WELL CONSTRUCTION SUMMARY

Well No. MW-11

PROJECT 450 Union Street	**PROJECT NO.** 170301202
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 10.74 (NAVD 88)
DRILLING AGENCY Eastern Environmental	**DATE STARTED** 2/11/2016 **DATE FINISHED** 2/11/2016
DRILLING EQUIPMENT Geoprobe® 7822DT Track-Mounted Drill Rig	**DRILLER** Eddie Gallo
SIZE AND TYPE OF BIT 4-inch OD, 4-foot long steel macrocore	**INSPECTOR** Adam Goldberg

METHOD OF INSTALLATION

Eastern Environmental drilled through an approx. 6" asphalt slab at boring location. Two-inch diameter boring SB11 was continuously sampled to 16 feet below grade. Eastern then advanced a four-inch anchored macrocore to 14 feet bgs to install 2-inch I.D. schedule 40 PVC well. The annulus above the well screen was filled with #2 filter sand to approx 3 feet below surface grade and hydrated bentonite was installed from 3 feet to 1 feet below grade surface. Soil cuttings and clean sand were then used as backfill to 1 foot bgs and grout was installed from 0.5 to 1 foot bgs. The well was completed with a flush-mounted 4-inch diameter road box and set in cement.

METHOD OF WELL DEVELOPMENT

Monsoon pump with dedicated tubing was used to develop the well.

TYPE OF CASING PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF BACKFILL MATERIAL** Soil Cuttings/Clean Sand	
TYPE OF SCREEN 0.020-inch slotted PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF SEAL MATERIAL** Hydrated 30-50 mesh bentonite chip	
BOREHOLE DIAMETER 4 inches		**TYPE OF FILTER MATERIAL** #2 Sand	

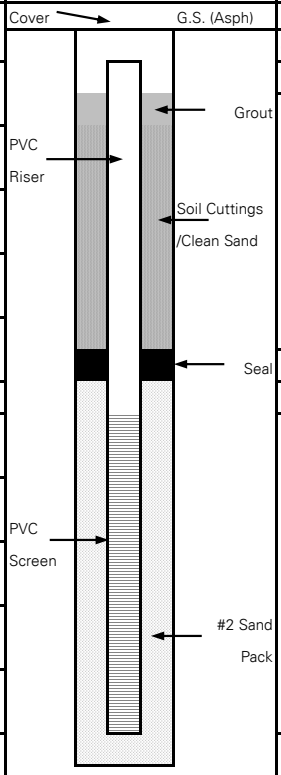
	ELEVATION	DEPTH (ft)
TOP OF CASING	~10.24	~0.5
TOP OF SEAL	9.74	1
TOP OF FILTER	7.74	3
TOP OF SCREEN	6.74	4
BOTTOM OF BORING	-3.26	14

SCREEN LENGTH: 10 ft

SLOT SIZE: 0.02 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
3.59	3/9/2016	7.15



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Concrete to about 0.2 ft	0.5
	1.0
Historic fill to about 15 ft	1.0
	3.0
	4.0
Native soil below about 15 ft	14.0

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WELL CONSTRUCTION SUMMARY

Well No. MW12

PROJECT 450 Union Street	**PROJECT NO.** 170301202
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 11.77 (NAVD 88)
DRILLING AGENCY Eastern Environmental	**DATE STARTED** 2/16/2016 **DATE FINISHED** 2/16/2016
DRILLING EQUIPMENT Geoprobe® 540B Portable Dingo Rig	**DRILLER** Eddie Gallo
SIZE AND TYPE OF BIT 4-inch OD, 4-foot long steel macrocore	**INSPECTOR** Adam Goldberg

METHOD OF INSTALLATION

Eastern Environmental drilled through an approx. 6" concrete slab at boring location. Two-inch diameter boring SB12 was continuously sampled to 16 feet below grade. Eastern then advanced a four-inch anchored macrocore to 15 feet bgs to install 1-inch I.D. schedule 40 PVC well. The annulus above the well screen was filled with #2 filter sand to approx 4 feet below surface grade and hydrated bentonite was installed from 4 feet to 2 feet below grade surface. Soil cuttings and clean sand were then used as backfill to 1 foot bgs and grout was installed from 0.5 to 1 foot bgs. The well was completed with a flush-mounted 4-inch diameter road box and set in cement.

METHOD OF WELL DEVELOPMENT

Monsoon pump with dedicated tubing was used to develop the well.

TYPE OF CASING PVC Sch 40	**DIAMETER** 1-in ID	**TYPE OF BACKFILL MATERIAL** Soil Cuttings/Clean Sand	
TYPE OF SCREEN 0.020-inch slotted PVC Sch 40	**DIAMETER** 1-in ID	**TYPE OF SEAL MATERIAL** Hydrated 30-50 mesh bentonite chip	
BOREHOLE DIAMETER 4 inches		**TYPE OF FILTER MATERIAL** #2 Sand	

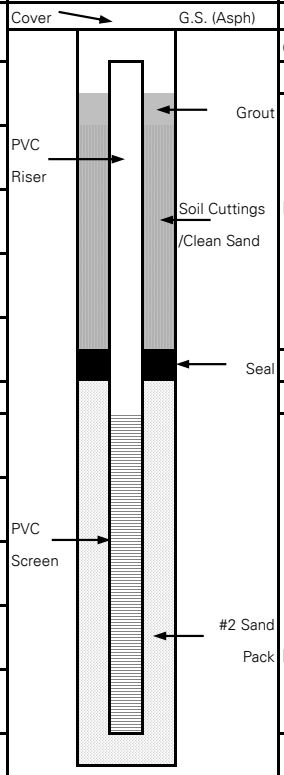
	ELEVATION	DEPTH (ft)
TOP OF CASING	11.27	~0.5
TOP OF SEAL	9.77	2
TOP OF FILTER	7.77	4
TOP OF SCREEN	6.77	5
BOTTOM OF BORING	-3.23	15

SCREEN LENGTH: 10 ft

SLOT SIZE: 0.02 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
3.82	3/9/2016	7.95



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Concrete to about 0.2 ft	0.5
	1.0
Historic fill to about 15 ft	2.0
	4.0
	5.0
Native soil below about 15 ft	15.0

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WELL CONSTRUCTION SUMMARY

Well No. MW14

PROJECT 450 Union Street	**PROJECT NO.** 170301202
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 12.10 (NAVD 88)
DRILLING AGENCY Eastern Environmental	**DATE STARTED** 2/11/2016 **DATE FINISHED** 2/11/2016
DRILLING EQUIPMENT Geoprobe® 7822DT Track-Mounted Drill Rig	**DRILLER** Eddie Gallo
SIZE AND TYPE OF BIT 4-inch OD, 4-foot long steel macrocore	**INSPECTOR** Adam Goldberg

METHOD OF INSTALLATION

Eastern Environmental drilled through an approx. 6" asphalt slab at boring location. Two-inch diameter boring SB14 was continuously sampled to 16 feet below grade. Eastern then advanced a four-inch anchored macrocore to 14 feet bgs to install 2-inch I.D. schedule 40 PVC well. The annulus above the well screen was filled with #2 filter sand to approx 5 feet below surface grade and hydrated bentonite was installed from 5 feet to 3 feet below grade surface. Soil cuttings and clean sand were then used as backfill to 1 foot bgs and grout was installed from 0.5 to 1 foot bgs. The well was completed with a flush-mounted 4-inch diameter road box and set in cement.

METHOD OF WELL DEVELOPMENT

Monsoon pump with dedicated tubing was used to develop the well.

TYPE OF CASING PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF BACKFILL MATERIAL** Soil Cuttings/Clean Sand
TYPE OF SCREEN 0.020-inch slotted PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF SEAL MATERIAL** Hydrated 30-50 mesh bentonite chip
BOREHOLE DIAMETER 4 inches		**TYPE OF FILTER MATERIAL** #2 Sand

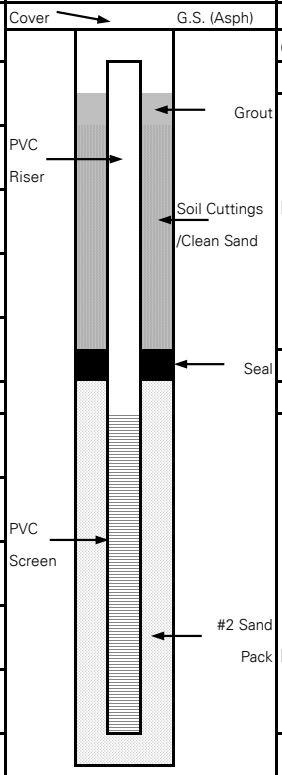
	ELEVATION	DEPTH (ft)
TOP OF CASING	12.05	~0.5
TOP OF SEAL	9.1	3
TOP OF FILTER	7.1	5
TOP OF SCREEN	6.1	6
BOTTOM OF BORING	-3.9	16

SCREEN LENGTH: 10 ft

SLOT SIZE: 0.02 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
3.70	3/9/2016	8.40



WELL DETAILS	SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
	Concrete to about 0.2 ft	0.5
		1.0
Grout	Historic fill to about 15 ft	
PVC Riser		
Soil Cuttings /Clean Sand		3.0
Seal		5.0
		6.0
PVC Screen		
#2 Sand Pack	Native soil below about 15 ft	
		16.0

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WELL CONSTRUCTION SUMMARY

Well No. MW15

PROJECT 450 Union Street	**PROJECT NO.** 170301202
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 12.18 (NAVD 88)
DRILLING AGENCY Eastern Environmental	**DATE STARTED** 2/11/2016 **DATE FINISHED** 2/12/2016
DRILLING EQUIPMENT Geoprobe® 7822DT Track-Mounted Drill Rig	**DRILLER** Eddie Gallo
SIZE AND TYPE OF BIT 4-inch OD, 4-foot long steel macrocore	**INSPECTOR** Adam Goldberg

METHOD OF INSTALLATION

Eastern Environmental drilled through an approx. 6" asphalt slab at boring location. Two-inch diameter boring SB15 was continuously sampled to 16 feet below grade. Eastern then advanced a four-inch anchored macrocore to 14 feet bgs to install 2-inch I.D. schedule 40 PVC well. The annulus above the well screen was filled with #2 filter sand to approx 3 feet below surface grade and hydrated bentonite was installed from 3 feet to 1 feet below grade surface. Soil cuttings and clean sand were then used as backfill to 1 foot bgs and grout was installed from 0.5 to 1 foot bgs. The well was completed with a flush-mounted 4-inch diameter road box and set in cement.

METHOD OF WELL DEVELOPMENT

Monsoon pump with dedicated tubing was used to develop the well.

TYPE OF CASING PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF BACKFILL MATERIAL** Soil Cuttings/Clean Sand	
TYPE OF SCREEN 0.020-inch slotted PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF SEAL MATERIAL** Hydrated 30-50 mesh bentonite chip	
BOREHOLE DIAMETER 4 inches		**TYPE OF FILTER MATERIAL** #2 Sand	

	ELEVATION	DEPTH (ft)
TOP OF CASING	11.68	~0.5
TOP OF SEAL	11.18	1
TOP OF FILTER	9.18	3
TOP OF SCREEN	8.18	4
BOTTOM OF BORING	1.82	14

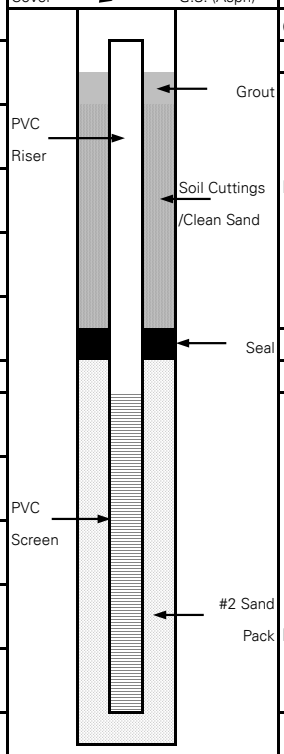
SCREEN LENGTH: 10 ft

SLOT SIZE: 0.02 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
3.63	3/9/2016	8.55

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Concrete to about 0.2 ft	0.5
	1.0
Historic fill to about 15 ft	1.0
	3.0
	4.0
Native soil below about 15 ft	14.0

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WELL CONSTRUCTION SUMMARY

Well No. MW16

PROJECT 450 Union Street	**PROJECT NO.** 170301202
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 12.04 (NAVD 88)
DRILLING AGENCY Eastern Environmental	**DATE STARTED** 2/11/2016 **DATE FINISHED** 2/11/2016
DRILLING EQUIPMENT Geoprobe® 7822DT Track-Mounted Drill Rig	**DRILLER** Eddie Gallo
SIZE AND TYPE OF BIT 4-inch OD, 4-foot long steel macrocore	**INSPECTOR** Adam Goldberg

METHOD OF INSTALLATION

Eastern Environmental drilled through an approx. 6" asphalt slab at boring location. Two-inch diameter boring SB16 was continuously sampled to 16 feet below grade. Eastern then advanced a four-inch anchored macrocore to 16 feet bgs to install 2-inch I.D. schedule 40 PVC well. The annulus above the well screen was filled with #2 filter sand to approx 5 feet below surface grade and hydrated bentonite was installed from 5 feet to 3 feet below grade surface. Soil cuttings and clean sand were then used as backfill to 1 foot bgs and grout was installed from 0.5 to 1 foot bgs. The well was completed with a flush-mounted 4-inch diameter road box and set in cement.

METHOD OF WELL DEVELOPMENT

Monsoon pump with dedicated tubing was used to develop the well.

TYPE OF CASING PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF BACKFILL MATERIAL** Soil Cuttings/Clean Sand
TYPE OF SCREEN 0.020-inch slotted PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF SEAL MATERIAL** Hydrated 30-50 mesh bentonite chip
BOREHOLE DIAMETER 4 inches		**TYPE OF FILTER MATERIAL** #2 Sand

	ELEVATION	DEPTH (ft)
TOP OF CASING	11.54	~0.5
TOP OF SEAL	9.04	3
TOP OF FILTER	7.04	5
TOP OF SCREEN	6.04	6
BOTTOM OF BORING	-3.96	16

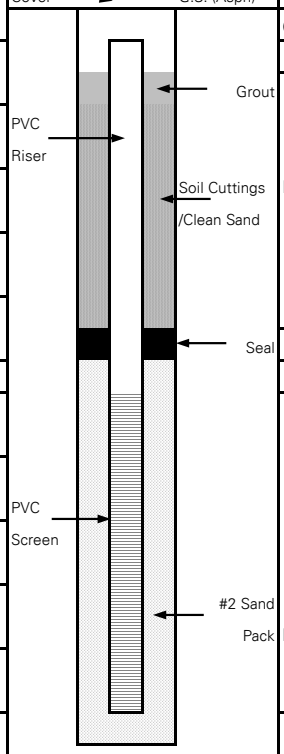
SCREEN LENGTH: 10 ft

SLOT SIZE: 0.02 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
3.84	3/9/2016	8.20

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Concrete to about 0.2 ft	0.5
	1.0
Historic fill to about 15 ft	3.0
	5.0
	6.0
Native soil below about 15 ft	16.0

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WELL CONSTRUCTION SUMMARY

Well No. MW17

PROJECT 450 Union Street	**PROJECT NO.** 170301202
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 11.88 (NAVD 88)
DRILLING AGENCY Eastern Environmental	**DATE STARTED** 2/11/2016 **DATE FINISHED** 2/11/2016
DRILLING EQUIPMENT Geoprobe® 7822DT Track-Mounted Drill Rig	**DRILLER** Eddie Gallo
SIZE AND TYPE OF BIT 4-inch OD, 4-foot long steel macrocore	**INSPECTOR** Adam Goldberg

METHOD OF INSTALLATION

Eastern Environmental drilled through an approx. 6" concrete slab at boring location. Two-inch diameter boring SB17 was continuously sampled to 16 feet below grade. Eastern then advanced a four-inch anchored macrocore to 17 feet bgs to install 2-inch I.D. schedule 40 PVC well. The annulus above the well screen was filled with #2 filter sand to approx 6 feet below surface grade and hydrated bentonite was installed from 6 feet to 4 feet below grade surface. Soil cuttings and clean sand were then used as backfill to 1 foot bgs and grout was installed from 0.5 to 1 foot bgs. The well was completed with a flush-mounted 4-inch diameter road box and set in cement.

METHOD OF WELL DEVELOPMENT

Monsoon pump with dedicated tubing was used to develop the well.

TYPE OF CASING PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF BACKFILL MATERIAL** Soil Cuttings/Clean Sand	
TYPE OF SCREEN 0.020-inch slotted PVC Sch 40	**DIAMETER** 2-in ID	**TYPE OF SEAL MATERIAL** Hydrated 30-50 mesh bentonite chip	
BOREHOLE DIAMETER 4 inches		**TYPE OF FILTER MATERIAL** #2 Sand	

	ELEVATION	DEPTH (ft)
TOP OF CASING	11.38	~0.5
TOP OF SEAL	7.88	4
TOP OF FILTER	5.88	6
TOP OF SCREEN	4.88	7
BOTTOM OF BORING	-5.12	17

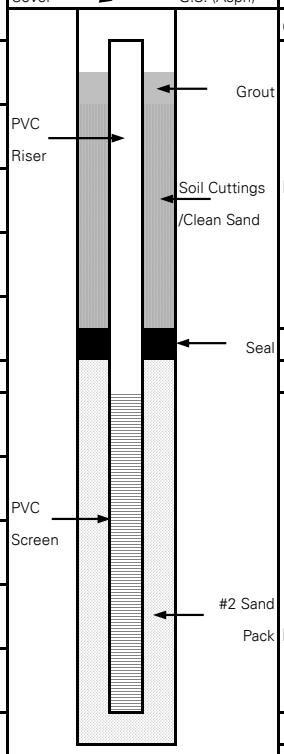
SCREEN LENGTH: 10 ft

SLOT SIZE: 0.02 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
3.93	3/9/2016	7.95

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Concrete to about 0.2 ft	0.5
	1.0
Historic fill to about 15 ft	
	4.0
	6.0
	7.0
Native soil below about 15 ft	
	17.0

LANGAN Engineering and Environmental Services, Inc.
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WELL CONSTRUCTION SUMMARY

Well No. RW01

PROJECT 450 Union Street	**PROJECT NO.** 170301202
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** ± 12.5 feet NAVD 88
DRILLING AGENCY Aquifer Drilling & Testing Company Inc	**DATE STARTED** 8/1/2016 **DATE FINISHED** 8/2/2016
DRILLING EQUIPMENT Truck Mounted CME 45 Rig	**DRILLER** Matt
SIZE AND TYPE OF BIT 3 7/8" Tricone Roller Bit	**INSPECTOR** Woo Kim / Kelvin Liu

METHOD OF INSTALLATION

Advanced 4-inch ID casing to 52 feet and cleaned borehole. Well was set at 52 feet with a 2-foot sump, 10 feet of screen (40-50 feet bgs), and 40 feet of PVC riser pipe. No. 3 silica sand was placed in annulus to about 2 feet above screen, followed by 2 feet of bentonite pellets. The bentonite pellets were allowed to hydrate before backfilling with grout above the bentonite seal to 6 inches below the surface. Steel casing was pulled and a permanent flush-mounted, bolt-down manhole was installed.

METHOD OF WELL DEVELOPMENT

A minimum of three well-volumes was purged, until the effluent contained a limited amount of sediment. Purge water was containerized into UN/DOT-approved 55-gallon drums and staged on site for removal.

TYPE OF CASING Flush Joint Steel	**DIAMETER** 4"	**TYPE OF BACKFILL MATERIAL** Grout	
TYPE OF SCREEN Slotted PVC	**DIAMETER** 2"	**TYPE OF SEAL MATERIAL** Bentonite	
BOREHOLE DIAMETER 2"		**TYPE OF FILTER MATERIAL** No. 3 Silica Sand	

TOP OF CASING	**ELEVATION** 12.5	**DEPTH (ft)** 0
TOP OF SEAL	**ELEVATION** -23.5	**DEPTH (ft)** 36
TOP OF FILTER	**ELEVATION** -25.5	**DEPTH (ft)** 38
TOP OF SCREEN	**ELEVATION** -27.5	**DEPTH (ft)** 40
BOTTOM OF BORING	**ELEVATION** -39.5	**DEPTH (ft)** 52
SCREEN LENGTH (FT) 10		
SLOT SIZE (INCH) 0.2		

GROUNDWATER ELEVATIONS

ELEVATION	**DATE**	**DEPTH TO WATER**
ELEVATION	**DATE**	**DEPTH TO WATER**
ELEVATION	**DATE**	**DEPTH TO WATER**
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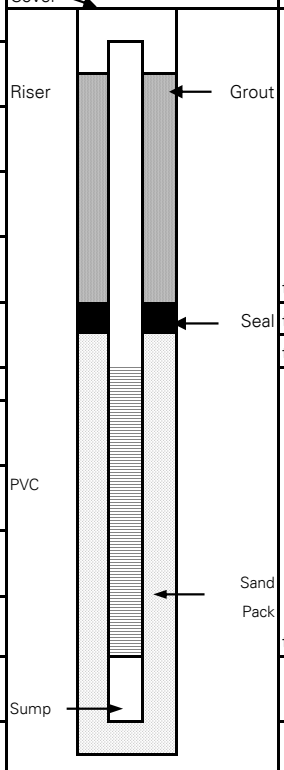

SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Ground Surface	0.0
top of seal	36.0
top of filter	38.0
top of screen	40.0
top of sump	50'
	52'

LANGAN Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.

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