Appendix E
Boring Logs

Boring Number: B-18

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

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
87.9 0									4" Asphalt	
	SS	S-1	12	56 75	8	>75		Fill	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
	SS	S-2	18	85 48 100	16	>100		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND, little fine to coarse gravel, trace silt	
	SS	S-3	9	66 100/3"	5	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Analytical sample (4'-6')
82.9 5	SS	S-4	2	100/2"	2	--			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
77.9 10	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									Test boring B-18 terminated at 14' bgs and backfilled with soil cuttings.	
67.9										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-18**

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

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

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
82.0 0									3" Asphalt	
	SS	S-1	18	34 66 60	10	>100		Fill	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		Fill	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Analytical sample (2'-4')
77.0 5	SS	S-3	24	50 33 40 50	8	73		Fill	Moist, very dense, brown, fine to coarse SAND and fine GRAVEL, little silt	
	SS	S-4	6	100	4	--		Fill	Moist, very dense, brown, fine to coarse SAND and fine GRAVEL, little silt	Rollerbit from 6.5 to 9' bgs. Possible boulder or bedrock.
▼ 72.0 10	NX	C-1	60		40			Weathered Rock Bedrock	See core log for description	
67.0 15									Boring B-19 terminated at 14' bgs and backfilled with soil cuttings.	
62.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-19**

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

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

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

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 3:00 3:00		XXX	Granite	Hard, slightly weathered, fine grained, gray, GRANITE, very close jointing	
67.0 / 15.0										Test boring B-19 terminated at 14' bgs.	
62.0 / 20.0											
57.0 / 25.0											

Bedding (mm)

Extremely Thin	<20
Very Thin	20-60
Thin	60-200
Medium	200-600
Thick	600-2000
Very Thick	2000-6000
Extremely Thick	>6000

Joint Spacing (mm)

Extremely Close	<20
Very Close	20-60
Close	60-200
Mod Close	200-600
Wide	600-2000
Very Wide	2000-6000
Extremely Wide	>6000

Continuity (mm)

Extremely	<25
Moderately	25-100
Slightly	100-200
Sound	>200

Attitude Angle

Horizontal	0° - 5°
Shallow	5° - 35°
Moderate	35° - 55°
Steep	55° - 85°
Vertical	85° - 90°

Aperture (mm)

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

Field Hardness

Very Hard	Knife Can't Scratch
Hard	Scratches with Difficulty
Med. Hard	Scratches Readily
Medium	Grooves with Difficulty
Soft	Grooves Readily
Very Soft	Carves with Knife

Weathering

Fresh	No Visible sign of rock material weathering; slight to no discoloration.
Slight	Discoloration indicated weathering. All the rock material may be discoloredand may be weaker externally than its fresh condition.
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.
Severe	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestone.
Complete	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely intact.
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

Reviewed 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

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: 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):

Depth	Date	Time
4.1	12/13/2017	07:45

Abandonment Method: Monitoring well installed
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
77.0 0									Top 6": Moist, very dense, gray, fine to coarse SAND and fine to coarse GRAVEL, little silt	
	SS	S-1	24	46 55 44 36	18	99		Silty Sand	Bottom 12": Moist, very dense, brown to gray, fine SAND, little silt trace organic fibers	
	SS	S-2	24	55 40 28 33	24	68			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			Moist, very dense, brown, fine SAND, trace silt	Corrosion sample (4'-6')
	SS	S-4	24	14 80 76 80	12	>100		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt	
	SS	S-5	4	100/4"	4	--			Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt	
67.0 10								Weathered Rock		Rollerbit from 12 to 14' bgs. Possible boulder, weathered rock, or bedrock.
62.0 15									Test boring B-20 (MW) terminated at 14' bgs and backfilled with soil cuttings.	
57.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-20 (MW)**

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

Boring Number: B-21

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: 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):

Depth	Date	Time
12	12/15/2017	14:40

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
82.5 0	SS	S-1	9	100 100/3"	9	>100		Topsoil	48" Topsoil: Moist, very dense, dark brown, fine to coarse SAND, little fine gravel, little silt, trace organic fibers	Analytical sample (2'-4')
	SS	S-2	24	17 15 12 16	12	27			Moist, very dense, dark brown, fine to coarse SAND, little fine gravel, little silt, trace organic fibers	
77.5 5	SS	S-3	24	10 85 36 11	6	>100		Fill	Moist, very dense, dark brown, fine to medium SAND and fine to coarse GRAVEL, little silt, trace brick and mortar	
	SS	S-4	24	10 10 11 44	8	21			Moist, medium dense, dark brown, fine to medium SAND and fine to coarse GRAVEL, little silt, trace brick and mortar	
	SS	S-5	24	4 7 16 36	8	23			Moist, medium dense, dark brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace brick and mortar	
72.5 10 ▼								Sand and Gravel		
	SS	S-6	24	86 80 56 38	18	>100			Wet, very dense, brown, fine to coarse SAND, little fine to coarse gravel, trace silt	
67.5 15									Test boring B-21 terminated at 15' bgs and backfilled with soil cuttings.	
62.5										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-21**

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

Boring Number: 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):

Depth	Date	Time
7.8	12/13/2017	12:50

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
96.1 0	SS	S-1	24	26 80 82 78	18	>100		Fill	4" Topsoil Bottom 4": Moist, very dense, gray-brown, fine to medium SAND, some fine to coarse gravel, little silt	Analytical sample (2'-4')
	SS	S-2	6	100/6"	6	>100			Moist, very dense, gray-brown, fine to medium SAND, some fine to coarse gravel, little silt	
91.1 5	SS	S-3	18	76 80 100	12	>100		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, little silt	
	SS	S-4	3	100/3"	3	>100			Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt	
	SS	S-5	3	100/3"	1	>100		Weathered Rock	No Recovery	Fractured piece of coarse gravel in spoon tip. Rollerbit through boulder or weathered rock
86.1 10	NX	C-1	60		95	--		Bedrock	See core log for description	from 9.2 to 11.5' bgs.
81.1 15									Test boring B-22 terminated at 16.5' bgs and backfilled with soil cuttings.	
76.1										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-22**

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

Boring Number: 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):

Depth	Date	Time
7.8	12/13/2017	12:50

Abandonment Method: Backfilled with soil cuttings

Logged By: A. Smith

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
81.1 / 15.0	NX	C-1	60	95	50	1:30 1:30 1:30 1:30 1:30			Granodiorite	Hard, slightly weathered, fine grained, gray, GRANODIORITE; primary joint set very close, steep	
76.1 / 20.0										Test boring B-22 terminated at 16.5' bgs.	
71.1 / 25.0											
66.1 / 30.0											

Bedding (mm)

Extremely Thin	<20
Very Thin	20-60
Thin	60-200
Medium	200-600
Thick	600-2000
Very Thick	2000-6000
Extremely Thick	>6000

Joint Spacing (mm)

Extremely Close	<20
Very Close	20-60
Close	60-200
Mod Close	200-600
Wide	600-2000
Very Wide	2000-6000
Extremely Wide	>6000

Continuity (mm)

Extremely	<25
Moderately	25-100
Slightly	100-200
Sound	>200

Attitude Angle

Horizontal	0° - 5°
Shallow	5° - 35°
Moderate	35° - 55°
Steep	55° - 85°
Vertical	85° - 90°

Aperture (mm)

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

Field Hardness

Very Hard	Knife Can't Scratch
Hard	Scratches with Difficulty
Med. Hard	Scratches Readily
Medium	Grooves with Difficulty
Soft	Grooves Readily
Very Soft	Carves with Knife

Weathering

Fresh	No Visible sign of rock material weathering; slight to no discoloration.
Slight	Discoloration indicated weathering. All the rock material may be discoloredand may be weaker externally than its fresh condition.
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.
Severe	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestone.
Complete	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely intact.
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

Reviewed by: **Date:** **Boring Number: B-22**

Boring Number: B-24

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	Time
14.5	11/22/2017	11:00

Abandonment Method: Backfilled with soil cuttings
Logged By: D. Abt / 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
55.0 0									6" Asphalt 6" Cobble Stones	Vacuum excavate boring from the ground surface to 4.8' bgs.
	VE	V-1	6		--	--		Fill	Moist, brown, fine to coarse SAND, some silt, little fine gravel	Analytical sample (2'-2.5')
50.0 5	VE	V-2	6		--	--			Moist, brown, fine to coarse SAND, some silt, little fine gravel	~~Analytical sample~~ (4.5'-5') Rollerbit through boulder or cobbles from 4.8 to 8' bgs.
	SS	S-1	24	30 26 36 39	0	62		Sand and Gravel	No Recovery: 3" Spoon: Moist, very dense, brown, fine to medium SAND, some fine to coarse gravel, some silt	Corrosion sample (8'-10')
45.0 10										
▼ 40.0 15	SS	S-2	24	95 24 27 44	5	51			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
35.0 20	SS	S-3	24	79 72 63 88	6	>100			Wet, very dense, gray-brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt	
30.0									Test boring B-24 terminated at 21' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-24**

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

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

Surface Elevation (ft.): 49.64
Total Depth (ft.): 15
Depth to Initial Water Level (ft):

Depth	Date	Time
8.5	10/23/2017	10:00

Abandonment Method: Monitoring well installed
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
49.6 0									4" Asphalt	
	VE	V-1			--	--		Fill	Moist, dark brown, fine to coarse GRAVEL and fine to coarse SAND, little silt	Analytical sample (2'-2.5')
44.6 5	VE	V-2			--	--		Sand and Gravel	Moist, dark brown, fine to coarse SAND, some fine to coarse gravel, little silt	Analytical sample (4.5'-5')
	SS	S-1	24	32 15 8 100	5	23			Wet, medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt, trace organics	
▼	SS	S-2	24	19 10 8 20	2	18			Wet, medium dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt, trace wood	
39.6 10										
	SS	S-3	12	95 100	10	>100			Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
34.6 15									Test boring B-25 (MW) terminated at 15' bgs and converted into a monitoring well.	
29.6										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-25 (MW)**

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

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 / 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

Surface Elevation (ft.): 53.01
Total Depth (ft.): 15
Depth to Initial Water Level (ft):

Depth	Date	Time
8.0	10/12/2017	13:45

Abandonment Method: Backfiled 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
53.0 0								Fill	3" Asphalt	
	VE	V-1			--	--			Moist, brown, fine SAND and fine to coarse GRAVEL, little silt	Analytical sample (2'-2.5')
48.0 5	VE	V-2			--	--		Sand and Gravel	Moist, brown, fine to coarse SAND and fine GRAVEL, trace silt	Analytical sample (5.5'-6')
	SS	S-1	9	60 100/3"	9	>100			Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, little silt	
▼										
43.0 10	SS	S-2	9	90 100/3"	9	>100			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			Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, little silt	50/9" blow count with 300 lb hammer.
									Test boring B-26 terminated at 15' bgs and backfilled with soil cuttings.	
33.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-26**

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

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: 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		Sand and Gravel	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	Analytical sample (2'-4')
45.1 5	SS	S-3	10	80 100/4"	10	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Corrosion sample (4'-6')
▼	SS	S-4	3	100/3"	3	--			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Rollerbit through cobbles from 6.2 to 8' bgs.
	SS	S-5	4	100/4"	4	--			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
40.1 10										
35.1 15	SS	S-6	24	100/6" 14 14 15	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.
30.1									Test boring B-27 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-27**

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

Boring Number: 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: 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 Description	Remarks
54.8 0									3.5" Asphalt	
	SS	S-1	15	10 50 100/3"	8	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
	SS	S-2	18	70 82 100	9	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Analytical sample (2'-4')
49.8 5	SS	S-3	8	85 100/2"	6	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Analytical sample (4'-5') Rollerbit through boulder from 5 to 8' bgs.
44.8 10	SS	S-4	10	54 100/4"	9	>100		Sand and Gravel	Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
▼ 39.8 15	SS	S-5	24	56 62 54 60	5	>100			Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
34.8									Test boring B-28 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-28**

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

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 / 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	13:30

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
47.8 0									3.5" Asphalt	
	SS	S-1	18	34 42 22	12	64		Fill	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		Sand and Gravel	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')
▼	SS	S-4	3	100/3"	3	--			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
	SS	S-5	24	95 80 56 54	18	>100			Wet, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	
37.8 10										
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	
27.8									Test boring B-29 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-29**

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

Boring Number: B-30

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

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
44.9 0									5" Asphalt	Vacuum excavate boring from the ground surface to 6' bgs.
	VE	V-1			--	--		Fill	Moist, brown, fine SAND, trace silt	Analytical sample (3'-3.5')
39.9 5	VE	V-2			--	--		Sand and Gravel	Wet, brown, Clayey SILT and fine to coarse SAND, trace fine gravel	Analytical sample (5'-5.5')
	SS	S-1	14	42 80 100/2"	12	>100			Wet, very dense, gray, fine to medium SAND, some silt, trace fine gravel	
	SS	S-2	5	100/5"	5	--			Wet, very dense, gray-brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
34.9 10										
29.9 15	SS	S-3	24	72 38 52 58	9	90			Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
24.9									Test boring B-30 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Loose: 4-10 M. Dense: 10-30 Dense: 30-50 V. Dense: >50

Fine Grained (Clay):
V. Soft: <2 Soft: 2-4 M. Stiff: 4-8 Stiff: 8-15 V. Stiff: 15-30 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: **Date:** **Boring Number: B-30**

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

Boring Number: B-31

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: 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
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
51.7 0									8" Asphalt Pavement 6" Subbase: Dry, brown, fine to coarse SAND, some fine to coarse gravel, little silt	Vacuum excavate boring from the ground surface to 6' bgs.
	VE	V-1			--	--		Sand and Gravel	Moist, brown, SILT and fine to medium SAND, little coarse gravel	Analytical sample (2'-2.5')
46.7 5 ▼	SS	S-1	6	100/6"	6	--			Moist, very dense, brown, fine SAND, some silt, some fine to coarse gravel	Corrosion sample (8'-10')
41.7 10	SS	S-2	24	58 62 66 70	18	>100			Moist, very dense, brown, fine SAND, some silt, some fine to coarse gravel	
36.7 15	SS	S-3	9	80 100/3"	9	>100			Moist, very dense, brown, SILT and fine to medium SAND, trace fine gravel	
31.7 20	SS	S-4	10	95 100/4"	10	>100			Moist, very dense, gray, fine SAND, some silt, trace fine gravel Test boring B-31 terminated at 19.8' bgs and backfilled with soil cuttings.	
26.7										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-31**

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

Boring Number: B-32

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

Surface Elevation (ft.): 67.25

Total Depth (ft.): 16

Depth to Initial Water Level (ft):

Depth	Date	Time
NE	11/30/2017	13:30

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
67.3 0									36" Topsoil	
	VE	V-1	6		--	--				
62.3 5								Fill	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	--		Sand and Gravel	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			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
52.3 15	SS	S-3	24	14 90 48 60	9	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
47.3									Test boring B-32 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-32**

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

Boring Number: 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 / 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
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	Time
NE	10/17/2017	13:50

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
65.8 0									4" Asphalt	
	SS	S-1	18	36 36 52	8	88		Fill	Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, little silt	
	SS	S-2	24	38 96 64 70	15	>100		Sand and Gravel	Moist, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	Analytical sample (2'-4')
	SS	S-3	10	79 100/4"	10	>100			Moist, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	
60.8 5										
	SS	S-4	6	100/6"	6	>100			Moist, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	
	SS	S-5	18	54 76 100	10	>100			Moist, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	
55.8 10										
	SS	S-6	24	50 100 100 100	0	>100			Moist, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	
50.8 15									Test boring B-33 terminated at 16' bgs and backfilled with soil cuttings.	
45.8										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-33**

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

Boring Number: 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: 41 Central St./Cross St., Waltham, MA
Northing: 2962009.9284 **Easting:** 728929.5735
Drilling Date: Start: 10/17/2017 **End:** 10/17/2017

Surface Elevation (ft.): 65.67
Total Depth (ft.): 16
Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/17/2017	09:45

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
65.7 0									8" Asphalt	Vacuum excavate ~~boring from the~~ ground surface to 6' bgs.
	VE	V-1			--	--		Sand and Gravel	Moist, brown, fine to coarse SAND, some fine to coarse gravel, some silt	Analytical sample (2'-2.5')
60.7 5	VE	V-2			--	--			Moist, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
	SS	S-1	18	72 75 100	12	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Corrosion sample (6'-7.5')
	SS	S-2	18	45 66 100	14	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
55.7 10										
50.7 15	SS	S-3	24	80 90 100 100	13	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
45.7									Test boring B-34 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-34**

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

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 / 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

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
66.5 0									6" Asphalt	
	SS	S-1	18	60 40 34	12	74		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, little silt	
	SS	S-2	18	60 98 100	12	>100			Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Analytical sample (2'-3.5')
	SS	S-3	2	100/2"	1	--			Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
61.5 5	SS	S-4	9	66 100/3"	8	>100			Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Corrosion sample (6'-6.75')
	SS	S-5	4	100/4"	4	--			Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
56.5 10										
51.5 15	SS	S-6	24	40 45 38 28	18	83			No Recovery 3 in: Moist, very dense, brown-gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Drove 3" spoon.
46.5									Test boring B-35 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-35**

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

Boring Number: B-36

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	Time
NE	10/19/2017	14:00

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
66.1 0									4" Asphalt	
	SS	S-1	18	16 16 10	8	26		Fill	Moist, medium dense, gray, fine to coarse SAND, some fine gravel, trace silt	
	SS	S-2	24	8 4 5 5	12	9		Sand	Moist, loose, brown, fine to medium SAND, trace silt	Analytical sample (2'-4')
61.1 5	SS	S-3	24	5 3 11 21	14	14			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	
56.1 10	SS	S-5	24	54 46 42 46	5	88		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace to little silt	
51.1 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	
46.1									Test boring B-36 terminated at 15.3' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-36**

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

Boring Number: B-37

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: 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	Time
NE	10/18/2017	14:00

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
65.3 0								Fill	4" Asphalt Moist, brown, fine to coarse SAND, some fine to coarse gravel, little silt	~~Vacuum excavate~~ boring from the ground surface to 6' bgs.
	VE	V-1			--	--			Moist, brown, fine to medium SAND, little fine to coarse gravel, trace silt	Analytical sample (2'-2.5')
60.3 5	SS	S-1	24	34 36 32 26	3	68		Sand	Moist, very dense, gray to brown, fine to medium SAND, little fine gravel, trace silt	
	SS	S-2	24	24 18 22 20	10	40			Moist, dense, gray to brown, fine to medium SAND, little fine gravel, trace silt	
55.3 10								Sand and Gravel		
50.3 15	SS	S-3	24	60 60 55 86	8	>100			Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
45.3									Test boring B-37 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-37**

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

Boring Number: 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 / 3 in / NA
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
Bore Hole Location: 401 Main St., Waltham, MA
Northing: 2962860.4893 **Easting:** 730274.4037
Drilling Date: Start: 10/18/2017 **End:** 10/18/2017

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
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
57.7 0									8" Asphalt	Vacuum excavate ~~boring from the~~ ground surface to 6' bgs. Boulders and cobbles from 1 to 3' bgs.
								Fill	Dry, gray to brown, fine to coarse GRAVEL, some fine to coarse sand	
	VE	V-1			--	--		Sand	Moist, brown, fine to medium SAND, little fine to coarse gravel, trace silt	Analytical sample (3'-3.5')
52.7 5										
	SS	S-1	24	36 30 26 30	10	56			Wet, very dense, brown, fine to medium SAND, trace silt	Analytical sample (6'-8')
▼	SS	S-2	24	32 40 44 45	8	84		Sand and Gravel	Wet, very dense, brown, fine to coarse SAND, some fine gravel, trace silt	
47.7 10										
								Sandy Silt		
42.7 15	SS	S-3	24	22 30 34 40	16	64			Wet, hard, brown, SILT, trace fine to medium sand	
37.7									Test boring B-38 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-38**

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

Boring Number: B-39

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

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
51.0 0									5" Asphalt	
	SS	S-1	18	46 65 54	6	>100		Sand and Gravel	Moist, very dense, brown, fine to coarse SAND, some fine gravel, little silt	
	SS	S-2	24	32 25 22 14	3	47		Sand and Gravel	Moist, dense, brown, fine to coarse SAND, some fine gravel, little silt	Analytical sample (2'-4')
46.0 5	SS	S-3	24	12 6 6 6	14	12		Sand	Moist, medium dense, brown, fine to medium SAND, trace silt	
	SS	S-4	24	10 10 8 7	14	18		Sand	Moist, medium dense, brown, fine to medium SAND, trace silt	Corrosion sample (6'-8')
41.0 10 ▼	SS	S-5	24	4 8 5 6	12	13		Sand	Moist, medium dense, brown, fine to coarse SAND, little fine gravel, trace silt	
36.0 15	SS	S-6	24	12 12 15 18	8	27		Sandy Silt	Top 1": Moist, medium dense, brown, fine to medium SAND, trace silt Bottom 7": Wet, very stiff, brown, SILT, trace fine to medium sand	
31.0									Test boring B-39 terminated at 17' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-39**

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

Boring Number: B-40

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. / 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

Surface Elevation (ft.): 43.17

Total Depth (ft.): 21

Depth to Initial Water Level (ft):

Depth	Date	Time
5.2	1/11/2018	15:00

Abandonment Method: Backfilled with soil cuttings

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
43.2 0	SS	S-1	24	98 70 44 13	5	>100		Fill	2" Asphalt Dry, very dense, brown, fine to coarse SAND, trace silt	
	SS	S-2	24	18 14 10 14	4	24		Fill	Moist, medium dense, brown, fine to coarse SAND, trace fine gravel, trace silt	
38.2 5	SS	S-3	24	19 24 27 20	2	51		Sand and 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 Gravel	Wet, dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
	SS	S-5	24	26 15 11 22	8	26		Sandy Silt	Wet, very stiff, brown, SILT, little fine to medium sand, trace fine gravel	Analytical sample (8'-10')
33.2 10										
28.2 15	SS	S-6	24	23 25 27 22	18	52		Sandy Silt	Wet, hard, gray, SILT, trace fine sand	
23.2 20	SS	S-7	24	10 15 16 19	20	31		Sandy Silt	Moist, hard, gray, SILT, little fine sand	
18.2									Test boring B-40 terminated at 21' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-40**

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

Boring Number: 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: 127 Linden St., Waltham, MA
Northing: 2963681.2446 **Easting:** 731597.5608
Drilling Date: Start: 11/21/2017 **End:** 11/21/2017

Surface Elevation (ft.): 41.3
Total Depth (ft.): 16
Depth to Initial Water Level (ft):

Depth	Date	Time
4.1	11/21/2017	12:30

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
41.3 0								Fill	2" Topsoil Moist, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Vacuum excavate boring from the ground surface to 6' bgs.
	VE	V-1			--	--				Analytical sample (2'-2.5')
▼ 36.3 5								Sand and Gravel		
	VE	V-2			--	--			Wet, brown, fine to medium SAND, little silt, trace fine gravel	Analytical sample (5.5'-6')
	SS	S-1	24	16 17 17 16	12	34			Wet, dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	Corrosion sample (6'-8')
	SS	S-2	24	12 17 16 20	18	33		Silty Sand	Wet, dense, gray, fine to SAND, little silt	
31.3 10										
26.3 15	SS	S-3	24	7 8 9 8	16	17			Wet, medium dense, gray, fine SAND, trace silt	
21.3									Test boring B-41 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-41**

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

Boring Number: B-42

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

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
42.1 0								Sand and Gravel	2" Asphalt Bottom 6": Moist, gray, fine to coarse SAND and fine GRAVEL, little silt	Vacuum excavate boring from the ground surface to 6' bgs.
	VE	V-1			--	--			Moist, gray, fine to coarse SAND and fine GRAVEL, little silt	Analytical sample (3'-3.5')
37.1 5	SS	S-1	24	13 2 2 2	3	4		Silty Sand	Wet, soft, dark gray, Organic SILT	Silty Sand is a potentialy varved deposit.
	SS	S-2	24	2 2 10 15	12	12			Wet, stiff, dark gray, fine to medium SAND, some organic clayey silt, little fine gravel	Corrosion sample (8'-10')
32.1 10										
27.1 15	SS	S-3	24	16 16 18 16	15	34			Wet, dense, brown, SILT, trace fine sand	
22.1 20	SS	S-4	24	12 14 18 16	16	32			Wet, dense, brown, fine to medium SAND, trace silt	
17.1									Test boring B-42 terminated at 21' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-42**

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

Boring Number: B-43

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

Surface Elevation (ft.): 43.5
Total Depth (ft.): 16
Depth to Initial Water Level (ft):

Depth	Date	Time
5.3	10/26	14:10

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
43.5 0									Top 6": Topsoil	
	SS	S-1	24	3 4 5 6	12	9		Fill	Bottom 6": Moist, loose, brown, fine to coarse SAND, some fine gravel	
	SS	S-2	24	5 5 5 5	6	10		Silty Sand	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			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')
	SS	S-5	24	24 26 26 43	14	52		Silty Clay	Wet, hard, gray, Silty CLAY, trace fine to medium sand	PP = 2.5 tsf
33.5 10										
								Silty Sand		
28.5 15	SS	S-6	24	22 30 40 42	16	70			Wet, very dense, brown, fine SAND, little silt	
									Test boring B-43 terminated at 16' bgs and backfilled with soil cuttings.	
23.5										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-43**

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

Boring Number: B-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 / 4 in / NA
Hammer Weight/Drop Height/ Spoon Size: 140 lb / 30 in /2 in O.D.
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

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

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
45.7 0									12" Topsoil	Vacuum excavate boring from the ground surface to 6' bgs.
	VE	V-1			--	--		Sandy Silt	Moist, brown, SILT, little fine to medium sand, little fine to coarse gravel	Analytic Sample (2'-2.5')
40.7 5										
	SS	S-1	24	12 14 18 30	8	37		Sand and Gravel	Wet, dense, brown, fine to coarse SAND, some fine to coarse gravel, little silt	
	SS	S-2	24	14 5 6 5	6	11			Wet, medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
35.7 10										
	SS	S-3	24	7 9 14 13	14	23		Silty Clay	Wet, very stiff, gray, Silty CLAY	PP = 2.0, 2.5, and 3.0 tsf
30.7 15										
25.7									Test boring B-44 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-44**

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

Boring Number: 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 / 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

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
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
48.5 0									4" Topsoil: Moist, gray, fine to medium SAND	~~Vacuum excavate~~ boring from the ground surface to 6' bgs.
	VE	V-1			--	--			Moist, brown, SILT	Analytical sample (2'-2.5')
43.5 ▼										
	SS	S-1	24	14 14 6 7	0	20		Sandy Silt	No Recovery	
	SS	S-2	24	5 8 4 5	0	12			No Recovery 3" split spoon- fine to coarse SAND, some fine gravel, trace silt	
38.5 10	SS	S-3	24	13 4 7 11	8	11			Wet, stiff, brown, SILT, trace fine to medium sand	
								Silty Clay		
33.5 15	SS	S-4	24	13 14 7 16	16	21			Wet, very stiff, gray, CLAY & SILT, trace fine to medium sand	
28.5									Test boring B-45 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):
V. Loose: 0-4 Loose: 4-10 M. Dense: 10-30 Dense: 30-50 V. Dense: >50

Fine Grained (Clay):
V. Soft: <2 Soft: 2-4 M. Stiff: 4-8 Stiff: 8-15 V. Stiff: 15-30 Hard: >30

Burmister Classification

and 35-50%
some 20-35%
little 10-20%
trace <10%
moisture, density, color

Reviewed by: **Date:** **Boring Number: B-45**

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

Boring Number: B-46

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

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

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
56.9 0									12" Topsoil	Vacuum excavate boring from the ground surface to 6' bgs.
	VE	V-1			--	--		Sand and Gravel	Moist, brown, fine to medium SAND, some fine to coarse gravel, little silt	Analytical sample (2.5'-3')
51.9 5	SS	S-1	24	4 3 3 3	6	6			Wet, loose, gray, fine to coarse SAND, some fine to coarse gravel, trace silt	
46.9 10	SS	S-2	24	8 12 12 8	8	24		Sandy Silt	Wet, very 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, hard, gray, Silty CLAY	
36.9									Test boring B-46 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-46**

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

Boring Number: B-47

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: 191 Waverly Oaks Rd., Waltham, MA
Northing: 2964858.9158 **Easting:** 734327.5545
Drilling Date: Start: 11/2/2017 **End:** 11/2/2017

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
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
68.7 0									12" Topsoil	Vacuum excavate boring from the ground surface to 6' bgs.
	VE	V-1			--	--		Sand and Gravel	Moist, brown, fine to coarse GRAVEL and fine to coarse SAND, trace silt	Analytical sample (2'-2.5')
63.7 5	SS	S-1	24	46 98 66 56	12	>100			Moist, very dense, brown to gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
	SS	S-2	24	32 30 27 20	3	57			Moist, very dense, brown to gray, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
58.7 10 ▼										
53.7 15	SS	S-3	24	21 25 21 20	3	46			Wet, dense, brown to gray, fine to coarse SAND, little fine gravel, trace silt	
48.7									Test boring B-47 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-47**

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

Boring Number: B-48

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

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
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
62.2 0									Top 6": Topsoil	
	SS	S-1	24	8 9 10 12	9	19		Sand and Gravel	Bottom 3": Dry, medium dense, brown, SILT	
	SS	S-2	24	46 70 50 82	14	>100			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			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		Silty Sand	Moist, dense, brown, fine SAND, some silt	Corrosion sample (6'-8')
	SS	S-5	24	28 18 20 28	12	38			Moist, dense, brown, fine SAND, little silt	
52.2 10 ▼										
47.2 15	SS	S-6	24	18 17 19 12	8	36			Wet, dense, gray, fine SAND, little silt	
42.2									Test boring B-48 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-48**

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

Boring Number: B-49

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. / 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

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
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
59.2 0									9" Topsoil	Vacuum excavate boring from the ground surface to 6' bgs. Analytical sample (1.5'-2')
	VE	V-1			--	--		Sand and Gravel	Moist, brown, fine to coarse SAND, some fine to coarse gravel, trace silt	
54.2 5									Moist, brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt	
▼	SS	S-1	24	32 54 22 20	8	76			Wet, very dense, gray, fine to medium SAND, little silt, little fine gravel	Analytical sample (6'-8')
	SS	S-2	24	7 9 10 12	18	19			Wet, medium dense, brown, fine to medium SAND, trace silt	
49.2 10										
44.2 15	SS	S-3	24	5 6 6 6	6	12			No Recovery: 3" Spoon: Wet, medium dense, gray-brown, fine to medium SAND, little fine gravel, little silt	
39.2									Test boring B-49 terminated at 16' bgs and backfilled with soil cuttings.	

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-49**

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

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 / 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

Surface Elevation (ft.): 71.29

Total Depth (ft.): 15

Depth to Initial Water Level (ft):

Depth	Date	Time
NE	10/25/2017	13:40

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
71.3 0									3" Asphalt Pavement 9" Cobble Base	
	SS	S-1	9	80 100/3"	4	>100		Sand and Gravel	Wet, very dense, gray, fine to coarse SAND, some fine gravel, trace silt	
	SS	S-2	24	48 26 36 24	4	62			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, some silt	Analytical sample (2'-4')
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 sample (4'-6')
	SS	S-4	24	14 12 22 100	5	34			Moist, dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Corrosion sample (6'-8')
	SS	S-5	9	15 100/3"	4	>100			Moist, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
61.3 10										
	SS	S-6	12	85 100	8	>100			Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace silt	
56.3 15									Test boring B-50 terminated at 15' bgs and backfilled with soil cuttings.	
51.3										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-50**

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

Boring Number: B-51

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

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

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
77.0 0									3" Topsoil	
	SS	S-1	24	6 5 4 14	8	9		Sand and Gravel	Moist, loose, brown, fine to coarse SAND, some fine gravel, little silt	Analytical sample (0'-2')
	SS	S-2	3	100/3"	3	>100			Moist, very dense, gray, fine to coarse GRAVEL, some fine to coarse sand, trace silt	
72.0 5	SS	S-3	24	36 32 40 62	8	72			Wet, very dense, brown-gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt	Analytical sample (4'-6')
▼	SS	S-4	24	72 62 90 70	12	>100			Wet, very dense, brown-gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt	
67.0 10	SS	S-5	24	61 71 45 51	16	>100			Moist, very dense, brown, fine to coarse SAND, trace fine gravel, trace silt	
	SS	S-6	4	100/4"	4	>100			Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, little silt	
62.0 15									Test boring B-51 terminated at 14.4' bgs and backfilled with soil cuttings.	
57.0										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-51**

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

Boring Number: B-52

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: 390 Waverley Oaks Rd., Waltham, MA

Northing: 2966243.2130 **Easting:** 736227.419

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	Time
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
87.9 0									4" Asphalt	
	SS	S-1	18	26 32 100	11	>100		Sand and Gravel	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')
82.9 5	SS	S-3	12	42 76	5	>76			Moist, very dense, brown, fine to coarse SAND, little fine gravel, little silt	Analytical sample (4'-5') Corrosion sample not obtained due to boulder and low recovery.
	SS	S-4	9	53 100/3"	8	>100			Moist, very dense, brown, fine to coarse SAND, some fine gravel, little silt	
	SS	S-5	6	100/6"	5	--		Weathered Rock	Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	Weathered rock encountered at approximately 8.8' bgs.
77.9 10	SS	S-6	6	100/6"	5	--			Wet, very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little silt	
72.9 15									Test boring B-52 terminated at 14.5' bgs and backfilled with soil cuttings.	
67.9										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-52**

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

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

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
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
105.9 / 0									4" Asphalt Pavement	
	SS	S-1	18	16 24 20	6	44		Sand and Gravel	Moist, dense, brown, fine to coarse SAND, trace fine gravel	
	SS	S-2	16	26 100 100/4"	16	>100		Sand and Gravel	Top 10": Moist, very dense, brown, fine to coarse SAND, some fine to coarse gravel, some silt	
	SS	S-3	3	100/3"	1	>100		WR	Bottom 6": Moist, very dense, gray, fine to coarse SAND and fine to coarse GRAVEL, little silt	Analytical sample (2'-3.3')
100.9 / 5 ▼								WR	Wet, very dense, gray, fine to coarse SAND, some fine gravel, trace silt	
	NX	C-1	60		45	--		Bedrock	See core log for description	
95.9 / 10										
									Test boring B-53 (MW) terminated at 11' bgs and converted into a monitoring well.	
90.9 / 15										
85.9										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-53 (MW)**

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

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

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

Logged By: A. Smith

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
95.9 / 10.0	NX	C-1	60	75	0	4.0 5.0 2.5 3.5	NR	XXX	Granite	Hard, slightly weathered, fine grained, gray GRANITE; primary joint set very close, extremely fractured	
90.9 / 15.0										Test boring B-53 terminated at 11' bgs and converted into monitoring well.	
85.9 / 20.0											
80.9 / 25.0											

Bedding (mm)

Extremely Thin	<20
Very Thin	20-60
Thin	60-200
Medium	200-600
Thick	600-2000
Very Thick	2000-6000
Extremely Thick	>6000

Joint Spacing (mm)

Extremely Close	<20
Very Close	20-60
Close	60-200
Mod Close	200-600
Wide	600-2000
Very Wide	2000-6000
Extremely Wide	>6000

Continuity (mm)

Extremely	<25
Moderately	25-100
Slightly	100-200
Sound	>200

Attitude Angle

Horizontal	0° - 5°
Shallow	5° - 35°
Moderate	35° - 55°
Steep	55° - 85°
Vertical	85° - 90°

Aperture (mm)

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

Field Hardness

Very Hard	Knife Can't Scratch
Hard	Scratches with Difficulty
Med. Hard	Scratches Readily
Medium	Grooves with Difficulty
Soft	Grooves Readily
Very Soft	Carves with Knife

Weathering

Fresh	No Visible sign of rock material weathering; slight to no discoloration.
Slight	Discoloration indicated weathering. All the rock material may be discoloredand may be weaker externally than its fresh condition.
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.
Severe	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestone.
Complete	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely intact.
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

Reviewed by: **Date:** **Boring Number: B-53 (MW)**

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

Boring Number: B-54

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

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
96.2 0									5" Asphalt Pavement	
	SS	S-1	18	40 32 16	6	48		Fill	Moist, dense, brown, fine to coarse SAND, trace fine gravel, trace silt	
	SS	S-2	24	8 7 10 20	7	17		Sand and Gravel	Moist, medium dense, brown, fine to coarse SAND, trace fine gravel, trace silt	Analytical sample (2'-4')
91.2 5	SS	S-3	24	40 30 90 100	7	>100			Moist, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, little silt	
	SS	S-4	3	100/3"	3	--			Moist, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, little silt	
86.2 10	SS	S-5	18	65 98 100	6	>100			Moist, very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, little silt	
	SS	S-6	1	100/1"	0	>100		Weathered Rock	No recovery	Rollerbit through boulder or weathered rock from 13 to 14' bgs.
81.2 15									Test boring B-54 terminated at 14.1' bgs and backfilled with soil cuttings.	
76.2										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-54**

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

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

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
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
99.2 0									4" Asphalt 14" Cobbles and Coarse Gravel	
	SS	S-1	21	55 76 92 100/3"	12	>100		Sand and Gravel	Moist, very dense, gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt	Analytical sample (2'-3.75')
	SS	S-2	12	72 100	6	>100			Moist, very dense, gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt	Corrosion sample (4'-5') Rollerbit through boulder from 5 to 6 ft bgs.
94.2 5 ▼	SS	S-3	18	80 84 110	10	>100			Moist, very dense, gray, fine to coarse GRAVEL and fine to coarse SAND, trace silt	
89.2 10	NX	C-1	60		24	--		Weathered Rock	See core log for description	
84.2 15									Test boring B-55 terminated at 13' bgs and backfilled with soil cuttings.	
79.2										

Sample Types

AS - Auger/Grab Sample
CS - California Sampler
BQ - 1.5" Rock Core
NQ - 2" Rock Core
V - Vac Ex/Grab Sample
SS - Split Spoon
ST - Shelby Tube
GP - Geoprobe

Consistency vs Blowcount/Foot

Granular (Sand):

V. Loose:	0-4	Dense:	30-50
Loose:	4-10	V. Dense:	>50
M. Dense:	10-30		

Fine Grained (Clay):

V. Soft:	<2	Stiff:	8-15
Soft:	2-4	V. Stiff:	15-30
M. Stiff:	4-8	Hard:	>30

Burmister Classification

and	35-50%
some	20-35%
little	10-20%
trace	<10%

moisture, density, color

Reviewed by: **Date:** **Boring Number: B-55**

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

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

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

Logged By: A. Smith

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 1.5		XXX	GRANITE	Hard, extremely fractured, slightly weathered, gray, fine grained, GRANITE; primary joint set very close	
84.2 / 15.0										Test boring B-55 terminated at 13' bgs and backfilled with soil cuttings.	
79.2 / 20.0											
74.2 / 25.0											

Bedding (mm)

Extremely Thin	<20
Very Thin	20-60
Thin	60-200
Medium	200-600
Thick	600-2000
Very Thick	2000-6000
Extremely Thick	>6000

Joint Spacing (mm)

Extremely Close	<20
Very Close	20-60
Close	60-200
Mod Close	200-600
Wide	600-2000
Very Wide	2000-6000
Extremely Wide	>6000

Continuity (mm)

Extremely	<25
Moderately	25-100
Slightly	100-200
Sound	>200

Attitude Angle

Horizontal	0° - 5°
Shallow	5° - 35°
Moderate	35° - 55°
Steep	55° - 85°
Vertical	85° - 90°

Aperture (mm)

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

Field Hardness

Very Hard	Knife Can't Scratch
Hard	Scratches with Difficulty
Med. Hard	Scratches Readily
Medium	Grooves with Difficulty
Soft	Grooves Readily
Very Soft	Carves with Knife

Weathering

Fresh	No Visible sign of rock material weathering; slight to no discoloration.
Slight	Discoloration indicated weathering. All the rock material may be discoloredand may be weaker externally than its fresh condition.
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.
Severe	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestone.
Complete	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely intact.
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

Reviewed by: **Date:** **Boring Number: B-55**