Appendix E Boring Logs





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number: 101038-102170**

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 415 South St., Waltham, MA Northing: 2958168.8310 Easting: 722741.199 **Drilling Date: Start:** 12/15/2017 **End:** 12/15/2017 Surface Elevation (ft.): 87.85

Total Depth (ft.): 14

Depth to Initial Water Level (ft): Depth Date Time 1.5 12/15/2017 12:15

Dinning	, Date.	Start. 12	2/10/20	.,	11 u. 12	2/10/20	, , ,		Logged By: A. Smith					
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks				
87.9 0					_				4" Asphalt					
_ <u>¥</u>	SS	S-1	12	56 75	8	>75		≣	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt					
 	SS	S-2	18	85 48 100	16	>100		_	Moist, very dense, brown, fine to coarse SAND, little fine to coarse gravel, trace silt					
<u>82.9</u> 5	SS	S-3	9	66 100/3"	5	>100		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Analytical sample (4'-6')				
 	SS	S-4	2	100/2"	2			San	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt					
	SS	S-5	18	86 48 100	12	>100		Silty Sand	Moist, very dense, brown, fine to coarse SAND, some silt, little fine to coarse gravel					
								Weathered Rock		Rollerbit from 12 to 14' bgs. Possible boulders or bedrock.				
72.9 15								Ň	Test boring B-18 terminated at 14' bgs and backfilled with soil cuttings.					
	Sa	mple Ty								nister Classification				
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	ornia Sa Rock Co	mpler Sre	V - Vac San S - Spli T - She GP - Ged	nple t Spoor lby Tul	n ne	V. Loos Loose: M. Den	se: 0)-4 E -10 V	ense: 30-50 V. Soft: <2 Stiff: 8-15 . Dense: >50 Soft: 4.4 V. Stiff: 15-30	and 35-50% some 20-35% little 10-20% trace <10% sture, density, color				
Revie	wed b	y:							Date: Boring Number: E	3-18				





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

 $\textbf{Drilling Contractor/Driller:} \ \ \text{GeoLogic - Earth Exploration, Inc. / M. Ferreira}$

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NX
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: Brandeis University, Waltham, MA Northing: 2958306.2240 Easting: 723000.451

Drilling Date: Start: 12/14/2017 End: 12/14/2017

Surface Elevation (ft.): 82.01

Total Depth (ft.): 14

 Depth to Initial Water Level (ft):

 Depth
 Date
 Time

 9.3
 12/14/2017
 14:20

Abandonment Method: Backfilled with soil cuttings

	,								Logged By: A. Smith				
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks			
0									3" Asphalt				
-	SS	S-1	18	34 66 60	10	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt				
	ss	S-2	16	40 95 100/4"	10	>100		E	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Analytical sample (2'-4')			
- <u>77.0</u> -	- SS	S-3	24	50 33 40 50	8	73		E	Moist, very dense, brown, fine to coarse SAND and fine GRAVEL, little silt				
	SS	S-4	6	100	4		\bowtie		Moist, very dense, brown, fine to coarse	Rollerbit from 6.5			
								Weathered Rock	SAND and fine GRAVEL, little silt See core log for description	to 9' bgs. Possible boulder or bedrock.			
- <u>72.0</u>	NX	C-1	60		40			Bedrock					
67.0	-								Boring B-19 terminated at 14' bgs and backfilled with soil cuttings.				
62.0													
Š	Sa	mple Ty	pes	•					Consistency vs Blowcount/Foot Burmi	ster Classification			
CS - Calif BQ - 1.5" NO - 2" R	AS - Auger/Grab Sample CS - California Sampler GQ - 1.5" Rock Core IQ - 2" Rock Core QF - Geoprobe						se: 0	-4 C	ense: 30-50 V. Soft: <2 Stiff: 8-15 lit	nd 35-50% ome 20-35% title 10-20% race <10% ture, density, color			
Revie	Reviewed by:								Date: Boring Number: B	-19			





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller:GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NX

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: Brandeis University, Waltham, MA Northing: 2958306.2240 Easting: 723000.451

Drilling Date: Start: 12/14/2017 **End:** 12/14/2017

ROCK CORE ONLY GINT LOGS MWRA WASM 3 20180220.GPJ - 4/27/23

Surface Elevation (ft.):82.01

Total Depth (ft.): 14

Depth to Initial Water Level (ft):

Depth 9.3 12/14/2017 14:20

Abandonment Method: Backfilled with soil cuttings

Elevation Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Down Press. (psi)	Graphic Log	Strata	Material Description	Remarks
72.0 10.0	NX	C-1	60	67	7	1:00 1:00 2:00		××× ××× ××× ××× ××× ××× ×××	Granite	Hard, slightly weathered, fine grained, gray, GRANITE, very close jointing	
 					·	3:00 3:00		××× ××× ××× ×××	 	Test having D 40 terminated at 14' has	
- <u>67.0</u> - 15.0										Test boring B-19 terminated at 14' bgs.	
- <u>62.0</u> - 											
_ <u>57.0</u>											

5	Bedding (mm)		Joint Spacin	g (mm)	Continui	ty (mm)	<u>Attitude</u>	Angle	Aperture (mm)		
Ve Th Me Th Ve	ctremely Thin ery Thin in edium iick ery Thick ctremely Thick	<20 20-60 60-200 200-600 600-2000 2000-6000 >6000	Extremely Close Very Close Close Mod Close Wide Very Wide Extremely Wide	<20 20-60 60-200 200-600 600-2000 2000-6000 >6000	Extremely Moderately Slightly Sound	<25 25-100 100-200 >200	Horizontal Shallow Moderate Steep Vertical	0° - 5° 5° - 35° 35° - 55° 55° - 85° 85° - 90°	Very Tight Tight Partly Open Open Mod. Wide Wide	< 0.1 0.1 - 0.25 0.25 - 0.5 0.5 - 2.5 2.5 - 10 >10	

Field	Hardness	Weat	Weathering								
Very Hard	Knife Can't Scratch Scratches with	Fresh Slight		No Visible sign of rock material weathering; slight to no discoloration. Discoloration indicated weathering. All the rock material may be discoloredand may be weaker externally							
김 Hard -	Difficulty		its fresh condition.								
Med. Hard	Scratches Readily Grooves with	Moderate	Less than half of the rock material is decomposed and/or disintergrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.								
Medium	Difficulty	Severe	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock								
Soft Very Soft	Grooves Readily Carves with Knife	Complete	present either as a continuous framework or as corestone. All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely intact.								
5		Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There change in volume, but the soil has not been significantly transported.								
Reviewe	ed by:			Date:	Boring Number: B-19						





Boring Number: B-20 (MW)

Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

 $\textbf{Drilling Contractor/Driller:} \ \ \text{GeoLogic - Earth Exploration, Inc. / M. Ferreira}$

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 250 South St., Waltham, MA **Northing:** 2958679.1419 **Easting:** 723407.2716 **Drilling Date: Start:** 12/12/2017 **End:** 12/13/2017

Surface Elevation (ft.): 76.95

Total Depth (ft.): 14

Depth to Initial Water Level (ft):DepthDateTime4.112/13/201707:45

Abandonment Method: Monitoring well installed

				.,,_,			-, . 0, _ 0			Logged By: A. Smith				
	Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks			
İ	0				46 55			<u>7</u> , ½, ½		Top 6": Moist, very dense, gray, fine to coarse SAND and fine to coarse GRAVEL, little silt				
	 	SS	S-1	24	44 36	18	99			Bottom 12": Moist, very dense, brown to gray, fine SAND, little silt trace organic fibers				
	. <u> </u>	- SS	S-2	24	55 40 28 33	24	68		Silty Sand	Moist, very dense, brown to gray, Slightly Organic SILT and fine to medium SAND, trace fine gravel, trace organic fibers	Analytical sample (2'-4')			
	72.0 5	- SS	S-3	24	20 38 72 50	12	>100		S	Moist, very dense, brown, fine SAND, trace silt	Corrosion sample (4'-6')			
		- ss	S-4	24	14 80 76 80	12	>100		_	Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt				
İ		SS	S-5	4	100/4"	4			3rave	Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt				
	67.0 10								Sand and Gravel	,				
	· - · -								Weathered Rock	T	Rollerbit from 12 to 14' bgs. Possible boulder, weathered rock, or bedrock.			
GPJ - 3/8/21	62.0 15 -	- 12.0 15 - -							8	Test boring B-20 (MW) terminated at 14' bgs and backfilled with soil cuttings.				
3 20180220.		-												
VASM	57.0													
WRA		<u>Sa</u>	mple Typ		F.//O::			_			ister Classification			
SSC	AS - Auge CS - Califo BQ - 1.5" I NQ - 2" Ro	ornia Sa Rock Co ock Cor	impler Sign G	V - Vac San S - Spli T - She P - Geo	nple t Spoor Iby Tul	n ne	V. Loos Loose: M. Den	se: O)-4 C ·10 V	ense: 30-50 V. Soft: <2 Stiff: 8-15 III. Dense: >50 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30 mois	nd 35-50% ome 20-35% ttle 10-20% race <10% tture, density, color			
Reviewed by: Date: Boring N							Date: Boring Number: B	-20 (MW)						





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

 $\textbf{Drilling Contractor/Driller:} \ \ \text{GeoLogic - Earth Exploration, Inc. / M. Ferreira}$

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 190 South St., Waltham, MA **Northing:** 2958896.4760 **Easting:** 723754.5903 **Drilling Date: Start:** 12/15/2017 **End:** 12/15/2017

Surface Elevation (ft.): 82.47

Total Depth (ft.): 15

Depth to Initial Water Level (ft):DepthDateTime1212/15/201714:40

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Desc	cription	Remarks
02.5	SS	S-1	9	100	9	>100	74 1× 74		48" Topsoil: Moist, very d	lense, dark brown,	Analytical sample
· -	ss	S-2	24	17 15 12 16	12	27	1/2 . 3 . 1/2 1/2 . 3 . 1/2 1/2 . 3 . 1/2 1/2 . 3 . 1/2 1/2 . 3 . 3 . 3 . 3 . 3 . 3 . 3 . 3 . 3 .	Topsoil	fine to coarse SAND, little trace organic fibers Moist, very dense, dark b SAND, little fine gravel, lit fibers	e fine gravel, little si vrown, fine to coars tle silt, trace organi	ee ic
- <u>77.5</u> -	SS	S-3	24	10 85 36 11	6	>100			Moist, very dense, dark be SAND and fine to coarse trace brick and mortar	GRAVEL, little silt	
· -	SS	S-4	24	10 10 11 44	8	21		₽	Moist, medium dense, da medium SAND and fine t little silt, trace brick and n	to coarse GRAVEL nortar	,
- <u>72.5</u> 10 -	SS	S-5	24	4 7 16 36	8	23			Moist, medium dense, da coarse SAND and fine to little silt, trace brick and n	coarse GRAVEL,	
67.5	- SS S-6 24 86 80 18							Sand and Gravel	Wet, very dense, brown, little fine to coarse gravel	fine to coarse SAN , trace silt	ID,
- <u>67.5</u>							× • • •		Test boring B-21 termina backfilled with soil cutting		
62.5											
	Sa	mple Ty	pes	_					Consistency vs Blowcount/Foo	<u>ot</u>	Burmister Classification
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	ornia Sa Rock Co	mpler sore	V - Vac Sam SS - Spli ST - She	nple	n k	V. Loos Loose: M. Den	se: 0)-4 [-10 \	Sand): Fine G ense: 30-50 V. Soft: ≤ . Dense: >50 Soft: 2- M. Stiff: 4-	4 V. Stiff: 15-30	and 35-50% some 20-35% little 10-20% trace <10%





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NX **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 99 Hope Ave., Waltham, MA Northing: 2959021.3215 Easting: 724037.4743

Drilling Date: Start: 12/13/2017 **End:** 12/13/2017

Surface Elevation (ft.): 96.12

Total Depth (ft.): 16.5

Depth to Initial Water Level (ft):

 Depth
 Date
 Time

 7.8
 12/13/2017
 12:50

Abandonment Method: Backfilled with soil cuttings

										L	ogged E	By: A. Smith		
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata		Materi	al Desci	ription		Remarks
0				26					4	" Topsoil				
_	SS	S-1	24	80 82 78	18	>100		₽	to lit	medium SAND, tle silt	some fi	se, gray-brown, fi ne to coarse grav	el,	Analytical sample (2'-4')
_	SS	S-2	6	100/6"	6	>100			S	loist, very dense, AND, some fine t	gray-brocoars	own, fine to mediu e gravel, little silt	ım	
91.1 5	SS	S-3	18	76 80 100	12	>100		iravel	N S	loist, very dense, AND, some fine t	brown, o coars	fine to coarse e gravel, little silt		
_	SS	S-4	3	100/3"	3	>100		and G	l N	loist, very dense,	brown,	fine to coarse		
. .								Sand and Gravel	S	AND, some fine t	o coars	e gravel, trace silt		
_	SS	S-5	3	100/3"	1	>100		**	_ N	lo Recovery				Fractured piece o
86.1 10								Weathered Rock		·				coarse gravel in spoon tip. Rollerbit through boulder or weathered rock
- - 81.1 15	NX	C-1	-1 60 95		Bedrock		ee core log for de	·			from 9.2 to 11.5' bgs.			
- -									b	est boring B-22 to ackfilled with soil	erminate cuttings	ed at 16.5' bgs an	d	
76.1	Sa Sa	ımple Ty	nes						Cone	istency vs Blowco	int/Foot		Burmi	ster Classification
AS - Auge CS - Califo BQ - 1.5" I NQ - 2" Ro	r/Grab S ornia Sa Rock Co	Sample mpler ore	V - Vac	nple t Spoor lby Tub	n ,	V. Loos Loose: M. Den	se: 0 4-)-4 [-10 \	(Sand Dense:		Fine Gra ft: <2 2-4	ined (Clay): Stiff: 8-15 V. Stiff: 15-30 Hard: >30	ar so litt tr	
Povio	wed b	ov:			I					Date:		Boring Numb	er: B	-22





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NX Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 99 Hope Ave., Waltham, MA Northing: 2959021.3215 Easting: 724037.4743

Drilling Date: Start: 12/13/2017 **End:** 12/13/2017

Surface Elevation (ft.): 96.12

Total Depth (ft.): 16.5

Depth to Initial Water Level (ft):

7.8 12/13/2017 12:50

Abandonment Method: Backfilled with soil cuttings

Elevation Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Down Press. (psi)	Graphic Log	Strata	Material Description	Remarks
 - <u>81.1</u> -	NX	C-1	60	95	50	1:30 1:30 1:30 1:30		#######	Granodiorite	Hard, slightly weathered, fine grained, gray, GRANODIORITE; primary joint set very close, steep	
15.0 -						1:30		''-#- -#- -#-		Test boring B-22 terminated at 16.5' bgs.	
- <u>76.1</u> - <u>20.0</u>											

Bedding (mm)	Joint Spacing (mm)	Continuity (mm)	Attitude Angle	Aperture (mm)
Extremely Thin <20	Extremely Close <20 Very Close 20-60 Close 60-200 Mod Close 200-600 Wide 600-2000 Very Wide 2000-6000 Extremely Wide >6000	Extremely <25 Moderately 25-100 Slightly 100-200 Sound >200	Horizontal 0° - 5° Shallow 5° - 35° Moderate 35° - 55° Steep 55° - 85° Vertical 85° - 90°	Very Tight < 0.1 Tight 0.1 - 0.25 Partly Open 0.25 - 0.5 Open 0.5 - 2.5 Mod. Wide 2.5 - 10 Wide >10

-3/8/21	30.0														
.GPJ	Bedd	ing (mm)		Joint Spacing (mm) Co						ty (mm)	Attitud	le Angle Aperture (mm)		
A WASM 3 20180220.	Extremely Very Thin Thin Medium Thick Very Thick Extremely	20 60 60 200	<20 20-60 0-200 0-600 0-2000 0-6000 6000	V C N V V	xtremely lery Close lose lod Close lide ery Wid xtremely	se se e	20 20 600 200 200	<20 0-60 0-200 0-600 0-2000 0-6000 6000	M _S	dremely oderately ightly ound	<25 25-100 100-200 >200	Horizontal Shallow Moderate Steep Vertical	0° - 5° 5° - 35° 35° - 55° 55° - 85° 85° - 90°	Very Tight Tight Partly Open Open Mod. Wide Wide	< 0.1 0.1 - 0.25 0.25 - 0.5 0.5 - 2.5 2.5 - 10 >10
MWRA	<u>Field</u>	Field Hardness					therin	g							
SDO1.	Very Hard Hard	/ery Hard Knife Can't Scratch Fre												oe weaker externally	
GINT	Med. Hard	Scratch	es Read	ily	Modera	ate								d to a soil. Fre	sh or discolored rock is
	Medium	Crooved with						than ha	alf of the	e rock mat		nposed and/	or disintegrated	I to a soil. Fres	sh or discolored rock is
CORE ONLY	Soft Very Soft	ft Grooves Readily ry Soft Carves with Knife Complete Residual S						ck mate ck mate	erial is o erial is o	decompose converted t	to soil. The n	integrated to nass structu	soil. The origin		ture is largely intact. royed. There is a large
30CK	Review	Reviewed by:								Dat	e:		Boring N	umber: B	-22





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / P. Fisher Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 11 Bellevue St., Waltham, MA Northing: 2959921.0834 Easting: 724730.7697

Drilling Date: Start: 10/11/2017 **End:** 11/22/2017

Surface Elevation (ft.): 55

Total Depth (ft.): 21

Depth to Initial Water Level (ft): Depth Date

14.5 11/22/2017 11:00

Abandonment Method: Backfilled with soil cuttings

Logged By: D Aht / A Smith

											Logg	ged B	y: D. Abt / A. Smith	1	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material D)escr	iption		Remarks
0									6	" Asphalt					Vacuum excavate
	VE	V-1	6					E	N	" Cobble St loist, brown ttle fine grav	, fine to c	coars	e SAND, some si	ilt,	boring from the ground surface to 4.8' bgs. Analytical sample (2'-2.5')
50.0 5	VE	V-2	6							loist, brown		oars	e SAND, some si	ilt,	Analytical sample (4.5'-5') Rollerbit through boulder or cobble
- 45.0 - 10	SS	S-1	24	30 26 36 39	0	62		rel	3 m		oist, very		se, brown, fine to to coarse gravel,		from 4.8 to 8' bgs Corrosion sample (8'-10')
40.0 15	- SS	S-2	24	95 24 27 44	5	51		Sand and Grave					fine to coarse SRAVEL, trace si	lt	
35.0 20	SS	S-3	24	79 72 63 88	6	>100							wn, fine to coarse arse sand, trace s		
										est boring E ackfilled wit			ed at 21' bgs and		
30.0	Sa	ımple Ty	pes						Consi	istency vs B	lowcount/	Foot		Burm	ister Classificatio
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	r/Grab S ornia Sa Rock Co	Sample Impler ore	V - Vac San SS - Spli ST - She SP - Ged	nple t Spoor lby Tub	n l	V. Loos Loose: VI. Den	se: 0	nular 1-4 C	(Sand) Dense:				ned (Clay): Stiff: 8-15 V. Stiff: 15-30 Hard: >30	a so li t	nd 35-50% ome 20-35% ttle 10-20% trace <10% sture, density, color
Revie	wed b	y:								Date:			Boring Numb	er: B	-24





Boring Number: B-25 (MW)

Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NX Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 45 Sun St., Waltham, MA Northing: 2960373.8970 Easting: 725100.683

Drilling Date: Start: 10/23/2017 End: 10/23/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 49.64

Total Depth (ft.): 15

8.5

Depth to Initial Water Level (ft): Depth Date

10/23/2017 Abandonment Method: Monitoring well installed

10:00

	,		-,,								Logge	ed B	y: A. Sn	nith				
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material De	escri	ption				Rem	arks
0							XXX		4	" Asphalt						_		
-	VE	V-1						E			brown, fine coarse SAN			GRAVEL	-		Analytica (2'-2.5')	ıl sample
-).		_									
44.6 5	VE	V-2					φ. O.				brown, fine o coarse gra						Analytica (4.5'-5')	l sample
-	SS	S-1	24	32 15 8 100	5	23); ; ; ; ; ; ;		8	Vet, mediu SAND and race organ	ım dense, b fine to coar iics	row se G	n, fine to SRAVEI	o coarse _, little si	e ilt,			
₹ - 39.6 10 -	SS	S-2	24	19 10 8 20	2	18		Sand and Gravel	(ım dense, b ınd fine to co							
- - -	SS	S-3	12	95 100	10	>100		Ö			lense, brow				ND			
34.6 15 -	-			100					Т	est boring	coarse GRA B-25 (MW) ted into a m) teri	minated	at 15' b	ogs			
29.6																		
23.0	Sa	ample Ty	pes	I		L	1	<u> </u>	Cons	istency vs	Blowcount/F	oot			В	urmis	ter Clas	sificatio
AS - Auge CS - Calif 3Q - 1.5" NQ - 2" R	er/Grab S ornia Sa Rock Co	Sample Impler ore	V - Vac Sam SS - Spli ST - She SP - Ged	nple t Spoor lby Tul	ne	V. Loose: Loose: M. Der	se: C	-10 V	(Sand Dense: /. Dens	30-50	V. Soft: Soft:	Grai <2 2-4 4-8	ned (Cla Stiff: V. Stiff Hard:	 8-15		and son little tra moistu	ne 20- e 10-	50% 35% 20% 0% ty, color
Revie	wed k	oy:			•					Date:			Borin	g Num	ber:	: B-2	25 (MV	V)





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 5 Fern St., Waltham, MA Northing: 2960688.6660 Easting: 725293.7979

Drilling Date: Start: 10/12/2017 **End:** 10/12/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 53.01

Total Depth (ft.): 15

Depth to Initial Water Level (ft): Depth Date 8.0 10/12/2017

Abandonment Method: Backfiled with soil cuttings

13:45

									Logged By: A. Smith
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks
0							XXXX		3" Asphalt
	VE	V-1						Fill	Moist, brown, fine SAND and fine to coarse GRAVEL, little silt Analytical sample (2'-2.5')
<u>48.0</u> 5	4								
J	VE	V-2					$\stackrel{\diamond}{\sim}$		Moist, brown, fine to coarse SAND and fine Analytical sample
	SS	S-1	9	60 100/3"	9	>100	。.()		GRAVEL, trace silt Moist, very dense, brown-gray, fine to coarse (5.5'-6')
₹ 43.0 10	SS	S-2	9	90 100/3"	9	>100		Sand and Gravel	SAND and fine to coarse GRAVEL, little silt Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, little silt
38.0 15	SS	S-3	12	100/3" 50/9"	10	>100		S.	Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, little silt with 300 lb Test boring B-26 terminated at 15' bgs and hammer.
	-								backfilled with soil cuttings.
33.0	S	ample Ty	pes						Consistency vs Blowcount/Foot Burmister Classification
AS - Auge CS - Calif 3Q - 1.5" NQ - 2" R	er/Grab S fornia Sa Rock Co lock Cor	Sample ampler ore S	V - Vac San SS - Spli ST - She SP - Geo	nple it Spoor elby Tub	n ne	V. Loos Loose: M. Der	se: 0	<u>inular (</u> i-4 D 10 V	Sand): Fine Grained (Clay): and 35-50% some 20-35%
Revie	wed b	oy:							Date: Boring Number: B-26





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 146 Felton St., Waltham, MA **Northing:** 2961016.6280 **Easting:** 725613.5234

Drilling Date: Start: 10/16/2017 **End:** 10/16/2017

Surface Elevation (ft.): 50.08

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

Depth Date Time 6.5 10/16/2017 14:30

Abandonment Method: Backfilled with soil cuttings

_									Logged By: A. Smith
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks
50.1 0									4" Asphalt
	SS	S-1	18	30 22 32	4	54	∘ () }		Moist, very dense, brown, fine to coarse SAND, some fine gravel, little silt
	- SS	S-2	21	18 92 98 100/3"	3	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt (2'-4')
45.1	SS	S-3	10	80 100/4"	10	>100	о О О		Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt (4'-6')
. <u>¥</u>	SS	S-4	3	100/3"	3) Ø Ø	avel	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt cobbles from 6.2 to 8' bgs.
	SS	S-5	4	100/4"	4			Sand and Gravel	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt
10	- SS	S-6	24	100/6" 14 14	18				Wet, very dense, gray, fine to coarse SAND, some fine gravel, little silt Blows from 14.5 to 16' bgs with 300 lb hammer.
	-			15					Test boring B-27 terminated at 16' bgs and backfilled with soil cuttings.
30.1	Sa	ample Ty	pes						Consistency vs Blowcount/Foot Burmister Classificat
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	ornia Sa Rock Co	impler ore	V - Vac San SS - Spli ST - She SP - Geo	nple t Spoor lby Tub	n ne	V. Loos Loose: M. Den	se: 0	-4 C	Sand : Fine Grained (Clay): and 35-50% some 20-35% Dense: 30-50 V. Soft: <2 Stiff: 8-15 little 10-20% Dense: >50 Soft: 2-4 V. Stiff: 15-30 trace <10% moisture, density, color
Revie	wed b	oy:							Date: Boring Number: B-27





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 100 Felton St., Waltham, MA
Northing: 2961222.6986 Easting: 726042.7302

Drilling Date: Start: 10/16/2017 **End:** 10/16/2017

Surface Elevation (ft.): 54.8

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

Depth Date Time 14.5 10/16/2017 10:00

Abandonment Method: Backfilled with soil cuttings

										Logged	By: A. Smith		
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata		Material Desc	cription	Rema	ırks
54.8 0									3	.5" Asphalt			
<u>-</u>	ss	S-1	15	10 50 100/3"	8	>100	ο. Ο . ο. Δ Σ		1	Moist, very dense, brown SAND and fine to coarse	, fine to coarse GRAVEL, little silt		
-	ss	S-2	18	70 82 100	9	>100	<i>∞</i>		S S	Moist, very dense, brown SAND and fine to coarse	, fine to coarse GRAVEL, little silt	Analytical (2'-4')	sample
49.8 5	SS	S-3	8	85 100/2"	6	>100			N S	floist, very dense, brown AND and fine to coarse	, fine to coarse GRAVEL, little silt	Analytical (4'-5') Rollerbit th boulder from 8' bgs.	rough
- 44.8 10	SS	S-4	10	54 100/4"	9	>100		Sand and Gravel	V a	Vet, very dense, brown, nd fine to coarse GRAV	fine to coarse SAN EL, little silt	ID	
<u>▼</u> 39.8 15	- SS	S-5	24	56 62 54 60	5	>100			а	Vet, very dense, brown, nd fine to coarse GRAV	EL, little silt	ID	
-	-								b	est boring B-28 termina ackfilled with soil cutting	ted at 16' bgs and is.		
34.8	Sa	ample Ty	pes						Cons	istency vs Blowcount/Foc	<u>ot</u>	Burmister Class	ificatio
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	ornia Sa Rock Co	impler ore	V - Vac San SS - Spli ST - She SP - Geo	nple t Spoor lby Tub	n ,	V. Loos Loose: M. Den	se: (-10 \	Dense:		4 V. Stiff: 15-30	and 35-50 some 20-3 little 10-20 trace <10 moisture, density	5%)% %
Revie	wed b	ov:								Date:	Boring Numb	er: B-28	





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 62 Felton St., Waltham, MA Northing: 2961354.6919 Easting: 726508.8779

Drilling Date: Start: 10/13/2017 **End:** 10/13/2017

Surface Elevation (ft.): 47.8

Total Depth (ft.): 16

Depth to Initial Water Level (ft): Depth Date Time 6.6 10/13/2017

Abandonment Method: Backfilled with soil cuttings

13:30

		Start.							Logged By: A. Smith
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks
47.8 0									3.5" Asphalt
-	SS	S-1	18	34 42 22	12	64		≣	Moist, very dense, gray, fine to coarse SAND, some fine to coarse gravel, little silt
-	- SS	S-2	24	20 45 28 36	14	73			Moist, very dense, gray, fine to coarse SAND, some fine to coarse gravel, little silt Analytical sample (2'-4')
42.8 5	SS	S-3	15	40 58 100/3"	14	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt Analytical sample (4'-5.3') and Corrosion sample (4'-5.3')
Ţ	SS	S-4	3	100/3"	3				Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt
- 37.8 10	- SS	S-5	24	95 80 56 54	18	>100		Sand and Gravel	Wet, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt
32.8 15	- SS	S-6	24	56 80 90 68	15	>100			Wet, very dense, gray, fine to medium SAND, some fine to coarse gravel, little clay
-	-								Test boring B-29 terminated at 16' bgs and backfilled with soil cuttings.
27.8					1				
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	er/Grab S ornia Sa Rock Co	mpler S	V - Vac San SS - Spli ST - She SP - Geo	nple t Spoor lby Tub	n k	V. Loos Loose: M. Den	se: 0	<u>nular (</u> 1-4 D 10 V	Sand):
Revie	wed b	y:							Date: Boring Number: B-29





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 42 Felton St., Waltham, MA Northing: 2961499.8980 Easting: 726877.4759

Drilling Date: Start: 10/13/2017 **End:** 10/13/2017

Surface Elevation (ft.): 44.87

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

Depth Date Time 5.2 10/13/2017 09:30

		Start. IV							Logg	ed By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material De	escription	Remarks
0									5" Asphalt		Vacuum excavate
- -	VE	V-1						Fill	Moist, brown, fine SAN	D, trace silt	boring from the ground surface to 6' bgs. Analytical sample
-											(3'-3.5')
<u>39.9</u>	VE	V-2					° . ()		Wet, brown, Clayey Sll SAND, trace fine grave		Analytical sample (5'-5.5')
-	SS	S-1	14	42 80 100/2"	12	>100			Wet, very dense, gray, some silt, trace fine gra	fine to medium SAN	D,
-	SS	S-2	5	100/5"	5)		Wet, very dense, gray-	brown fine to coarse	_
34.9 10 -								Sand and Gravel	SAND and fine to coar	50 9.0 tv <u>22</u> , italo oik	
29.9 15	- SS	S-3	24	72 38 52 58	9	90			Wet, very dense, brow and fine to coarse GRA		ND
- - -									Test boring B-30 termi backfilled with soil cutti	nated at 16' bgs and ngs.	
24.9	\Box								analatanan Blassa (#		Dumaistan Olesesia di
	<u>Sa</u>	mple Ty	pes V - Vac	Ex/Gra	b		Gra	nular (S	consistency vs Blowcount/F cand): Fine	Grained (Clay):	and 35-50%
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	ornia Sa	mpler ore S	Sam SS - Spli ST - She SP - Geo	t Spoor Iby Tub	¦e ∣l	V. Loos Loose: M. Den	se: 0	-4 De 10 V.	nse: 30-50 V. Soft: Dense: >50 Soft:	<2 Stiff: 8-15 2-4 V. Stiff: 15-30 4-8 Hard: >30	some 20-35% little 10-20% trace <10% moisture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

 $\textbf{Drilling Contractor/Driller:} \ \ \text{GeoLogic - Earth Exploration, Inc. / M. Ferreira}$

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 8 Felton St., Waltham, MA **Northing:** 2961592.0985 **Easting:** 727250.3929

Drilling Date: Start: 10/12/2017 End: 10/12/2017

Surface Elevation (ft.): 51.73

Total Depth (ft.): 19.8

Depth to Initial Water Level (ft):

 Depth
 Date
 Time

 6.0
 10/12/2017
 10:20

Abandonment Method: Backfilled with soil cuttings

											Log	ged B	y: A. Smith		
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material [Descr	iption		Remarks
51.7 0					_				8'	' Asphalt F	Pavement				Vacuum excavate
_									6'	' Subbase	: Dry, brov	vn, fi	ne to coarse		boring from the
_									S	AND, som	e fine to c	oarse	e gravel, little silt	_/	ground surface to 6' bgs.
_	VE	V-1							S.	oist, brow AND, little	n, SILT ar coarse gr	nd fin avel	e to medium		Analytical sample (2'-2.5')
46.7 5 ▼	00	S-1		100/6"	0					-:-4	d b		en - CAND		
-	SS	5-1	6	100/6	6				si	oist, very o	dense, bro ne to coars	own, i se gra	fine SAND, some avel	9	Corrosion sample (8'-10')
-	SS	S-2	24	58 62 66	18	>100		vel			dense, brone to coars		fine SAND, some avel	9	
41.7 10 -				70				Sand and Gravel							
36.7 15	SS	S-3	9	80 100/3"	9	>100			M	oist, very o edium SA	dense, bro ND, trace	own, s e fine	SILT and fine to gravel		
- - 31.7 20	SS	S-4	10	95 100/4"	10	>100			\tra	ace fine gr	avel		e SAND, some s		
- -									ba	est boring ackfilled w	B-31 term ith soil cut	nnate tings	ed at 19.8' bgs an	nd	
26.7	Sa	ımple Ty	/pes						Consi	stency vs l	Blowcount/	/Foot		Burm	ister Classification
AS - Auge CS - Califo BQ - 1.5" I NQ - 2" Ro	r/Grab S ornia Sa Rock Co	Sample mpler ore	V - Vac Sam SS - Spli ST - She GP - Ged	nple t Spoor lby Tub	n l	V. Loos Loose: M. Den	se: 0	anular ()-4 D -10 V		30-50			ined (Clay): Stiff: 8-15 V. Stiff: 15-30 Hard: >30	a s li	and 35-50% ome 20-35% title 10-20% trace <10% sture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 85 Central St., Waltham, MA Northing: 2961885.9469 Easting: 728253.0253

Drilling Date: Start: 11/30/2017 **End:** 11/30/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Reviewed by:

Surface Elevation (ft.): 67.25

Total Depth (ft.): 16

Depth to Initial Water Level (ft): Depth Date Time ΝE 11/30/2017 13:30

Abandonment Method: Backfilled with soil cuttings

Boring Number: B-32

	g Dutc.	Start: 1	1/30/20	.,	iiu. 1	1/50/20	, , ,		Logged By: A. Smith
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks
0							1, 1, 1		36" Topsoil
	1						· <u>/ [. /</u>		
	VE	V-1	6				12: <u>3:1</u> 2: 3:17: 3		
62.3	- - -							Ē	Moist, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt Analytical sample (2'-2.5')
	SS	S-1	4	100/4"	4				Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt Corrosion sample (6'-6.3')
57.3 10	- ss	S-2	24	18 38 66 60	10	>100		le/	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt
10 - - - <u>52.3</u> 15	- - - SS	S-3	24	14 90 48	9	>100		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt
	_			60					Test boring B-32 terminated at 16' bgs and backfilled with soil cuttings.
47.3									
AC A		ample Ty	pes V - Vac	Ex/Gra	ıb		Gra		Consistency vs Blowcount/Foot Burmister Classification Sand): Fine Grained (Clay): and 35-50%
AS - Auge CS - Calit BQ - 1.5" NQ - 2" R	fornia Sa Rock Co	ore S	Sam SS - Spli ST - She SP - Geo	nple t Spoor lby Tub	n ne	V. Loos Loose: M. Den	se: 0	-4 E	Sarity File Grained (Clay): Some 20-35%





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D. Bore Hole Location: 58 Central St./ 40 Appleton St., Waltham, MA

Northing: 2961982.2488 Easting: 728675.3252

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Drilling Date: Start: 10/17/2017 **End:** 10/17/2017

Surface Elevation (ft.): 65.84

Total Depth (ft.): 16

Depth to Initial Water Level (ft): Depth Date ΝE 10/17/2017 13:50

	,		-,,							Logged	d By: A. Smith		
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata		Material Des	scription		Remarks
0									4	" Asphalt			
-	SS	S-1	18	36 36 52	8	88		≣	\\	Moist, very dense, browing SAND, some fine to coar			
-	SS	S-2	24	38 96 64 70	15	>100				Moist, very dense, brown GRAVEL and fine to coa		ilt	Analytical sample (2'-4')
60.8 5	SS	S-3	10	79 100/4"	10	>100			N C	Moist, very dense, browing BRAVEL and fine to coa	n, fine to coarse arse SAND, trace s	ilt	
-	SS	S-4	6	100/6"	6	>100		_	N G	Moist, very dense, brown GRAVEL and fine to coa	n, fine to coarse arse SAND, trace s	ilt	
55.8 10	SS	S-5	18	54 76 100	10	>100		Sand and Gravel	N C	floist, very dense, browing RAVEL and fine to coa	n, fine to coarse arse SAND, trace si	ilt	
50.8 15	- ss	S-6	24	50 100 100 100	0	>100			(Moist, very dense, browเ GRAVEL and fine to coส	arse SAND, trace s		
-										est boring B-33 termina ackfilled with soil cutting			
45.8													
	<u>Sa</u>	ample Ty							Cons	istency vs Blowcount/Fo	<u>ot</u>	Burmi	ister Classification
AS - Auge CS - Calif 3Q - 1.5" NQ - 2" R	fornia Sa Rock Co	sample ampler ore	V - Vac San SS - Spli ST - She SP - Ged	nple t Spoor lby Tul	n ne	V. Loos Loose: M. Den	se: 0	-10 V	(Sand Dense: /. Dens	30-50 V. Soft: <se:>50 Soft: 2</se:>	<u>Grained (Clay):</u> 2 Stiff: 8-15 -4 V. Stiff: 15-30 -8 Hard: >30	so lit t	nd 35-50% ome 20-35% ttle 10-20% race <10% ture, density, color
Revie	wed b	oy:								Date:	Boring Numb	er: B	-33





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira **Drilling Method/Casing/Core Barrel Size:** Drive and Wash / 4 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 41 Central St./Cross St., Waltham, MA

Northing: 2962009.9284 Easting: 728929.5735

Drilling Date: Start: 10/17/2017 End: 10/17/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 65.67

Total Depth (ft.): 16

Depth to Initial Water Level (ft):DepthDateTimeNE10/17/201709:45

Abandonment Method: Backfilled with soil cuttings

	,		0,, 20			o,,_					Logge	d By	: A. Smith		
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material De	scri	ption		Remarks
65.7 0									8	" Asphalt					Vacuum excavate
	VE	V-1								Noist brow	yn fine to co	aree	e SAND, some t	fine	boring from the ground surface to 6' bgs. Analytical sample
	VE	V-1									ravel, some		SOAIND, SOME	III IC	(2'-2.5')
60.7 5	- VE	V-2							O.	noist, brow oarse GR	n, fine to co AVEL, trace	arse silt	e SAND and fine	e to	
- 	SS	S-1	18	72 75 100	12	>100		avel	N S	Moist, very SAND and	dense, brow fine to coars	/n, fi se G	ine to coarse BRAVEL, trace s	silt	Corrosion sample (6'-7.5')
	SS	S-2	18	45 66 100	14	>100		Sand and Gravel	N S	Moist, very SAND and	dense, brow fine to coars	/n, fi se G	ine to coarse RAVEL, trace s	silt	
. <u>55.7</u>	-														
50.7 15	- SS	S-3	24	80 90 100 100	13	>100							ine to coarse RAVEL, trace s	silt	
											B-34 termin vith soil cuttin		d at 16' bgs and	d	
45.7															
	Sa	ample Ty	pes	l		1	1	I	Cons	istency vs	Blowcount/Fo	oot		Bu	rmister Classification
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	Rock Co	sample ampler ore	V - Vac San SS - Spli ST - She SP - Geo	nple t Spooi lby Tul	n ne	V. Loose: Loose: M. Der	se: 0	-10 V	(Sand Dense: /. Dens	30-50	V. Soft:	<u>Grair</u> <2 2-4 4-8	ned (Clay): Stiff: 8-15 V. Stiff: 15-30 Hard: >30	m	and 35-50% some 20-35% little 10-20% trace <10% noisture, density, color
Revie	wed b	oy:								Date:			Boring Num	ber:	B-34





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 4 Central St./Newton St., Waltham, MA

Northing: 2962067.6581 Easting: 729417.6995 **Drilling Date: Start:** 10/19/2017 **End:** 10/19/2017 Surface Elevation (ft.): 66.47

Total Depth (ft.): 16

Depth to Initial Water Level (ft): Depth Date Time

NE 10/19/2017 11:45

Second S		,	Start.							Logged By: A. Smith	
SS S-1 18 40 12 74 18 18 34 12 74 18 18 34 12 74 18 18 34 12 74 18 18 34 12 74 18 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 18 34 34 34 34 34 34 34 3	` ,	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks	5
SS S-1 18 40 12 74 15 10 10 10 10 10 10 10										6" Asphalt	_
SS S-2 18 98 12 >100 SAND and fine to coarse GRAVEL, trace silt (2-3.5)	-	SS	S-1	18	40	12	74			Moist, very dense, brown, fine to coarse	
SAND and fine to coarse GRAVEL, trace silt Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt Test boring B-35 terminated at 16' bgs and backfilled with soil cuttings. S- Auger/Grab Sample S- Coalifornia Sample S- California Sample O-15' Rock Core GP-Geprobe No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt Prove 3' spoon. Test boring B-35 terminated at 16' bgs and backfilled with soil cuttings. S- Auger/Grab Sample Sample Sample Sample Sample Sample Sample Sample Sample Sample Sample Sample Sample ST Shelby Tube GP-Geprobe M. Dense: 30-50 No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt Prove 3' spoon. S- Auger/Grab Sample	_	SS	S-2	18	98	12	>100				nple
SS S-4 9 66	61.5 5	SS	S-3	2	100/2"	1				Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
SAND and fine to coarse GRAVEL, trace silt No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt Test boring B-35 terminated at 16' bgs and backfilled with soil cuttings. S - Auger/Grab Sample S - Capillorinia Sampler S - Split Spoon G - 1.5' Rock Core G - Ceoprobe G - Geoprobe SAND and fine to coarse GRAVEL, trace silt No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse GRAVEL, trace silt Test boring B-35 terminated at 16' bgs and backfilled with soil cuttings. Burmister Classificati some 20-35% silt spoon 15-100-10 V. Dense: 30-50 V. Loose: 4-10 V. Dense: 30-50 M. Dense: 10-30 M. Stiff: 4-8 Hard: >30 M. Stiff	-	SS	S-4	9	1	8	>100		ravel	Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt Corrosion sar (6'-6.75')	nple
S-Auger/Grab Sample S-California Sample Q- 1.5" Rock Core Q- 2" 56.5 10	SS	S-5	4	100/4"	4			Sand and G			
Burmister Classificati S - Auger/Grab Sample S - California Sample Q - 1.5" Rock Core Q - 2" Rock Core Q	- - 51.5 15	- SS	S-6	24	45 38	18	83			3 in: Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	on.
S - Auger/Grab Sample S - California Sample C - 1.5" Rock Core Q - 2" Rock Core Q - 2" Rock Core Q - Geoprobe S - Geoprobe S - Geoprobe S - Geoprobe S - California Sample C - 2" Core C - 2" Rock Core Q - 1.5" Rock Core Q - 2" Rock Core Q - 3" Rock Core Q - 4" Core C - 2" Rock Core Q - 4" Core C - 2" Rock Core Q - 4" Core C - 2" Rock Core Q - 4" Core C	- - -										
S - Auger/Grab Sample S - California Sampler Q - 1.5" Rock Core Q - 2" Rock Core Q - Geoprobe V - Vac Ex/Grab Sample SS - Split Spoon ST - Shelby Tube GP - Geoprobe V - Vac Ex/Grab Sample SS - Split Spoon ST - Shelby Tube GP - Geoprobe M - Dense: 30-50 V - Soft: <2 Stiff: 8-15 Soft: 2-4 V - Stiff: 15-30 M - Stiff: 4-8 Hard: >30 moisture, density, color	46.5										
S - Adjen Grand Sample S - California Sample Q - 1.5" Rock Core Q - 2" Rock Core Q - 2" Rock Core Q - Geoprobe S - Sample S - Split Spoon S -		Sa	ample Ty	pes					9	Consistency vs Blowcount/Foot Burmister Classific	atio
Povioused by: Povious Number: R 25	CS - Califo	ornia Sa	impler ore	San SS - Spli ST - She	nple it Spoor elby Tul	n ,	Loose:	se: 0 4-	-4 D -10 V	ense: 30-50 V. Soft: <2 Stiff: 8-15 little 10-20% Dense: >50 Soft: 2-4 V. Stiff: 15-30 trace <10%)
Reviewed by. Borning Number. B-33	Revie	wed b	y:							Date: Boring Number: B-35	





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number: 101038-102170**

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 22 Townsend St., Waltham, MA Northing: 2962336.1513 Easting: 729714.3343 **Drilling Date: Start:** 10/19/2017 **End:** 10/19/2017

Surface Elevation (ft.): 66.06

Total Depth (ft.): 15.3

Depth to Initial Water Level (ft):

Depth Date ΝE 10/19/2017 14:00

	,								Logged By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks	
0									4" Asphalt	
	SS	S-1	18	16 16 10	8	26		E	Moist, medium dense, gray, fine to coarse SAND, some fine gravel, trace silt	
	SS	S-2	24	8 4 5 5	12	9			Moist, loose, brown, fine to medium SAND, trace silt Analytical sam (2'-4')	ıple
61.1	- SS	S-3	24	5 3 11 21	14	14		Sand	Moist, medium dense, brown, fine to coarse SAND, trace fine gravel, trace silt	
 	- SS	S-4	24	31 34 34 38	16	68			Moist, very dense, brown, fine to medium SAND, trace silt	
				54 46					Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace to	
- <u>56.1</u> 	SS	S-5	24	42 46	5	88		Sand and Gravel	little silt	
<u>51.1</u> - 15	SS	S-6	15	36 36 100/3"	5	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace to little silt	
 	-								Test boring B-36 terminated at 15.3' bgs and backfilled with soil cuttings.	
46.1										
13.1	Sa	mple Ty	pes			1		1	Consistency vs Blowcount/Foot Burmister Classifica	ation
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	er/Grab S ornia Sa Rock Co ock Core	Sample mpler S ore S	V - Vac San SS - Spli T - She GP - Geo	nple t Spoor lby Tub	n ne	V. Loos Loose: M. Den	se: O	anular)-4 C -10 V	Sand : Fine Grained (Clay): and 35-50% some 20-35%	or
Revie	wed b	y:							Date: Boring Number: B-36	





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Number: 101038-102170 Project Location: Massachusetts

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 99 Chamberlain Terrace, Waltham, MA

Northing: 2962447.3562 Easting: 730136.9483 **Drilling Date: Start:** 10/18/2017 **End:** 10/18/2017 Surface Elevation (ft.): 65.28

Total Depth (ft.): 16

Depth to Initial Water Level (ft): Depth Date

10/18/2017 14:00 Abandonment Method: Backfilled with soil cuttings

Logged By: A. Smith

NE

									Logged By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
05.5									4" Asphalt	Vacuum excavate
								E	Moist, brown, fine to coarse SAND, some fit to coarse gravel, little silt	
	VE	V-1							Moist, brown, fine to medium SAND, little fir to coarse gravel, trace silt	Analytical sample (2'-2.5')
- <u>60.3</u> -	_			34				рі	Moist, very dense, gray to brown, fine to	
-	ss	S-1	24	36 32 26 24	3	68		Sand	medium SAND, little fine gravel, trace silt	
- <u>55.3</u> 10	- SS	S-2	24	18 22 20	10	40			Moist, dense, gray to brown, fine to medium SAND, little fine gravel, trace silt	
	-							d Gravel		
50.3 15	- SS	S-3	24	60 60 55 86	8	>100		Sand and Gravel	Wet, very dense, brown, fine to coarse SAN and fine to coarse GRAVEL, trace silt	ID
2 ZU 100ZZU:GF3 - 5/0/ZI	-								Test boring B-37 terminated at 16' bgs and backfilled with soil cuttings.	
45.3		_								
AS - Auge CS - Calife BQ - 1.5" NQ - 2" R	er/Grab S ornia Sai Rock Co ock Core	mpler Sore S	V - Vac Sam SS - Spli T - She GP - Geo	iple t Spoor lby Tub	n ne	V. Loos Loose: M. Den	se: 0	nular (-4 C 10 V	Sand): Fine Grained (Clay):	and 35-50% some 20-35% little 10-20% trace <10% moisture, density, color
Revie	wed b	y:							Date: Boring Numb	er: B-37





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

 $\textbf{Drilling Contractor/Driller:} \ \ \text{GeoLogic - Earth Exploration, Inc. / M. Ferreira}$

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Drilling Date: Start: 10/18/2017 **End:** 10/18/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 57.74

Total Depth (ft.): 16

 Depth to Initial Water Level (ft):

 Depth
 Date
 Time

 8.5
 10/18/2017
 09:55

Abandonment Method: Backfilled with soil cuttings

	,					-,					Logg	jed B	By: A. Smith		
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material D	escr	iption		Remarks
0									8	" Asphalt					Vacuum excavate
-								E	S	ome fine t	o coarse sa	and	coarse GRAVEL		boring from the ground surface to 6' bgs. Boulders and cobbles from 1 to 3' bgs.
-	VE	V-1									vn, fine to m ravel, trace		um SAND, little fi	ne	Analytical sample (3'-3.5')
<u>52.7</u> -				36				Sand					ne to medium		
-	SS	S-1	24	30 26 30	10	56	0 000		S	SAND, trad	ce silt			ĺ	Analytical sample (6'-8')
₹ 47.7 10	SS	S-2	24	32 40 44 45	8	84		Sand and Gravel	s S	Vet, very o	lense, brow gravel, trace	/n, fii e silt	ne to coarse SAN	ND,	
-								Sand a							
42.7 15	- ss	S-3	24	22 30 34	16	64		Sandy Silt		Vet, hard, and	brown, SIL	T, tra	ace fine to mediu	ım	
- - -				40			M40				B-38 term vith soil cutt		ed at 16' bgs and		
37.7															
	Sa	ample Ty							Cons	istency vs	Blowcount/l	Foot		l —	ister Classification
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	Rock Co	impler sore	V - Vac San SS - Spli ST - She GP - Geo	nple t Spoor lby Tuk	n ne	V. Loose: Loose: M. Der	se: 0)-4 [·10 \	(Sand Dense: /. Dens	30-50 se: >50	Fine V. Soft: Soft: M. Stiff:	<2 2-4 4-8	ined (Clay): Stiff: 8-15 V. Stiff: 15-30 Hard: >30	se li t mois	nd 35-50% ome 20-35% ttle 10-20% race <10% tture, density, color
Revie	wed k	y:								Date:			Boring Numb	oer: B	-38





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 50 Linden St., Waltham, MA **Northing:** 2963203.1720 **Easting:** 730823.592

Drilling Date: Start: 10/23/2017 **End:** 10/23/2017

Surface Elevation (ft.): 50.99

Total Depth (ft.): 17

Depth to Initial Water Level (ft):

Depth Date Time

11.8 10/23/2017 13:45 **Abandonment Method:** Backfilled with soil cuttings

Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Descr	iption	Remarks
51.0 0	+ +								5" Asphalt		
	SS	S-1	18	46 65 54	6	>100		Gravel	Moist, very dense, brown, t SAND, some fine gravel, lit		
	- ss	S-2	24	32 25 22 14	3	47		Sand and Gravel	Moist, dense, brown, fine to some fine gravel, little silt	o coarse SAND,	Analytical sample (2'-4')
<u>46.0</u> 5	- ss	S-3	24	12 6 6 6	14	12			Moist, medium dense, brov SAND, trace silt	wn, fine to medium	1
	- SS	S-4	24	10 10 8 7	14	18			Moist, medium dense, brov SAND, trace silt	wn, fine to medium	Corrosion sampl (6'-8')
41.0	- SS	S-5	24	4 8 5 6	12	13		Sand	Moist, medium dense, brow SAND, little fine gravel, trad		
▼ 36.0	- - -										
36.0 15	- ss	S-6	24	12 12 15 18	8	27		Sandy Silt	Top 1": Moist, medium der medium SAND, trace silt Bottom 7": Wet, very stiff, b fine to medium sand		
							1 -1 -1 -		Test boring B-39 terminate backfilled with soil cuttings.	d at 17' bgs and	
31.0											
	Sa	mple Ty	pes						Consistency vs Blowcount/Foot		Burmister Classificati
CS - Cali	er/Grab S fornia Sa ' Rock Co	mpler sore	V - Vac Sam S - Spli T - She	nple t Spoor	n l	V. Loos Loose:	se: 0 4-	-4 C	ense: 30-50 V. Soft: <2 . Dense: >50 Soft: 2-4	ned (Clay): Stiff: 8-15 V. Stiff: 15-30	and 35-50% some 20-35% little 10-20% trace <10%
NQ - 2" R	Rock Core	Ğ	P - Geo	probe		M. Den	ise: 10)-30	M. Stiff: 4-8	Hard: >30	moisture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

 $\textbf{Drilling Contractor/Driller:} \ \ \textbf{GeoLogic - Earth Exploration, Inc. / D. Jacobs}$

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 74 Linden St., Waltham, MA
Northing: 2963369.1110 Easting: 731109.016

Drilling Date: Start: 1/11/2018 **End:** 1/11/2018

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Reviewed by:

Surface Elevation (ft.): 43.17

Total Depth (ft.): 21

Depth to Initial Water Level (ft):DepthDateTime5.21/11/201815:00

Abandonment Method: Backfilled with soil cuttings

Boring Number: B-40

Logged By: D. Abt

									Logged By: D. Abt	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
0				98			XXXX		2" Asphalt	
	SS	S-1	24	70 44 13	5	>100		_	Dry, very dense, brown, fine to coarse SAND, trace silt	
	ss	S-2	24	18 14 10 14	4	24		█	Moist, medium dense, brown, fine to coarse SAND, trace fine gravel, trace silt	
3 <u>8</u> 2	SS	S-3	24	19 24 27 20	2	51		Gravel	Moist, very dense, brown, fine to coarse GRAVEL, some fine to coarse sand, little silt	
 	ss	S-4	24	12 20 18 13	5	38		Sand and Grave	Wet, dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
 - <u>33.2</u> -	SS	S-5	24	26 15 11 22	8	26			Wet, very stiff, brown, SILT, little fine to medium sand, trace fine gravel	Analytical sample (8'-10')
	- SS	S-6	24	23 25 27 22	18	52		Sandy Silt	Wet, hard, gray, SILT, trace fine sand	
	- SS	S-7	24	10 15 16 19	20	31			Moist, hard, gray, SILT, little fine sand	
 									Test boring B-40 terminated at 21' bgs and backfilled with soil cuttings.	
18.2										
	<u>Sa</u>	mple Ty	pes						Consistency vs Blowcount/Foot Burn	nister Classification
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	ornia Sa Rock Co	impler ore S	V - Vac Sam S - Spli T - She SP - Geo	nple t Spoor lby Tul	n ne	V. Loos Loose: M. Den	se: 0	-4 E	Dense: 30-50 V. Soft: <2 Stiff: 8-15 /. Dense: >50 Soft: 2-4 V. Stiff: 15-30	and 35-50% some 20-35% little 10-20% trace <10% isture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / P. Fisher Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 127 Linden St., Waltham, MA Northing: 2963681.2446 Easting: 731597.5608

Drilling Date: Start: 11/21/2017 **End:** 11/21/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 41.3

Total Depth (ft.): 16

Depth to Initial Water Level (ft): Depth Date

4.1 11/21/2017 12:30

	,		.,,_0			.,, _					Logg	ed B	y: A. Smith		
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material D	escr	iption		Remarks
0 	VE	V-1						E	Ĭ Ň		n, fine to co AVEL, little		e SAND and fine	to	Vacuum excavate boring from the ground surface to 6' bgs. Analytical sample (2'-2.5')
- <u>▼</u> - 36.3 - 5	VE	V-2						Sand and Gravel	V	Vet, browr	n, fine to me	ediur	m SAND, little silt,	,	Analytical sample
	- SS	S-1	24	16 17 17 16	12	34		Sand ar	ti V fi	race fine g Vet, dense ine to coar	ravel e, brown, fin se GRAVE	ne to L, tra	coarse SAND ar ace silt		(5.5'-6') Corrosion sample (6'-8')
31.3 10	- SS	S-2	24	12 17 16 20	18	33			V	Vet, dense	e, gray, fine	to S	AND, little silt		
	-			7				Silty Sand		N /-4 dir			fine CAND trace		
<u>26.3</u> 15	SS	S-3	24	8 9 8	16	17			s	silt			fine SAND, trace	9	
	-								7 b	est boring packfilled v	B-41 termi vith soil cutti	inate ings.	ed at 16' bgs and		
21.3															
	Sa	ample Ty		•					Cons	istency vs	Blowcount/F	Foot		Burmi	ister Classification
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	Rock Co	ampler ore S	V - Vac Sam S - Spli T - She GP - Geo	nple t Spoor lby Tul	n ne	V. Loo: Loose: M. Der	se: 0	10 V	(Sand Dense: /. Den	30-50	<u>Fine</u> V. Soft: Soft: M. Stiff:	Grai <2 2-4 4-8	ined (Clay): Stiff: 8-15 V. Stiff: 15-30 Hard: >30	so li t	nd 35-50% ome 20-35% ttle 10-20% race <10% ture, density, color
Revie	wed b	oy:								Date:			Boring Numb	er: B	-41





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / P. Fisher

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 168 Linden St., Waltham, MA Northing: 2963916.3760 Easting: 731917.682

Drilling Date: Start: 11/2/2017 **End:** 11/2/2017

Surface Elevation (ft.): 42.13

Total Depth (ft.): 21

Depth to Initial Water Level (ft):

Depth Date Time 3.2 11/2/2017 09:25

	Dutc.	Start.	1/2/201	,	UI. 11/	2/2011			Logged	By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Des	cription	Remarks
0							<u>.</u>		2" Asphalt		Vacuum excavate
	-							Sand and Gravel	Bottom 6": Moist, gray, fi and fine GRAVEL, little s		boring from the ground surface to 6' bgs.
- ▼ -	VE	V-1						and C	Moist, gray, fine to coars	e SAND and fine	Analytical sample
37.1 5	-							Sand	GRAVEL, little silt		(3'-3.5')
	SS	S-1	24	13 2 2 2	3	4			Wet, soft, dark gray, Org	anic SILT	Silty Sand is a potentialy varved deposit.
				2 2					Wet, stiff, dark gray, fine		
32.1	SS	S-2	24	10 15	12	12			some organic clayey silt,	little fine gravei	(8'-10')
	- SS	S-3	24	16 16 18	15	34		Silty Sand	Wet, dense, brown, SIL	, trace fine sand	
15	SS	S-4	24	16 12 14 18	16	32			Wet, dense, brown, fine trace silt	to medium SAND,	
 	-			16					Test boring B-42 termina backfilled with soil cutting		
17.1											
AS - Auge CS - Califo BQ - 1.5"	er/Grab S ornia Sa Rock Co	impler ore S	V - Vac Sam SS - Spli T - She SP - Geo	nple t Spoor lby Tub	n l	V. Loos Loose:	se: (anular)-4 C -10 V	Sand): Fine G	<u>rained (Clay):</u> 2 Stiff: 8-15 4 V. Stiff: 15-30	Burmister Classification and 35-50% some 20-35% little 10-20% trace <10%
NQ - 2" R	OCK COIL										moisture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 32 Waverly Oaks Rd., Waltham, MA Northing: 2964059.3675 Easting: 732508.0332

Drilling Date: Start: 10/26/2017 **End:** 10/27/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Reviewed by:

Surface Elevation (ft.): 43.5

Total Depth (ft.): 16

5.3

Depth to Initial Water Level (ft): Depth Date 10/26

Abandonment Method: Backfilled with soil cuttings

Boring Number: B-43

14:10

	, D ato.	Start: 10	5120120			J, L, , , L	011		Logged By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
0				3			74 18. 14		Top 6": Topsoil	
_	SS	S-1	24	4 5 6	12	9		Ē	Bottom 6": Moist, loose, brown, fine to coarse SAND, some fine gravel	
-	SS	S-2	24	5 5 5 5	6	10			Wet, medium dense, gray, fine SAND, some silt, trace fine gravel	Analytical sample (2'-4')
38.5	SS	S-3	24	3 3 4 8	4	7		Silty Sand	Wet, loose, brown, fine to coarse SAND, little silt, trace organic fibers	
-	SS	S-4	24	3 23 66 60	12	89			Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Corrosion sample (6'-8')
33.5 10	SS	S-5	24	24 26 26 43	14	52		Clay	Wet, hard, gray, Silty CLAY, trace fine to medium sand	PP = 2.5 tsf
10								Silty Clay		
- <u>28.5</u> - 15	- SS	S-6	24	22 30 40 42	16	70		Silty Sand	Wet, very dense, brown, fine SAND, little silt	
- - -	-			_			E-15-34.2		Test boring B-43 terminated at 16' bgs and backfilled with soil cuttings.	
23.5										
	Sa	mple Ty	pes						Consistency vs Blowcount/Foot Burn	mister Classification
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	ornia Sa Rock Co	impler ore S	V - Vac Sam S - Spli T - She SP - Geo	nple t Spoor lby Tub	n ne	V. Loo Loose M. Dei	se: 0	-4 [10 \	lense: 30-50 V. Soft: <2 Stiff: 8-15 '. Dense: >50 Soft: 2-4 V. Stiff: 15-30 M. Stiff: 4-8 Hard: >30 mc	and 35-50% some 20-35% little 10-20% trace <10% oisture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / P. Fisher

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Barra Hala Lagatiana Co Marraha Calas D.L. Malifara MA

Bore Hole Location: 68 Waverly Oaks Rd., Waltham, MA **Northing:** 2964126.8030 **Easting:** 732954.263

Drilling Date: Start: 10/31/2017 **End:** 10/31/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 45.65

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

 Depth
 Date
 Time

 7.0
 10/31/2017
 11:00

Drilling	g Date:	Start: 1	0/31/20	17 Ei	nd: 10)/31/20	017						y: A. Smith		VIIICU W	nur son cutungs
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material De	escri	ption			Remarks
0							17.71.			Topsoil						Vacuum excavate boring from the
-									Mois little	st, brow fine to	n, SILT, littl coarse grav	le fin ⁄el	e to mediu	m san	d,	ground surface to 6' bgs.
	VE	V-1						Sandy Silt								Analytic Sample (2'-2.5')
40.7																
. <u>¥</u> .	- ss	S-1	24	12 14 18 30	8	37		/el			e, brown, fin o coarse gra			ND,		
	SS	S-2	24	14 5 6 5	6	11		Sand and Gravel			m dense, b fine to coar					
10 								3								
30.7 15	- SS	S-3	24	7 9 14 13	14	23		Silty Clay	Wet	, very s	tiff, gray, Sil	lty C	LAY			PP = 2.0, 2.5, and 3.0 tsf
											B-44 termi			s and		
25.7																
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	er/Grab S fornia Sa Rock Co	ampler sore	V - Vac Sam SS - Spli T - She GP - Geo	nple t Spoor lby Tuk	n ,	V. Loos Loose: M. Der	se: 0	<u>inular (</u> i-4 D 10 V	(Sand): Dense:	30-50 >50	V. Soft: Soft:		V. Stiff: 1	3-15 5-30 >30	s li	ister Classification and 35-50% ome 20-35% ittle 10-20% trace <10% sture, density, color
Revie	wed b	oy:							Da	ate:			Boring I	Numb	er: B	3-44





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / P. Fisher

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 131 Waverly Oaks Rd., Waltham, MA

Northing: 2964321.5588 Easting: 733550.3289

Drilling Date: Start: 10/31/2017 **End:** 10/31/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 48.52

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

Depth Date Time 5.4 10/31/2017 13:15

Abandonment Method: Backfilled with soil cuttings

	,										Logge	ed By	: A. Smith			
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material De	escri	ption		F	Remarks
0							111		4'	' Topsoil:	Moist, gray,	fine	to medium SA	ND		um excavate
	VE	V-1							NA NA	oist, brov	ın SILT				grour 6' bgs	
. 43.5 <u>¥</u>	VE	V-1							IV	oist, brow	III, SILT				(2'-2.	tical sample 5')
	- SS	S-1	24	14 14 6 7	0	20		Sandy Silt		o Recove						
- <u>38.5</u> 10	- ss	S-2	24	5 8 4 5	0	12			3' fir	ne gravel,	on- fine to co trace silt		e SAND, some			
	SS	S-3	24	4 7 11	8	11				and	nown, SILT,	uac	e fine to mediu	1111		
- 33.5 15	- SS	S-4	24	13 14 7 16	16	21		Silty Clay		et, very s medium		AY d	& SILT, trace fil	ne		
									T _i	est boring ackfilled v	B-45 termin vith soil cuttir	nateongs.	d at 16' bgs and	d		
28.5		mand - T							Co::-::	otono	Dlevies					Nacification
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	er/Grab S fornia Sa Rock Co	ampler ore	V - Vac Sam SS - Spli T - She P - Ged	nple t Spoor lby Tub	n ne	V. Loose: Loose: M. Der	se: 0	nular (0-4 D 10 V		<u>:</u> 30-50	V. Soft:		ned (Clay): Stiff: 8-15 V. Stiff: 15-30 Hard: >30		and some little trace moisture, de	35-50% 20-35% 10-20% <10% ensity, color
Revie	wed k	oy:								Date:			Boring Num	ber	: B-45	





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / P. Fisher

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 161 Waverly Oaks Rd., Waltham, MA

Northing: 2964423.8834 Easting: 733848.2348

Drilling Date: Start: 11/14/2017 **End:** 11/16/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 56.94

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

Depth Date Time 6.4 11/16/2017 14:05

Drilling	j Date:	Start: 1	1/14/20	17 EI	na: 11	1/16/20	J1 <i>7</i>			Logg		y: A. Smith		son saturige
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata		Material D	escri	ption		Remarks
0							1/2 77 1/2 7/4 1/2 1/4		12" Top	osoil				Vacuum excavate boring from the
	VE	V-1						Gravel	Moist, t	orown, fine to m coarse gravel, li	nediu ittle s	m SAND, some ilt		ground surface to 6' bgs. Analytical sample (2.5'-3')
51.9 5 - <u>▼</u>	- SS	S-1	24	4 3 3 3	6	6		Sand and		ose, gray, fine t coarse gravel, tr		arse SAND, som silt	e	
46.9 10	SS	S-2	24	8 12 12 8	8	24		Sandy Silt	Wet, ve	ery stiff, brown,	SILT	, some fine sand		Corrosion sample (8'-10')
41.9 15	- SS	S-3	24	20 34 44 50	16	78		Silty Clay	Wet, ha	ard, gray, Silty (CLAY	(
 				30					Test bo backfille	oring B-46 termi ed with soil cutti	inate ings.	d at 16' bgs and		
36.9		ammia T							Camalatan	u vo Dlavessee			D	iotou Classificatica
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	er/Grab S fornia Sa	ampler s	V - Vac San SS - Spli T - She GP - Ged	nple t Spoor lbv Tul	n ne	V. Loos Loose: M. Der	se: 0	nular ()-4 D -10 V	(Sand):	-50 V. Soft:		ned (Clay): Stiff: 8-15 V. Stiff: 15-30 Hard: >30	a so li t	nd 35-50% ome 20-35% ttle 10-20% race <10% tture, density, color
Revie	wed b	oy:							Date) :		Boring Numb	er: B	-46





Project Name: Rehabilitation of Weston Aqueduct Supply Main 3 Client: MWRA

Project Number: 101038-102170 Project Location: Massachusetts

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / P. Fisher

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 191 Waverly Oaks Rd., Waltham, MA Northing: 2964858.9158 Easting: 734327.5545

Drilling Date: Start: 11/2/2017 **End:** 11/2/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Reviewed by:

Surface Elevation (ft.): 68.65

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

Depth Date Time 12.8 11/2/2017 14:50

Abandonment Method: Backfilled with soil cuttings

Boring Number: B-47

gillilling	J Date.	Start: 1	1/2/201	/ EIIG	J. 11/	2/201	,		Logged By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
0							21 1/2 · 1/1 1/2 · 1/4 · 1/2		12" Topsoil	Vacuum excavate boring from the
-	VE	V-1							Moist, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	ground surface to 6' bgs. Analytical sample (2'-2.5')
63.7 5	- SS	S-1	24	46 98 66 56	12	>100		avel	Moist, very dense, brown to gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
5 <u>8.7</u> 10	- SS	S-2	24	32 30 27 20	3	57		Sand and Gravel	Moist, very dense, brown to gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
<u>▼</u>	- SS	S-3	24	21 25 21 20	3	46			Wet, dense, brown to gray, fine to coarse SAND, little fine gravel, trace silt	
	-								Test boring B-47 terminated at 16' bgs and backfilled with soil cuttings.	
48.7	Sa	mple Ty	pes			<u> </u>			Consistency vs Blowcount/Foot Bur	 mister Classificatior
AS - Auge CS - Calif 3Q - 1.5" NQ - 2" R	er/Grab S fornia Sa Rock Co	Sample Impler ore	V - Vac Sam SS - Spli ST - She SP - Geo	iple t Spoor lbv Tub	n ne	V. Loo Loose: M. Der	se: 0	nular -4 C	(Sand): Fine Grained (Clay): Dense: 30-50 V. Soft: <2 Stiff: 8-15 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30	and 35-50% some 20-35% little 10-20% trace <10% pisture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: 225 Waverly Oaks Rd., Waltham, MA **Northing:** 2965111.7525 **Easting:** 734637.5415

Drilling Date: Start: 10/24/2017 **End:** 10/24/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Reviewed by:

Surface Elevation (ft.): 62.23

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

Depth Date Time 11.3 10/24/2017 13:25

Abandonment Method: Backfilled with soil cuttings

Boring Number: B-48

Drilling	Date:	Start: 10	0/24/20	17 Ei	nd: 10)/24/2	017		Logged By: A. Smith	with 30ii cutting3
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
02.2				8			74.14. 17		Top 6": Topsoil	
-	ss	S-1	24	9 10 12	9	19			Bottom 3": Dry, medium dense, brown, SILT	
-	SS	S-2	24	46 70 50 82	14	>100		Sand and Gravel	Dry, very dense, brown, fine to coarse SAND, little fine to coarse gravel, little silt	Analytical sample (2'-4')
57.2 5	SS	S-3	24	36 38 40 33	12	78		Sanc	Dry, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Analytical sample (4'-6')
-	SS	S-4	24	31 20 14 14	16	34			Moist, dense, brown, fine SAND, some silt	Corrosion sample (6'-8')
<u>52.2</u> 10	SS	S-5	24	28 18 20 28	12	38			Moist, dense, brown, fine SAND, little silt	
10 <u>¥</u> -								Silty Sand		
47.2 15	- SS	S-6	24	18 17 19 12	8	36			Wet, dense, gray, fine SAND, little silt	
- -							*• 1 • •		Test boring B-48 terminated at 16' bgs and backfilled with soil cuttings.	
=										
42.2										
	Sa	mple Ty	pes	1			1		Consistency vs Blowcount/Foot Burn	nister Classificatio
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	ornia Sa Rock Co	impler ore S	V - Vac Sam SS - Spli T - She GP - Geo	iple t Spoor lby Tuk	n ,	V. Loo: Loose: M. Der	se: 0	-4 [10 \	Dense: 30-50 V. Soft: <2 Stiff: 8-15 / Dense: >50 Soft: 2-4 V. Stiff: 15-30	and 35-50% some 20-35% little 10-20% trace <10% isture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Number: 101038-102170 Project Location: Massachusetts

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / D. Jacobs Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 271 Waverley Oaks Rd., Waltham, MA Northing: 2965275.1540 Easting: 735017.5246

Drilling Date: Start: 1/24/2018 **End:** 1/26/2018

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Reviewed by:

Surface Elevation (ft.): 59.22

Total Depth (ft.): 16

Depth to Initial Water Level (ft): Depth Date Time 7.2 1/26/2018 10:00

Abandonment Method: Backfilled with soil cuttings

Boring Number: B-49

Dillilling	J Date.	Start: 1	724/201	O EIII	u. 1/2	.0/201	0		Logged By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
0							<u>74 1× -77</u>		9" Topsoil	Vacuum excavate boring from the
-	VE	V-1							Moist, brown, fine to coarse SAND, some fine to coarse gravel, trace silt Moist, brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt	ground surface to 6' bgs. Analytical sample (1.5'-2')
<u>54.2</u> 5										
▼ -	- ss	S-1	24	32 54 22 20	8	76		ravel	Wet, very dense, gray, fine to medium SAND, little silt, little fine gravel	Analytical sample (6'-8')
49.2 10	SS	S-2	24	7 9 10 12	18	19		Sand and Grave	Wet, medium dense, brown, fine to medium SAND, trace silt	
	- SS	S-3	24	5 6 6	6	12			No Recovery: 3" Spoon: Wet, medium dense, gray-brown, fine to medium SAND, little fine gravel, little silt	
-				6			, , , , , , , , , , , , , , , , , , ,		Test boring B-49 terminated at 16' bgs and backfilled with soil cuttings.	
39.2	Sa	ımple Ty	pes						Consistency vs Blowcount/Foot Burn	nister Classification
AS - Auge CS - Calif 3Q - 1.5" NQ - 2" R	er/Grab S fornia Sa Rock Co	Sample mpler ore	V - Vac Sam SS - Spli ST - She SP - Ged	nple t Spoor lbv Tuk	n ne	V. Loo Loose M. Dei	se: 0	nular 1-4 [10 \	(Sand): Fine Grained (Clay): Dense: 30-50 V. Soft: <2 Stiff: 8-15 Dense: >50 Soft: 2-4 V. Stiff: 15-30	and 35-50% some 20-35% little 10-20% trace <10% sture, density, color





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts **Project Number:** 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 3 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 320 Waverley Oaks Rd., Waltham, MA

Northing: 2965897.0948 Easting: 735637.6863

Drilling Date: Start: 10/25/2017 **End:** 10/25/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 71.29

Total Depth (ft.): 15

Depth to Initial Water Level (ft):

Depth Date NE 10/25/2017 13:40

	,								Logged By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks	s
0									3" Asphalt Pavement	
-	SS	S-1	9	80 100/3"	4	>100	٥. · · ·		9" Cobble Base Wet, very dense, gray, fine to coarse SAND,	
-	SS	S-2	24	48 26 36 24	4	62			some fine gravel, trace silt Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, some silt Analytical sar (2'-4')	mple
66.3 5	SS	S-3	24	18 18 20 24	2	38			Moist, dense, brown, fine to coarse SAND and fine to coarse GRAVEL, some silt Analytical sar (4'-6')	mple
-	SS	S-4	24	14 12 22 100	5	34	(° U)	Sand and Gravel	Moist, dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt (6'-8')	mple
-	SS	S-5	9	15 100/3"	4	>100))	dand	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
61.3 -	-							S		
<u>56.3</u> 15	SS	S-6	12	85 100	8	>100	, O , O)		Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt Test boring B-50 terminated at 15' bgs and	
15									backfilled with soil cuttings.	
51.3										
20	Sa	ample Ty	pes	'		'			Consistency vs Blowcount/Foot Burmister Classific	cation
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	ornia Sa Rock Co	sample impler ore S	V - Vac Sam S - Spli T - She SP - Geo	nple t Spoor lby Tul	n l	V. Loos Loose: M. Den	se: 0	10 V	Sand): Fine Grained (Clay): and 35-50% some 20-35% little 10-20% posses: ense: 30-50 V. Soft: <2 Stiff:	
Revie	wed b	oy:							Date: Boring Number: B-50	





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira
Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 356 Waverley Oaks Rd., Waltham, MA

Northing: 2965991.6800 Easting: 735756.981

Drilling Date: Start: 10/25/2017 End: 10/25/2017

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 77
Total Depth (ft.): 14.4

Depth to Initial Water Level (ft):

Depth Date Time 7.7 10/25/2017 10:40

Abandonment Method: Backfilled with soil cuttings

											Logg	jed B	y: A. Sm	ith			
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Material D	escr	iption			F	Remarks
0	ss	S-1	24	6 5 4 14	8	9			N	' Topsoil loist, loos ome fine ç	e, brown, fir gravel, little :	ne to	coarse	SAND,		Analy (0'-2'	/tical sample)
	SS	S-2	3	100/3"	3	>100					dense, grag some fine to				silt		
- <u>72.0</u> - <u>5</u>	- SS	S-3	24	36 32 40 62	8	72			W G	/et, very o RAVEL a	lense, brow and fine to c	/n-gr :oars	ray, fine se SAND	to coarse), trace s	e illt	Analy (4'-6'	rtical sample)
- <u> </u>	ss	S-4	24	72 62 90 70	12	>100		Sand and Gravel	G	/et, very o RAVEL a	lense, brow and fine to c	/n-gr :oars	ray, fine se SAND	to coarse), trace s	e illt		
67.0 10	SS	S-5	24	61 71 45 51	16	>100		Sand	S S	loist, very AND, trad	dense, bro ce fine grave	wn, 1 el, tra	fine to ca	oarse			
		0.0	4	100/4"	1	. 100				loint von	donno bro	un f	fine to e	o area			
62.0 15	SS	S-6	4	100/4	4	>100	<u>*************************************</u>		S	AND, son	dense, bro ne fine to co g B-51 termi vith soil cutt	oarse inate	e gravel, ed at 14.	little silt	nd		
 57.0																	
37.0	Sa	ample Ty	Des						Consi	stency vs	Blowcount/I	Foot			Burmi	ister C	Classification
AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	er/Grab s fornia Sa	Sample sore S	V - Vac San S - Spli T - She P - Ged	nple t Spoor lby Tub	n ,	V. Loos Loose: M. Den	se: 0	<u>nular (</u> -4 D 10 V	(Sand) Dense: /. Dens	<u>:</u> 30-50	1		ined (Clav Stiff: V. Stiff: Hard:	8-15	a so li t	nd ome ttle race	35-50% 20-35% 10-20% <10% ensity, color
Revie	wed l	by:								Date:			Borin	g Numl	oer: B	-51	





Project Name: Rehabilitation of Weston Aqueduct Supply Main 3 Client: MWRA

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 390 Waverley Oaks Rd., Waltham, MA

Northing: 2966243.2130 Easting: 736227.419

GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Drilling Date: Start: 10/26/2017 **End:** 10/26/2017

Surface Elevation (ft.): 87.91

Total Depth (ft.): 14.5

Depth to Initial Water Level (ft):

Depth Date 5.2 10/26/2017 13:00

Abandonment Method: Backfilled with soil cuttings

									Logged By: A. Smith
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks
0							0.000		4" Asphalt
-	SS	S-1	18	26 32 100	11	>100			Moist, very dense, brown, fine to medium SAND, some fine gravel, little silt
-	ss	S-2	2	100/2"	2			_	Moist, very dense, brown, fine to coarse SAND, trace silt Analytical sample (2'-2.2')
<u>82.9</u> .	SS	S-3	12	42 76	5	>76		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND, little fine gravel, little silt Analytical sample (4'-5') Corrosion sample not obtained due
-	SS	S-4	9	53 100/3"	8	>100		S	Moist, very dense, brown, fine to coarse SAND, some fine gravel, little silt
77.9 10	SS	S-5	6	100/6"	5				Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt Weathered rock encountered at
10 - -	-							Weathered Rock	approximately 8.8' bgs.
-	SS	S-6	6	100/6"	5				Wet, very dense, brown, fine to coarse SAND
72.9 15									and fine to coarse GRAVEL, little silt Test boring B-52 terminated at 14.5' bgs and backfilled with soil cuttings.
67.9	Sa	ımple Ty	pes						Consistency vs Blowcount/Foot Burmister Classification
AS - Auge CS - Calif 3Q - 1.5" NQ - 2" R	ornia Sa Rock Co	impler ore S	V - Vac Sam SS - Spli T - She GP - Ged	iple t Spoor Iby Tub	ו אב	V. Loos Loose: M. Den	se: 0	-4 D	Sand): Fine Grained (Clay): and 35-50% some 20-35% ense: 30-50 V. Soft: <2 Stiff:
Revie	wed b	y:							Date: Boring Number: B-52

Sheet 1 of 1



Boring Number: B-53 (MW)

Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

 $\textbf{Drilling Contractor/Driller:} \ \ \text{GeoLogic - Earth Exploration, Inc. / M. Ferreira}$

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 450 Waverley Oaks Rd., Waltham, MA

Northing: 2966643.9120 Easting: 736978.095 Drilling Date: Start: 10/26/2017 End: 11/3/2017

Surface Elevation (ft.): 105.91

Total Depth (ft.): 11

Depth to Initial Water Level (ft):

Depth Date Time 6.0 11/3/2017 11:00

Abandonment Method: Backfilled with soil cuttings

J									Logged By: A. Smith	
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description	Remarks
0							0.000	_	4" Asphalt Pavement	
	SS	S-1	18	16 24 20	6	44		nd Gravel	Moist, dense, brown, fine to coarse SAND, trace fine gravel	
- -	SS	S-2	16	26 100 100/4"	16	>100		Sand and	Top 10": Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, some silt	
									Bottom 6": Moist, very dense, gray, fine to	
_	SS	S-3	3	100/3"	1	>100		X.	coarse SAND and fine to coarse GRAVEL,	Analytical sample
100.9 5 ▼								>	little silt Wet, very dense, gray, fine to coarse SAND, some fine gravel, trace silt	(2'-3.3')
· * -									See core log for description	
95.9 10	NX	C-1	60		45			Bedrock		
- - - 90.9 15									Test boring B-53 (MW) terminated at 11' bgs and converted into a monitoring well.	
85.9 AS - Auge CS - Calife BQ - 2" Ro	r/Grab S ornia Sa Rock Co	mpler ore	V - Vac San SS - Spli ST - She	nple t Spoor lby Tub	n ne	V. Loos Loose:	se: 0)-4 [·10 \	Sand): Fine Grained (Clay): ar so lense: 30-50 V. Soft: <2 Stiff: 8-15 lit Dense: >50 Soft: 2-4 V. Stiff: 15-30 tr	me 20-35% le 10-20% ace <10%
Revie	wed b		GP - Geo	phione					Date: Boring Number: B-	ure, density, color 53 (MW)

Sheet 1 of 1



Boring Number: B-53 (MW)

Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 450 Waverley Oaks Rd., Waltham, MA **Northing:** 2966643.9120 **Easting:** 736978.095

Drilling Date: Start: 10/26/2017 **End:** 11/3/2017

ROCK CORE ONLY GINT LOGS MWRA WASM 3 20180220.GPJ - 3/8/21

Surface Elevation (ft.): 105.91

Total Depth (ft.): 11

Depth to Initial Water Level (ft):

Depth Date Time
6.0 11/3/2017 11:00

Abandonment Method: Backfilled with soil cuttings

Elevation Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Down Press. (psi)	Graphic Log	Strata	Material Description	Remarks
10.0	NX	C-1	60	75	0	4.0 5.0 2.5 3.5		××× ××× ××× ××× ××× ××× ×××	Granite	Hard, slightly weathered, fine grained, gray GRANITE; primary joint set very close, extremely fractured	
										Test boring B-53 terminated at 11' bgs and converted into monitoring well.	
15.0 											
85.9 20.0											
80.9											

Bedding (mm)	Joint Spacing (mm)	Continuity (mm)	Attitude Angle	Aperture (mm)
Extremely Thin <20	Extremely Close <20 Very Close 20-60 Close 60-200 Mod Close 200-600 Wide 600-2000 Very Wide 2000-6000 Extremely Wide >6000	Extremely <25 Moderately 25-100 Slightly 100-200 Sound >200	Horizontal 0° - 5° Shallow 5° - 35° Moderate 35° - 55° Steep 55° - 85° Vertical 85° - 90°	Very Tight < 0.1 Tight 0.1 - 0.25 Partly Open 0.25 - 0.5 Open 0.5 - 2.5 Mod. Wide 2.5 - 10 Wide >10

<u>Field</u>	<u>Hardness</u>	<u>Weat</u>	thering		
Very Hard	Knife Can't Scratch	Fresh	No Visible sign of rock	material weathering; slight to no	discoloration.
Hard	Scratches with Difficulty	Slight	than its fresh condition.		al may be discoloredand may be weaker externally
Med. Hard	Scratches Readily	Moderate			or disintergrated to a soil. Fresh or discolored rock is
Medium	Grooves with Difficulty	Severe		tinuous framework or as coresto ck material is decomposed and	ones. /or disintegrated to a soil. Fresh or discolored rock is
Soft	Grooves Readily	0	present either as a conf	tinuous framework or as coresto	one.
Very Soft	Carves with Knife	Complete Residual Soil	All rock material is conv		o soil. The original mass structure is largely intact. Ire and material fabric are destroyed. There is a large y transported.
Reviewe	ed by:			Date:	Boring Number: B-53 (MW)





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller: GeoLogic - Earth Exploration, Inc. / M. Ferreira **Drilling Method/Casing/Core Barrel Size:** Drive and Wash / 3 in / NA

Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.

Bore Hole Location: 496 Waverley Oaks Rd., Waltham, MA

Northing: 2966867.4920 Easting: 737411.643

Drilling Date: Start: 10/24/2017 End: 10/24/2017

Surface Elevation (ft.): 96.15

Total Depth (ft.): 14.1

Depth to Initial Water Level (ft):

Depth Date Time 11.0 10/24/2017 10:35

Abandonment Method: Backfilled with soil cuttings

												Log	ged B	y : A. S	Smith				
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata			Ma	terial [Descr	iption				R	emarks
0									5	' Asphalt	Pave	ment							
	SS	S-1	18	40 32 16	6	48		≣.	N	oist, den	se, b	rown,		o coar	se SAI	ND,			
_	- ss	S-2	24	8 7 10 20	7	17	。 。) 。			oist, med AND, tra						arse	!	Analyt (2'-4')	tical sample
91.2	- ss	S-3	24	40 30 90 100	7	>100	。○ 。○ > >		G	oist, very RAVEL	and fi	ne to	coars	se SAN	ID, little	e silt			
	SS	S-4	3	100/3"	3			Sand and Gravel	M G	oist, very RAVEL	/ dens and fi	se, bro	own, coars	fine to se SAN	coarse ID, little	e e silt			
_ <u>86.2</u> _ <u>▼</u> .	SS	S-5	18	65 98 100	6	>100	· () · () · ()	Sa		oist, very RAVEL									
	SS S-6 1 100/1" 0							Weathered Rock		o recove		4.1		.1 -1 4	4 41 -			boulde weath	bit through er or ered rock 13 to 14'
81.2 15 15 15 16 17 18 17 18 18 18 18 18 18 18 18 18 18 18 18 18								3	b	est borin ackfilled	g B-5 with s	4 term oil cut	ninate	ed at 14	4.1' bg	s an	a	bgs.	
₹ <u>/6.2</u>		mnla Tu				Consistency vs Blowcount/Foot E							Dur	iotor C	localficatio				
76.2 AS - Auge CS - Calif BQ - 1.5" NQ - 2" R	er/Grab S fornia Sa Rock Co Rock Core	Sample Impler ore S	V - Vac Sam SS - Spli ST - She SP - Geo	nple t Spoor lby Tul	n	V. Loos Loose: M. Den	se: 0	nular 1-4 C 10 V	(Sand) Dense: /. Dens	30-50 e: >50	V			Stiff: V. Sti Hard	8-1 iff: 15- : >3	30	a s li mois	ome ittle trace sture, de	35-50% 20-35% 10-20% <10% ensity, color
Revie	weul	yy.								Date:				DUI	ng Nı	AIIID	ei. D	-54	





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

 $\textbf{Drilling Contractor/Driller:} \ \ \text{GeoLogic - Earth Exploration, Inc. / M. Ferreira}$

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Bore Hole Location: Beaver Brook Reservation, Waltham, MA

Northing: 2967033.9054 Easting: 737747.5134

Drilling Date: Start: 10/27/2017 End: 10/27/2017

Surface Elevation (ft.): 99.15

Total Depth (ft.): 13

Depth to Initial Water Level (ft):DepthDateTime5.810/27/201714:40

Abandonment Method: Backfilled with soil cuttings

			-,,						Logged By: A. Smith										
Elev. Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Blows per 6 inches	Sample Recovery (in)	N-Value	Graphic Log	Strata	Material Description Remarks										
0									4" Asphalt 14" Cobbles and Coarse Gravel										
 	SS	S-1	21	55 76 92 100/3"	12	>100		vel	Moist, very dense, gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt Analytical sample (2'-3.75')										
94.2 5 <u>¥</u>	SS	S-2	12	72 100	6	>100		Sand and Gravel	Moist, very dense, gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt Corrosion sample (4'-5') Rollerbit through										
- - -	SS	S-3	18	80 84 110	10	>100		San	Moist, very dense, gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt boulder from 5 to 6 ft bgs.										
 - <u>89.2</u> 10 -	NX	C-1	60		24			Weathered Rock	See core log for description										
 - <u>84.2</u> -	-								Test boring B-55 terminated at 13' bgs and backfilled with soil cuttings.										
 	-																		
79.2																			
AS - Auge CS - Califo BQ - 1.5" NQ - 2" Ro	er/Grab S ornia Sa Rock Co ock Core	impler Sore S	V - Vac San SS - Spli ST - She SP - Geo	nple t Spooi lby Tul	n ne	V. Loos Loose: M. Den	se: 0 4-	nular 1-4 C 10 V	Sand Fine Grained (Clay): and 35-50% some 20-35% little 10-20% trace < 10% M. Stiff: 4-8 Hard: >30 Soft	Revie	wed b	y:							Date: Boring Number: B-55





Client: MWRA Project Name: Rehabilitation of Weston Aqueduct Supply Main 3

Project Location: Massachusetts Project Number: 101038-102170

Drilling Contractor/Driller:GeoLogic - Earth Exploration, Inc. / M. Ferreira

Drilling Method/Casing/Core Barrel Size: Drive and Wash / 4 in / NA **Hammer Weight/Drop Height/ Spoon Size:** 140 lb / 30 in /2 in O.D.

Bore Hole Location: Beaver Brook Reservation, Waltham, MA

Northing: 2967033.9054 Easting: 737747.5134 Drilling Date: Start: 10/27/2017 End: 10/27/2017

ROCK CORE ONLY GINT LOGS MWRA WASM 3 20180220.GPJ - 5/18/23

Surface Elevation (ft.):99.15

Total Depth (ft.): 13

Depth to Initial Water Level (ft):

Depth Date Time 5.8 10/27/2017 14:40

Abandonment Method: Backfilled with soil cuttings

Elevation Depth (ft)	Sample Type	Sample Number	Sample Length (in)	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Down Press. (psi)	Graphic Log	Strata	Material Description	Remarks
- 89.2 10.0	NX	C-1	60	40	0	1.5 1.5 1.5 1.5		××× ××× ××× ××× ××× ××× ×××	GRANITE	Hard, extremely fractured, slightly weathered, gray, fine grained, GRANITE; primary joint set very close	
						1.5				Test boring B-55 terminated at 13' bgs and backfilled with soil cuttings.	
- <u>79.2</u> - <u>79.2</u> 											
- 74.2 - 25.0 											

Bedding (mm)		Joint Spacing (mm)		Continuity (mm)		Attitude Angle		Aperture (mm)	
Very Thin 2 Thin 6 Medium 20 Thick 60 Very Thick 200	<20 20-60 60-200 00-600 00-2000 00-6000 >6000	Extremely Close Very Close Close Mod Close Wide Very Wide Extremely Wide	<20 20-60 60-200 200-600 600-2000 2000-6000 >6000	Extremely Moderately Slightly Sound	<25 25-100 100-200 >200	Horizontal Shallow Moderate Steep Vertical	0° - 5° 5° - 35° 35° - 55° 55° - 85° 85° - 90°	Very Tight Tight Partly Open Open Mod. Wide Wide	< 0.1 0.1 - 0.25 0.25 - 0.5 0.5 - 2.5 2.5 - 10 >10

Field Hardness		Weathering						
Very Hard Hard	Knife Can't Scratch Scratches with Difficulty	Fresh Slight			light to no discoloration. ck material may be disco	oloredand may be weaker externally tha		
Med. Hard Medium	Scratches Readily Grooves with Difficulty	as corestones.	d to a soil. Fresh or discolored rock is					
Soft Very Soft	Grooves Readily Carves with Knife	s Readily present either as a continuous framework or as corestone.						
Reviewed by:			Date:	· , .	Number: B-55			