



DeWitt's Driven Grout Pile



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Driven Grout Pile Offers Substantial Savings in Time and Dollars

The Driven Grout Pile was conceived to provide an economical pile capable of supporting loads in excess of 100 tons. In most situations it will provide a cost saving pile in lieu of the normal precast-stressed concrete pile, H-pile, pipe pile or augercast pile.

The pile offers many advantages over these piles. The material required is most always immediately and locally available. The pre-manufacture and delivery is minimal compared to rolling and shipment of steel pile and casting of PC-PS pile. The pile offers a great savings in job time as well as dollars.

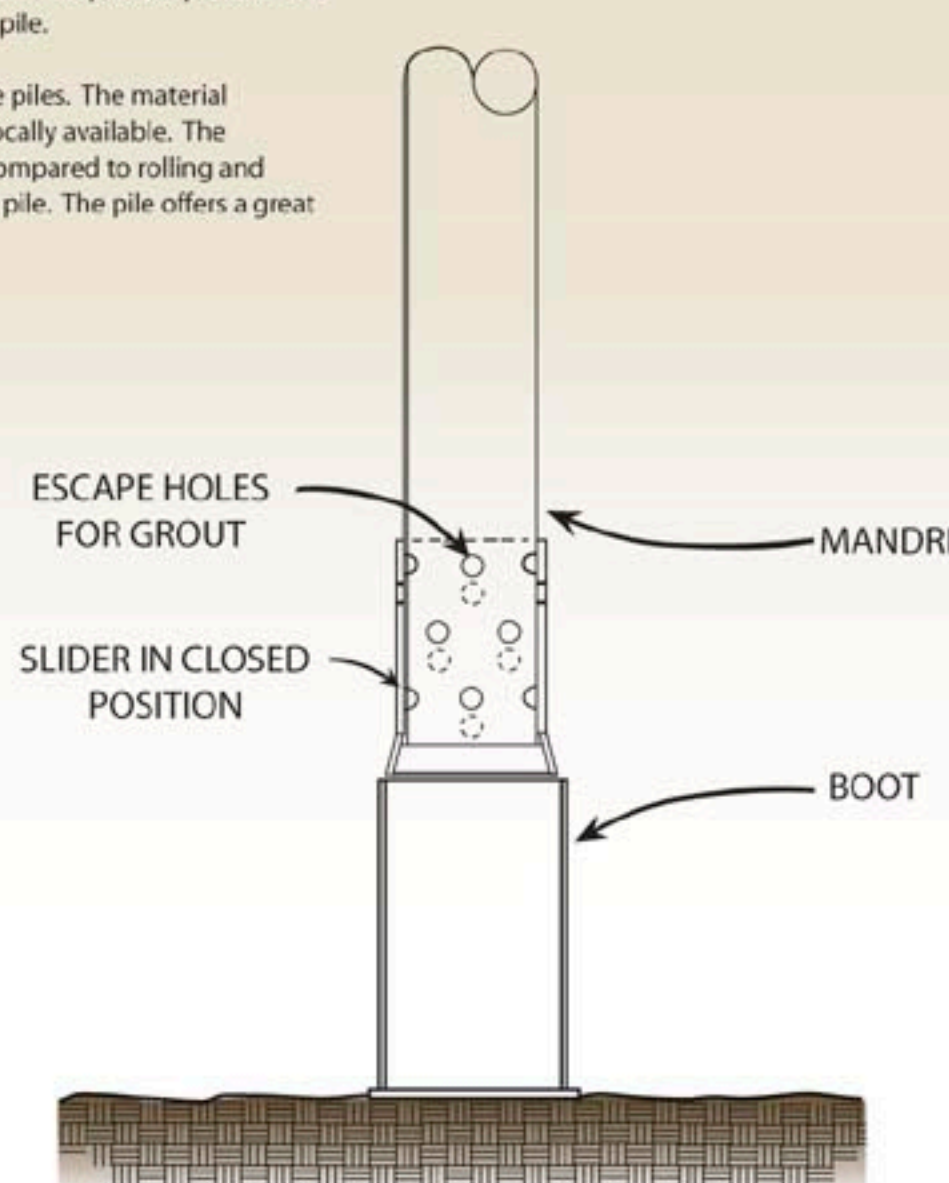


Figure 1
Inserting Mandrel and Slider Into Boot



Examining the Unique Driven Grout Pile Process

A Pile is started by placing a "boot" on the correct location (Figure 1). This boot consists of a short piece of pipe with an end plate attached and serves to contain the grout at the onset, and also protects the tip of the mandrel during driving. The mandrel is placed in the boot, then charged with fluid grout at pressures ranging to 200 psi. At this point the driving commences. The grout injected prior to and during driving escapes under pressure from the tip serving to maintain the diameter of the shaft and provides lubrication to facilitate extraction of the mandrel. Once bearing is met (terminal driving criteria), the grout is injected as required under pressure as the mandrel is extracted (Figure 4). The design of the mandrel keeps soil from entering the grout column.

Hammer Energy Goes Directly to the Tip of the Pile

The Pile is completed by installing a rebar cage and a Sonotube sleeve. Since there are no spoils that accumulate, this sleeve forms the top of the piling where it enters the pile cap.

Since the mandrel is continuously being driven through an annular column of fluid grout, the only resistance encountered during driving is that which is localized at the tip of the pile. All hammer energy therefore goes directly to the tip of the pile, conforming neatly to the wave equation. It is after the grout column gains strength that the skin friction develops. This phenomenon imparts an inherent conservatism to the ultimate capacity of the piling.

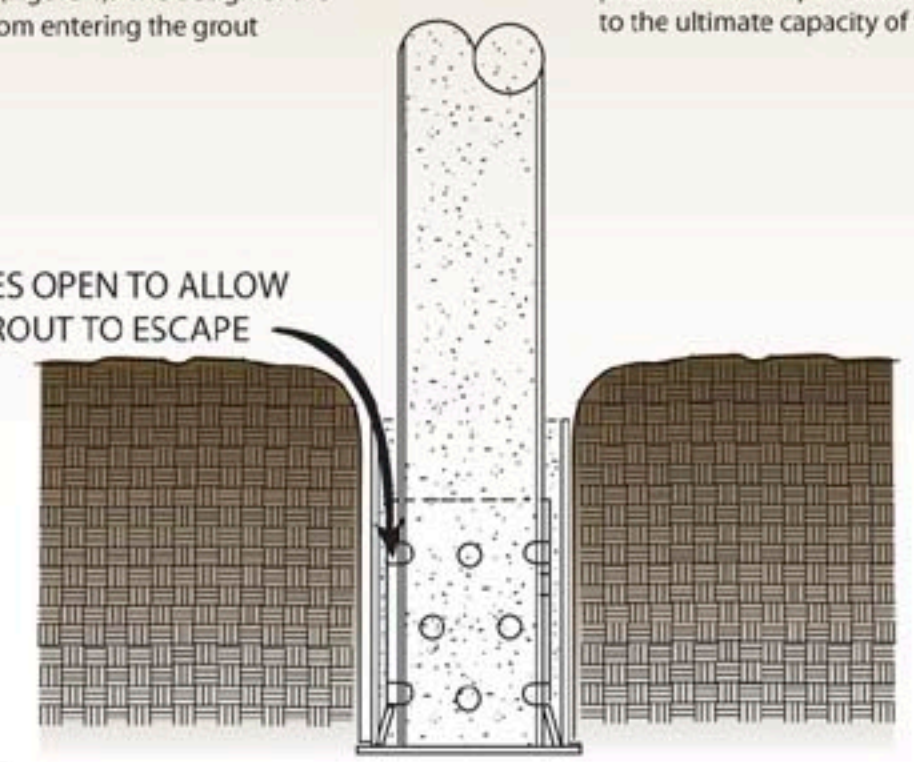


Figure 2
Ready to Drive

Densification Increases Load Carrying Capacity

Pile length adjustment is simply done by decreasing or increasing the number of strokes from the pre-calibrated grout pump; therefore, there is little waste and cut off is accomplished by striking off the top sonotube form.

Driving these piles with the conventional equipment results in a large load carrying capacity due to a densification of the soil at the tip, also increasing the friction factor around the perimeter of the pile.

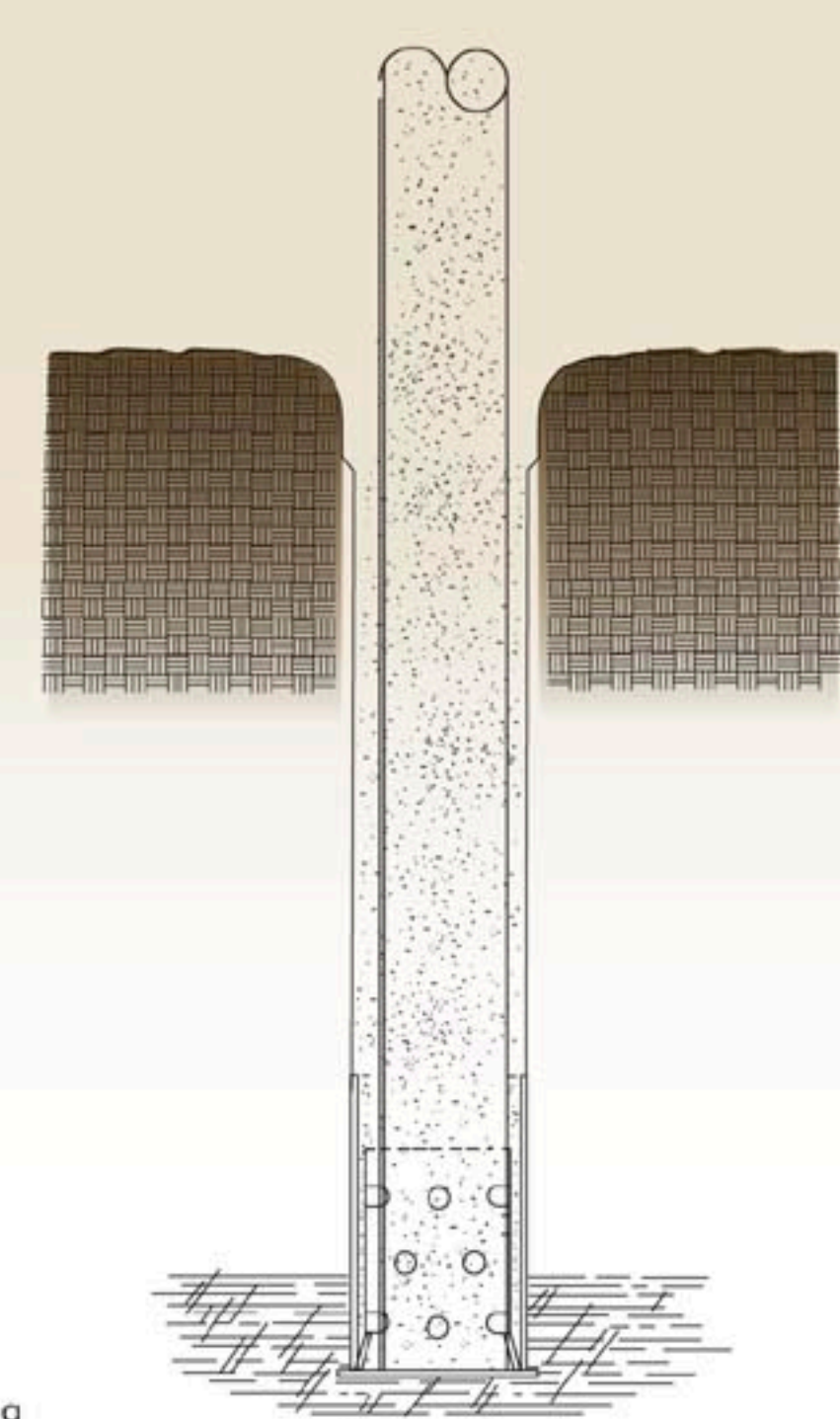


Figure 3
Driven to Bearing



No Spoils, No Cut-Off & Little Material Waste During Installation

The process produces virtually no spoils, which is very significant in contaminated construction sites. It is a concrete pile, and therefore is resistant to most all corrosive conditions which otherwise may attack steel piles. Since the piling is cast in place, there is no cut off and there is little waste of material during the installation. This efficient process has installed up to twenty 110-foot piles per day with a design load of 220 tons.

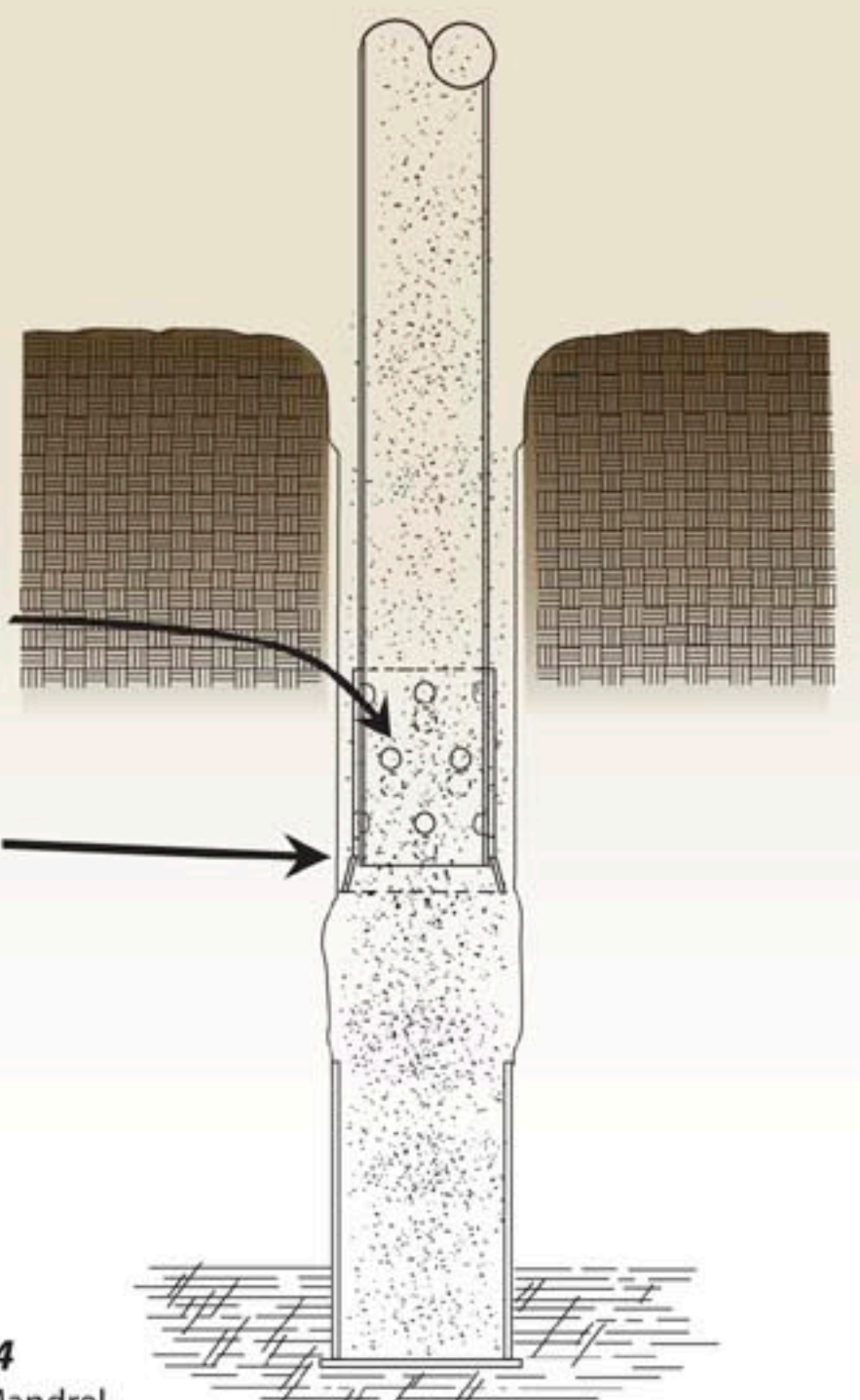


Figure 4
Withdrawing Mandrel

Downdrag Loads Can Reduce Allowable Capacities

Settlement of soils surrounding piles can induce frictional dowdrag loads that essentially reduce the allowable pile capacity. Driving a steel casing in the upper soils precludes soil/grout interacting, reducing dowdrag loads. In most situations the steel casing can replace the need for a rebar cage.

Investigating the Distinctive Sleeved Driven Grout Pile Process

A Sleeved Driven Grout Pile is started by first driving a steel sleeve with the "boot" tack welded to the bottom (figure 5). The sleeve is driven to a predetermined depth. The mandrel is now placed in the sleeve, then grout is injected and the driving begins. The driving breaks the "boot" away from the sleeve. The sleeve remains in place and forms the top of the pile where it enters the pile cap (figure 6). The process is completed like a typical Driven Grout pile.

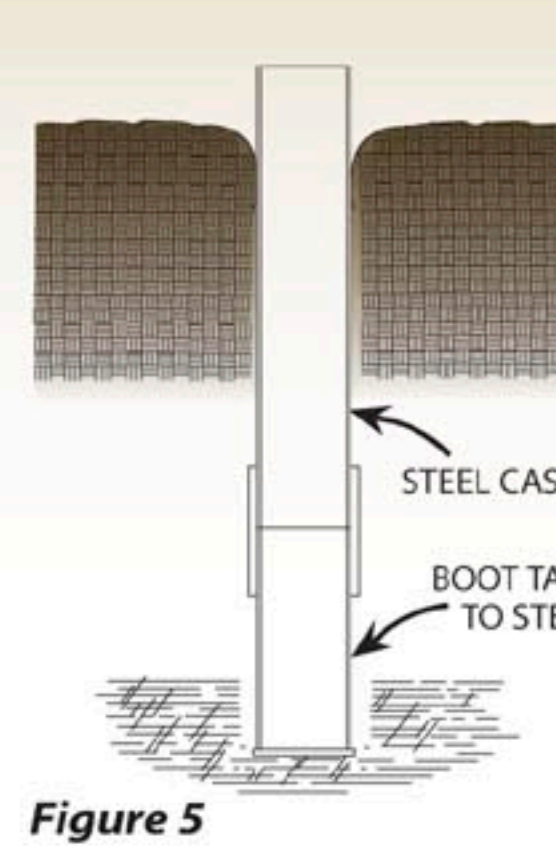


Figure 5

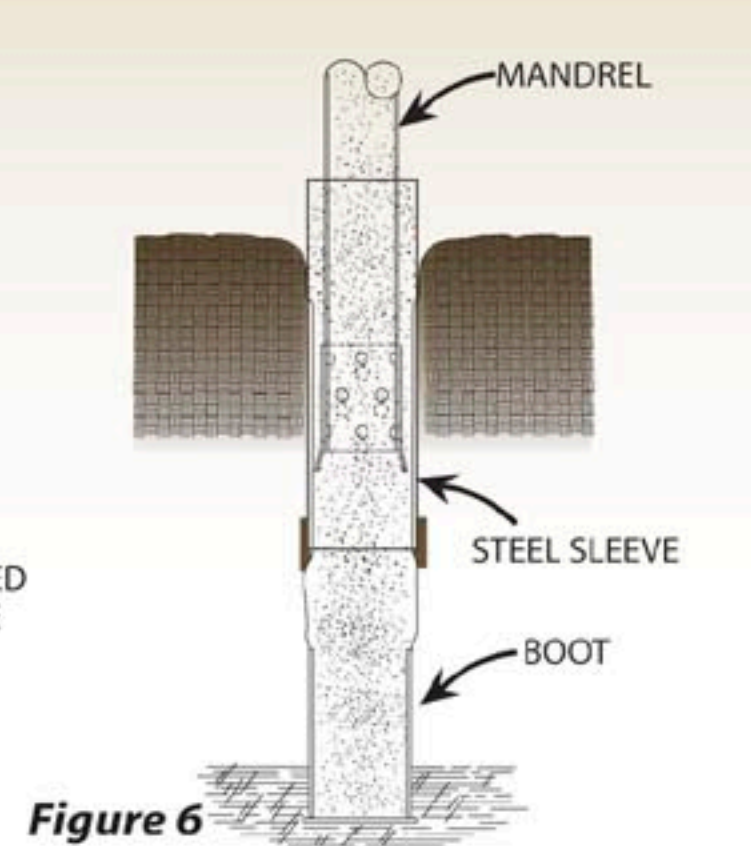


Figure 6



Setting the Rebar Cage/Center Bar Completes the Driven Grout Pile

After the mandrel is withdrawn, to form the top of the pile on a "Typical" Driven Grout Pile, a sonotube is set at the correct elevation. With the Sleeved Pile, the steel casing forms the top. The Center bar and Rebar cage are now set in place (figure 7). In most circumstances the rebar cage can be deleted and replaced by the sleeve. Unlike auger-cast pile, there is little or no spoils to be removed, saving time and money. The piles are now ready to be formed into a pile cap.

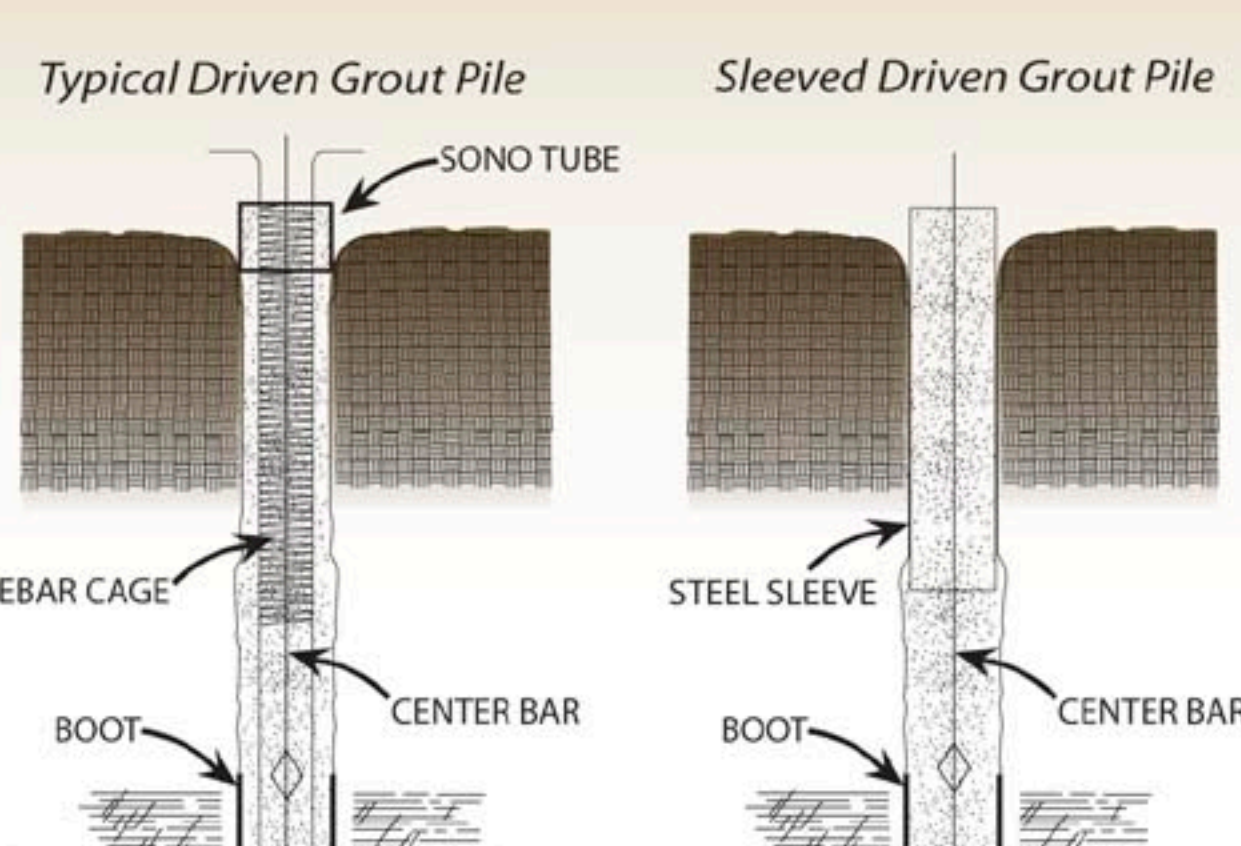
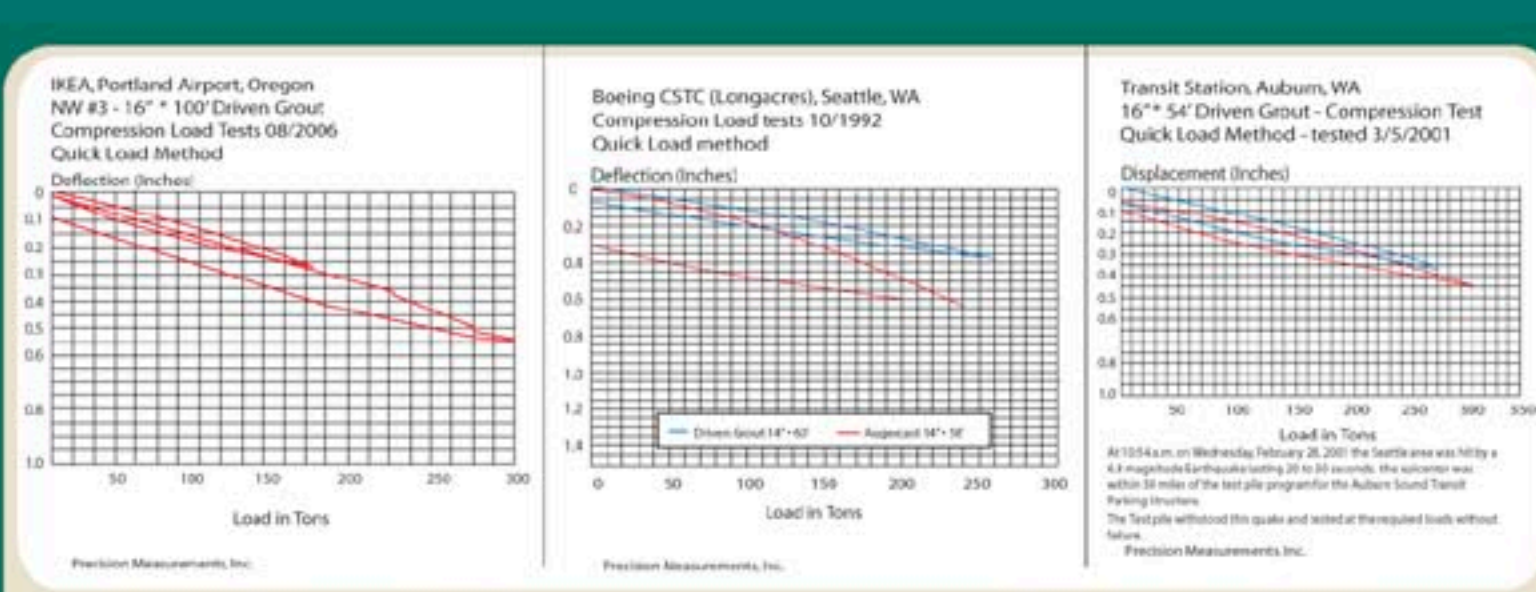


Figure 7



Soil Boring - IKEA		Soil Boring - Boeing	
Material Description	Depth	Material Description	Depth
Loose brown, fine SAND with trace silt (M)	0-5	Brown fine gravel with silt, fine sand, trace (M)	0-5
becomes very loose wet at 5.0 feet		Dark gray silty clay with fine sand (M)	5-10
Very soft to soft, dark gray sand (S)	5-10	Dark gray silty clay with fine sand (M)	10-15
with trace clay, wet, low plasticity, grades to interbedded layers 3 to 10 inches thick of clay silt and sandy silt with trace medium sand at 10.0 feet		Dark gray silty clay with fine sand (M)	15-20
becomes green gray with trace to some clay and trace organic, low to medium plasticity at 10.0 feet		Dark gray silty clay with fine sand (M)	20-25
Very soft, dark gray and gray brown, clayey Silt with trace sand, wet, medium plasticity	10-15	Dark gray silty clay with fine sand (M)	25-30
with trace wood fragments at 25.0 feet		Dark gray silty clay with fine sand (M)	30-35
Very soft to soft, dark gray (S)	15-20	Dark gray silty clay with fine sand (M)	35-40
with trace sand, clay, and organic, wet, low plasticity		Dark gray silty clay with fine sand (M)	40-45
becomes sandy at 22.5 feet		Dark gray silty clay with fine sand (M)	45-50
Loose, dark gray, fine SAND with trace silt and trace organic (1 inch diameter), wet, low plasticity	20-25	Dark gray silty clay with fine sand (M)	50-55
Very soft, dark gray Silt with trace fine sand and trace fine plasticity	25-30	Dark gray silty clay with fine sand (M)	55-60
Medium dense, dark gray, fine SAND with trace silt, wet	30-35	Dark gray silty clay with fine sand (M)	60-65
with trace mica and some fine organic laminae at 48.0 feet		Dark gray silty clay with fine sand (M)	65-70
becomes dense at 117.5 feet		Dark gray silty clay with fine sand (M)	70-75
		Dark gray silty clay with fine sand (M)	75-80
		Dark gray silty clay with fine sand (M)	80-85
		Dark gray silty clay with fine sand (M)	85-90
		Dark gray silty clay with fine sand (M)	90-95
		Dark gray silty clay with fine sand (M)	95-100
		Dark gray silty clay with fine sand (M)	100-105
		Dark gray silty clay with fine sand (M)	105-110
		Dark gray silty clay with fine sand (M)	110-115
		Dark gray silty clay with fine sand (M)	115-120
		Dark gray silty clay with fine sand (M)	120-125
		Dark gray silty clay with fine sand (M)	125-130
		Dark gray silty clay with fine sand (M)	130-135
		Dark gray silty clay with fine sand (M)	135-140
		Dark gray silty clay with fine sand (M)	140-145
		Dark gray silty clay with fine sand (M)	145-150
		Dark gray silty clay with fine sand (M)	150-155
		Dark gray silty clay with fine sand (M)	155-160
		Dark gray silty clay with fine sand (M)	160-165
		Dark gray silty clay with fine sand (M)	165-170
		Dark gray silty clay with fine sand (M)	170-175
		Dark gray silty clay with fine sand (M)	175-180
		Dark gray silty clay with fine sand (M)	180-185
		Dark gray silty clay with fine sand (M)	185-190
		Dark gray silty clay with fine sand (M)	190-195
		Dark gray silty clay with fine sand (M)	195-200
		Dark gray silty clay with fine sand (M)	200-205
		Dark gray silty clay with fine sand (M)	205-210
		Dark gray silty clay with fine sand (M)	210-215
		Dark gray silty clay with fine sand (M)	215-220
		Dark gray silty clay with fine sand (M)	220-225
		Dark gray silty clay with fine sand (M)	225-230
		Dark gray silty clay with fine sand (M)	230-235
		Dark gray silty clay with fine sand (M)	235-240
		Dark gray silty clay with fine sand (M)	240-245
		Dark gray silty clay with fine sand (M)	245-250
		Dark gray silty clay with fine sand (M)	250-255
		Dark gray silty clay with fine sand (M)	255-260
		Dark gray silty clay with fine sand (M)	260-265
		Dark gray silty clay with fine sand (M)	265-270
		Dark gray silty clay with fine sand (M)	270-275
		Dark gray silty clay with fine sand (M)	275-280
		Dark gray silty clay with fine sand (M)	280-285
		Dark gray silty clay with fine sand (M)	285-290
		Dark gray silty clay with fine sand (M)	290-295
		Dark gray silty clay with fine sand (M)	295-300
		Dark gray silty clay with fine sand (M)	300-305
		Dark gray silty clay with fine sand (M)	305-310
		Dark gray silty clay with fine sand (M)	310-315
		Dark gray silty clay with fine sand (M)	315-320
		Dark gray silty clay with fine sand (M)	320-325
		Dark gray silty clay with fine sand (M)	325-330
		Dark gray silty clay with fine sand (M)	330-335
		Dark gray silty clay with fine sand (M)	335-340
		Dark gray silty clay with fine sand (M)	340-345
		Dark gray silty clay with fine sand (M)	345-350
		Dark gray silty clay with fine sand (M)	350-355
		Dark gray silty clay with fine sand (M)	355-360
		Dark gray silty clay with fine sand (M)	360-365
		Dark gray silty clay with fine sand (M)	365-370
		Dark gray silty clay with fine sand (M)	370-375
		Dark gray silty clay with fine sand (M)	375-380
		Dark gray silty clay with fine sand (M)	380-385
		Dark gray silty clay with fine sand (M)	385-390
		Dark gray silty clay with fine sand (M)	390-395
		Dark gray silty clay with fine sand (M)	395-400
		Dark gray silty clay with fine sand (M)	400-405
		Dark gray silty clay with fine sand (M)	405-410
		Dark gray silty clay with fine sand (M)	410-415
		Dark gray silty clay with fine sand (M)	415-420
		Dark gray silty clay with fine sand (M)	420-425
		Dark gray silty clay with fine sand (M)	425-430
		Dark gray silty clay with fine sand (M)	430-435
		Dark gray silty clay with fine sand (M)	435-440
		Dark gray silty clay with fine sand (M)	440-445
		Dark gray silty clay with fine sand (M)	445-450
		Dark gray silty clay with fine sand (M)	450-455
		Dark gray silty clay with fine sand (M)	455-460
		Dark gray silty clay with fine sand (M)	460-465
		Dark gray silty clay with fine sand (M)	465-470
		Dark gray silty clay with fine sand (M)	470-475
		Dark gray silty clay with fine sand (M)	475-480
		Dark gray silty clay with fine sand (M)	480-485
		Dark gray silty clay with fine sand (M)	485-490
		Dark gray silty clay with fine sand (M)	490-495
		Dark gray silty clay with fine sand (M)	495-500