

MICHAEL E. ELIA, P.E.
CONSULTING ENGINEER
PO BOX 6376, PORTLAND, OREGON 97228

TEL (503) 246-0621 FAX (503) 246-0686

January 20, 2012

Jonathan Bean
3136 SW 11th Ave
Portland, OR 97239

Re: Limited Geotechnical Investigation and Recommendations for
3136 SW 11th Ave
Portland, OR 97239

Dear Mr. Bean:

As requested and in conformance with the Limited Engineering Services Proposal and Agreement, dated January 19, 2012, a limited subsurface investigation was accomplished at 3136 SW 11th Ave., Portland, OR 97239. The engineer's understanding of the proposed construction, surface conditions, subsurface conditions and recommendations for design follow below. Please see Figure 1 for a map showing the location of the proposed work.

ENGINEER'S UNDERSTANDING OF PROPOSED CONSTRUCTION

The engineer understands that a new wood-framed addition will be constructed and attached to the east side of the existing residence. The new addition will be supported by a poured-in-place concrete foundation. Within the existing residence the north and south foundation walls, both of which run in an east-west plane, will be rebuilt or strengthened. A new poured-in-place concrete foundation will support the rebuilt or strengthened foundation walls.

SURFACE CONDITIONS

The front and west side of the residence bordered the east side of SW 11th Ave. Beginning at 11th Ave. and extending to the front of the existing residence, the ground surface was relatively level. Beginning at the front of the residence and extending to approximately the eastern property boundary, the ground surface descended at about a two horizontal units to one vertical slope (2H:1V). A few low growing shrubs and other plants were growing from the ground surface.

An elevated side yard and 13-foot long concrete wall of an adjacent property paralleled and appeared to surcharge the north foundation wall of the exiting residence. The wall was offset about five feet north of the north foundation wall of the existing residence and varied in height from about one foot at the west perimeter of the residence, increasing to about eight feet high at the eastern end of the concrete wall. The top of the wall appeared relatively level, with the bottom of the wall stepping downslope.

SUBSURFACE CONDITIONS

On Thursday, January 19, 2012, two hand-auger borings and two manual Dynamic Cone Penetrometer tests were accomplished. Please see Figure 2 for a general plot sketch showing

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the locations of the borings and Dynamic Cone tests and Figures 3 through 6 for boring and Dynamic Cone logs.

Boring B-1 and Dynamic Cone Test DC-1

B-1 and DC-1 were accomplished near the southeast corner of the residence. Brown silt with some clay, very soft and wet extended from the ground surface to about 3.5 ft. below the ground surface (bgs). At 6.5 ft. bgs. the boring was terminated in brown silt with some clay, very stiff and wet. A perched water table was encountered at about 1.5 ft. bgs. DC-1 was terminated in very stiff soil at 5.0 ft. bgs.

Boring B-2 and Dynamic Cone Test DC-2

B-2 and DC-2 were accomplished near the southwest corner of the residence. The boring encountered brown silt with some clay, very soft and wet, from the ground surface to about 5.5 ft. bgs. The very soft soil and a perched water table prevented advancing the hand auger beyond 5.5 ft. bgs. The perched water table was encountered at about 1.0 ft. bgs. DC-2 was driven to 13.0 ft. bgs. and was terminated in very stiff soil. The soil strength transitioned from soft to medium stiff at about 10.5 ft. bgs.

RECOMMENDATIONS

1. Foundation

Foundation footings may consist of round or rectangular concrete piers extending into underlying very stiff soils. The tops of the piers may be connected one with the other by concrete grade beams.

2. Allowable Foundation Bearing Pressure

Allowable soil bearing pressure of round or rectangular piers extending into very stiff soil: 4,000 psf.

3. Lateral Earth Pressures for Retaining Walls

Active Pressure: 35 pcf (for walls the tops of which are able to yield, i.e., displace, a horizontal distance of $H \times 0.02$ or greater)

At Rest Pressure: 50 pcf

Surcharge for North Wall: σ_v psf (see Figure 7).

4. Lateral Seismic Earth Pressures for Retaining Walls

Seismic Lateral Earth Pressure: $6H^2$, applied at $0.6H$

5. Sliding Resistance

Friction coefficients for concrete footings and pier bases founded on and poured onto:

- A. Very stiff underlying native soil: 0.35
- B. Six inches of crushed aggregate placed on very stiff underlying native soil: 0.50

Foundation piers may function as keys to resist sliding forces that may be applied in the planes of the new foundation walls. The proposed spacing of the keys and the locations of keys relative to steps in the foundation footing are provided in Figure 8.

If keys are used to resist lateral forces orthogonal to foundation walls, when calculating the available passive resistance to sliding, the upper one foot of soil should be ignored.

Passive Pressure: 250 pcf

To resist lateral sliding forces orthogonal to walls, a concrete slab or spaced concrete grade beams may be utilized

6. Retaining Wall Drainage

Because of the perched water table noted during the subsurface investigation, new drainage can be provided on the outside face of the existing terracotta foundation walls. One way to accomplish drainage may be the installation of vertical drains along the exterior faces of the walls on three-foot centers. For example, vertical holes, large enough to accommodate a three-inch diameter perforated and socked HDPE pipe, may be augured immediately adjacent to the existing walls. A length of perforated and socked HDPE pipe with a closed top end may be installed to the full depth of the augured holes and the annular space backfilled with clean sand. The depths of the holes and installed HDPE should extend at least to the approximate depths of the bottoms of the terracotta block walls. From the interior of the existing crawl space, a solid-wall plastic pipe may be installed horizontally to intersect with and penetrate the lower end of the socked and perforated HDPE pipe. Please see Figure 9 for a representation of the proposed drainage.

Drainage for other newly constructed concrete retaining walls may consist of a one-foot wide column of clean crushed drain rock. The column of drain rock should extend from the ground surface to the bottoms of the walls and should be separated from onsite soils with a non-woven filter fabric (such as ProPex 4551). A three-inch diameter perforated pipe can be installed to collect water at the bottom of the walls. The perforated drain should be connected to the local sewer.

7. Geotechnical Inspections

The following periodic special inspections are recommended:

- A. Foundation, retaining wall and concrete pier bearing surfaces.
- B. Spacing of keys.
- C. Installation of retaining wall drainage.
- D. Installation of gravel sub-base, if used.

If more information is needed or if there are questions, please call.

Sincerely,

Michael E. Elia, P.E., G.E.

Enc Figures 1 through 9

Cc Paul Albertine, P.E., S.E.



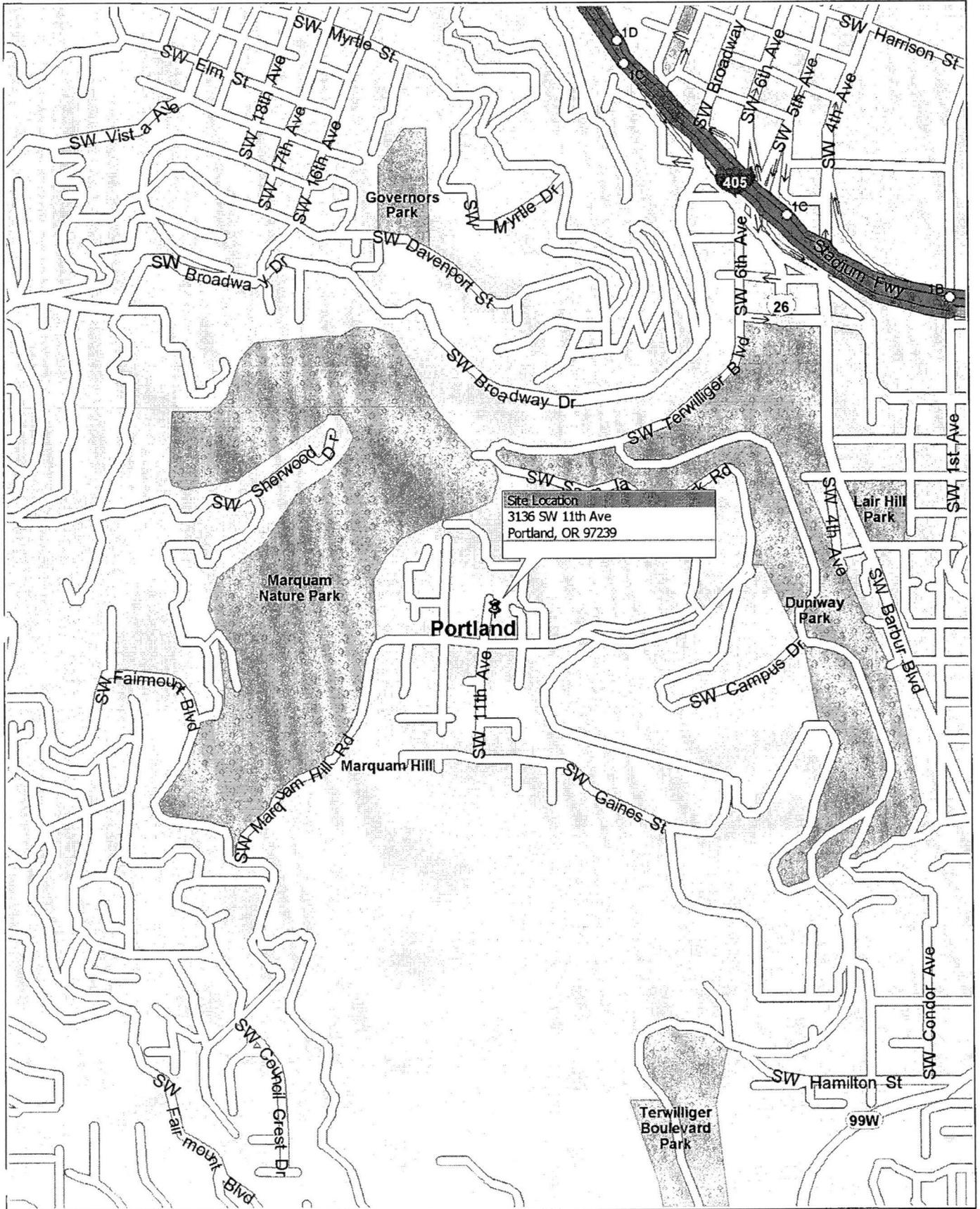
EXPIRES: Dec. 31, 2013

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3136 SW 11th Ave, Portland, OR 97239

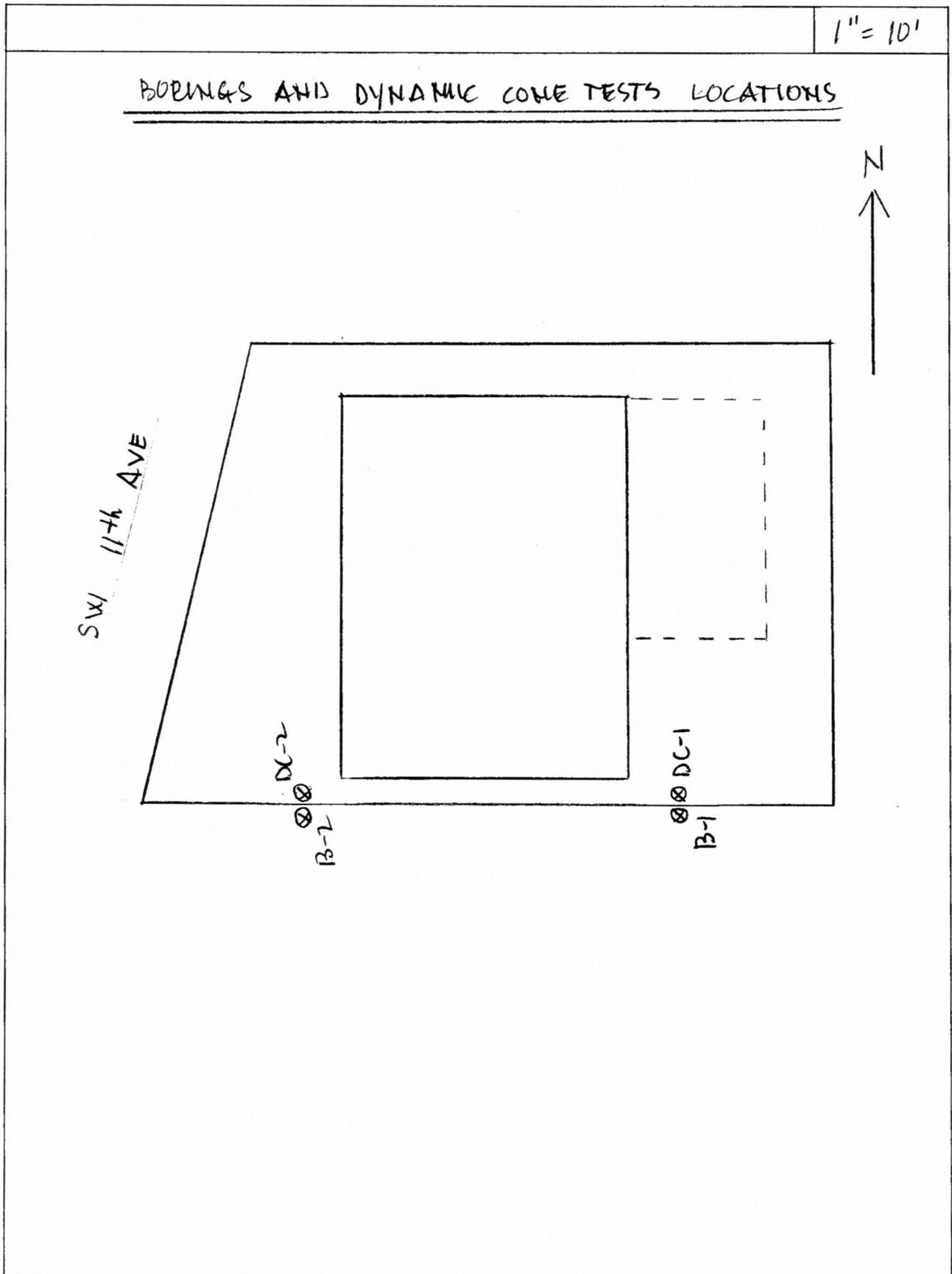
FIGURE 1



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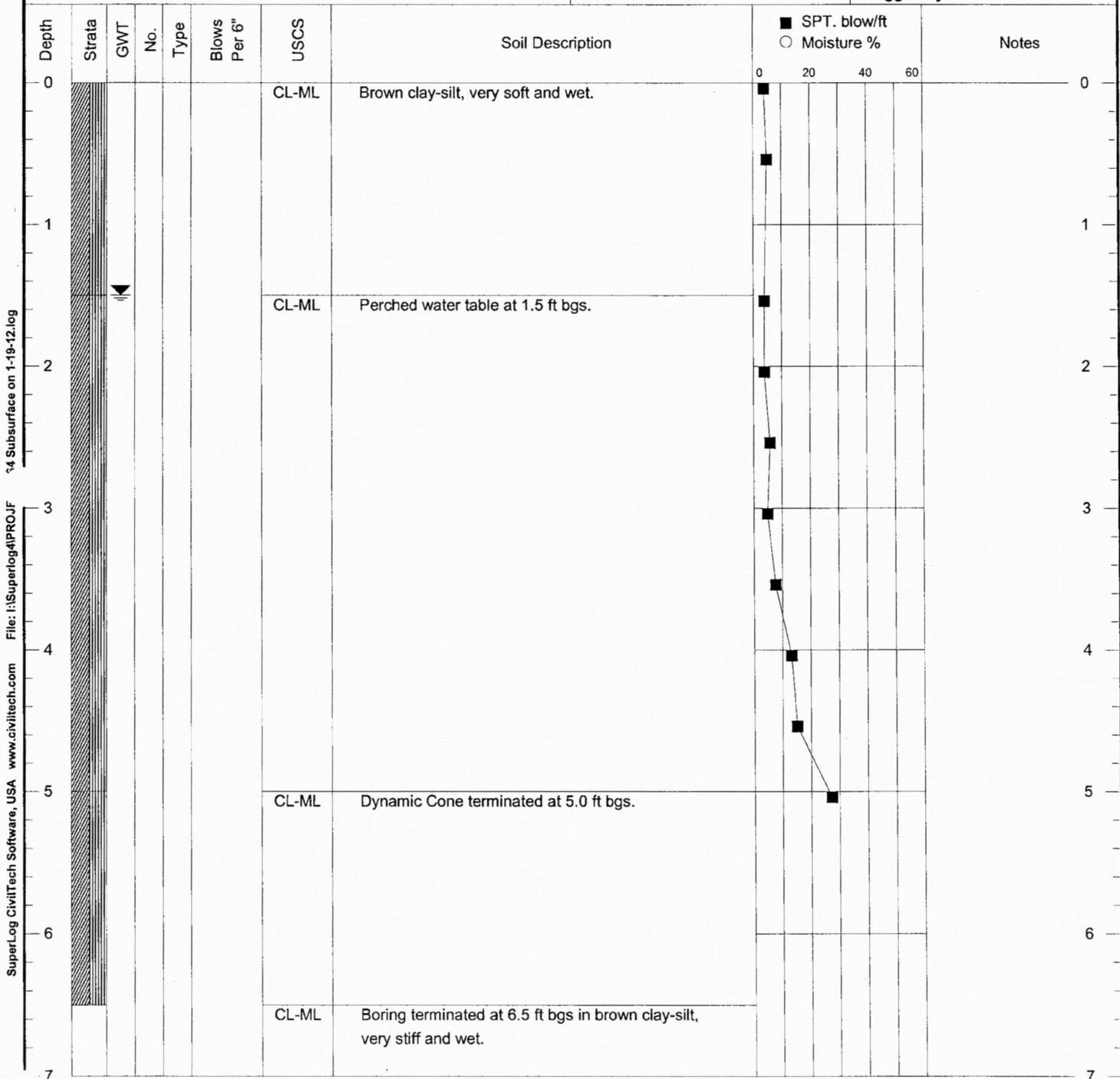
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FIGURE 2	



1-20-12 764

CivilTech Software **Boring Log No. B-1** **Jonathan Bean** **FIGURE 3**

Location: 3136 SW 11th Ave, Portland, OR 97239		WO#:
Method: Hand Auger		Ground EL: 624 (Estimate)
Hammer: Dynamic Cone Penetrometer	Hammer weight (lb): 35	Hole depth (ft): 6.5
Sampler:	Drop (in): 15	G.W.T. @ Drilling (ft): 1.5
Driller: MEE	Drill Date: 01/19/12	Logged by:



SuperLog CivilTech Software, USA www.civiltech.com File: I:\Superlog4\PROJF 34 Subsurface on 1-19-12.log

Remarks:

1-20-12 764 FIGURE 4
WILDCAT DYNAMIC CONE LOG

Michael Elia, P.E., G.E.
 503-246-0621
 mike@michaelelia.com

PROJECT NUMBER: 764
 DATE STARTED: 01-19-2012
 DATE COMPLETED: 01-19-2012

HOLE #: DC-1
 CREW: _____
 PROJECT: Bean
 ADDRESS: 3136 SW 11th Ave
 LOCATION: Portland, OR 97239

SURFACE ELEVATION: 624 feet (Estimate)
 WATER ON COMPLETION: Perched Water
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		SAND & SILT	CLAY
-	2	8.9	..				2	VERY LOOSE	SOFT
-	3	13.3	...				3	VERY LOOSE	SOFT
1 ft	3	13.3	...				3	VERY LOOSE	SOFT
-	2	8.9	..				2	VERY LOOSE	SOFT
-	2	8.9	..				2	VERY LOOSE	SOFT
2 ft	2	8.9	..				2	VERY LOOSE	SOFT
-	3	13.3	...				3	VERY LOOSE	SOFT
-	5	22.2	.....				6	LOOSE	MEDIUM STIFF
3 ft	3	13.3	...				3	VERY LOOSE	SOFT
1 m	6	26.6	.....				7	LOOSE	MEDIUM STIFF
-	5	19.3	.....				5	LOOSE	MEDIUM STIFF
4 ft	11	42.5	.....				12	MEDIUM DENSE	STIFF
-	13	50.2	.....				14	MEDIUM DENSE	STIFF
-	20	77.2	.....				22	MEDIUM DENSE	VERY STIFF
5 ft	25	96.5	.....				-	MEDIUM DENSE	VERY STIFF
-									
6 ft									
2 m									
7 ft									
8 ft									
9 ft									
3 m	10 ft								
11 ft									
12 ft									
4 m	13 ft								

1-20-12 764 FIGURE 5

 CivilTech Software		Boring Log No. B-2 Jonathan Bean	
Location: 3136 SW 11th Ave, Portland, OR 97239			WO#:
Method: Hand Auger			Ground EL: 639 (Estimate)
Hammer: Dynamic Cone Penetrometer		Hammer weight (lb): 35	Hole depth (ft): 13.0
Sampler:		Drop (in): 15	G.W.T. @ Drilling (ft):
Driller: MEE		Drill Date: 01/19/12	Logged by:

Depth	Strata	GWT	No.	Type	Blows Per 6"	USCS	Soil Description	■ SPT. blow/ft ○ Moisture %	Notes
0						CL-ML	Brown clay-silt, very soft and wet.		
1.0						CL-ML	Perched water at 1.0 ft bgs.		
5.5						CL-ML	Boring terminated at 5.5 ft bgs in brown clay-silt, very soft and wet. Water prevented hole from remaining open.		
13.0						?	Dynamic Cone terminated at 13.0 ft bgs in very stiff soil.		

SuperLog CivilTech Software, USA www.civiltech.com File: I:\Superlog4\PROJF

54 Subsurface on 1-19-12.log

Remarks:

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764 FIGURE 6

WILDCAT DYNAMIC CONE LOG

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503-246-0621
mike@michaelelia.com

PROJECT NUMBER: 764
DATE STARTED: 01-19-2012
DATE COMPLETED: 01-19-2012

HOLE #: DC-2
CREW:
PROJECT: Bean
ADDRESS: 3136 SW 11th Ave
LOCATION: Portland, OR 97239

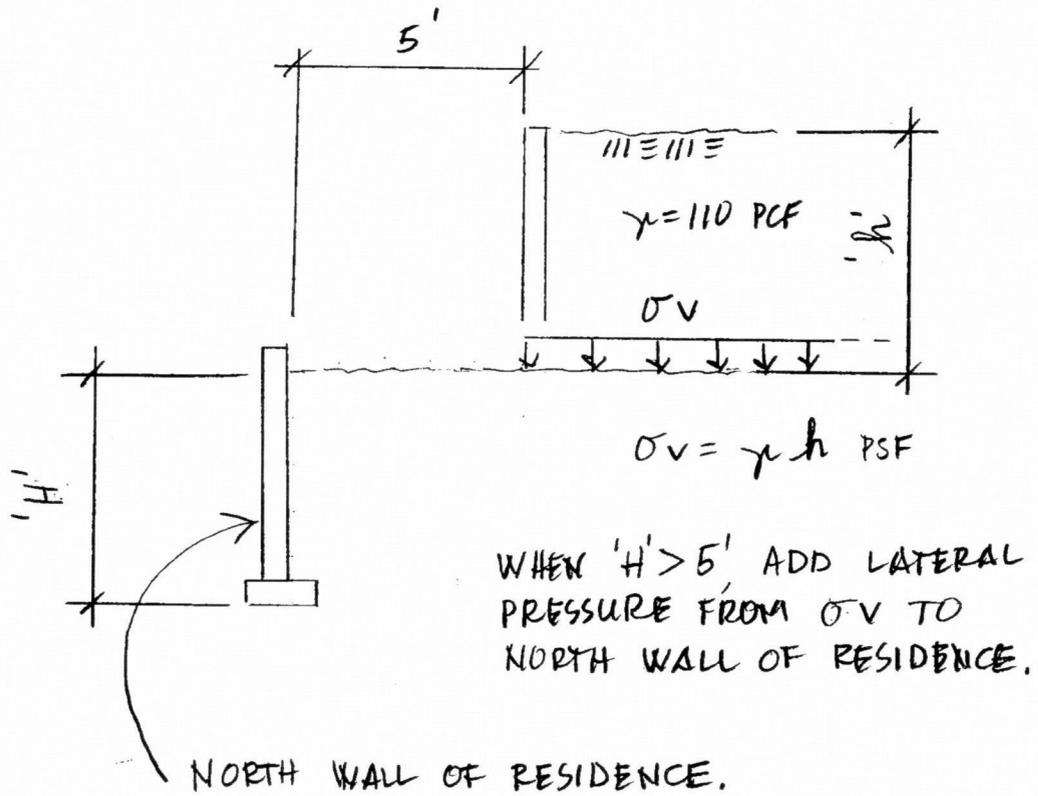
SURFACE ELEVATION: 624 feet (Estimate)
WATER ON COMPLETION: Perched Water
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		SAND & SILT	CLAY
-	2	8.9	••				2	VERY LOOSE	SOFT
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
- 1 ft	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	2	8.9	••				2	VERY LOOSE	SOFT
-	2	8.9	••				2	VERY LOOSE	SOFT
- 2 ft	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
- 3 ft	1	4.4	•				1	VERY LOOSE	VERY SOFT
- 1 m	2	8.9	••				2	VERY LOOSE	SOFT
-	1	3.9	•				1	VERY LOOSE	VERY SOFT
- 4 ft	2	7.7	••				2	VERY LOOSE	SOFT
-	2	7.7	••				2	VERY LOOSE	SOFT
-	2	7.7	••				2	VERY LOOSE	SOFT
- 5 ft	2	7.7	••				2	VERY LOOSE	SOFT
-	2	7.7	••				2	VERY LOOSE	SOFT
-	1	3.9	•				1	VERY LOOSE	VERY SOFT
- 6 ft	1	3.9	•				1	VERY LOOSE	VERY SOFT
-	1	3.9	•				1	VERY LOOSE	VERY SOFT
- 2 m	1	3.9	•				1	VERY LOOSE	VERY SOFT
- 7 ft	2	6.8	•				1	VERY LOOSE	VERY SOFT
-	2	6.8	•				1	VERY LOOSE	VERY SOFT
-	2	6.8	•				1	VERY LOOSE	VERY SOFT
- 8 ft	4	13.7	•••				3	VERY LOOSE	SOFT
-	2	6.8	•				1	VERY LOOSE	VERY SOFT
-	3	10.3	••				2	VERY LOOSE	SOFT
- 9 ft	4	13.7	•••				3	VERY LOOSE	SOFT
-	5	17.1	••••				4	VERY LOOSE	SOFT
-	4	13.7	•••				3	VERY LOOSE	SOFT
- 3 m 10 ft	4	13.7	•••				3	VERY LOOSE	SOFT
-	6	18.4	••••				5	LOOSE	MEDIUM STIFF
-	7	21.4	•••••				6	LOOSE	MEDIUM STIFF
-	7	21.4	•••••				6	LOOSE	MEDIUM STIFF
- 11 ft	8	24.5	••••••				6	LOOSE	MEDIUM STIFF
-	9	27.5	•••••••				7	LOOSE	MEDIUM STIFF
-	10	30.6	••••••••				8	LOOSE	MEDIUM STIFF
- 12 ft	12	36.7	•••••••••				10	LOOSE	STIFF
-	15	45.9	••••••••••				13	MEDIUM DENSE	STIFF
-	21	64.3	•••••••••••				18	MEDIUM DENSE	VERY STIFF
- 4 m 13 ft	32	97.9	•••••••••••••				-	MEDIUM DENSE	VERY STIFF

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FIGURE 7	

1/4" = 1'-0"

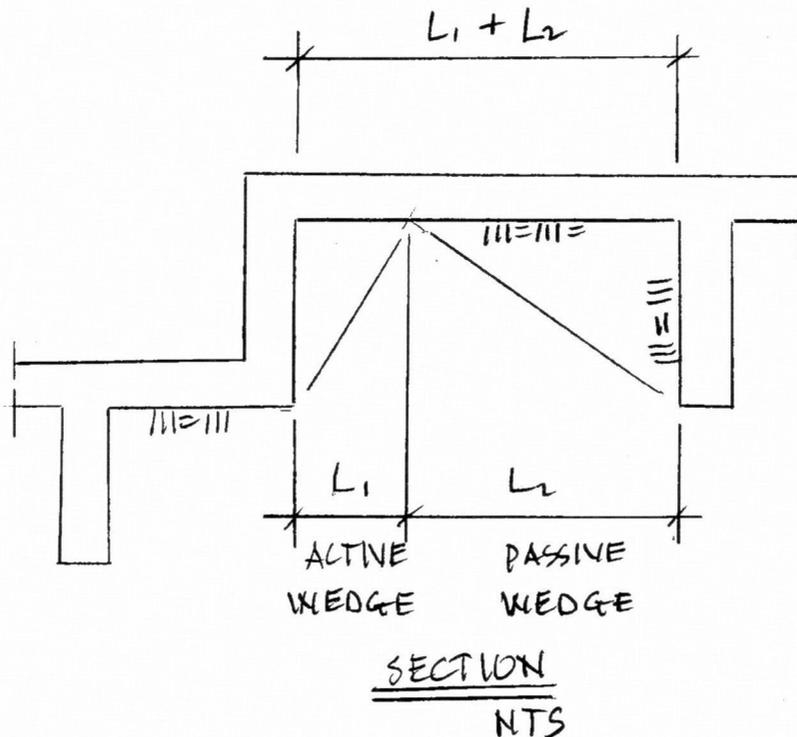
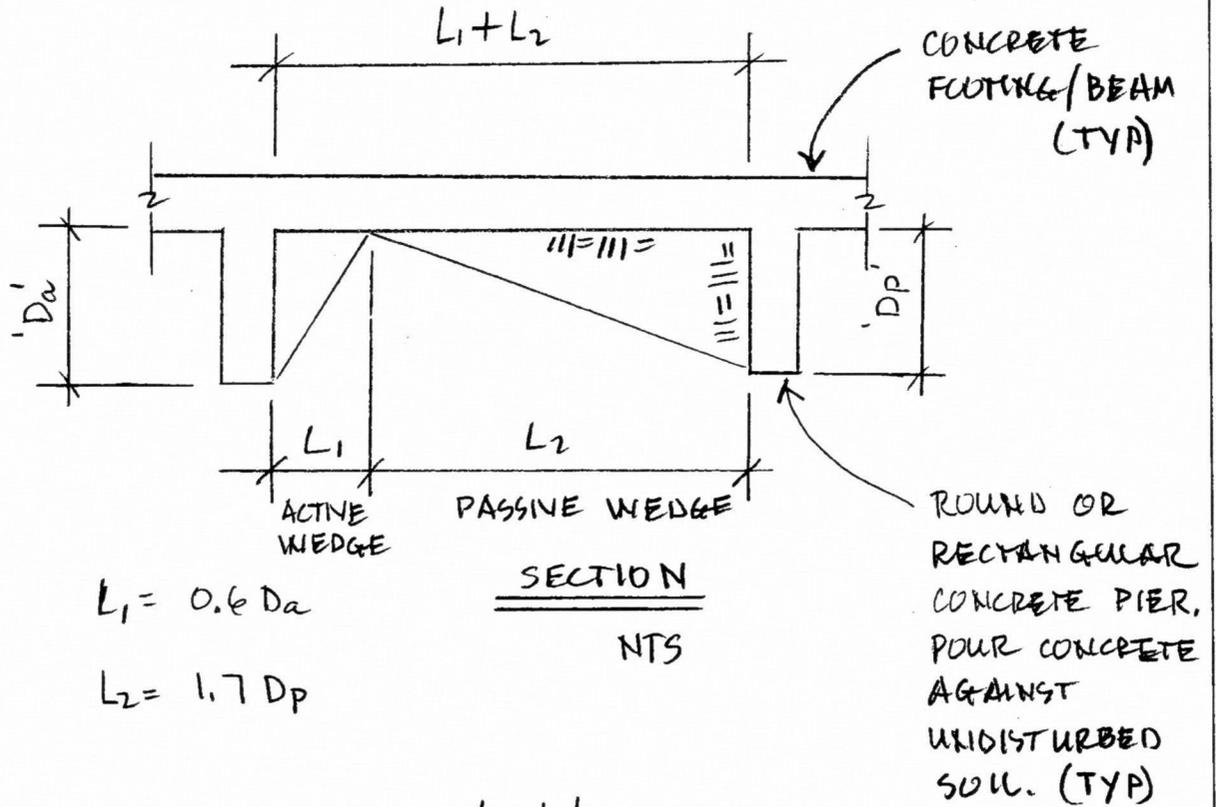


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1-20-12	764
FIGURE 8	

NTS

SPACING OF FOUNDATION PIERS - WHEN USED AS KEYS TO RESIST LATERAL FORCES PARALLEL TO



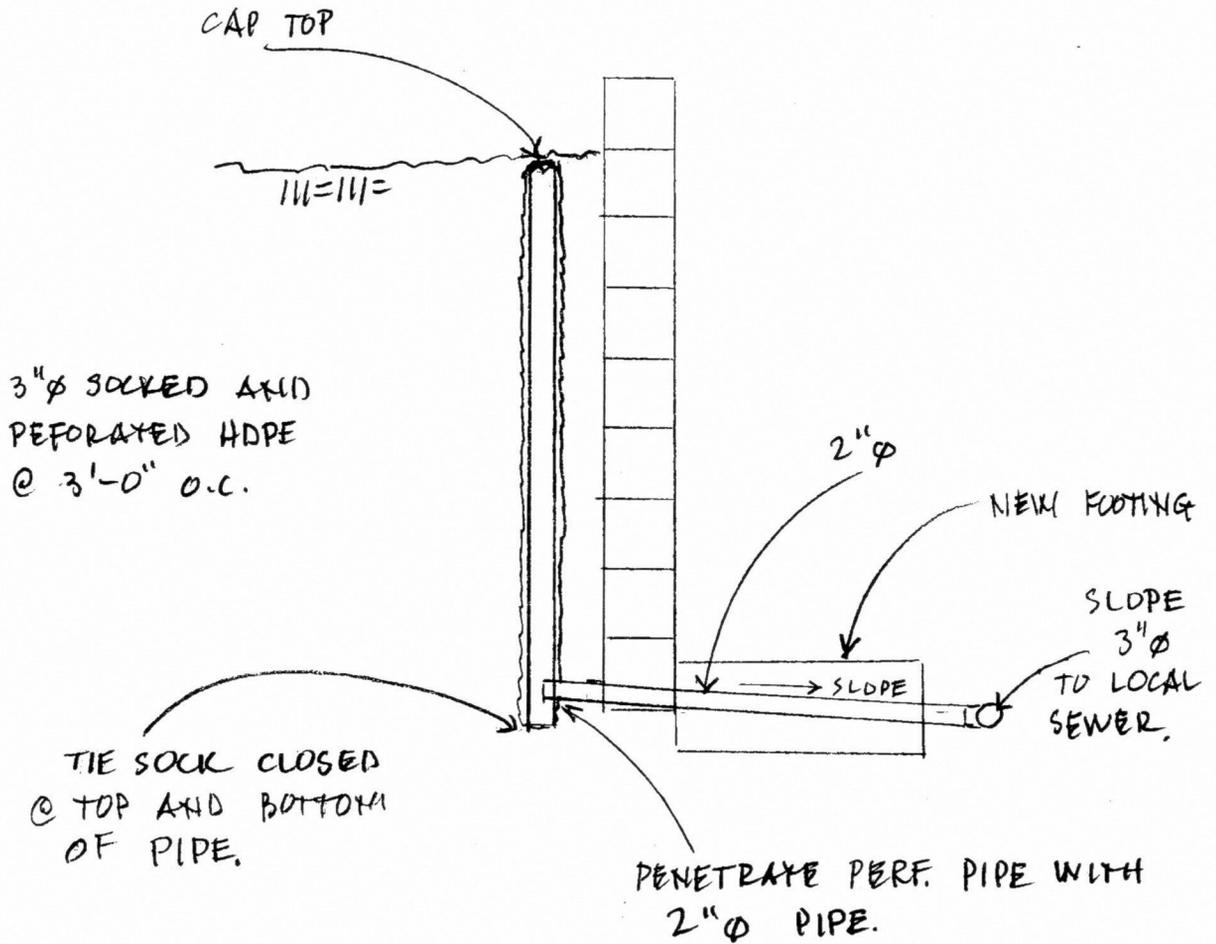
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1-20-12	764
FIGURE 9	

NTS

PROPOSED DRAINAGE FOR EXISTING TERACOTTA WALLS

NTS



MICHAEL E. ELIA, P.E.
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TEL (503) 246-0621 FAX (503) 246-0686

February 17, 2012

Jonathan Bean
3136 SW 11th Ave
Portland, OR 97239

Re: Geotechnical Addendum No. 1
Additional Recommendations for
3136 SW 11th Ave
Portland, OR 97239

Dear Mr. Bean:

In discussions with the structural engineer, the following additional recommendations were developed. They may be used in the design of methods to rebuild or strengthen the existing north and south foundation walls and other new concrete foundation elements.

1. In lieu of installing new drainage on the backfill side of existing or new walls that are resisting lateral soil loads, the walls may be designed for undrained conditions.
 - a. Undrained active EFW: 80 PCF
 - b. Undrained at rest EFW: 90 PCF
2. When calculating the passive resistance provided by foundation keys, a contribution to passive resistance from soil arching at the ends of the keys may be included. The additional passive force for each end of a key is $P_{pc} = 46d^3$, where P_{pc} is the passive contribution and 'd' is the depth of the key below the bottom of the footing. This contribution is for EFW_p = 250 pcf and $0 < d < 5$ feet. For more information, please see the attached sketch.
3. A perusal of the Dynamic Cone test logs indicates that very stiff soil may be present at about three to four feet below the assumed bottom surfaces of the existing terracotta block walls. Keys that function as vertical load carrying elements should extend into very stiff soil.

If more information is needed or if there are questions, please call.

Sincerely,

Michael E. Elia, P.E., G.E.

Enc One sketch attached

Cc Paul Albertine, P.E., S.E.



EXPIRES: Dec. 31, 2013

MICHAEL E. ELIA, P.E.

2-17-12

764

SKETCH ON 2-17-12

