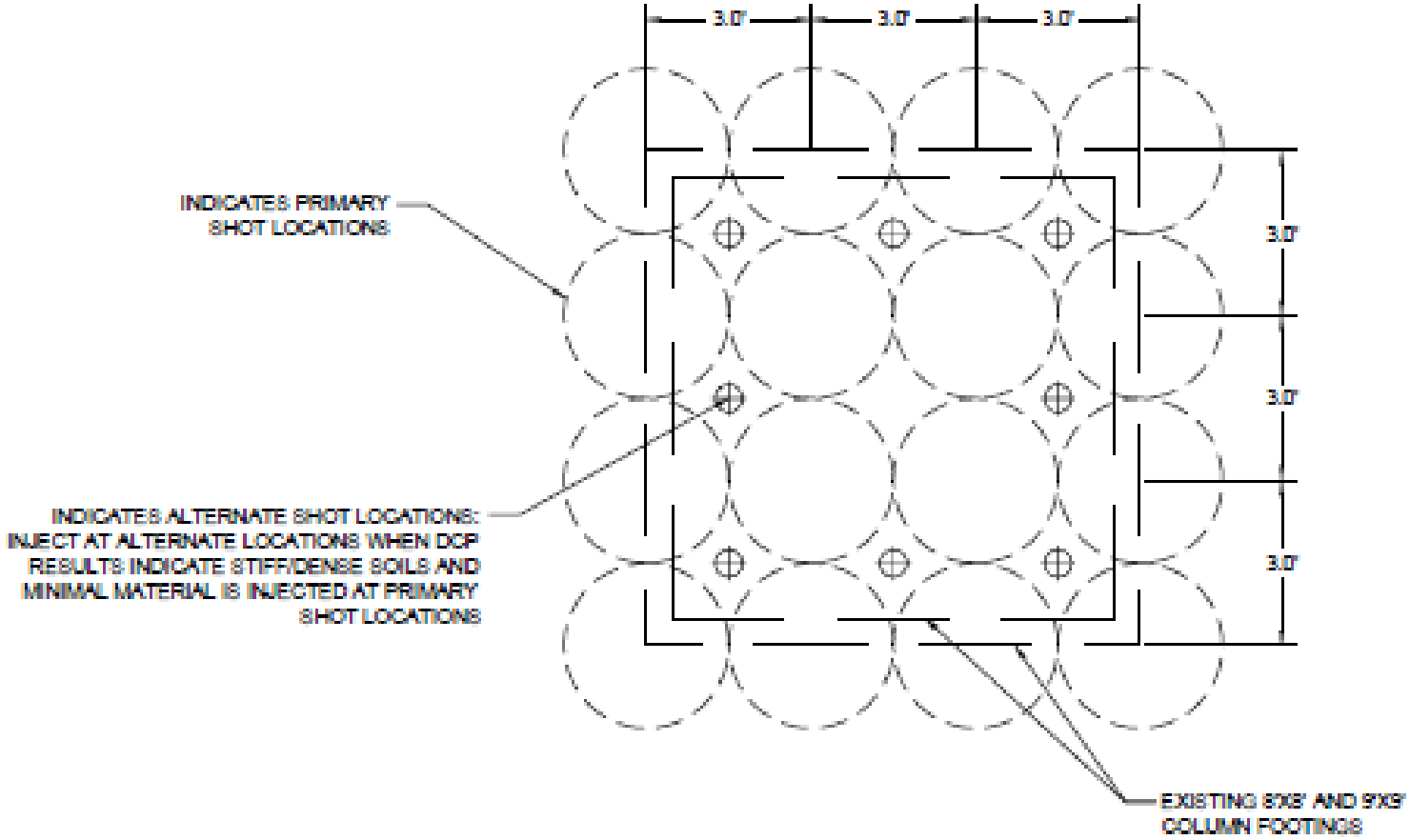

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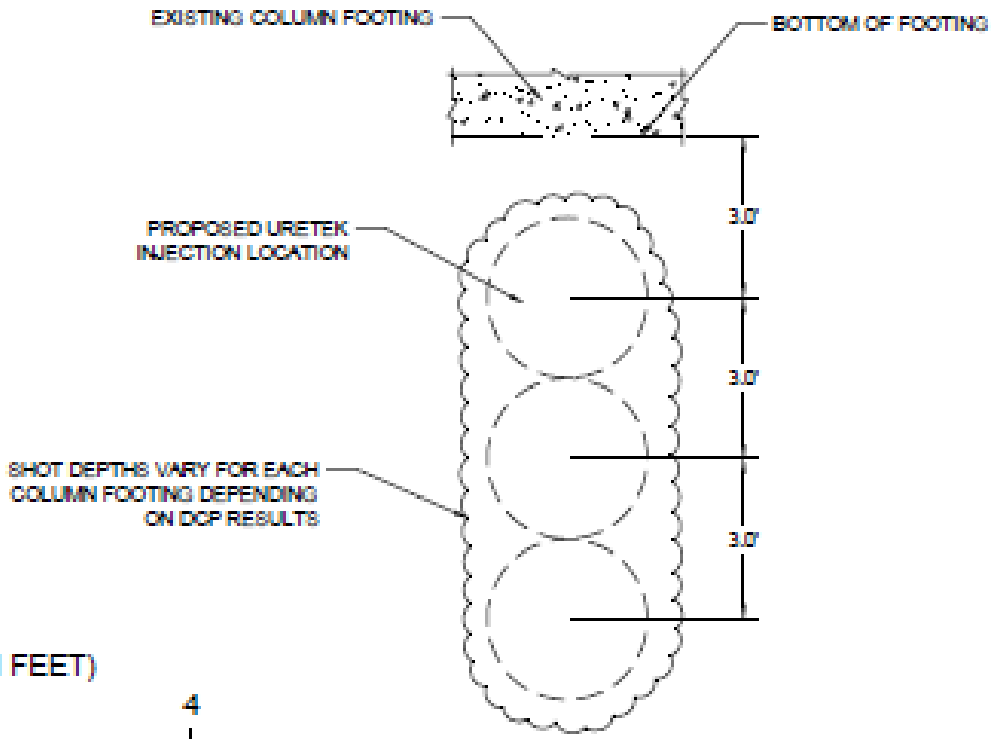
PLAN VIEW - PROPOSED URETEK INJECTION LAYOUT



SCALE (IN FEET)

2 4

4 0

TYPICAL SECTION VIEW - PROPOSED URETEK INJECTION LOCATION

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Depth (cm)	Depth (ft)	Pre DPM30 Blows/10 cm	Pre SPT Blows/FT	Depth (cm)	Depth (ft)	Post DPM30 Blows/10 cm	Post SPT Blows/FT
10	0.3			10	0.3		
20	0.7			20	0.7		
30	1			30	1		
40	1.3	27	21	40	1.3		
50	1.6	44	34	50	1.6		
60	2	40	31	60	2	28	21
70	2.3	33	25	70	2.3	22	17
80	2.6	54	41	80	2.6	56	43
90	3	36	28	90	3	22	17
100	3.3	19	15	100	3.3	27	21
110	3.6	19	15	110	3.6	160	123
120	3.9	50	38	120	3.9	173	133
130	4.3	36	28	130	4.3	86	66
140	4.6	30	23	140	4.6	140	107
150	4.9	50	38	150	4.9	150	115
160	5.2	67	51	160	5.2	179	137
170	5.6	83	64	170	5.6	169	129
180	5.9	97	74	180	5.9	190	146
190	6.2	11	8	190	6.2	210	161
200	6.6	139	106	200	6.6	225	172
210	6.9			210	6.9		

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Depth (cm)	Depth (ft)	Pre DPM30 Blows/10 cm	Pre SPT Blows/FT	Depth (cm)	Depth (ft)	Post DPM30 Blows/10 cm	Post SPT Blows/FT
10	0.3			10	0.3		
20	0.7			20	0.7		
30	1			30	1		
40	1.3			40	1.3		
50	1.6	10	8	50	1.6	29	22
60	2	21	16	60	2	30	23
70	2.3	42	32	70	2.3	24	18
80	2.6	54	41	80	2.6	31	24
90	3	31	24	90	3	53	41
100	3.3	25	19	100	3.3	35	27
110	3.6	30	23	110	3.6	38	29
120	3.9	43	33	120	3.9	47	36
130	4.3	27	21	130	4.3	48	37
140	4.6	32	25	140	4.6	39	30
150	4.9	18	14	150	4.9	47	36
160	5.2	21	16	160	5.2	55	42
170	5.6	31	24	170	5.6	54	41
180	5.9	24	18	180	5.9	49	38
190	6.2	27	21	190	6.2	57	44
200	6.6	20	15	200	6.6	69	53
210	6.9	24	18	210	6.9	66	51
220	7.2	20	15	220	7.2	73	56
230	7.5	30	23	230	7.5	89	68
240	7.9	101	77	240	7.9	100	77
250	8.2	120	92	250	8.2		
260	8.5	145	111	260	8.5		

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