MORETRENCH

51 Smart Avenue
Yonkers, NY 10704
Tel (914) 423-1331
Fax (914) 423-0913

April 25, 2013

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B, 12th Floor
625 Broadway
Albany, NY 12233-7016
Phone: 518-402-9768
Fax : 518-402-9773

Attention: Ronnie Lee

Reference: SPDES Equivalent Permit - Dewatering
626 First Ave – New York, NY
Former Kips Bay Fuel Terminal
Site No : C231014

Dear Mr. Lee,

We have been contracted by JDS Development for the installation of a dewatering system to facilitate the construction of a new multi-story building located at 626 First Avenue in New York, NY. We are herein submitting to you all of the pertinent information to obtain the necessary SPDES Equivalent Permit for this project.

SUBMITTED ITEMS:

1. Authorization Letter
2. System Detail Sheet
3. Site Plans and Maps
4. USGS Map
5. Groundwater Analysis
6. Treatment System Submittal
7. Typical Wellpoint Cross-section
8. Geotechnical Evaluation
9. Previous SPDES Equivalent Permit for PS281

MORETRENCH

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Yonkers, NY 10704
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SUMMARY OF JOB INFORMATION:

Excavation will take place for the construction of new multi-story building located at 626 First Ave in New York, NY. Sumping operations and a wellpoint system (if required) will be used to support the excavation. Steel sheeting and a secant pile wall shall be installed around the perimeter of the excavation down to rock, creating a cutoff to minimize the amount of groundwater infiltration.

The groundwater located approximately 8'-10' below grade, shall be discharged for a period of one year at a maximum discharge rate of 600 GPM = 864,000 GPD = 115,508 CFD = 1.33 CFS. The groundwater shall first pass through a treatment system and flowmeter before emptying into the existing 4'x2'4" Storm Sewer located on East 35th Street between the FDR Service Road and First Avenue. The 4'x2'4" storm sewer empties into the East River.

The project site is located at 626 First Avenue in New York, NY 10016. The NYC Department Of Buildings has recently changed the project address from 616 First Avenue to 626 First Avenue.

The project site is located on the former Kips Bay Fuel Terminal site and adjacent to the newly constructed PS281 School building which was covered under a NYSDEC SPDES Equivalent Permit issued by the NYSDEC in January 2011 (enclosed).

If you have any questions do not hesitate to contact us at (914) 423-1331.

Very truly yours,
MORETRENCH AMERICAN CORPORATION

Joseph Mahon

Enclosures

JDS DEVELOPMENT GROUP

March 19, 2013

Moretrench American Corporation
51 Smart Avenue
Yonkers, NY 10704

Re: 616 First Avenue LLC
626 1st Avenue
New York, NY 10016

Dear Moretrench American Corp.,

Kindly let this letter serve as authorization to file and obtain the proper DEP/DEC permits for dewatering the site for the above referenced project.

Please contact the undersigned with any questions.

Very truly yours,

JDS Development Group

Sean Gavigan
Project Director

Cc: Michael Stern - JDS
Simon Koster -JDS

104 Fifth Avenue
New York, New York 10011

JDS DEVELOPMENT GROUP

Special Indemnity Agreement
For Temporary Groundwater Discharge in the City Sewer System

March 19, 2013

Commissioner
Department of Environmental Protection
59-17 Junction Boulevard
Corona, NY 11368

Re: Dewatering Permit
616 First Avenue LLC
626 1st Avenue
New York, NY 10016

Dear Commissioner:

616 First Avenue LLC hereby agrees to indemnify and to save harmless, to the fullest extent permitted by law, the City of New York, the New York City Department of Environmental Protection (hereinafter referred to as the "City") and their respective offices, representatives, agencies, contractors, servants, and employees from and against any and all claims, suits, actions, proceedings, and losses that may arise after the date of this agreement from the construction, maintenance, operation, or use of any sewer connection (direct or indirect) to the City Sewer System for the purpose of dewatering.

In addition it is noted that the City is held harmless due to any harmful side effects of lowering the Water Table as but not limited to impact of drawdown on the perimeter of the site, salt water intrusion, movement of contaminated groundwater, backflow due to surcharge of outlet sewer and effects on any wetlands.

Very truly yours,

JDS Development Group

Sean Gavigan
Project Director

Notary Public State of New York
County of Queens
Daniel Asher Stern
Reg. 01ST6144249
Commission Expires 4/24/2014

3/19/13

Cc: Michael Stern - JDS
Simon Koster -JDS

104 Fifth Avenue
New York, New York 10011

Region 2 Long Island Well Dewatering System Detail Sheet

1. **PROJECT DESCRIPTION** - Temporary dewatering for the construction of a new multi-story building.

2. **PROPOSED DEWATERING SYSTEM** (Complete all items)

a.	Number of wellpoints	150
b.	Diameter of wellpoints	1 1/2"
c.	Spacing of wellpoints	7'
d.	Length of screen	3'-5'
e.	Depth to bottom of screen	40'
f.	Number of pumps	(1) and 1 on stand by
g.	Capacity of pumps	30 HP
h.	Static water level	0
i.	Drawdown required	25'
j.	Duration of dewatering	1 Year
k.	Radius of Influence	200'
l.	Maximum daily pumpage	600 GPM
m.	Estimated daily pumpage	200 GPM

3. **PROPOSED POINT OF DISCHARGE** (Show on site plan and check one of the following)

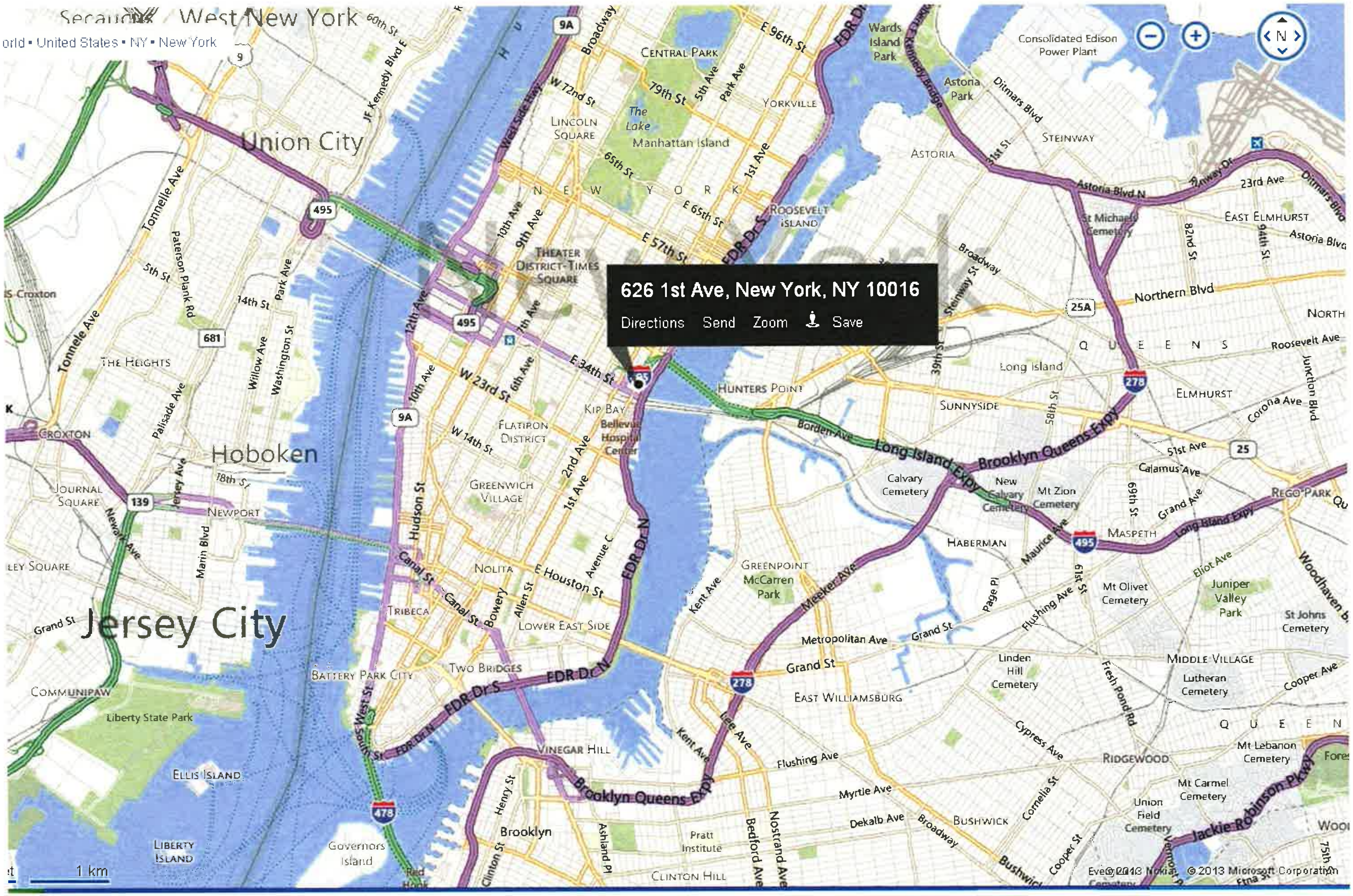
Surface Water ☐ if checked, provide name of body of water _____

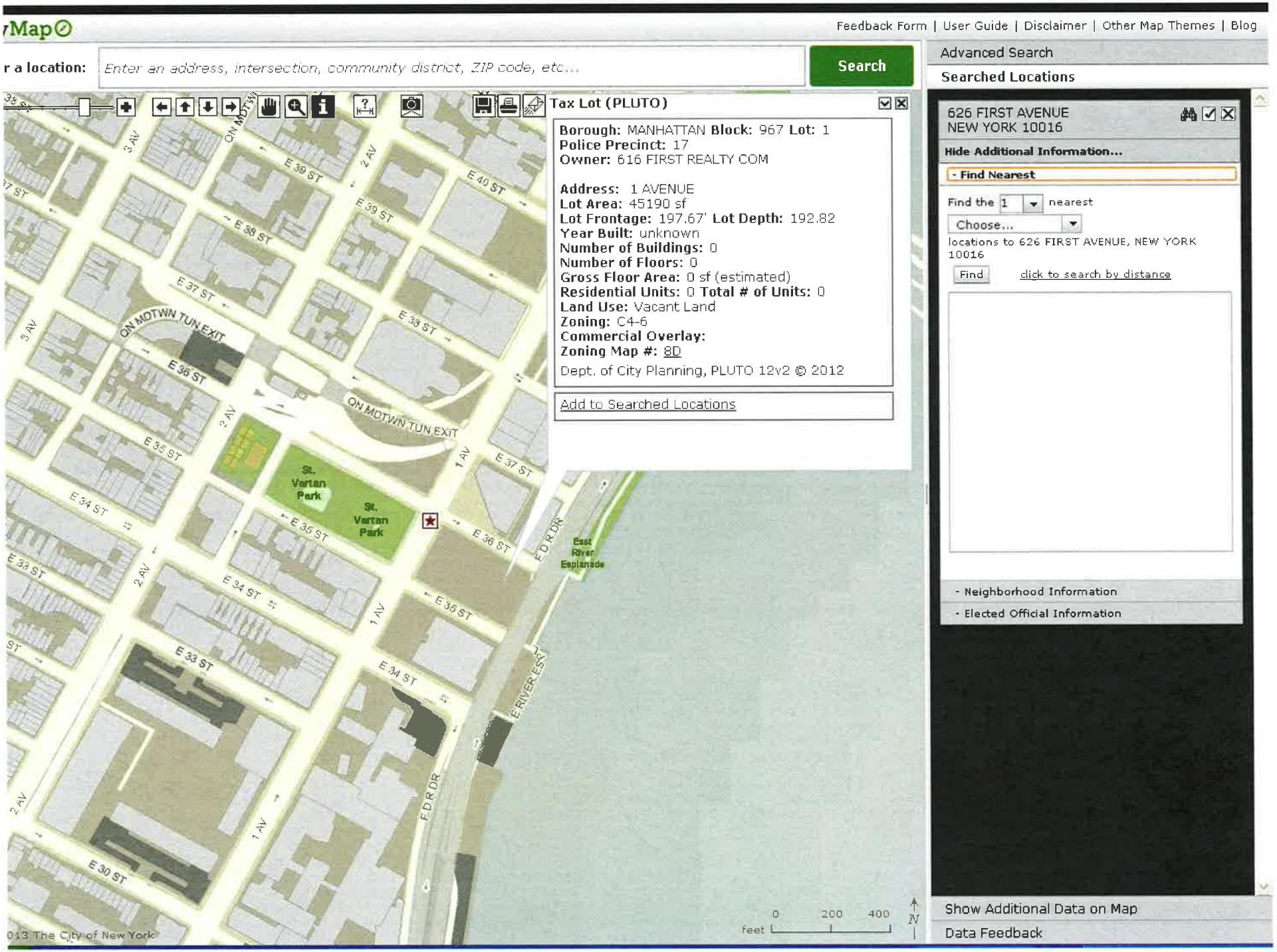
Combined or Sanitary Sewer ☐ if checked, provide WPCP drainage area _____

Storm Sewer ☑ if checked, provide name of body of water East River and NYCDEP Outfall number _____

Other ☐ explain _____

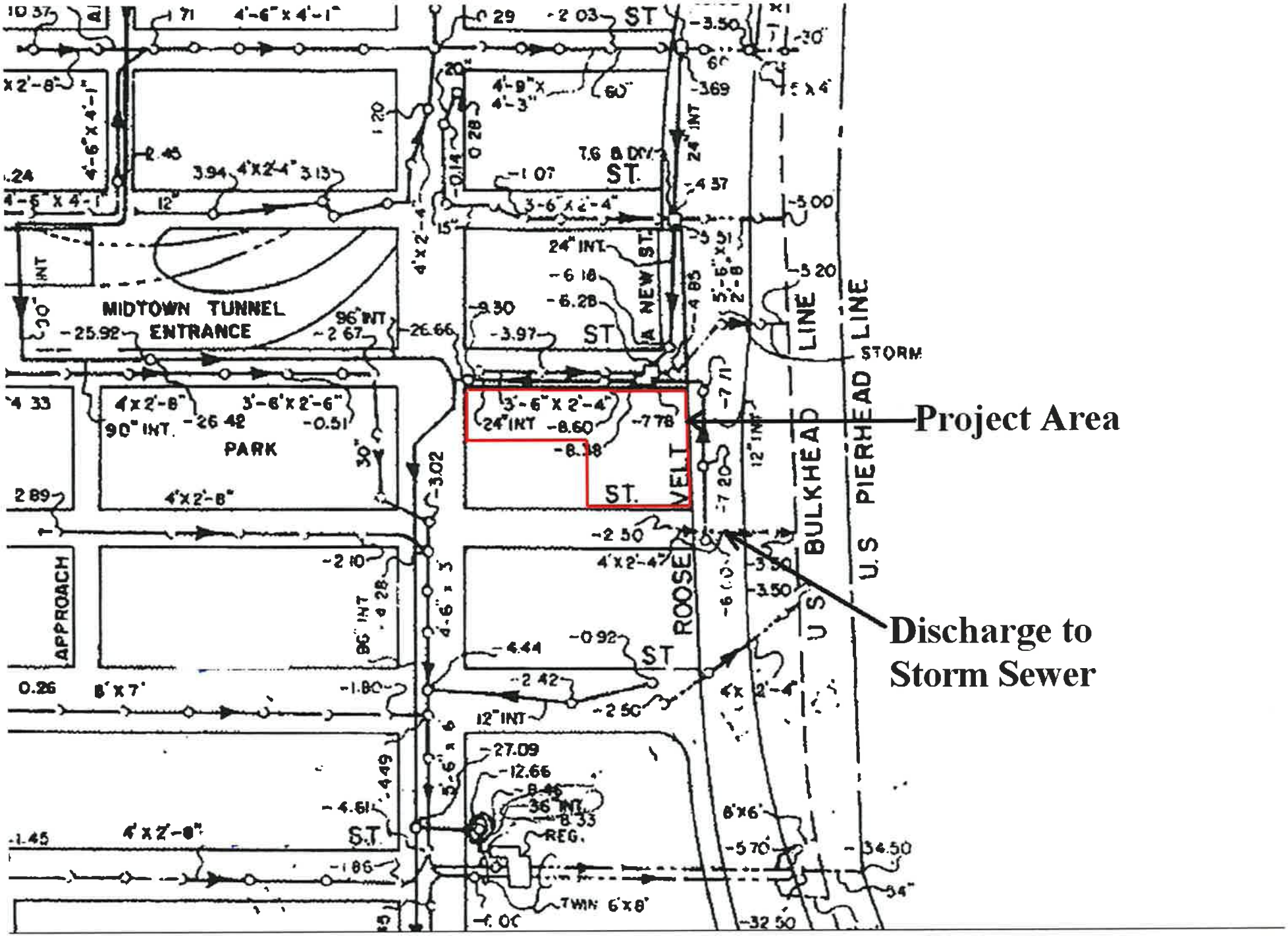
Prepared by: (Print) Joseph Mahon **(Signature)** _____ **(Date)** 4/29/13


626 1st Ave, New York, NY 10016
Directions Send Zoom Save
orld • United States • NY • New York
Union City
Hoboken
Jersey City
West New York
Central Park
Lincoln Square
Theater District-Times Square
Kip Bay
Flatiron District
Greenwich Village
Nolita
Lower East Side
Tribeca
Battery Park City
Two Bridges
Vinegar Hill
Brooklyn
Roosevelt Island
Yorkville
Astoria
Steinway
East Elmhurst
Hunters Point
Sunnyside
Long Island
Elmhurst
Maspeth
Haberman
Greenpoint
East Williamsburg
Ridgewood
Bushwick
Middle Village
Rego Park
Clinton Hill
Governors Island
Liberty Island
Ellis Island
Liberty State Park
Communipaw
Journal Square
The Heights
Newport
Brooklyn Queens Expy
Long Island Expy
FDR Dr N
FDR Dr S
Northern Blvd
Astoria Blvd N
1 km
© 2013 Nokia © 2013 Microsoft Corporation

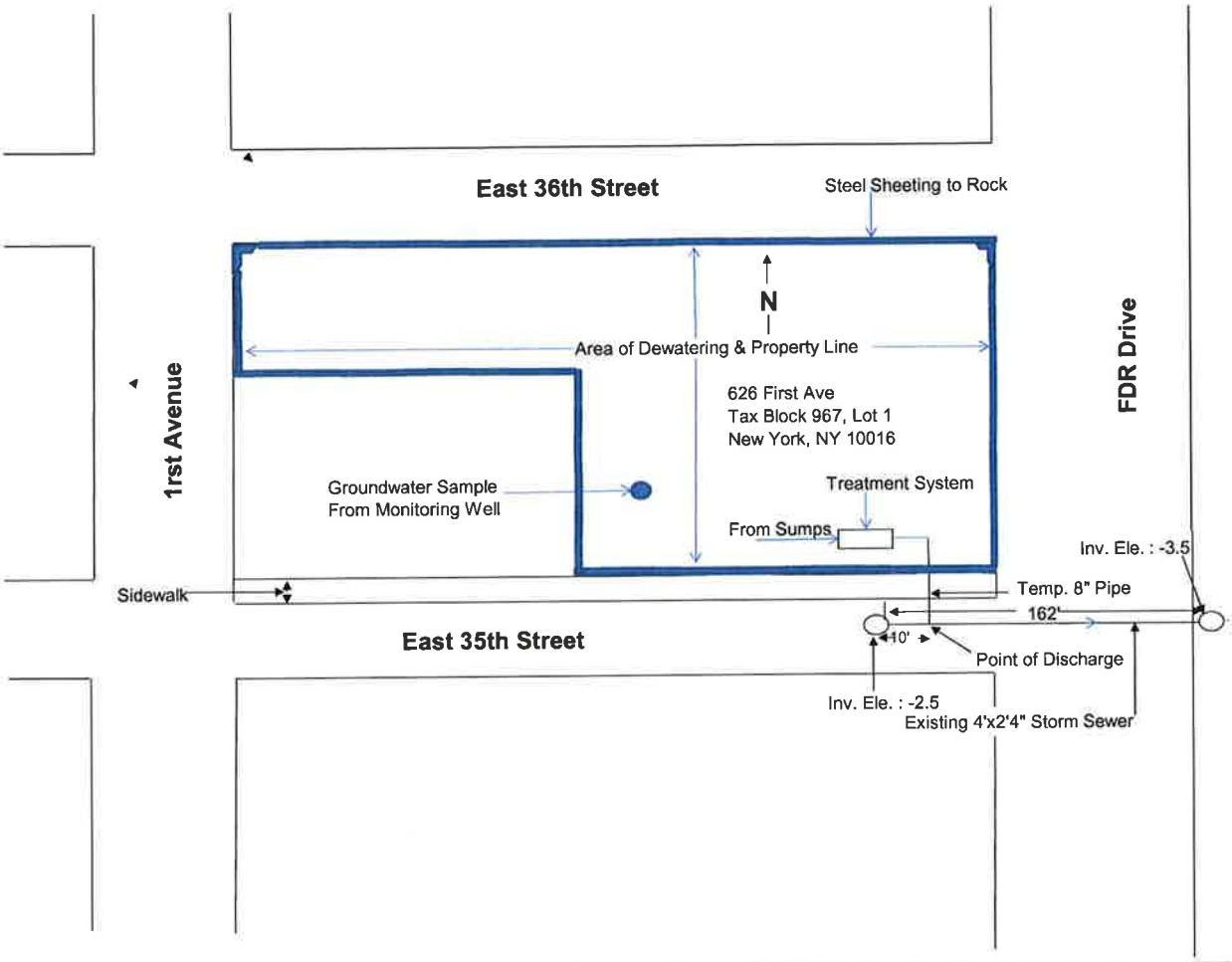


626 First Avenue New York, NY 10016

626 First Avenue New York, NY 10016

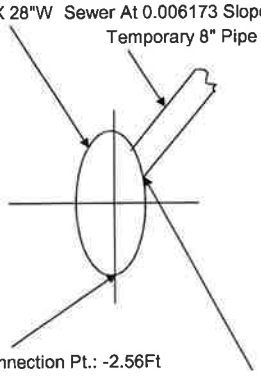


626 First Avenue New York, NY 10016



Existing 48"H X 28"W Sewer At 0.006173 Slope

Temporary 8" Pipe At 0.04 Slope



Inv. Ele. At Connection Pt.: -2.56Ft

Inv. Ele. Of 8" Pipe At Sewer Con.: 0.11Ft

Flow Rate Inside The Existing 48"H X 28"W Storm Sewer

Slope			
Invert Elevation At Mh At East End		-3.5	
Invert Elevation At Mh At West End		-2.5	
Distance between manholes (ft)		162	
s=Slope of sewer			0.006173
Flow Velocity			
V=Flow Velocity	(1.486/n)*(Rh)^2/3 *(s)^1/2		
Rh=Hydraulic Radius	$\pi(A*B)/[2\pi(0.5(A^2+B^2))^{0.5}]$		0.71
n=	0.014		
V=Flow Velocity	1.486/0.014*0.71^2/3*0.006173^1/2		6.64 Ft/sec
Max Flow Rate Through 48"H X 28"W Storm Sewer			
Area=A		πAB	7.33 SF
Flow Rate		Q=V*A	48.65 CFS
Max Flow Rate through Sewer			21,835 GPM
Flow Rate Ratio = (Dewatering Flow Rate)/(Max flow Rate in Sewer)			
Total Pump capacity	1.33	CFS	
48"H X 28"W sewer capacity	48.65	CFS	1.33/48.65
% Capacity Of Dewatering System Into Existing Sewer Pipe			2.73%

SUMMARY OF DEWATERING SYSTEM

Scope of Work	Dewatering discharge will be to an existing 48"x28" storm sewer located on East 35th St between First Avenue and the FDR Drive in New York, NY.
Project Name:	626 First Ave
Total Quantity of Discharge:	600 GPM Max Flow = 864,000 GPD = 115,508 CFD = 1.33 CFS
Duration of Discharge:	1 year
Flow Meter:	MW500 manufactured by McCrometer
Pretreatment Equipment:	Treatment System
Discharge Pipe Location:	Temporary 8" Pipe Connected To Existing Storm Sewer located on East 35th St. between First Avenue and the FDR Drive in New York, NY.

Flow Rate Inside The Temporary 8" Metal Discharge Pipe

Slope			
Inv Ele at Connection to Storm Sewer		-2.5+10(0.006173)	-2.56 ft
Inv El at Connection to Storm Sewer @ Approx. 2:00		-2.56+2+(0.5774)(1.167)	0.11 ft
Invert Elevation at Flowmeter and Property Line		0.11+30(0.04)	1.31 ft
Approximate Length Of Discharge Pipe To 48"H X 28"W Sewer			30 ft
S=Slope Of 8" Temporary Discharge Pipe			0.04
Flow Velocity			
V=Flow Velocity	(1.486/n)*(Rh)^2/3 *(s)^1/2		
Rh=Hydraulic Radius	r/2		0.17
n=	0.014		
V=Flow Velocity	1.486/0.014*0.167^2/3*0.04^1/2		6.44 Ft/sec
Max Flow Rate Through 8" Discharge Pipe			
Area=A		(Pi*D^2)/4	0.35 SF
Flow Rate		Q=V*A	2.25 CFS
Max Flow Rate Through 8" Metal Pipe			1,009 GPM
Flow Rate Ratio = (Dewatering Flow Rate)/(Max Rate in Discharge Pipe)			
Total Pump capacity	1.33 CFS		
Discharge Pipe capacity	2.25 CFS	1.33/2.25	
% Capacity Of Dewatering System Into Temporary Metal Discharge Pipe			59.19%

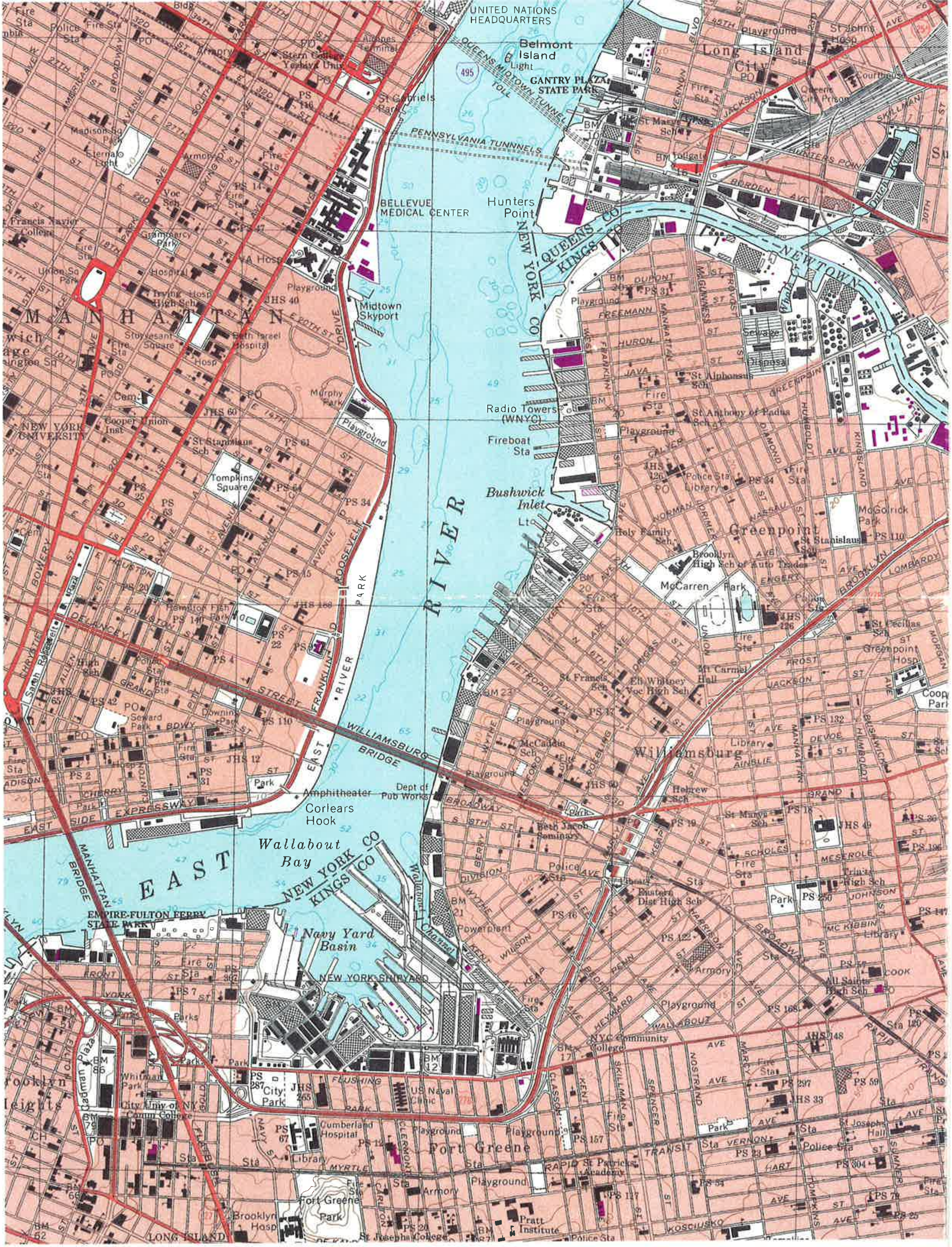
Leonard R. Guglielmo
51 Smart Avenue
Yonkers, NY 10704

The purpose of this drawing is to show dewatering capacity and tie-in to existing sewer. Responsibility for field installation and compliance is by others. Existing sewer information, orientation and inverts are provided by others. Based on the information provided, this drawing represents a reasonable` sewer connection design. The dewatering system and treatment system is designed by others.

MORETRENCH
626 First Ave
New York, NY

DRAWING NO: 1

Scale: NTS
Date: 3/21/2013


UNITED NATIONS HEADQUARTERS
Belmont Island
Light
495
QUEENS MIDTOWN TUNNEL
TOLL
GANTRY PLAZA STATE PARK
Long Island City
Queens City Prison
Courthouse
St Gabriels Park
PENNSYLVANIA TUNNNELS
BELLEVUE MEDICAL CENTER
Hunters Point
NEW YORK CO
QUEENS CO
KINGS CO
NEWTOWN
Madison Sq
Gramercy Park
Union Sq Park
Francis Xavier College
VA Hosp
Playground
Midtown Skyport
MANHATTAN
Stuyvesant Square
Beth Israel Hospital
DUPONT
FREEMANN
HURON
JAVA
St Alphonsus Sch
Sewage Disposal
GREENPOINT
Murphy Park
Radio Towers (WNYC)
Fireboat Sta
St Anthony of Padua Sch
NEW YORK UNIVERSITY
Cooper Union Inst
Tompkins Square
Playground
ROOSEVELT
PARK
RIVER
Bushwick Inlet
Lt
Greenpoint
McGolrick Park
St Stanislaus
Holy Family Sch
Brooklyn High Sch of Auto Trades
McCarren Park
HOUSTON
BOWERY
DELANCEY
FRANKLIN D ROOSEVELT
RIVER
EAST
St Francis Sch
Eli Whitney Voc High Sch
St Carmel Hall
Greenpoint Hosp
Seward Park
WILLIAMSBURG BRIDGE
STREET
Williamsburg
McCaddin Sch
Playground
Amphitheater
Corlears Hook
Dept of Pub Works
BROADWAY
Hebrew Sch
EXPRESSWAY
CHERRY
Wallabout Bay
Beth Jacob Seminary
EAST
MANHATTAN BRIDGE
NEW YORK CO
KINGS CO
Wallabout Channel
Navy Yard Basin
Powerplant
Eastern Dist High Sch
EMPIRE-FULTON FERRY STATE PARK
NEW YORK SHIPYARD
Armory
All Saints High Sch
Playground
WALLABOUT
NYC Community College
Park
City Park
US Naval Clinic
FLUSHING
Brooklyn Heights
Whitman Park
City Univ of NY Comm College
Cumberland Hospital
Fort Greene
Playground
St Patricks Academy
St Josephs Hall
Police Sta
MYRTLE
Armory
Fort Greene Park
Pratt Institute
Brooklyn Hosp
St Josephs College
LONG ISLAND
KOSCIUSKO

PHOENIX
Environmental Laboratories, Inc.

Tuesday, April 16, 2013

Attn: Mr. Joe Mahon
Moretrench
51 Smart Avenue
Yonkers, NY 10704

Project ID: 626 FIRST AVE.
Sample ID#s: BD57750

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #MA-CT-007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 16, 2013

FOR: Attn: Mr. Joe Mahon
Moretrench
51 Smart Avenue
Yonkers, NY 10704

Sample Information		Custody Information		Date	Time
Matrix:	GW DISCHARGE	Collected by:		04/10/13	11:00
Location Code:	MORETRENCH	Received by:	LB	04/10/13	16:15
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBD57750
Phoenix ID: BD57750

Project ID: 626 FIRST AVE.
Client ID: EXISTING MONITORING WELL

Parameter	Result	RL/ PQL	Units	Date/Time	By	Reference	
Cadmium	0.001	0.001	mg/L	04/10/13	EK	E200.7	
Copper	0.017	0.005	mg/L	04/10/13	EK	E200.7	
Mercury	< 0.0002	0.0002	mg/L	04/11/13	RS	245.1	
Nickel	0.010	0.001	mg/L	04/10/13	EK	E200.7	
Lead	0.007	0.002	mg/L	04/10/13	EK	E200.7	
Zinc	0.039	0.002	mg/L	04/10/13	EK	E200.7	
Carbonaceous BOD	< 4.0	4.0	mg/L	04/10/13 21:00	RS/RM	SM5210B	
Chloride	1280	75	mg/L	04/11/13	EG	300.0	
Flash Point	>200	200	degree F	04/11/13	Y	SW1010	
Chromium, Hexavalent	< 0.01	0.01	mg/L	04/10/13 19:00	O	S3500CRD	
Ignitability	Passed	140	degree F	04/11/13	Y	SW846	1
Nitrite-N	0.01	0.01	mg/L	04/10/13 18:35	MK	E353.2	
Nitrate-N	< 0.01	0.01	mg/L	04/10/13 18:35	MK	E353.2	
pH	7.98	0.10	pH Units	04/11/13 09:05	BS/EG	4500-H B	1
Nitrogen Tot Kjeldahl	14.4	0.50	mg/L	04/11/13	WHM	E351.1	
Total Nitrogen	14.4	0.10	mg/L	04/11/13	WHM	S4500NH3/300.0	1
O&G, Non-polar Material	< 1.4	1.4	mg/L	04/11/13	MSF	E1664A	
Total Suspended Solids	17	10	mg/L	04/10/13	M/KDB/K	SM2540D	
Total Solids	2900	50	mg/L	04/11/13	KDB/KG	SM2540B	
Mercury Digestion	Completed			04/11/13	X/X	245.1	
PCB Extraction (2 Liter)	Completed			04/10/13	BT	E608	
Semi-Volatile Extraction	Completed			04/10/13	i/T	SW3510	
Total Metals Digestion	Completed			04/10/13	AG		
Polychlorinated Biphenyls							
PCB-1016	ND	0.065	ug/L	04/11/13	AW	E608	
PCB-1221	ND	0.065	ug/L	04/11/13	AW	E608	
PCB-1232	ND	0.065	ug/L	04/11/13	AW	E608	
PCB-1242	ND	0.065	ug/L	04/11/13	AW	E608	

Project ID: 626 FIRST AVE.
Client ID: EXISTING MONITORING WELL

Phoenix I.D.: BD57750

Parameter	Result	RL/ PQL	Units	Date/Time	By	Reference	
PCB-1248	ND	0.065	ug/L	04/11/13	AW	E608	
PCB-1254	ND	0.065	ug/L	04/11/13	AW	E608	
PCB-1260	ND	0.065	ug/L	04/11/13	AW	E608	
PCB-1262	ND	0.065	ug/L	04/11/13	AW	E608	1
PCB-1268	ND	0.065	ug/L	04/11/13	AW	E608	1
QA/QC Surrogates							
% DCBP (Surrogate Rec)	98		%	04/11/13	AW	30 - 150 %	
% TCMX (Surrogate Rec)	70		%	04/11/13	AW	30 - 150 %	
Volatiles							
1,1,1-Trichloroethane	ND	5.0	ug/L	04/11/13	H/J	E624	
1,1,2,2-tetrachloroethane	ND	5.0	ug/L	04/11/13	H/J	E624	
1,1,2-Trichloroethane	ND	5.0	ug/L	04/11/13	H/J	E624	
1,1-Dichloroethane	ND	5.0	ug/L	04/11/13	H/J	E624	
1,1-Dichloroethene	ND	5.0	ug/L	04/11/13	H/J	E624	
1,2-Dichlorobenzene	ND	5.0	ug/L	04/11/13	H/J	E624	
1,2-Dichloroethane	ND	5.0	ug/L	04/11/13	H/J	E624	
1,2-Dichloropropane	ND	5.0	ug/L	04/11/13	H/J	E624	
1,3-Dichlorobenzene	ND	5.0	ug/L	04/11/13	H/J	E624	
1,4-Dichlorobenzene	ND	5.0	ug/L	04/11/13	H/J	E624	
2-Chloroethyl vinyl ether	ND	5.0	ug/L	04/11/13	H/J	E624	
Acrolein	ND	25	ug/L	04/11/13	H/J	E624	
Benzene	ND	5.0	ug/L	04/11/13	H/J	E624	
Bromodichloromethane	ND	5.0	ug/L	04/11/13	H/J	E624	
Bromoform	ND	5.0	ug/L	04/11/13	H/J	E624	
Bromomethane	ND	5.0	ug/L	04/11/13	H/J	E624	
Carbon tetrachloride	ND	5.0	ug/L	04/11/13	H/J	E624	
Chlorobenzene	ND	5.0	ug/L	04/11/13	H/J	E624	
Chloroethane	ND	5.0	ug/L	04/11/13	H/J	E624	
Chloroform	ND	5.0	ug/L	04/11/13	H/J	E624	
Chloromethane	ND	5.0	ug/L	04/11/13	H/J	E624	
cis-1,2-Dichloroethene	ND	5.0	ug/L	04/11/13	H/J	E624	
cis-1,3-Dichloropropene	ND	5.0	ug/L	04/11/13	H/J	E624	1
Dibromochloromethane	ND	5.0	ug/L	04/11/13	H/J	E624	
Ethylbenzene	ND	5.0	ug/L	04/11/13	H/J	E624	
m&p-Xylene	ND	5.0	ug/L	04/11/13	H/J	E624	
Methyl t-butyl ether (MTBE)	ND	5.0	ug/L	04/11/13	H/J	E624	1
Methylene chloride	ND	5.0	ug/L	04/11/13	H/J	E624	B
o-Xylene	ND	5.0	ug/L	04/11/13	H/J	E624	
Tetrachloroethene	ND	5.0	ug/L	04/11/13	H/J	E624	
Toluene	ND	5.0	ug/L	04/11/13	H/J	E624	
trans-1,2-Dichloroethene	ND	5.0	ug/L	04/11/13	H/J	E624	
trans-1,3-Dichloropropene	ND	5.0	ug/L	04/11/13	H/J	E624	
Trichloroethene	ND	5.0	ug/L	04/11/13	H/J	E624	
Trichlorofluoromethane	ND	5.0	ug/L	04/11/13	H/J	E624	
Vinyl chloride	ND	5.0	ug/L	04/11/13	H/J	E624	
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	99		%	04/11/13	H/J	70 - 130 %	
% Bromofluorobenzene	98		%	04/11/13	H/J	70 - 130 %	
% Dibromofluoromethane	106		%	04/11/13	H/J	70 - 130 %	

Project ID: 626 FIRST AVE.
Client ID: EXISTING MONITORING WELL

Phoenix I.D.: BD57750

Parameter	Result	RL/ PQL	Units	Date/Time	By	Reference	
% Toluene-d8	99		%	04/11/13	H/J	70 - 130 %	
Base Neutrals & Acid Compounds							
1,2,4-Trichlorobenzene	ND	5.0	ug/L	04/11/13	DD	E625	
1,2-Dichlorobenzene	ND	5.0	ug/L	04/11/13	DD	E625	1
1,2-Diphenylhydrazine	ND	5.0	ug/L	04/11/13	DD	E625	1
1,3-Dichlorobenzene	ND	5.0	ug/L	04/11/13	DD	E625	1
1,4-Dichlorobenzene	ND	5.0	ug/L	04/11/13	DD	E625	1
2,4,6-Trichlorophenol	ND	5.0	ug/L	04/11/13	DD	E625	
2,4-Dichlorophenol	ND	5.0	ug/L	04/11/13	DD	E625	
2,4-Dimethylphenol	ND	5.0	ug/L	04/11/13	DD	E625	
2,4-Dinitrophenol	ND	5.0	ug/L	04/11/13	DD	E625	
2,4-Dinitrotoluene	ND	5.0	ug/L	04/11/13	DD	E625	
2,6-Dinitrotoluene	ND	5.0	ug/L	04/11/13	DD	E625	
2-Chloronaphthalene	ND	5.0	ug/L	04/11/13	DD	E625	
2-Chlorophenol	ND	5.0	ug/L	04/11/13	DD	E625	
2-Nitrophenol	ND	5.0	ug/L	04/11/13	DD	E625	
3,3-Dichlorobenzidine	ND	5.0	ug/L	04/11/13	DD	E625	IO
4,6-Dinitro-2-methylphenol	ND	5.0	ug/L	04/11/13	DD	E625	
4-Bromophenyl phenyl ether	ND	5.0	ug/L	04/11/13	DD	E625	
4-Chloro-3-methylphenol	ND	5.0	ug/L	04/11/13	DD	E625	
4-Chlorophenyl phenyl ether	ND	5.0	ug/L	04/11/13	DD	E625	
4-Nitrophenol	ND	5.0	ug/L	04/11/13	DD	E625	
Acenaphthene	ND	5.0	ug/L	04/11/13	DD	E625	
Acenaphthylene	ND	5.0	ug/L	04/11/13	DD	E625	
Anthracene	ND	5.0	ug/L	04/11/13	DD	E625	
Benz(a)anthracene	ND	5.0	ug/L	04/11/13	DD	E625	
Benzidine	ND	5.0	ug/L	04/11/13	DD	E625	1
Benzo(a)pyrene	ND	5.0	ug/L	04/11/13	DD	E625	
Benzo(b)fluoranthene	ND	5.0	ug/L	04/11/13	DD	E625	
Benzo(ghi)perylene	ND	5.0	ug/L	04/11/13	DD	E625	
Benzo(k)fluoranthene	ND	5.0	ug/L	04/11/13	DD	E625	
Benzyl butyl phthalate	ND	5.0	ug/L	04/11/13	DD	E625	
Bis(2-chloroethoxy)methane	ND	5.0	ug/L	04/11/13	DD	E625	
Bis(2-chloroethyl)ether	ND	5.0	ug/L	04/11/13	DD	E625	
Bis(2-chloroisopropyl)ether	ND	5.0	ug/L	04/11/13	DD	E625	1
Bis(2-ethylhexyl)phthalate	9.4	5.0	ug/L	04/11/13	DD	E625	
Chrysene	ND	5.0	ug/L	04/11/13	DD	E625	
Dibenz(a,h)anthracene	ND	5.0	ug/L	04/11/13	DD	E625	
Diethyl phthalate	ND	5.0	ug/L	04/11/13	DD	E625	
Dimethylphthalate	ND	5.0	ug/L	04/11/13	DD	E625	
Di-n-butylphthalate	ND	5.0	ug/L	04/11/13	DD	E625	
Di-n-octylphthalate	ND	5.0	ug/L	04/11/13	DD	E625	
Fluoranthene	ND	5.0	ug/L	04/11/13	DD	E625	
Fluorene	ND	5.0	ug/L	04/11/13	DD	E625	
Hexachlorobenzene	ND	5.0	ug/L	04/11/13	DD	E625	
Hexachlorobutadiene	ND	5.0	ug/L	04/11/13	DD	E625	
Hexachlorocyclopentadiene	ND	5.0	ug/L	04/11/13	DD	E625	
Hexachloroethane	ND	5.0	ug/L	04/11/13	DD	E625	
Indeno(1,2,3-cd)pyrene	ND	5.0	ug/L	04/11/13	DD	E625	

Project ID: 626 FIRST AVE. Phoenix I.D.: BD57750
Client ID: EXISTING MONITORING WELL

Parameter	Result	RL/ PQL	Units	Date/Time	By	Reference
Isophorone	ND	5.0	ug/L	04/11/13	DD	E625
Naphthalene	ND	5.0	ug/L	04/11/13	DD	E625
Nitrobenzene	ND	5.0	ug/L	04/11/13	DD	E625
N-Nitrosodimethylamine	ND	5.0	ug/L	04/11/13	DD	E625
N-Nitrosodi-n-propylamine	ND	5.0	ug/L	04/11/13	DD	E625
N-Nitrosodiphenylamine	ND	5.0	ug/L	04/11/13	DD	E625
Pentachlorophenol	ND	5.0	ug/L	04/11/13	DD	E625
Phenanthrene	ND	5.0	ug/L	04/11/13	DD	E625
Phenol	ND	5.0	ug/L	04/11/13	DD	E625
Pyrene	ND	5.0	ug/L	04/11/13	DD	E625
QA/QC Surrogates						
% 2,4,6-Tribromophenol	107		%	04/11/13	DD	15 - 130 %
% 2-Fluorobiphenyl	88		%	04/11/13	DD	30 - 130 %
% 2-Fluorophenol	43		%	04/11/13	DD	15 - 130 %
% Nitrobenzene-d5	86		%	04/11/13	DD	30 - 130 %
% Phenol-d5	30		%	04/11/13	DD	15 - 130 %
% Terphenyl-d14	107		%	04/11/13	DD	30 - 130 %

1 = This parameter is not certified by NY NELAC for this matrix. NY NELAC does not offer certification for all parameters at this time.
1O = This parameter is not certified by NY NELAC for this matrix.
B = Present in blank, no bias suspected.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quanitation) ND=Not Detected BRL=Below Reporting Level

Comments:

Per 1.4.6 of EPA method 8270D, 1,2-Diphenylhydrazine is unstable and readily converts to Azobenzene. Azobenzene is used for the calibration of 1,2-Diphenylhydrazine.

Ignitability is based solely on the results of the closed cup flashpoint analysis performed above. Passed is >140 degree F.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller, Laboratory Director
April 16, 2013
Reviewed and Released by: Greg Lawrence, Assistant Lab Director

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

QA/QC Report

April 16, 2013

QA/QC Data

SDG I.D.: GBD57750

Parameter	Blank	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 225842, QC Sample No: BD56818 (BD57750)												
Mercury - Water	BRL	<0.0002	<0.0002	NC	89.8	85.1	5.4	85.9	84.8	1.3	70 - 130	20
Comment:												
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%.												
QA/QC Batch 225673, QC Sample No: BD57135 (BD57750)												
ICP Metals - Aqueous												
Cadmium	BRL	<0.001	<0.001	NC	91.4	91.2	0.2	91.2	91.5	0.3	75 - 125	20
Copper	BRL	0.018	0.018	NC	95.7	95.1	0.6	97.9	98.8	0.9	75 - 125	20
Lead	BRL	<0.002	<0.002	NC	90.8	91.3	0.5	89.3	89.8	0.6	75 - 125	20
Nickel	BRL	0.089	0.091	2.20	93.1	93.0	0.1	91.3	91.8	0.5	75 - 125	20
Zinc	BRL	0.007	0.007	NC	90.9	90.7	0.2	95.4	95.7	0.3	75 - 125	20

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QA/QC Report

April 16, 2013

QA/QC Data

SDG I.D.: GBD57750

Parameter	Blank	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 225834, QC Sample No: BD55450 (BD57750)												
Flash Point		>200	>200	NC	100						85 - 115	30
QA/QC Batch 225844, QC Sample No: BD56676 (BD57750)												
Oil and Grease by EPA 1664	BRL	<1.4			99.0						85 - 115	20
QA/QC Batch 225731, QC Sample No: BD56693 (BD57750)												
Total Suspended Solids	BRL	<5.0	<5.0	NC	103						85 - 115	20
QA/QC Batch 225794, QC Sample No: BD57317 (BD57750)												
Nitrogen Tot Kjeldahl	BRL	0.48	0.48	NC	101			102			85 - 115	20
QA/QC Batch 225818, QC Sample No: BD57447 (BD57750)												
Nitrate-N	BRL	<0.01	<0	NC	105			121			85 - 115	20
Nitrite-N	BRL	0.13	0.13	0	100			93.8			85 - 115	20
QA/QC Batch 225806, QC Sample No: BD57582 (BD57750)												
Chromium, Hexavalent	BRL	<0.01	<0.01	NC	99.0			109			70 - 130	20
QA/QC Batch 225939, QC Sample No: BD57674 (BD57750)												
Chloride	BRL	21.4	21.5	0.50	93.8			98.6				
Nitrate as Nitrogen	BRL	3.80	3.79	0.30	92.3			98.4				
Nitrite as Nitrogen	BRL	<0.01	<0.01	NC	95.2			108				
QA/QC Batch 225884, QC Sample No: BD57701 (BD57750)												
pH		7.10	7.2	1.40	98.9						85 - 115	20
QA/QC Batch 225815, QC Sample No: BD57802 (BD57750)												
B.O.D./5 day	BRL	<4.0	<4.0	NC	110			106			70 - 130	20

PHOENIX

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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

QA/QC Report

April 16, 2013

QA/QC Data

SDG I.D.: GBD57750

Parameter	Blank	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 223361, QC Sample No: BD46312 (BD57750)									
Semivolatiles									
1,2,4-Trichlorobenzene	ND	95	95	0.0				30 - 130	20
1,2-Dichlorobenzene	ND	82	81	1.2				30 - 130	20
1,2-Diphenylhydrazine	NR	85	86	1.2				30 - 130	20
1,3-Dichlorobenzene	ND	81	80	1.2				30 - 130	20
1,4-Dichlorobenzene	ND	80	79	1.3				30 - 130	20
2,4,6-Trichlorophenol	ND	106	107	0.9				30 - 130	20
2,4-Dichlorophenol	ND	105	106	0.9				30 - 130	20
2,4-Dimethylphenol	ND	60	60	0.0				30 - 130	20
2,4-Dinitrophenol	ND	65	77	16.9				30 - 130	20
2,4-Dinitrotoluene	ND	102	105	2.9				30 - 130	20
2,6-Dinitrotoluene	ND	97	97	0.0				30 - 130	20
2-Chloronaphthalene	ND	93	93	0.0				30 - 130	20
2-Chlorophenol	ND	76	76	0.0				30 - 130	20
2-Nitrophenol	ND	82	84	2.4				30 - 130	20
3,3'-Dichlorobenzidine	ND	N/A	N/A	NC				30 - 130	20
4,6-Dinitro-2-methylphenol	ND	82	94	13.6				30 - 130	20
4-Bromophenyl phenyl ether	ND	103	103	0.0				30 - 130	20
4-Chloro-3-methylphenol	ND	96	99	3.1				30 - 130	20
4-Chlorophenyl phenyl ether	ND	101	101	0.0				30 - 130	20
4-Nitrophenol	ND	26	27	3.8				15 - 130	20
Acenaphthene	ND	86	86	0.0				30 - 130	20
Acenaphthylene	ND	92	92	0.0				30 - 130	20
Anthracene	ND	96	97	1.0				30 - 130	20
Benz(a)anthracene	ND	98	99	1.0				30 - 130	20
Benzidine	ND	N/A	N/A	NC				30 - 130	20
Benzo(a)pyrene	ND	88	87	1.1				30 - 130	20
Benzo(b)fluoranthene	ND	102	99	3.0				30 - 130	20
Benzo(ghi)perylene	ND	86	102	17.0				30 - 130	20
Benzo(k)fluoranthene	ND	102	93	9.2				30 - 130	20
Benzyl butyl phthalate	ND	100	94	6.2				30 - 130	20
Bis(2-chloroethoxy)methane	ND	91	91	0.0				30 - 130	20
Bis(2-chloroethyl)ether	ND	74	73	1.4				30 - 130	20
Bis(2-chloroisopropyl)ether	ND	68	68	0.0				30 - 130	20
Bis(2-ethylhexyl)phthalate	ND	94	87	7.7				30 - 130	20
Chrysene	ND	104	101	2.9				30 - 130	20
Dibenz(a,h)anthracene	ND	89	104	15.5				30 - 130	20
Diethyl phthalate	ND	98	99	1.0				30 - 130	20
Dimethylphthalate	ND	98	97	1.0				30 - 130	20
Di-n-butylphthalate	ND	98	97	1.0				30 - 130	20
Di-n-octylphthalate	ND	94	93	1.1				30 - 130	20
Fluoranthene	ND	101	102	1.0				30 - 130	20

QA/QC Data

SDG I.D.: GBD57750

Parameter	Blank	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
Fluorene	ND	95	95	0.0				30 - 130	20
Hexachlorobenzene	ND	94	92	2.2				30 - 130	20
Hexachlorobutadiene	ND	90	101	11.5				30 - 130	20
Hexachlorocyclopentadiene	ND	72	82	13.0				30 - 130	20
Hexachloroethane	ND	78	78	0.0				30 - 130	20
Indeno(1,2,3-cd)pyrene	ND	89	103	14.6				30 - 130	20
Isophorone	ND	92	92	0.0				30 - 130	20
Naphthalene	ND	92	93	1.1				30 - 130	20
Nitrobenzene	ND	76	77	1.3				30 - 130	20
N-Nitrosodimethylamine	ND	33	33	0.0				30 - 130	20
N-Nitrosodi-n-propylamine	ND	75	75	0.0				30 - 130	20
N-Nitrosodiphenylamine	ND	113	114	0.9				30 - 130	20
Pentachlorophenol	ND	100	106	5.8				30 - 130	20
Phenanthrene	ND	97	98	1.0				30 - 130	20
Phenol	ND	24	24	0.0				15 - 130	20
Pyrene	ND	101	103	2.0				30 - 130	20
% 2,4,6-Tribromophenol	78	84	84	0.0				15 - 130	20
% 2-Fluorobiphenyl	78	92	92	0.0				30 - 130	20
% 2-Fluorophenol	32	39	39	0.0				15 - 130	20
% Nitrobenzene-d5	66	77	78	1.3				30 - 130	20
% Phenol-d5	19	23	23	0.0				15 - 130	20
% Terphenyl-d14	103	112	112	0.0				30 - 130	20

Comment:

* TURNED YELLOW AFTER FIRST SHAKE. VERIFIED PH: 2

Additional 8270 criteria: 20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

QA/QC Batch 225669, QC Sample No: BD56977 (BD57750)

Polychlorinated Biphenyls

PCB-1016	ND	94	91	3.2				40 - 140	20
PCB-1221	ND							40 - 140	20
PCB-1232	ND							40 - 140	20
PCB-1242	ND							40 - 140	20
PCB-1248	ND							40 - 140	20
PCB-1254	ND							40 - 140	20
PCB-1260	ND	91	91	0.0				40 - 140	20
PCB-1262	ND							40 - 140	20
PCB-1268	ND							40 - 140	20
% DCBP (Surrogate Rec)	79	74	61	19.3				30 - 150	20
% TCMX (Surrogate Rec)	83	85	81	4.8				30 - 150	20

Comment:

A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.

QA/QC Batch 225931, QC Sample No: BD57336 (BD57750)

Volatiles

1,1,1-Trichloroethane	ND	112	112	0.0	104	103	1.0	70 - 130	30
1,1,2,2-Tetrachloroethane	ND	98	99	1.0	99	97	2.0	70 - 130	30
1,1,2-Trichloroethane	ND	111	114	2.7	110	109	0.9	70 - 130	30
1,1-Dichloroethane	ND	106	108	1.9	103	101	2.0	70 - 130	30
1,1-Dichloroethene	ND	102	103	1.0	100	99	1.0	70 - 130	30
1,2-Dichlorobenzene	ND	99	100	1.0	94	93	1.1	70 - 130	30
1,2-Dichloroethane	ND	109	112	2.7	107	106	0.9	70 - 130	30
1,2-Dichloropropane	ND	106	105	0.9	103	103	0.0	70 - 130	30

QA/QC Data

SDG I.D.: GBD57750

Parameter	Blank	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
1,3-Dichlorobenzene	ND	98	100	2.0	92	91	1.1	70 - 130	30	
1,4-Dichlorobenzene	ND	97	97	0.0	93	92	1.1	70 - 130	30	
Acrolein	ND	110	114	3.6	109	107	1.9	70 - 130	30	
Benzene	ND	102	103	1.0	100	101	1.0	70 - 130	30	
Bromodichloromethane	ND	111	111	0.0	106	106	0.0	70 - 130	30	
Bromoform	ND	109	110	0.9	104	105	1.0	70 - 130	30	
Bromomethane	ND	123	119	3.3	44	62	34.0	70 - 130	30	m,r
Carbon tetrachloride	ND	110	111	0.9	103	104	1.0	70 - 130	30	
Chlorobenzene	ND	100	104	3.9	100	97	3.0	70 - 130	30	
Chloroethane	ND	106	104	1.9	100	96	4.1	70 - 130	30	
Chloroform	ND	111	112	0.9	106	105	0.9	70 - 130	30	
Chloromethane	ND	112	113	0.9	86	89	3.4	70 - 130	30	
cis-1,2-Dichloroethene	ND	107	110	2.8	104	104	0.0	70 - 130	30	
cis-1,3-Dichloropropene	ND	107	106	0.9	108	105	2.8	70 - 130	30	
Dibromochloromethane	ND	106	110	3.7	103	101	2.0	70 - 130	30	
Ethylbenzene	ND	99	100	1.0	96	93	3.2	70 - 130	30	
m&p-Xylene	ND	100	103	3.0	98	95	3.1	70 - 130	30	
Methyl t-butyl ether (MTBE)	ND	99	98	1.0	108	109	0.9	70 - 130	30	
Methylene chloride	1.1	101	103	2.0	97	96	1.0	70 - 130	30	
o-Xylene	ND	107	108	0.9	102	100	2.0	70 - 130	30	
Tetrachloroethene	ND	100	103	3.0	97	95	2.1	70 - 130	30	
Toluene	ND	104	106	1.9	103	102	1.0	70 - 130	30	
trans-1,2-Dichloroethene	ND	103	104	1.0	99	99	0.0	70 - 130	30	
trans-1,3-Dichloropropene	ND	107	107	0.0	108	107	0.9	70 - 130	30	
Trichloroethene	ND	112	113	0.9	105	103	1.9	70 - 130	30	
Trichlorofluoromethane	ND	121	121	0.0	99	97	2.0	70 - 130	30	
Vinyl chloride	ND	109	110	0.9	93	94	1.1	70 - 130	30	
% 1,2-dichlorobenzene-d4	104	103	102	1.0	99	100	1.0	70 - 130	30	
% Bromofluorobenzene	95	102	101	1.0	102	101	1.0	70 - 130	30	
% Dibromofluoromethane	107	106	105	0.9	107	104	2.8	70 - 130	30	
% Toluene-d8	100	101	100	1.0	101	102	1.0	70 - 130	30	

Comment:

Additional 8260 criteria: 10% of compounds can be outside of acceptance criteria as long as recovery is 40-160%.

m = This parameter is outside laboratory ms/msd specified recovery limits.
r = This parameter is outside laboratory rpd specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
April 16, 2013

Tuesday, April 16, 2013

Sample Criteria Exceedences Report

GBD57750 - MORETRENCH

Requested Criteria: None

State: NY

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

NY Temperature Narration

April 16, 2013

SDG I.D.: GBD57750

The samples in this delivery group were received at 6°C.
(Note acceptance criteria is above freezing up to 6°C)

CHAIN OF CUSTODY RECORD

PHOENIX Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp 40 w/ ice Pg 1 of 1

Data Delivery:
- ☐ Fax #: _____
- ☐ Email: _____

Customer: Marathon America's Corp.
Address: 51 Smart Ave. Eastchester, NY 10704

Project: 626 First Ave.
Report to:
Invoice to:

Project P.O:
Phone #:
Fax #:

Client Sample - Information - Identification

Sampler's Signature _____ Date: 4/10/13

Analysis Request: NYSDEC

Matrix Code:
DW=drinking water WW=wastewater S=soil/solid O=oil
GW=groundwater SL=sludge A=air X=other

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Soil VOA Vials [ ]	GL Soil container [ ] methanol [ ] Sod Bisulfate	GL Soil container ( ) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] HCl	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml [ ] 1000ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle
57750	Existing Monitoring Well	GW	4/10/13	1:00				3	1	1	1	1		
									2					

Relinquished by	Accepted by:	Date	Time:
		4-10-13	1:30
		4-10-13	1615

Turnaround:
- ☐ 1 Day*
- ☐ 2 Days*
- ☐ 3 Days*
- ☐ Standard
- ☐ Other

* SURCHARGE APPLIES

CT/RI
- ☐ RCP Cert
- ☐ GW Protect
- ☐ GA Mobility
- ☐ GB Mobility
- ☐ SW Protection
- ☐ Res. Vol.
- ☐ Ind. Vol.
- ☐ Res. Criteria
- ☐ Other

MA
- ☐ MCP Certification
- ☐ GW-1
- ☐ GW-2
- ☐ GW-3
- ☐ S-1
- ☐ S-2
- ☐ S-3
- ☐ MWRA eSMART
- ☐ Other

Data Format
- ☐ Excel
- ☐ PDF
- ☐ GIS/Key
- ☐ EQuIS
- ☐ Other _____

Data Package
- ☐ ASP-A
- ☐ NJ Reduced Deliv. *
- ☐ NJ Hazsite EDD
- ☐ Phoenix Std Report
- ☐ Other

Comments, Special Requirements or Regulations:
626 First Ave.
New York, NY
Block 967, Lot 1

State where samples were collected: NY

Technical Submittal

for the

Groundwater Treatment System

located at

MTA 618 First Avenue

GWTT Ref Q-4816

Rev 0

May 2, 2013

PREPARED BY:

GROUND/WATER TREATMENT & TECHNOLOGY, INC.
PO BOX 1174
DENVILLE, NEW JERSEY 07834
(973) 983-0901

GWTT
Ground/Water Treatment & Technology, Inc.

P.O. Box 1174
Denville, New Jersey 07834
Tel: (973) 983-0901
Fax: (973) 983-0903

A 100% Employee Owned Company and Subsidiary of MORETRENCH

MTA 618 First Avenue

Groundwater Treatment System

The proposed groundwater treatment system can treat a maximum of 700 gpm of water generated from sumping operations. The groundwater treatment system has been designed to remove low levels of Volatile Organic Compounds (VOCs) as well as Total Suspended Solids (TSS). The system will consist of the following major components:

- One (1) influent frac tank
- One (1) clarifier with settling tube media
- One (1) duplex transfer pump skid
- Three (3) multi-bag filters, parallel operation
- Four (4) liquid phase granular activated carbon filters
- Two (2) 6" flow meters
- One (1) common 8" effluent flow meter

Water from sumping operations will be directed to the influent frac tank. The frac tank is constructed with an open top for ease of cleaning and will be equipped with under/over weirs to facilitate the settling of solids.

From the influent frac tank, water will flow into the clarifier. The clarifier is equipped with a number of features that will facilitate both the settling of solids and routine maintenance of the unit. Water to the clarifier is directed to an influent chamber. A weir plate extending from the top of the unit forces the water underneath settling tube media. Treated water flows upward through the settling tubes while solids collect and fall to the bottom of the bulk settling clarifier. Tube settlers capture the settleable fine floc that escapes the clarification zone beneath the tube settlers and allows the larger floc to travel to the tank bottom in a more settleable form. The tube settler's channel collects solids into a compact mass which promotes the solids to slide down the tube channel.

Solids and/or sludge that have settled to the bottom of the clarifier and frac tank will need to be periodically removed to prevent accumulated material from reducing the settling time thus reducing the efficiency of the unit. All material from the bottom of the tank must be disposed of in accordance with site and local regulations.

Clarified water rises above the settling tube media and flows over a final weir plate into the two (2) centrifugal pumps which transfer water through the bag filters. The duplex pump skid will contain a control system and two (2) full capacity centrifugal pumps each capable of producing 700 gpm @ approximately 105' TDH. The pumps will each be equipped with 25 Hp, 460V, 3 phase, 60 Hz electric

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Denville, New Jersey 07834
Tel: (973) 983-0901
Fax: (973) 983-0903

motors. The control system will consist of two (2) pump motor starters and five (5) float controls – Pump 1 on, Pump 2 on, Pump 1 off, Pump 2 off, and a high level alarm which will activate an alarm light.

The bag filter skid will consist of three (3) multi-bag filter housings plumbed in parallel. The inlet and outlet of the bag filter skid will be equipped with manifolds complete with isolation valves. Each of the filter housings will contain six (6) 5-micron bag filters designed to remove sediment prior to the inlet of the carbon adsorbers. The inlet and outlet of each of the bag filter housings will also be equipped with pressure gauges to monitor the differential pressure across the filter housing. The bag filters should be changed once the differential pressure across the housing reaches 15 to 25 psi. The bag filter housings will be plumbed in parallel such that the bags in one (1) filter housing can be changed while the remaining filter housings continues to process water at the design water flow rate of 700 gpm.

If the bag filters are not properly operated and maintained, the differential pressure across the filter housings can rise to the point that the transfer pumps cannot pump water from the clarifier faster than water is introduced into the clarifier. The water level in the clarifier will rise and eventually activate the high level alarm light. **If the bag filters are not changed, the water level in the clarifier will continue to rise and will eventually overflow.**

From the bag filter skid, water will continue to flow under pressure to the carbon adsorber battery. Four carbon adsorbers will be provided the following configuration: two parallel pairs of lead lag series configuration. The carbon adsorbers will each contain 6,000 lbs. of reactivated, granular liquid phase carbon media designed to remove low levels of SVOCs and VOCs prior to discharge. If breakthrough of SVOCs or VOCs occurs on the lead carbon adsorber, the water can temporarily be directed to the lag unit by changing hoses or adjusting valves depending on the system configuration. The spent carbon would then need to be removed from the lead unit and will be replaced with 6,000 lbs of reactivated carbon media. The spent carbon will be sampled to determine RCRA waste characteristics and will be disposed of accordingly.

The inlet and outlet of each carbon adsorber will be equipped with a pressure gauge to monitor the differential pressure across the carbon media. The differential pressure across each carbon adsorber should be recorded in a log book on a daily basis. If the differential pressure across a particular carbon adsorber rises to the point that water flow is restricted, that carbon adsorber should be taken off line temporarily to backwash the media. Backwash water should be obtained from a clean water source such as a hydrant or a water truck. The waste water from the backwash process can be directed to the combination settling tank/OWS and will be processed through the treatment system.

A 6" diameter mechanical flow meter with a totalizer will be provided after each lag carbon adsorber to indicate the instantaneous flow rate and to record the total gallons of water treated by the treatment system. Each 6" flow meter has an acceptable flow range of 90 to 1200 gpm. The two (2) 6" effluent

GWTT
Ground/Water Treatment & Technology, Inc.

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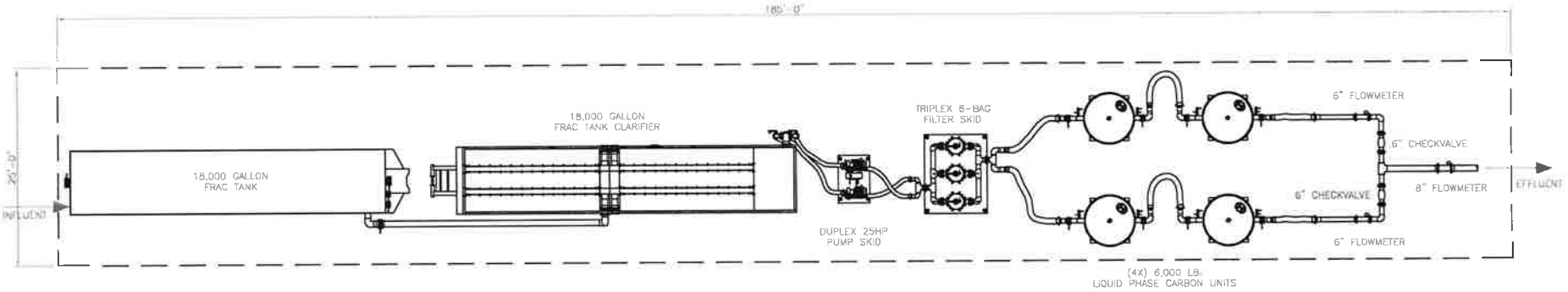
flow meters will be manifolded together; total system effluent will be measured via one (1) 8" combined effluent flow meter. Flow readings should be recorded daily in a log book

The individual components of the system will be skid mounted to the greatest extent possible and will be interconnected using PVC piping and suction hose. Pressure gauges and sample taps will be located throughout the system to monitor system performance. Butterfly valves will be provided on the inlet and outlet of each of the major units to isolate them for maintenance.

05/02/13
Q-4816
Rev-0



TREATMENT SYSTEM PLAN VIEW

NO.	REVISIONS	DATE
A	PRELIMINARY DESIGN FOR REVIEW	05/01/13

MTA – 618 FIRST AVENUE
700 GPM OPTION
EQUIPMENT LAYOUT

SCALE: NTS	APPROVED BY: JPB	DRAWN BY: BJK	
DATE: 05/01/13			

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DWG SIZE: B	SHEET: 1 OF 1	DRAWING NUMBER: Q-4816-LYT	A

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ADLER TANK RENTALS

Easy-to-clean, smooth-wall interior

18,000 Gallon
Open-Top Tank

(Available in California)

Capacity: 18,060 gal (430 bbl)
Height: 13'
Width: 8'
Length: 46' 1"
Tare Weight: 26,820 lbs

All sizes are approximate

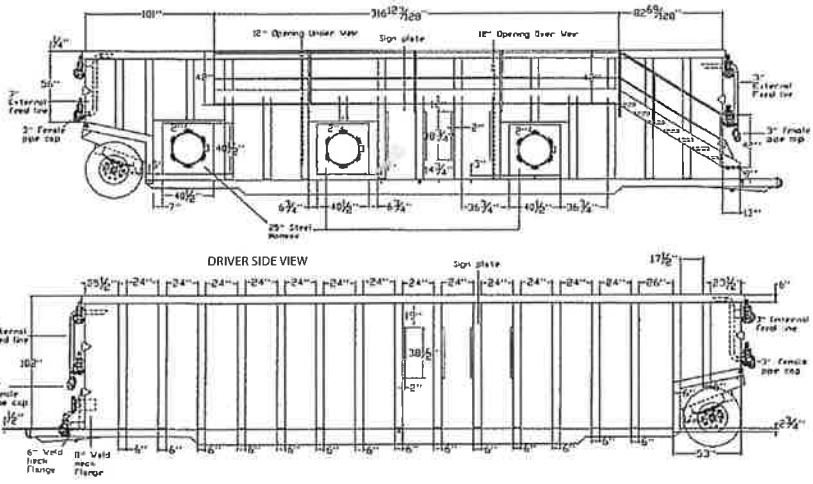
At Adler Tank Rentals, we are committed to providing safe and reliable containment solutions for all types of applications where performance matters.

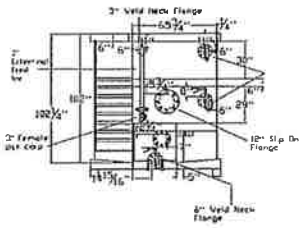
Designed to allow tank content access via an open top, the 18,000 Gallon Open Top Tank is outfitted with a complete set of safety features, including a built-in stair and walkway, safety decals and non-slip step materials on all climbable surfaces.

Mechanical Features

- Bare steel interior
- 3" fill line
- Three (3) standard 22" side-hinged manways
- Multiple valved fill/drain ports, including floor-level valves for low point drain out
- Sloped and V bottom for quicker drain out and easier cleaning
- Easy-to-clean design with smooth wall interior, no corrugations and no internal rods
- Fixed rear axle for increased maneuverability
- Nose rail cut-out for easy access when installing hose and fittings on the front/bottom of tank
- Open top for easy access to liquids being stored, pumped or treated
- Full-length catwalk equipped with safety rails and non-slip tread
- Two (2) front and two (2) rear 6" valved fill/drain port

18,000 Gallon Open-Top Tank





Tank configurations may vary in selected markets

Safety Features

- Non-slip step materials on ladderwells and catwalks
- "Safety yellow" rails and catwalks for high visibility
- Safe operation reminder decals
- Built-in stair and walkway

Options

- Heating coils
- Level gauges (fixed or temporary)
- External or internal manifold
- White exterior for MSS compliance
- Audible alarms, strobes and level gauges (digital and mechanical)

Comprehensive Service

Adler Tank Rentals provides containment solutions for hazardous and non-hazardous liquids and solids. We offer 24-hour emergency service, expert planning assistance, transportation, repair and cleaning services. All of our rental equipment is serviced by experienced Adler technicians and tested to exceed even the most stringent industry standards.

ADLER TANK RENTALS

800-421-7471 www.adlertankrentals.com

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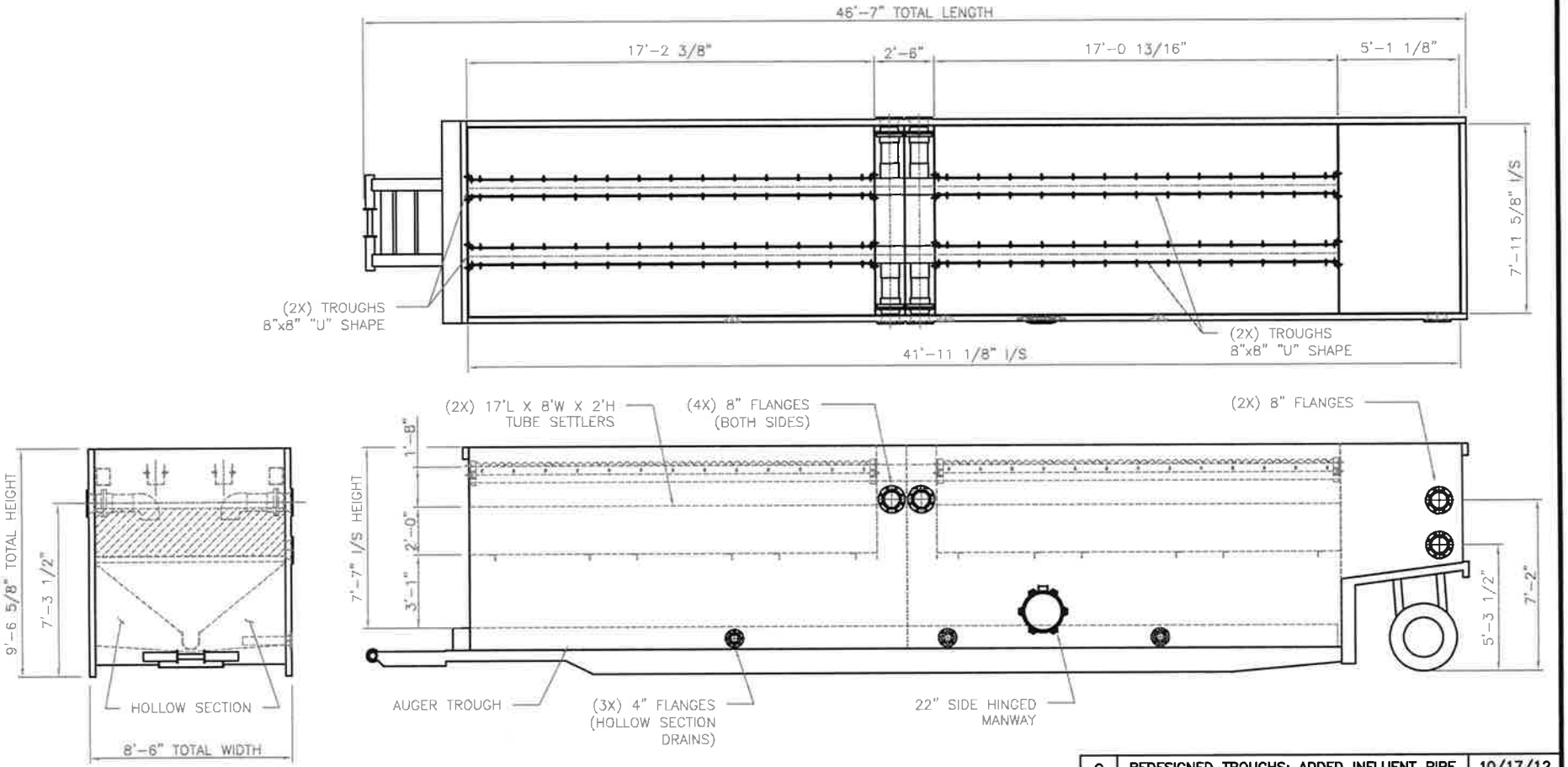

NO.	REVISIONS	DATE
C	REDESIGNED TROUGHS; ADDED INFLUENT PIPE	10/17/12
B	ADDED SLUDGE TROUGH, RESLOPED BOTTOM	04/06/12
A	TYPICAL	10/08/09

FRAC TANK CLARIFIER
GWTT# 1338
EQUIPMENT SPECIFICATION

FRAC TANK CLARIFIER SPECIFICATIONS

– GWTT EQUIPMENT NUMBER:	1338
– RIW NUMBER:	60272
– NOMINAL VOLUME:	18,000 GALLONS
– TANK CONSTRUCTION:	A-36 CARBON STEEL
– INLET CONNECTIONS (4X):	8" FLANGES
– OUTLET CONNECTIONS (2X):	8" FLANGES
– DRAINS (3X):	4" FLANGES
– APPX. TANK WEIGHT (EMPTY):	30,000 LBS
– APPX. TANK WEIGHT (OPERATING):	180,000 LBS

SCALE: NTS	APPROVED BY: BJK	DRAWN BY: BJK
DATE: 10/08/09		

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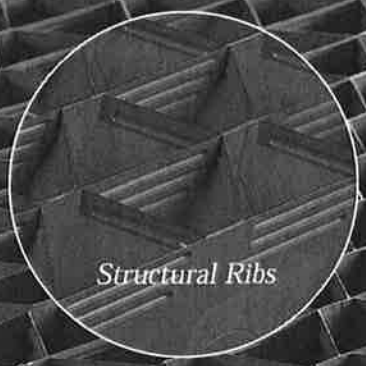
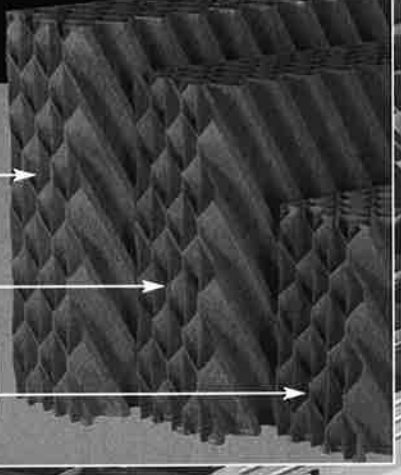
DENVILLE, NJ 07834

DWG SIZE: A	SHEET: 1 OF 1	DRAWING NUMBER: EQ-1338-SPC	C

ACCU-PAC® TUBE SETTLERS



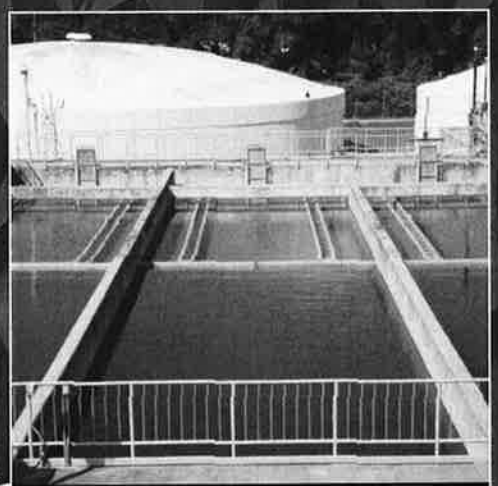
6000-SERIES



IFR-6041 (nom. 4 ft.)

IFR-6036 (nom. 3 ft.)

IFR-6024 (nom. 2 ft.)



City of Myrtle Beach, South Carolina

NSF®

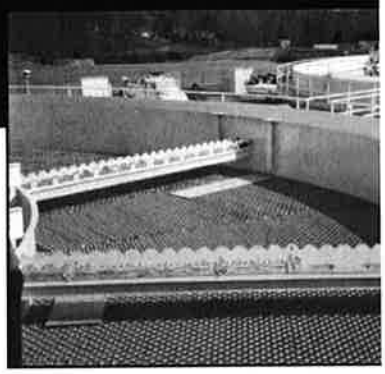
Certified to ANSI/NSF 61

AccuPac®

6000-Series Tube Settlers improve plant efficiency and quality for water clarification in potable water and wastewater applications.

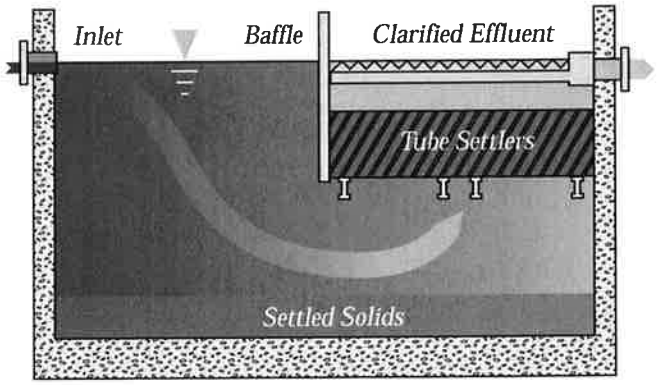
BRENTWOOD INDUSTRIES

ACCU-PAC TUBE SETTLERS



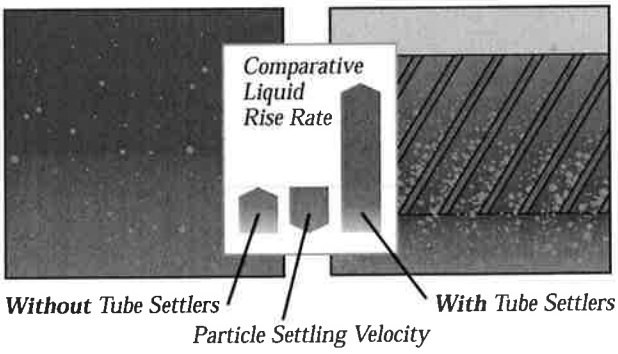
New Jersey-American Water Co.
Tinton Falls, New Jersey

AccuPac® 6000-Series Tube Settlers utilize individual, isolated tubular channels, each sloped at 60°, to expand the settling capacity of water and wastewater clarifiers. Engineered with the individual tubes rising in the same direction to eliminate mixing currents and unstable flow patterns. Constructed of flame-resistant, self-extinguishing PVC that is also inert to naturally occurring constituents in water and wastewater. Potable (blue) 6000-series modules are Tested and Certified by NSF to ANSI/NSF Standard 61.



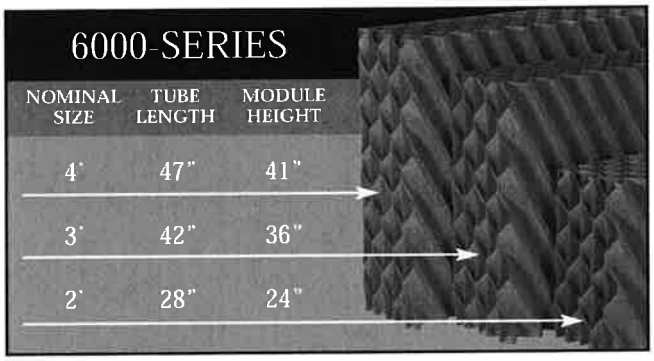
IMPROVE EFFICIENCY

The shape and configuration of 6000-series modules are engineered to minimize the Reynolds Number and to create laminar flow for rapid settling of solids. This enhanced settling reduces chemical coagulant use and downstream filter backwash requirements. For plant design and upgrading, less settling area is needed.



CONFIGURATIONS

For use in either circular or rectangular tanks, standard module sizes are 6, 8, 10, or 12 ft. lengths and 1 or 2 ft. widths. Other sizes available upon request. Available in both potable (blue) and non-potable (black).



Brentwood also offers complete systems including supports, baffles, surface grating, troughs, and weirs as required for both municipal and industrial projects.

Non-metallic chain and flight sludge collection systems for rectangular clarifiers are available from our Polychem division.

NSF Certified to ANSI/NSF 61

STRUCTURAL INTEGRITY

The 6000-SeriesTube Settler modules are self-supporting and constructed of prime, rigid, UV-protected PVC. Integrated structural ribs provide substantial loading strength (maximum 250 lbs/ft²). The unique design assures a solid interface during installation. Brentwood's sheet forming and bonding processes ensure tremendous strength and long-term durability.

HIGH-TUBIDITY, HIGH RATE APPLICATIONS

3' and 4' IFR-6000 modules are particularly effective in high-turbidity, and higher rate applications

TUBE SETTLER MAXIMUM APPLICATION RATES

Flow (GPM): Required flow through the basin.

Area (FT²): Tube settler area within the basin.

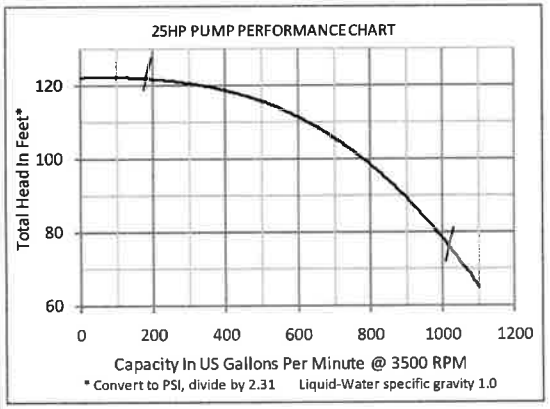
Application Rate (AR): $\frac{GPM}{FT^2}$

IFR-6024 (2 ft.)	IFR-6036 (3 ft.)	IFR-6041 (4 ft.)
AR = ≤ 2.5	AR = ≤ 4.0	AR = ≤ 4.5

BRENTWOOD INDUSTRIES

Brentwood Industries, Inc.
Mailing Address P.O. Box 605, Reading, PA 19603, USA
Shipping Address 610 Morgantown Road, Reading, PA 19611
Phone 610.236.1100 *Fax* 610.736.1280
Email wwsales@brentw.com
Website www.BrentwoodProcess.com

Printed 06/03

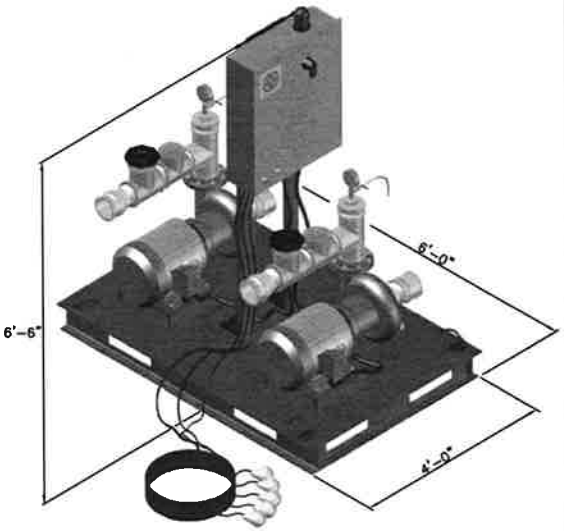


HIGH LEVEL ALARM

ELECTRICAL PANEL SPECIFICATIONS FOR 25 HP DUPLEX PUMP SKID

- VOLTAGE: 460 VOLTS
- PHASE: 3
- REQUIRED OVER CURRENT PROTECTION: 80 AMPS
- ACTUAL CURRENT LOAD: 71.1 AMPS

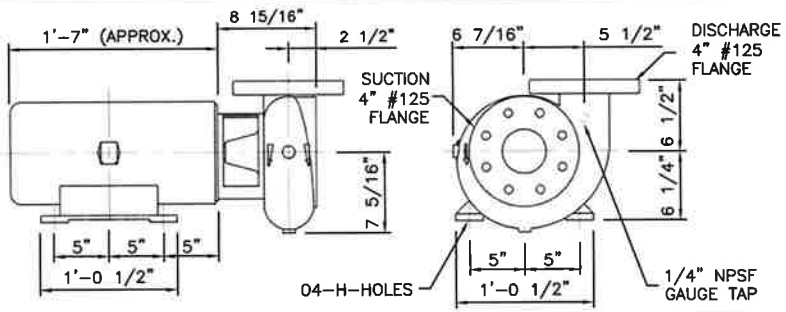
SERVICE WITHIN 50' (PROVIDED BY OTHERS)



NOTE: THIS DRAWING DEPICTS A "TYPICAL" SKID. ACTUAL DETAILS AND DIMENSIONS MAY VARY.

25 HP PUMP MECHANICAL/ELECTRICAL SPECIFICATIONS

– TYPICAL CAPACITY AND HEAD:	750 GPM @ 100' TDH
– CONSTRUCTION:	STAINLESS STEEL
– MAXIMUM HEAD:	120 ft.
– MAXIMUM FLOW:	1000 GPM
– FRAME:	256TCZ
– ENCLOSURE:	TEFC
– SUCTION:	4" FLANGE
– DISCHARGE:	4" FLANGE
– PUMP WEIGHT:	400 Lbs.
– IMPELLER DIAMETER:	6"
– DRIVER:	60 Hz 2 POLE 3500 RPM



NO.	REVISIONS	DATE
A	TYPICAL	01/14/09

DUPLEX 25 Hp PUMP SKID STANDARD EQUIPMENT SPECIFICATION

SCALE: NTS	APPROVED BY: JB	DRAWN BY: AAV	
DATE: 01/14/09			

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P.O. BOX 1174
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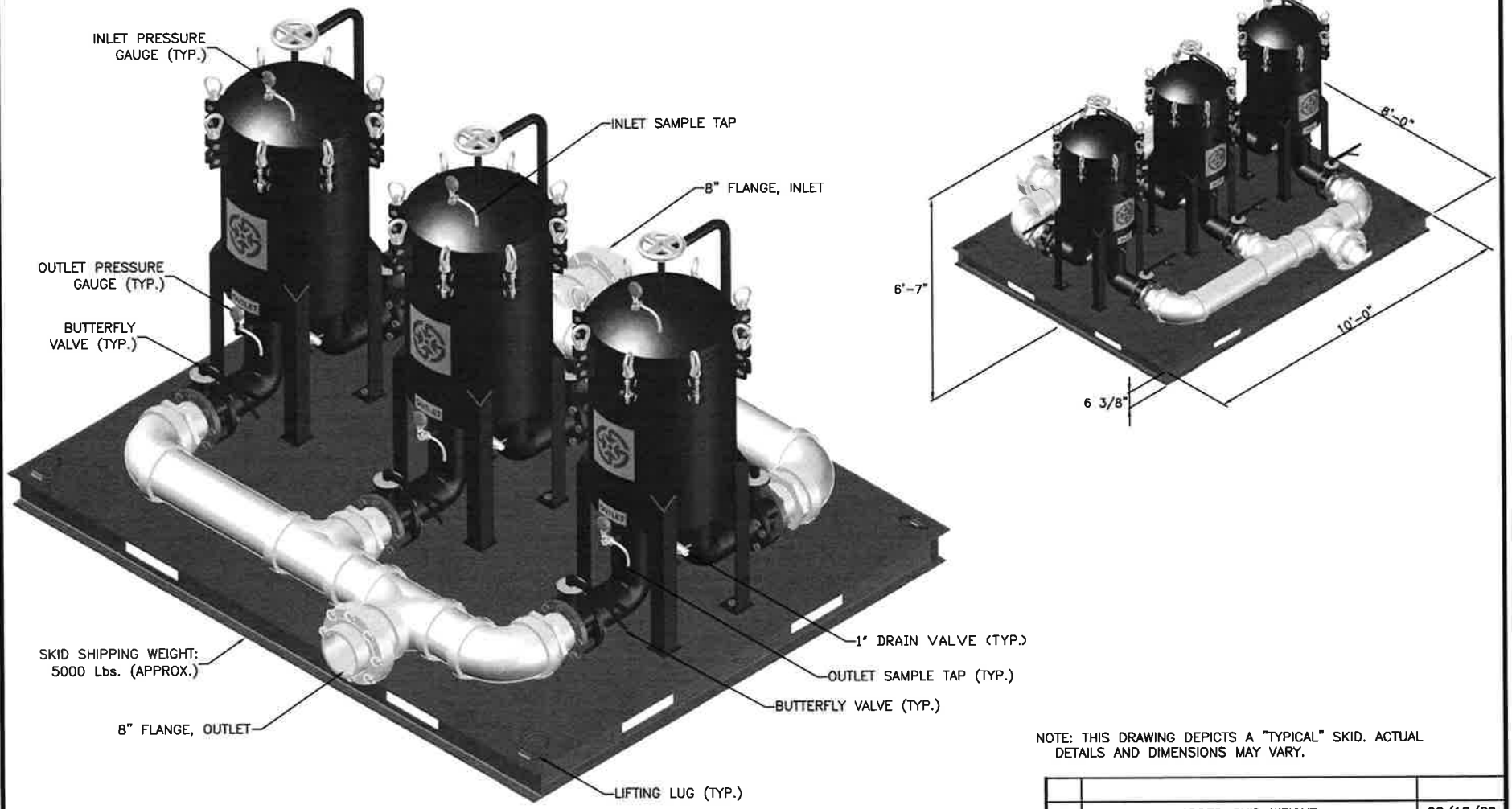
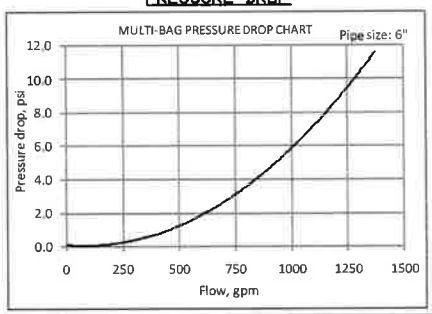
DWG SIZE: A	SHEET: 1 OF 1	DRAWING NUMBER: ST-0048-SPC	A



NOTE: THIS DRAWING DEPICTS A "TYPICAL" SKID. ACTUAL DETAILS AND DIMENSIONS MAY VARY.

PRESSURE DROP

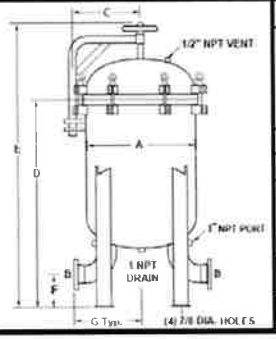


MULTI-BAG FILTER SPECIFICATIONS

- CONSTRUCTION:	CARBON STEEL
- HOUSING STYLE:	STANDARD
- NUMBER OF BASKETS:	6
- STRAINING FILTERING AREA:	26.4 SQR. FT.
- INLET/OUTLET SIZE:	6"
- NOMINAL FLOW RATE:	600
- STANDARD PRESSURE:	150 PSI
- WEIGHT (PER DRY UNIT):	750 Lbs.

BASIC DIMENSIONS

MODEL NUMBER & A: 24"
LEG BOLT CIRCLE: ø22.0"
B: 6" C:15.0"
D: 50.7" E: 69.7"
F: 7.00" G: 20.1"



NO.	REVISIONS	DATE
C	ADDED SKID WEIGHT	02/18/09

TRIPLEX SIX BAG FILTER SKID STANDARD EQUIPMENT SPECIFICATION

SCALE: NTS	APPROVED BY: JB	DRAWN BY: AAV	
DATE: 07/17/08			

GROUND/WATER TREATMENT & TECHNOLOGY
P.O. BOX 1174
DENVILLE, NJ 07834

DWG SIZE: A	SHEET: 1 OF 1	DRAWING NUMBER: ST-0020-SPC	C

Rosedale Filter Media

Rosedale has a wide selection of filter media available to help solve your filtration problems. Our product offerings include filter bags, filter cartridges, and perforated strainer baskets. This selection features a variety of options from low-cost, disposable filter media; through high-performance filter cartridge; to cleanable stainless steel elements.

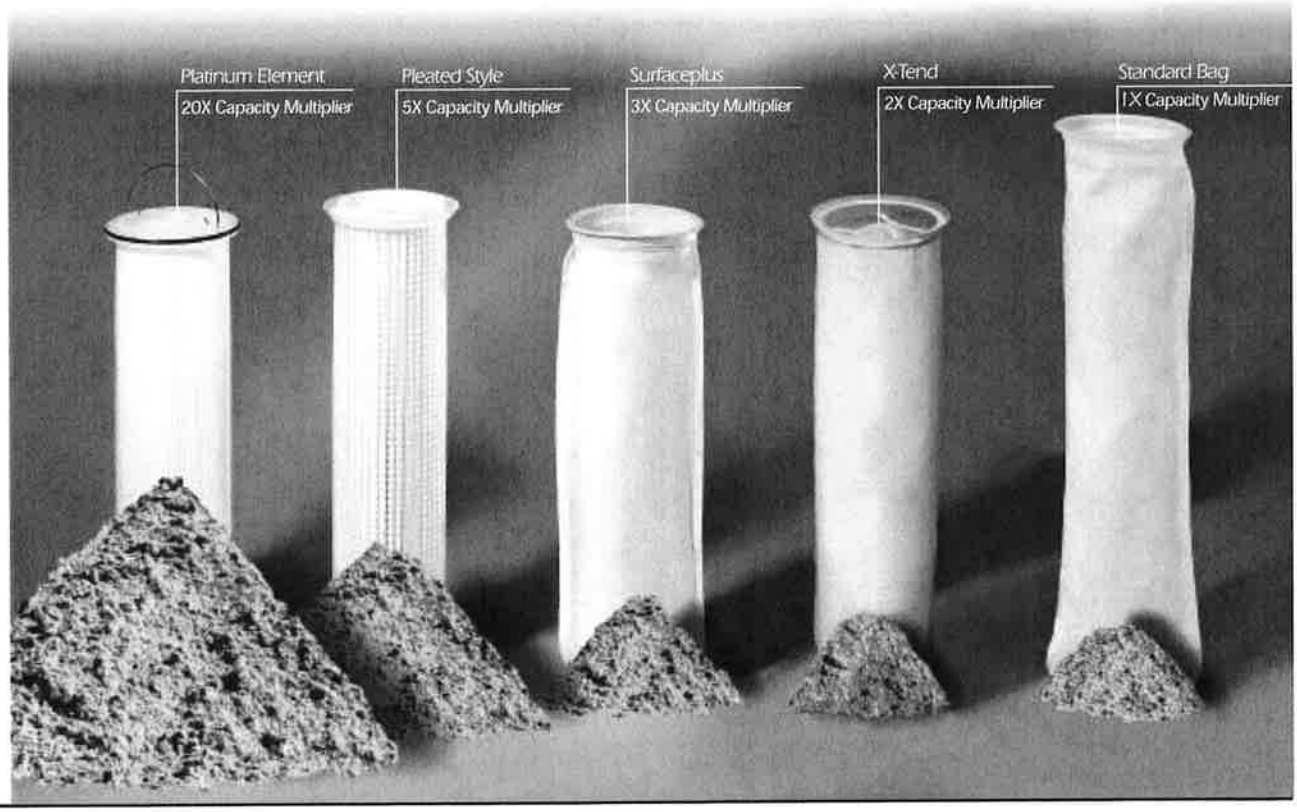
The filtration efficiency values specified in our data (see Element Performance Chart on page 123), are the indication of the filter's performance. Unlike many manufacturers, Rosedale publishes the filtration efficiency and dirt capacity of our media, providing all the information needed for an accurate sizing of a filter.

Our media is offered in standard grades and high efficiency. Standard grade refers to products which are nominally rated. This means there is no specified efficiency at the micron size but the product is interchangeable with industry standards. Rosedale high efficiency filter media is rated 95%, 99%, or 99.98% efficient at the specified micron level.

Nominal Rating	Absolute Rating (95% Efficiency)
1	35
3	35
5	48
10	55
15	65
25	70
50	90
75	110
100	110

Bag or cartridge filters are usually selected so that the clean pressure drop does not exceed 2 psi. Change-out is recommended at 15 psid (for bags), and 30 psid (for cartridges). Higher pressure drops may be tolerated when contaminant loading is low.

A more comprehensive chart on page 123 details each product group with corresponding efficiency and micron rating.



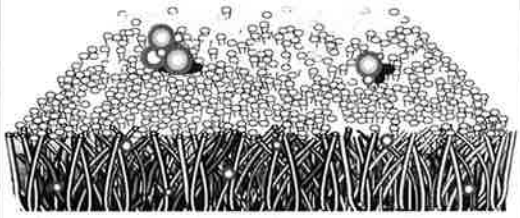
High-Capacity Filter Bags for Rosedale Bag Filters

Fits All Rosedale Filter Housings

Construction

Felt Bags-Standard Grade

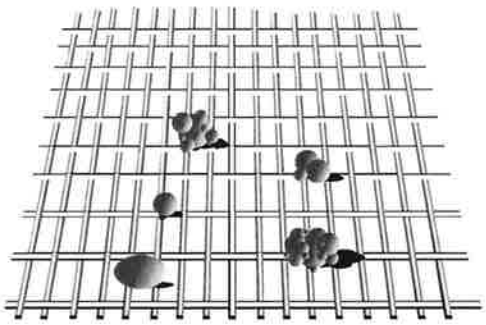
Felt construction is generally chosen where smaller particle retention is required, in the nominal 1 to 100 micron range. It offers higher solids loading capacity than mesh. General-purpose felt bags are offered in polyester and polypropylene materials. Special-purpose felt bags are offered in polyester and polypropylene materials. Special-purpose felt bags include high temperature service (to 500°F) bags of Nomex® nylon or Teflon®.



Mesh Bags

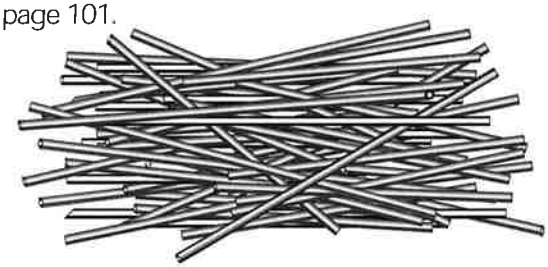
Mesh is a woven construction, generally used where micron ratings of 50 to 800 are required.

Two types are offered. The **multifilament** mesh is a low cost, disposable material offered in polyester. **Monofilament** mesh has higher strength, and is available in nylon. (It should be considered cleanable.)



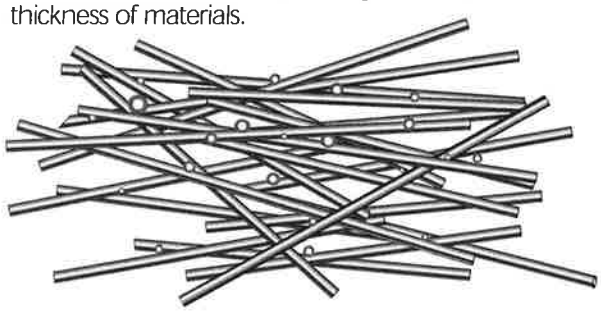
Oil Adsorption Bags

For removal of free oil, bags made of polypropylene microfibers, known as oil-adsorb, are available. A size 2 oil-adsorb bag will remove approximately a half-pound of oil from a water-oil liquid. It is only available with a 25 micron rating. If finer filtration is needed in an oil removal task, or high volume oil removal is required, Rosedale's Sorbent Containment Systems are available and information is located on page 101.



Melt Blown Media (Microfiber)

Polypropylene melt blown media offers unparalleled adsorption capacity for the removal of hydrocarbon contaminates from liquid streams. The melt blown media is also the heart of the high efficiency filter bag. The small diameter fibers create the bag's ability to remove fine particulate at high efficiencies. Fiber diameter is important because the pore size is a function of fiber diameter, density of fibers, and thickness of materials.

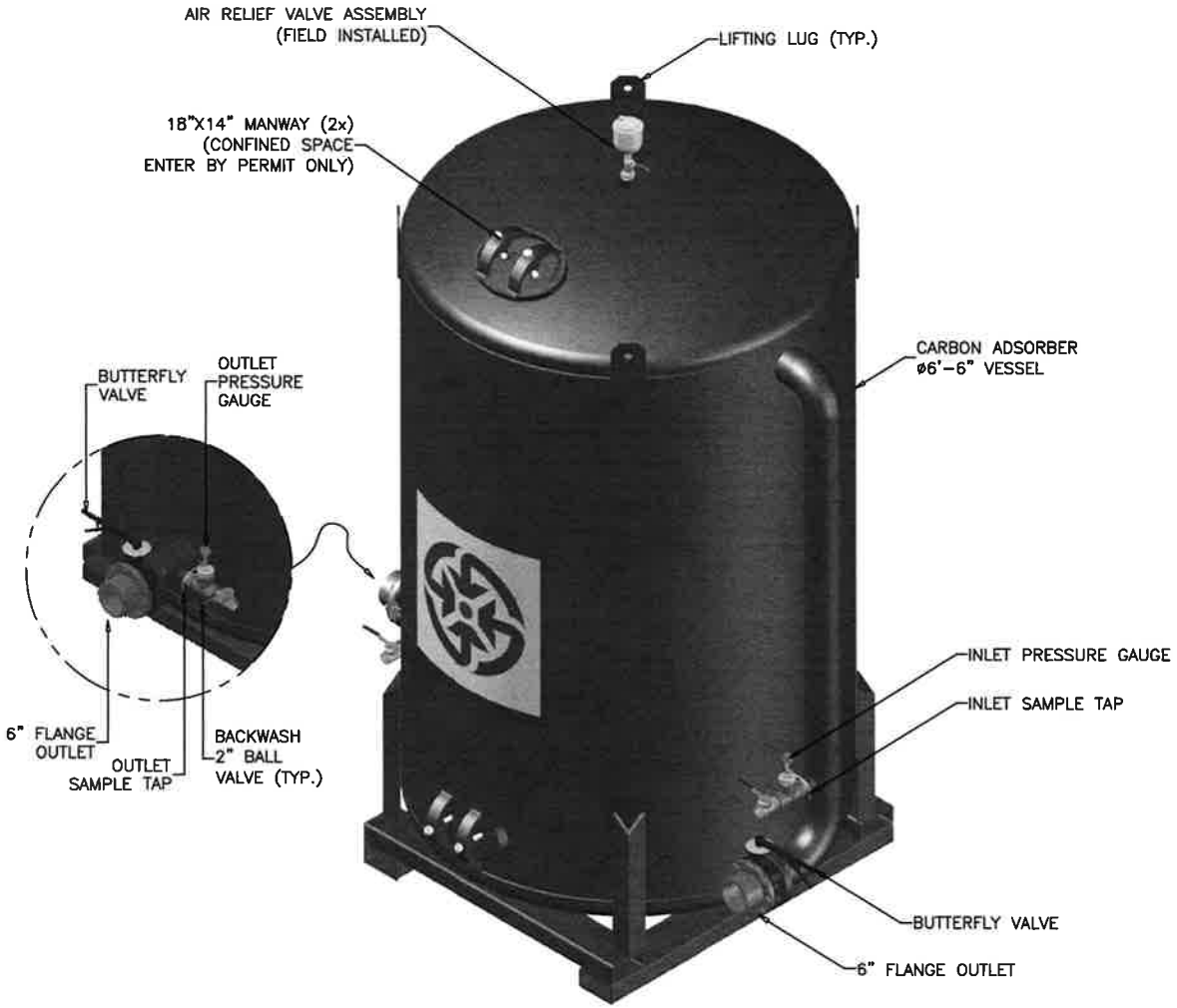


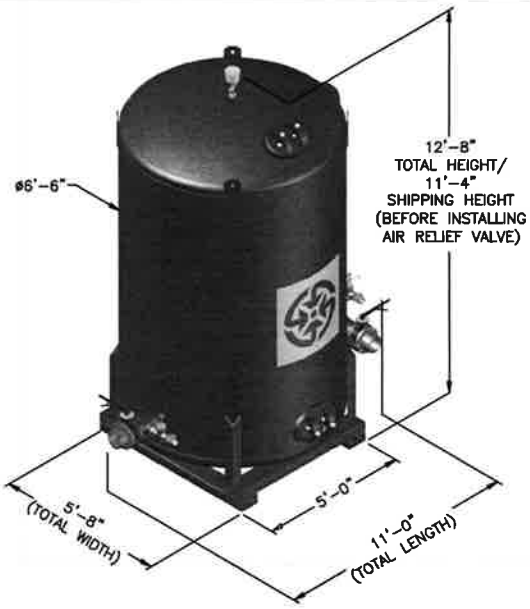
Felt Bag Finishes and Covers

Standard finish. Plain, as manufactured, without treatment or covers.

Glazed finish. The outer most surface fibers are melted by a momentary application of high heat. This bonds the fibers together and reduces the possibility of fiber migration.

Mesh covers completely encase the felt bag. This cover acts to contain any fibers that may separate from the filter bag. Materials available in mono and multifilament mesh, spun bonded nylon and polyester.





NOTE: THIS DRAWING DEPICTS A "TYPICAL" SKID. ACTUAL DETAILS AND DIMENSIONS MAY VARY.

6,000 POUNDS CARBON ADSORBER SPECIFICATIONS

– CARBON FILL:	6,000 Lbs.
– DESIGN STANDARD PRESSURE:	75 PSI
– MAX. FLOW RATE:	300 GPM
– HOUSING CONSTRUCTION:	A-36 CARBON STEEL
– INLET CONNECTION:	6" FLANGE
– OUTLET CONNECTION:	6" FLANGE
– CARBON FILL VOLUME:	210 Cu.ft.
– CARBON ADSORBER WEIGHT	
EMPTY:	4,500 Lbs.
SHIPPING (W/CARBON):	10,500 Lbs.
OPERATING:	20,000 Lbs.
– EBCT @ 300 GPM:	5.25 min.

NO.	REVISIONS	DATE
B	TYPICAL	05/26/09

6,000 Lb. CARBON ADSORBER STANDARD EQUIPMENT SPECIFICATION

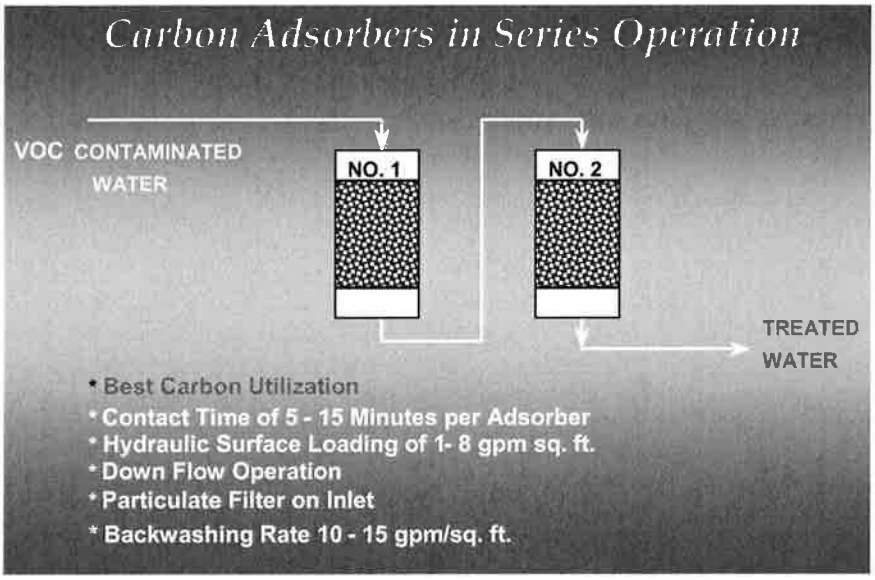
SCALE: NTS	APPROVED BY: JB	DRAWN BY: AAV	
DATE: 02/11/09			

GROUND/WATER TREATMENT & TECHNOLOGY
P.O. BOX 1174
DENVILLE, NJ 07834

DWG SIZE:	SHEET:	DRAWING NUMBER:	
A	1 OF 1	ST-0057-SPC	B

Design of Pump and Treat GAC Systems

A pump and treat scheme like the one shown in the Figure below made up of two adsorbers in series allows for the best utilization of the carbon. The adsorbers should be sized to give an empty bed contact time (EBCT) of between 5 and 15 minutes at a hydraulic surface loading of 1 to 8 gpm/ft^2. These operating parameters are important in that they can strongly influence the length of the mass transfer zone (MTZ). The length of the MTZ should be significantly shorter than the depth of carbon bed. If this is not the case rapid breakthrough of the components being controlled may occur.



The lead adsorber in series operation is normally operated beyond the breakthrough discharge limit for the first compound needing to be controlled. This allows for more complete loading of the carbon contained in the first adsorber (reducing carbon consumption) before it is changed out with fresh carbon and the second adsorber is moved to the lead position. Under some circumstances such as low contaminant concentrations, long contact times and long expected operating cycles, adsorbers can be operated in parallel without a backup adsorber, provided the effluent from the adsorber is frequently monitored. Often the appearance of the contaminant of interest at the vessels 75% sample port is used to schedule changeout servicing. Monitoring in this manner assures breakthrough beyond acceptable limits does not occur.

The above is an excerpt from USFilter Westates Technical Dept. Los Angeles, CA, Tech Note No. 24, October 2001 "Carbon Applications for Groundwater Clean-Up" by James R. Graham, PhD., Technical Director, USFilter Westates.

DATA SHEET

USFILTER WESTATES CARBON

AQUACARB® 830 AND 1240

Coal based granular activated carbon

(Formerly KG-401 and KG-502)

FOR MUNICIPAL, INDUSTRIAL AND REMEDIAL WATER TREATMENT

Description & Applications

AquaCarb® 830 and AquaCarb® 1240 are high activity granular activated carbons manufactured from selected grades of bituminous coal. Manufactured by direct activation, they exhibit exceptional hardness and attrition resistance and have become a cost effective choice for use in municipal, industrial and remedial water treatment applications. These high surface area microporous carbons have been specifically developed for the removal of a broad range of organic contaminants from potable, waste and process waters.

- ANSI/NSF Standard 61 classified for use in potable water applications
- Fully conforms to physical, performance and leachability requirements established by the current ANSI/AWWA B604 (which includes the Food Chemical Codex requirements)
- A detailed quality assurance program guarantees consistent quality from lot to lot and shipment to shipment

Quality Control

All AquaCarb® activated carbons are extensively quality checked at our State of California certified environmental and carbon testing laboratory located in Los Angeles, CA. USFilter's laboratory is fully equipped to provide complete quality control analyses using ASTM standard test methods in order to assure the consistent quality of all AquaCarb® carbons.

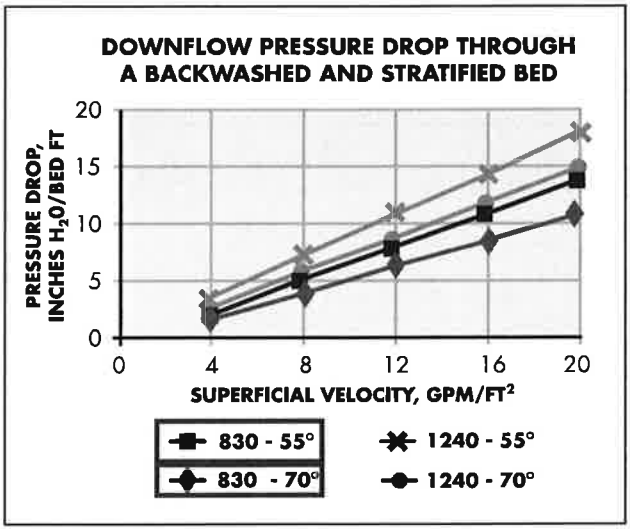
Our technical staff offers hands-on guidance in selecting the most appropriate system, operating conditions and carbon to meet your needs. For more information, contact your nearest USFilter representative.

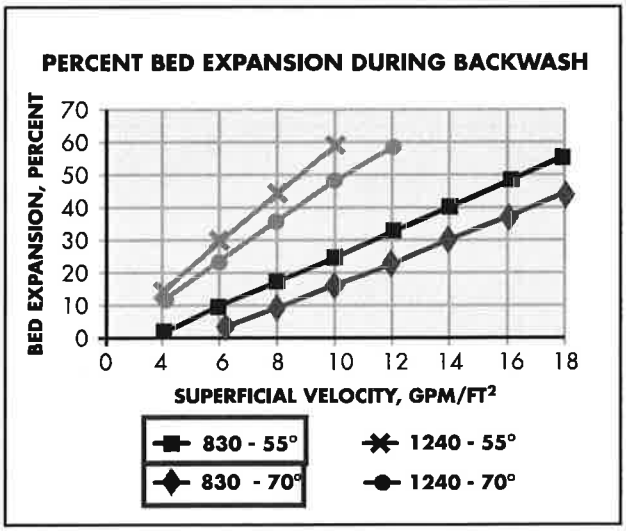
USFilter

AQUACARB® 830
AQUACARB® 1240

Coal based granular activated carbon

(Formerly KG-401 and KG-502)





Safety Note: Wet activated carbon depletes oxygen from the air and therefore dangerously low levels of oxygen may be encountered. Whenever workers enter a vessel containing activated carbon, the vessel's oxygen content should be determined and work procedures for potentially low oxygen areas should be followed. Read Material Safety Data Sheet (MSDS) before using this product.

All information presented herein is believed reliable and in accordance with accepted engineering practices. USFilter makes no warranties as to the completeness of this information. Users are responsible for evaluating individual product suitability for specific applications. USFilter assumes no liability whatsoever for any special, indirect or consequential damages arising from the sale, resale or misuse of its products.

SPECIFICATIONS/TYPICAL PROPERTIES

Specification	AquaCarb® 830	AquaCarb® 1240
Carbon Type	Bituminous Coal	Bituminous Coal
Mesh Size, U.S. Sieve	8 x 30	12 x 40
Effective Size, mm	0.8 - 1.1	0.55 - 0.75
Uniformity Coefficient (max)	2.1	1.9
Iodine No., mgI_2/g (min.)	900	1000
Abrasion No., Wt. % (min.)	80	80
Apparent Density, g/cc	0.46 - 0.54	0.46 - 0.54

USFilter

Westates
Customer and
Technical Service Network:

Gulf Coast Region	800.659.1723
(Louisiana)	225.744.3153
Western Region	800.659.1771
Mid-Atlantic Region	800.659.1717
Midwest Region	708.345.7290
Northwest Region	800.659.1718
Southeast Region	225.744.3153
New England Region	800.659.1717

USFilter reserves the right to change the specifications referred to in this literature at any time, without prior notice. AquaCarb is a trademark of United States Filter Corporation or its affiliates.

www.usfilter.com

USFilter

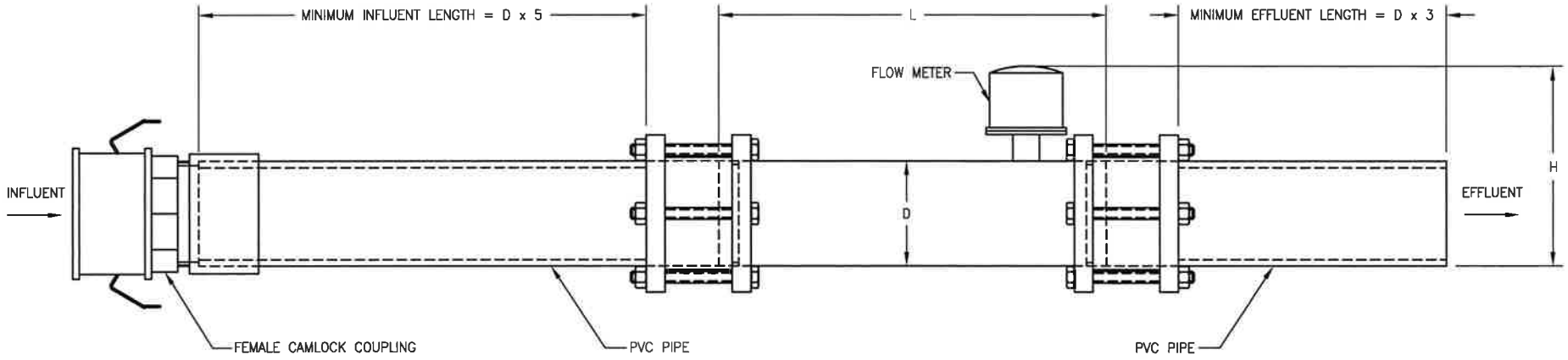
WESTATES CARBON
15319 Carmenita Avenue
Santa Fe Springs, CA 90670

TOLL FREE 800.659.1771
TELEPHONE 562.229.9606
FACSIMILE 562.229.9322

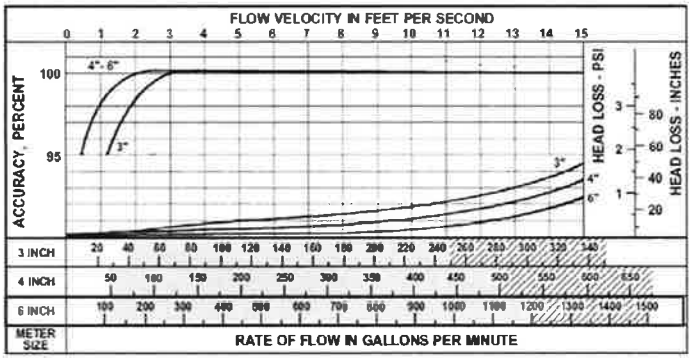
CARBON SPECIFICATION

AQUACARB™ NS
(Reactivated)

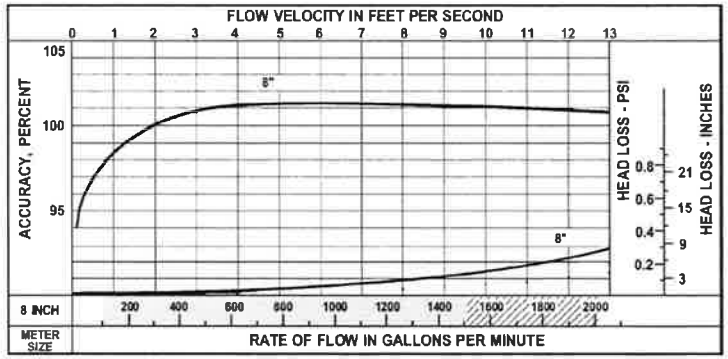
ANALYSIS	SPECIFICATIONS
Type	Reactivated Bituminous Coal
PSD, U.S. Standard Mesh Size	8x30 mesh, 5% max. over, 5% max. under
Iodine Number, mgI_2/g	850 min. 950 typical
Abrasion Number, wt. %	75 min.
Moisture as Packed, wt. %	2% max.
Apparent Density, g/cc	0.46 - 0.58



FLOW METER ASSEMBLY



ACCURACY AND HEAD LOSS CURVES
(3"/4"/6" FLOW METERS)



ACCURACY AND HEAD LOSS CURVES
(8" FLOW METER)

MG100 FLOW METER SPECIFICATIONS

– METER SIZE, D (INCHES):	3	4	6	8
– MAXIMUM FLOW U.S. GPM:	250	600	1200	1500
– MINIMUM FLOW U.S. GPM:	40	50	90	100
– HEAD LOSS IN INCHES AT MAX. FLOW:	29.50	23.00	17.00	6.75
– H (INCHES):	10.9	12.78	13.84	14.84
– L (INCHES):	13	20	20	20
– O.D. OF METER TUBE:	3.50	4.50	6.625	8.625
– MIN. INFLUENT LENGTH (INCHES):	15	20	30	40
– MIN. EFFLUENT LENGTH (INCHES):	9	12	18	24

– MAXIMUM TEMPERATURE: 160°F CONSTANT

– PRESSURE RATING: 150 PSI

NO.	REVISIONS	DATE
A	TYPICAL	01/28/09

FLOW METER ASSEMBLY STANDARD EQUIPMENT SPECIFICATION

SCALE: NTS	APPROVED BY: JB	DRAWN BY: AAV	
DATE: 01/28/09			

GROUND/WATER TREATMENT & TECHNOLOGY
P.O. BOX 1174
DENVILLE, NJ 07834

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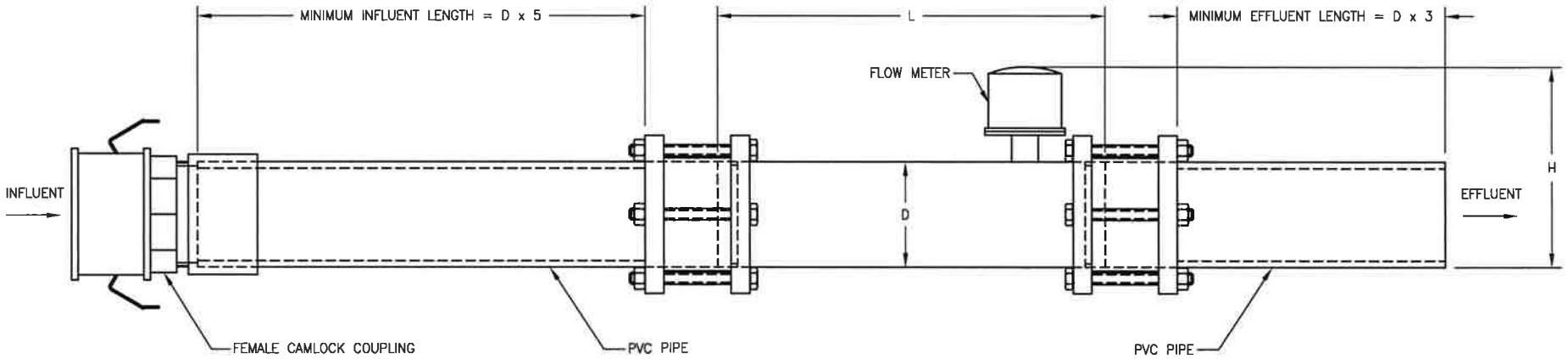
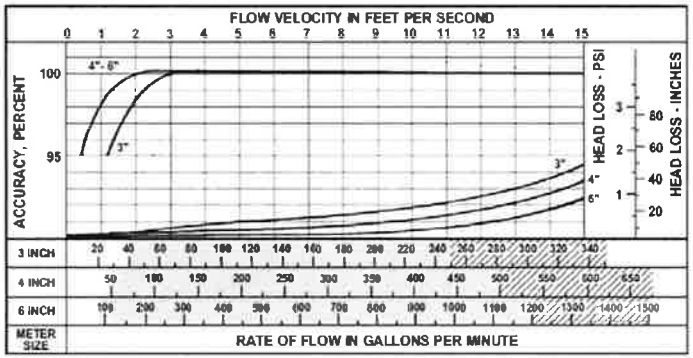
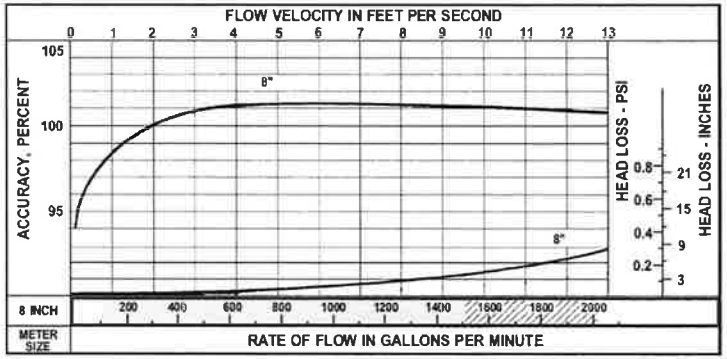


FLOW METER ASSEMBLY



ACCURACY AND HEAD LOSS CURVES
(3"/4"/6" FLOW METERS)



ACCURACY AND HEAD LOSS CURVES
(8" FLOW METER)

MG100 FLOW METER SPECIFICATIONS

	3	4	6	8
– METER SIZE, D (INCHES):				
– MAXIMUM FLOW U.S. GPM:	250	600	1200	1500
– MINIMUM FLOW U.S. GPM:	40	50	90	100
– HEAD LOSS IN INCHES AT MAX. FLOW:	29.50	23.00	17.00	6.75
– H (INCHES):	10.9	12.78	13.84	14.84
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NO.	REVISIONS	DATE
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FLOW METER ASSEMBLY STANDARD EQUIPMENT SPECIFICATION

SCALE: NTS	APPROVED BY: JB	DRAWN BY: AAV
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DENVILLE, NJ 07834

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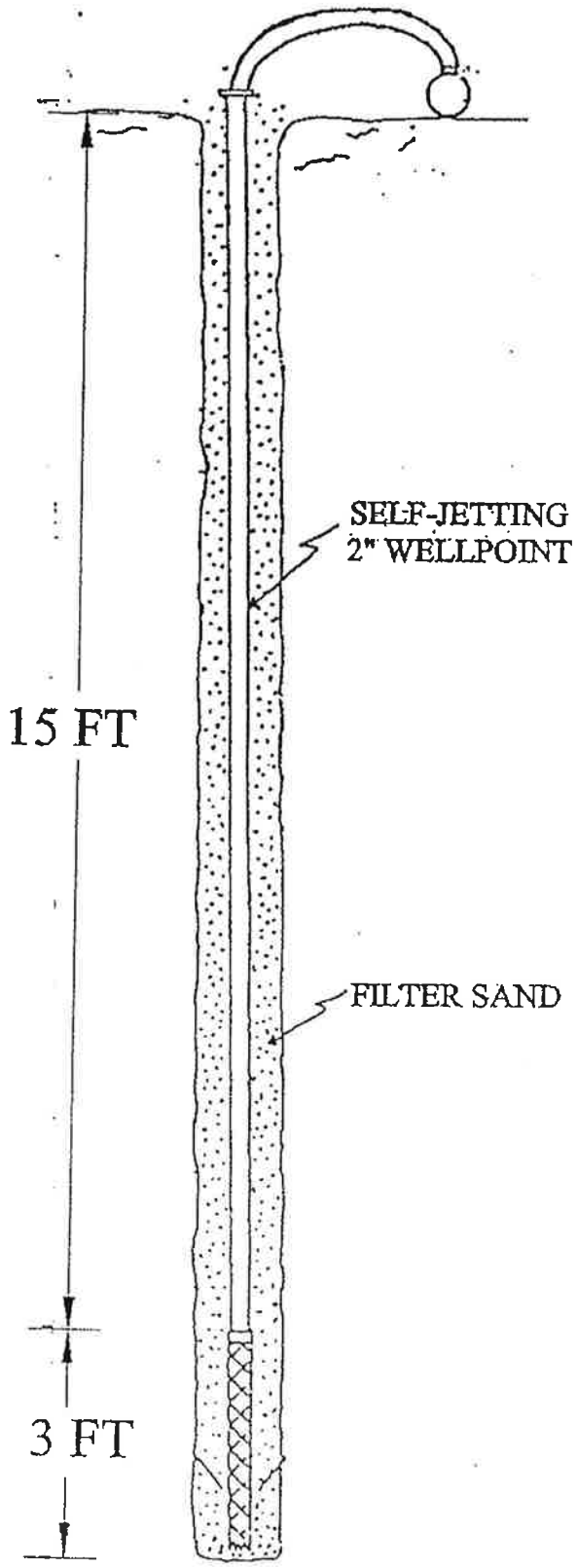

TYPICAL WELLPOINT DETAIL

MORETRENCH AMERICAN CORPORATION
100 STICKLE AVE. ROCKAWAY, NJ 07866

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I. INTRODUCTION

Langan Engineering and Environmental Services, P.C. (Langan) has completed a Preliminary Geotechnical Evaluation for FSM East River Associates, LLC (FSM) for the Kips Bay site that is part of the existing Con Edison First Avenue Properties (FAP) in the borough of Manhattan, New York. FAP consists of three distinct sites; the Parking Lot site located on First Avenue between East 39th and East 40th Streets; the Kips Bay site located between First Avenue and FDR Drive, and between East 35th and East 36th Streets; and the Waterside site located between First Avenue and FDR Drive, and between East 39th and East 41st Streets. FSM plans to develop all three sites. Figure 1 shows the sites on a topographic map of the area.

This report has been divided into three volumes as follows:

- Volume 1 – The Parking Lot Site
- Volume 2 – The Kips Bay Site
- Volume 3 – The Waterside Site.

The objectives of this investigation were to evaluate the site subsurface conditions and to provide preliminary geotechnical recommendations with respect to future building construction by FSM. Although building designs have yet to be proposed at the sites, this report provides general concepts for foundation construction alternatives that appear feasible for each specific site. An environmental assessment of each site has been prepared by TRC Environmental Corporation (TRC) and issued under separate cover.

Specifically, the purposes of this investigation and report were to evaluate the site subsurface conditions, and to provide preliminary geotechnical recommendations for construction with respect to the following:

1. suitable foundation systems including estimated design capacities;
2. appropriate floor slab support;
3. anticipated settlements;
4. lateral earth pressures for the design of temporary and permanent sub-grade walls;
5. drainage schemes for temporary and permanent groundwater control;
6. protection of the proposed Con Edison steam tunnel and utility corridors adjacent to the site;
7. construction recommendations including soil and rock excavations; and,
8. seismic design parameters according to the NYC Seismic Code.

To accomplish the purposes stated, Langan performed the following services:

1. reviewed available geologic and geotechnical information of the area;
2. conducted a field subsurface investigation program;
3. performed a geotechnical laboratory testing program on selected samples; and,
4. analyzed the results and presented recommendations contained in this report.

II. EXISTING CONDITIONS and PROPOSED DEVELOPMENT

The Kips Bay site is an approximate 69,500 sq ft (1.6 acre) tract that spans the entire block bounded by First Avenue to the west, East 35th Street to the south, the FDR Drive to the east, and East 36th Street to the north. Langan understands that a 50 to 60 story building is conceptually planned for this site, although a building design is yet to be proposed.

At the time of the investigation, the site was divided into two areas. The western portion of the site contained several one to two story structures and parking areas. The eastern portion of the site was undergoing demolition activities to remove below grade concrete slabs. The eastern portion of the site was backfilled with crushed stone and made level with the surrounding grades. The grade is nearly level, sloping gently to the east, with ground elevations[1] of about el 8 along First Avenue and about el 6 along the FDR Drive.

Currently, building design plans have not been developed. However, recommendations given in this report are based on the assumption that a 50 to 60 story high-rise building with multiple basement levels is to be constructed on the Kips Bay site. Once design plans are finalized, recommendations given in this report should be reviewed and revised as necessary to address specific design issues. An additional field subsurface exploration program will likely be needed to meet New York City Building Code (NYCBC) and/or specific design requirements.

III. GEOLOGIC BACKGROUND

In order to obtain general geologic information about the Kip's Bay site, and to tailor the field investigation and laboratory testing program to anticipated subsurface conditions, we reviewed available United States Geologic Survey (USGS) Geologic Maps and investigations previously performed by Langan on nearby sites.

The surficial soils at Kips Bay can be described as "Made Lands". Made Land soils are generally characterized by highly variable constituents, especially in areas along

[1] Elevations given in this report reference the borough of Manhattan datum, which is 2.75 ft above mean sea level as established by the 1929 NGVD at Sandy Hook, NJ.

waterways. As these areas (including this site) are comprised of reclaimed land, material utilized to achieve the existing site elevations were often highly variable with various constituents. Generally, the material is comprised of sand and gravel sized particles, however silts and clays, along with larger cobble and boulder sized material can be encountered, particularly in areas once occupied by structures. As such, typical engineering properties are difficult establish.

The site lies within the southern Manhattan Prong of the New England Upland physiographic province. The underlying bedrock geology of the site was formerly defined as the Manhattan Formation. However, the U.S. Geologic Survey (USGS) recently refined the Manhattan geology by subdividing the underlying bedrock into the Manhattan and Hartland Formations. Figure 2, the "Bedrock and Engineering Geologic Maps of New York County", shows that the Kips Bay site is situated in the Hartland Formation. The Hartland Formation is characterized by dark gray, medium to coarse grained muscovite-biotite-garnet schist and gray fine grained quartz-feldspar granulite with biotite and garnet, with localized concentrations of granite and intrusions of course grained granitic pegmatite. Schist is a metamorphic rock formed under the effects of heat and pressure during deep burial with the earth's crust.

The predominant structural feature of the Hartland Formation schist is the parallel alignment of the mineral grains, which is technically referred to as schistosity or foliation. The dominant regional structural features (due to schistosity and folding) trend approximately parallel to the Manhattan Meridian North[2] with local variations due to asymmetrical folding and generally dip steeply to the west or to the east, depending on the local positioning within the fold. Foliation dipping to other directions or nearly horizontal foliation has been observed.

The quality of the Hartland Formation schist is generally fair to good, and tends to improve with depth. However, localized shear zones and zones of decomposed rock are known to exist, sometimes to significant depths. A review of the Rock Data Map of Manhattan (1944) indicates that the site lies outside the original shoreline of Manhattan (about First Avenue) and that rock elevations in the vicinity of the site range from about el +3 along 1st Avenue to about el -102 along the FDR Drive.

A prominent geologic structural feature has been mapped just to the east of the sites, along the west shore of the East River. The feature, known as Cameron's Line, is a contact zone between the schist and granulite of the Hartland Formation (to the east) and Inwood Marble, Fordham Gneiss, and Ravenswood Granodiorite (to the west). Within the

[2] Manhattan Meridian North is oriented approximately 30° east of True North.

contact zone, highly variable bedrock conditions (elevations, rock type and quality) can be expected.

IV. KIPS BAY SUBSURFACE INVESTIGATION

In order to obtain information regarding types of encountered soils, depth to bedrock, and quality of rock, the Kips Bay subsurface investigation plan included 29 test borings (denoted B-1 through B-29). Two borings originally planned were deleted from the program (B12 and B-19) by TRC. In addition, one borehole was abandoned and not relocated after two attempts were made to advance the borehole (B-1). A total of 26 borings were actually drilled. The field investigation was conducted under the full-time controlled inspection of Langan field engineers who classified representative soil and rock samples, and maintained logs of all borings. The boring locations were selected in conjunction with TRC to provide required geotechnical as well as environmental data. GEOD Corporation (GEOD) measured the ground surface elevation at each borehole location in the field. As previously noted, TRC is preparing an environmental assessment/work plan for the site under a separate contract.

Geotechnical Investigation

Warren George Inc. (WGI) and Aquifer Drilling and Testing, Inc. (ADT) drilled the borings from April 2001 through September 2001. The type of drill rig used depended on the company that drilled the borehole and the borehole location. Mobile B-61 and B-80, CME-55 and 75 truck mounted rigs, and a DK50RA skid rig were used to advanced the test borings to depths ranging from 17 to 420 ft using 3⅞-inch tri-cone roller bits and mud rotary drilling techniques. Each borehole was hand excavated to a depth of about 5 ft to clear the hole of near-surface utilities.

Standard Penetration Tests[3] (SPT) and split spoon sampling were generally conducted at 5-ft intervals until roller bit refusal. Five undisturbed (Shelby tube) samples were obtained from various borings. Rock core samples were retrieved in each of the borings using an NX-size double tube core barrel with a diamond bit. The rock core samples were measured to determine percent recovery[4] and Rock Quality Designation (RQD)[5]. Oriented cores that allow for the measurement of the strike and dip of structural features (i.e., foliation, folding, joint sets, etc.) were obtained from three borings by WGI.

---

[3] SPT: Number of blows of a 140 pound hammer, falling freely for 30 inches, required to advance a 2-inch O.D. split spoon sampler 12 inches, after an initial penetration of 6 inches.

[4] The total length of retrieved core pieces divided by the total core run.

[5] RQD: The total length of all pieces of a core 4 inches or longer divided by the total length of the core run.

Figure 3 presents the Boring Location Plan. Copies of the boring logs are contained in Appendix A.

Geotechnical Laboratory Testing

Representative soil samples were selected for laboratory testing. Laboratory testing was used to confirm classifications and to determine index properties for use in engineering evaluation and preliminary recommendations given in this report. Rock core samples were examined in our laboratory.

The following geotechnical tests were performed:

Atterberg Limits – Liquid and Plastic (ASTM D4318)
Water Content Determinations (ASTM D2216)
Permeability (ASTM D2434)
Grain Size Distribution (ASTM D422)

Geotechnical laboratory test results are presented in Appendix B.

Environmental Investigation

As part of their environmental investigation, TRC collected soil and water samples from the test borings and conducted Organic Vapor Monitoring (OVM) of the split spoon samples. Sampling locations and OVM readings are noted on our logs. Refer to the TRC report for full details and results of their investigation.

V. SUBSURFACE CONDITIONS

The generalized stratigraphy underlying the Kips Bay site consists of a surficial layer of fill overlying alternating layers of silty sand and clay followed by weathered rock and competent bedrock. These strata are discussed in the following sections in order of increasing depth.

Subsurface profiles of five selected cross-sections (designated A-A and E-E) taken through the site are presented in Figures 4 through 6. The cross-section locations are shown in Figure 3. Table 1 summarizes the approximate thicknesses and elevations of the various strata encountered in the borings.

Miscellaneous Fill [11-65][6]

A surficial layer of brown, silty, medium to coarse sand fill was encountered at all boring locations, and appears to be present over the entire site. The average thickness of the sandy fill was about 22 ft, with local variations throughout the site of about 10 to 39 ft. The fill was thickest along the FDR Drive, and thinnest along First Avenue. The sandy fill contained gravel, cinders, wood, brick, and concrete. Concrete slabs/foundations varying in thickness from about 3 to 12 ft were encountered in eight borings at depths ranging from about 4 to 7 ft below the existing ground surface. The slabs were cored with an NX-size core barrel. See Table 2 details regarding the encountered concrete obstructions.

The upper 5-ft of this stratum was hand excavated to avoid damage to existing utilities, therefore SPT was not performed in the upper 5 ft of the fill material. Below 5 ft, SPT N-values ranged from 6 blows per ft (bpf) to refusal of the split spoon sampler[7] with typical values of 10 to 15 bpf. The higher N-values are most likely a result of the debris in the fill that impeded advance of the split spoon sampler. The fill is considered to be loose to medium dense.

The fill material is classified as NYCBC Class 11-65 nominally unsatisfactory bearing material.

Layered Sand and Clay – East River Deposits

Immediately below the surficial fill are alternating layers of natural sand and clay deposited by the East River. At nine of the test boring locations, sand was present immediately below the fill, while at 16 locations clay was encountered below the fill (in one boring mica schist was present just below the fill, see below). Sand was the predominate material and was interbedded with multiple, thin clay layers. The sand and clay strata were encountered at depths ranging from about 10 to 39 ft below the existing ground surface. This corresponds to elevations of about el -2 to el -34. The combined total thickness of the sand and clay strata varied from a minimum of about 6 ft in the western portion of the site to about 125 ft in the east (closest to the East River).

Fine to Medium Sand [7-65 and 8-65]

The gray-brown, silty, very fine sand and brown, silty, fine to coarse sand contained a trace of mica. Laboratory tests indicated that the fines content (percent silt and clay) varied from about 15% to 50%. In the nine borings where sand was immediately below

[6] The numbers in brackets [ ] indicate the classification of soil and rock materials as per the New York City Building Code (NYCBC).
[7] Refusal of the split spoon sampler is defined as when the number of blows required to drive the split spoon sampler exceeds 100 blows for a 6-inch increment.

the fill, the upper sand layers were typically about 4 to 12 ft thick. In the borings where the sand was underlying clay material, the sand was about 17 ft to more than 85 ft thick. Sand was not found in borings B-13 and B-29.

The upper portion of the sand layers were loose to medium dense as indicated by SPT N-values that were in the range of about 10 to 20 bpf. The relative density of the sand generally increased with depth. The lower portions of the sand strata were medium dense to dense with SPT N-values on the order of 30 to 60 bpf. Occasional high SPT N-values (greater than 75 bpf) were recorded as a result of the presence of gravel, cobbles, and weathered rock material within the sand strata.

The sand stratum is classified as NYCBC Class 8-65 (very fine sand) and Class 7-65 (sand).

Silty Clay [9-65]

In 16 of the borings, a relatively thin layer of greenish-gray and black organic clay was encountered just below the fill. The clay contained silt, peat, mica, and a trace of very fine to fine sand. In general, there were about two to three layers of clay interbedded within the sand. The thickness of the clay lenses varied from about 3 to 29 ft, with the trend of thickening toward the east (approaching the East River). No clay was encountered in borings B-18, B-21, and B-24.

Results of Atterberg Limits tests show that the clay is highly plastic. The average plastic limit (PL) and liquid limit (LL) were 30 and 60, respectively. Typical SPT N-values ranged from 3 to 16 bpf, indicating a soft to stiff deposit. There are some localized very soft zones (weight of hammer) and very stiff lenses with SPT N-values of 20 to 25 bpf (possibly due to obstructions). Unconfined strength as indicated by a pocket penetrometer were generally from 0.5 to 1 tsf, which confirms that the clay is a medium stiff deposit.

The natural water contents of the medium stiff clays were typically near the liquid limit, which is indicative of a normally consolidated deposit. Organic material can raise the water content of the sample, making the clay appear to be normally consolidated rather than slightly overconsolidated. For the stiff clays, natural water contents were closer to the plastic limit, indicating that the deposit is slightly overconsolidated.

The silty clay is classified as NYCBC Class 9-65.

Weathered Rock [4-65]

Highly weathered to decomposed mica schist rock was encountered immediately below the natural sand and clay layers in 14 of the 26 completed borings. The mica schist rock has weathered into a dark gray and greenish-brown silty medium to coarse sand with muscovite and biotite mica, garnet, and quartz pieces. The weathered rock recovered in split spoon samples typically displayed the structure of the parent material, but was easily disturbed with finger pressure.

The weathered rock material was encountered at depths varying from about 30 ft along First Avenue, to approximately 142 ft adjacent to FDR Drive. Where weathered rock was present in the western half of the site, the stratum was a maximum of about 6 ft thick. In the eastern portion of the site, the stratum thickness ranged from a few feet to more than 260 ft.

At a distance of about 60 to 70 ft from the FDR Drive, the depth to weathered rock dramatically dipped downward toward the East River. The weathered rock stratum thickness also increases dramatically at this point. It is believed that these significant increases occur where the prominent geologic structural feature Cameron's Line cuts through the site. As discussed, Cameron's Line is a geologic contact between the Hartland Formation and Inwood Marble and Fordham Gneiss. Near the contact, temperature and stress within the contact zone likely altered the Hartland Formation. This may have contributed to the very deep zone of weathered rock encountered beneath the eastern portion of the site.

SPT N-values were high, generally exceeding 100 bpf, indicative of a very dense material. Even though the density of the weathered mica schist impeded advance of the split spoon sampler after a few inches, the borehole could be advanced using the tri-cone roller bit.

The weathered rock is classified as NYCBC Class 4-65.

Schist Bedrock (1-65, 2-65, and 3-65)

Competent, gray mica schist bedrock (Manhattan Schist) underlies the surficial fill, layered sand and clay strata, and weathered rock. The top of competent rock was defined as the point of split spoon and tri-cone roller bit refusal, and the beginning of rock coring. Bedrock was encountered at a depth of about 11 ft adjacent to First Avenue (~el -4) and progressively increased to a depth of about 85 ft in the central portion of the site (~el -78). Within the eastern portion of the site, where the deep weathered rock zone was encountered, competent rock was not reached until a depth of about 400 ft (el –394).

Three borings (B-6, B-16, and B-27) along the FDR Drive were terminated within the weathered rock at depths of 290 ft, 262 ft, and 381 ft.

The schist bedrock encountered has a prominent foliation produced by the parallel alignment of biotite, muscovite, and chlorite mica minerals. The mica schist was generally fresh to slightly weathered with fracturing primarily parallel to the foliation. Joint and foliation dip angles ranged from about 15° to 55°, but were typically about 45° below horizontal. Quartz and occasional garnet minerals were noted.

Core recoveries ranged from about 58% to 100%, but generally exceeded 90%, whereas, Rock Quality Designation (RQD) values ranged from about 33% to 98%, typically exceeding 80%. These recovery and RQD values indicate good quality rock designated as NYCBC Class 1-65 to Class 2-65. In test borings B-5, B-17 and B-26, about 7 to 10 ft of NYC Class 3-65 rock was encountered immediately below the weathered rock. A 4-ft thick seam of Class 3-65 rock was noted in boring B10 at about 5 ft below the top of competent bedrock.

Oriented cores were obtained from three borings, B-7, B-18, and B-29. Discontinuities can be measured on oriented cores to determine the direction of planar structural features (foliation, joint sets, etc.) that can be used in evaluating rock excavation slope stability. In general, fractures parallel to foliation dip westward, whereas, fractures perpendicular to foliation dip to the east. Table 2 summarizes the oriented core data.

The bedrock is classified as NYCBC Class 1-65 (hard rock) to Class 2-65 (medium hard rock).

Groundwater

Groundwater was observed in the boreholes at about 8-ft to 11-ft below the existing ground surface. This corresponds to about el –0.5 to el –6.5. Noted groundwater levels are shown in Table 1. Due to the site's proximity to the East River, groundwater levels can be expected to be tidally influenced and fluctuate accordingly.

Refer to the TRC report with regard to potential groundwater contamination issues.

VI. EVALUATION AND PRELIMINARY RECOMMENDATIONS

The following sections discuss our evaluation and preliminary design recommendations for feasible foundation systems, floor slabs, lateral earth pressures, excavation, seismic and liquefaction considerations, and groundwater control. Anticipated column loads were

not available at the time of this report. Once the actual building design has been developed, building specific foundation design recommendations should be reevaluated.

Shallow Foundations

Spread Footings

The use of spread foundations is not considered feasible for this project. The surficial fill materials are not suitable for support of spread footings due to their variable compaction (loose to medium dense). Being loose in nature, the miscellaneous fill and natural sands are susceptible to liquefaction, which prohibits footings from bearing in these materials. Spread footings would also impose additional stress on the underlying clay soils that could result in unacceptable total and/or differential settlements for the likely high column loads.

Mat Foundation

Once the building design is developed (i.e. building loads, basement elevations, etc.) the use of a mat foundation could be considered. It is estimated that the building would have to be founded at a depth of at least 25 ft below the existing grade to bypass the uncontrolled fill and liquefiable sandy soils. A mat contact pressure could be determined such that new stresses imposed on the underlying clay layers would not result in settlements that exceed tolerable limits of the structure.

Deep Foundations

Two deep foundation alternatives are considered feasible for this project; driven piles bearing on the weathered/competent rock, and drilled piles (caissons) with rock sockets. Pile options considered include timber, steel pipe, tapered piles, and H-piles. The following sections discuss the foundation alternatives and provide recommendations specific to each based on information found in geotechnical publications, the NYCBC, Langan's geotechnical experience, and data from our subsurface investigation.

Timber Piles

Timber piles do not appear practical for support of the anticipated heavy column loads, but could be considered for floor slab support. A frictional timber pile driven through liquefiable soils into the underlying natural layered sand and clay should provide up to about 25 tons of axial (download) capacity. Assuming a 5-ton per pile downdrag allowance (negative skin friction), the design axial capacity would be about 20 tons per pile. The average length of the piles is anticipated to be about 50 ft as measured from the existing ground surface. In the eastern portion of the site, where rock is less than 50 ft, the timber piles can be used as end-bearing piles and provide the axial capacity given above. Frictional and end-bearing timber piles should have a minimum tip diameter of

8 inches and a uniform taper. Once the building loads, elevations, and locations are defined, the feasibility and design parameters for timber piles should be reevaluated.

It should be noted that numerous concrete obstructions and debris in the upper fill were encountered during our test boring program. In order to drive piles through the fill, pre-drilling, pre-excavation, and/or spudding would likely be required to prevent damage to the piles.

The nominal individual pile lateral load capacity permitted by the Building Code is 2 kips. Greater lateral capacities must be substantiated with a lateral load test and a check of bending stresses in the pile.

Timber piles are not suitable to provide uplift resistance due to difficulty in structurally connecting the pile to the concrete pile cap. Tiedown anchors installed through the pile caps and socketed into the bedrock should be installed to provide the needed uplift resistance. Tiedown anchors are discussed in a later section.

Pipe Piles

Closed-end, concrete filled, steel pipe piles bearing on the mica schist bedrock in the western portion of the site, and bearing on weathered rock in the eastern third of the site could be utilized. Table 5 presents estimated capacities of steel, concrete filled, pipe piles bearing on the weathered rock and mica schist. Included for each pipe diameter is the estimated uplift resistance that would be provided for the given embedment length below the liquefiable soil. For the purpose of estimating total pile length, as measured from the existing ground surface, add approximately 30 ft to the lengths given in Table 5. The estimated uplift values given in Table 5 are believed to be conservative. Actual uplift capacities should be verified by a load test program.

All pipe piles should be fitted with a conical driving tip to allow the pipe to penetrate the fill and into the bearing material without damage. The pipe piles should be internally inspected after driving to verify their integrity. Even with the conical tip, concrete and obstructions in the upper fill are expected to impede pile installation. It should be expected that a significant obstruction removal program will be required before pile driving proceeds. Pre-drilling and/or spudding at the individual pile locations will likely be necessary to penetrate potential obstructions prior to driving. If a basement is incorporated into the building design, it may be advantageous to excavate for the basement prior to pile installation.

Tapered Piles

To reduce the required pile lengths, and therefore costs, a tapered pile driven into the dense sands could be utilized. These pile systems will generally achieve their required driving resistance ("fetch up") at a much shallower depth than straight-sided pipe piles. However, tapered piles may "fetch up" prior to achieving the driving depth required to bypass any liquefiable soils. After building design details are identifiable, a more detailed liquefaction analysis is recommended to aid in the evaluation of using tapered piles. Proprietary tapered piles that possess the required capacities include the Monotube Pile Corporation pile and Underpinning and Foundation Constructors' TPT (Tapered-Pile-Tip) pile. Each of these pile systems is capable of achieving higher capacity than timber piles, but less than piles driven to rock.

Due to the presence of major obstructions within the fill material, pre-excavation or pre-drilling will be needed for each of the pile types. The exact design capacity would be determined based on a series of pile load tests described in the following section of this report. Pile driving criteria (minimum tip elevation, terminal resistance, etc.) would be based on the results of the load test program.

Monotube Piles

The Monotube pile is a circular steel pile with a uniform tapered lead section and is available in a variety of diameters and tapers. Monotubes can be driven with conventional pile driving equipment. Based on our experience at a nearby Con Edison site, it is anticipated that the 14-inch butt diameter, J-taper (0.25-inch per foot) may be feasible on the site. This size Monotube pile should be capable of generating up to a 70-ton design capacity with a 25-ft embedment within the underlying sand/clay stratum layer. This corresponds to an approximate pile tip depth of about 60 ft below existing grade. Should additional capacity be required, larger piles and/or a steeper taper can be considered.

TPT Piles

The TPT pile is comprised of a large, precast, trapezoidal shaped mass of concrete attached to a corrugated pipe. The concrete mass is driven with a steel mandrel inserted through the pipe. The concrete mass densifies soil as it is driven through the upper soils until the bearing stratum is reached and terminal penetration resistances are achieved. We estimate that the dense silty sand stratum would provide a 60 to 100-ton design capacity utilizing a TPT pile. The pile capacity can be varied by using different size precast bases. A drawback of employing the TPT pile is the need to pre-excavate and/or pre-drill the hole to ensure obstructions are broken that could stop the pile prior to reaching the acceptable tip elevation.

H-Piles

The axial load capacity of steel H-piles bearing on rock is typically governed by the axial capacity of the H-pile section. Depending on the pile section, the anticipated download capacity of an H-pile is about 50 to 75 tons. Available uplift resistance is approximately 500 to 900 lbs per foot of pile embedment below the upper liquefiable soils. If an H-pile section is selected, more detailed information can be given regarding the uplift resistance. To achieve the driving resistance necessary to obtain the design capacity, it is likely that H-piles would penetrate significantly into the weathered rock, particularly in the eastern portion of the site. Several index piles, say 8 to 10, should be installed to evaluate the driving criteria. A load test program should verify the pile capacities.

Drilled Piles (Caissons)

Drilled piles, or caissons, socketed into weathered or competent rock are also a feasible foundation system for the site. A drilled pile consists of a steel casing installed through the overburden soils and an uncased rock socket below. The casing and socket are then filled with concrete and a steel reinforcing core is added as required.

Due to numerous obstructions present in the upper fill layer, it may be advantageous to drill the entire length of the caisson; installing steel casing sections as the borehole is advanced. The casing would be seated about 2 ft into rock and then the socket continued to the design depth. In competent rock, the rock socket is generally a slightly smaller diameter than the casing. In weathered rock, the socket may possibly be excavated to create a "bell" to create an increased bearing area at the base of the caisson. However, the feasibility of drilling a belled base in weathered rock would have to be further studied. The contaminated drill cuttings would need to be properly stockpiled and disposed in accordance with TRC's environmental findings and report.

A "hybrid" method of installation is to drive a steel pipe pile to the top of rock, "seating" it about 2 ft into the rock. The pipe is then cleaned out with a drill bit, and the rock socket is then drilled through the inside of the pipe into the rock below. This method can hinder rock socket drilling if the pipe was driven out of plumb or bent during driving.

The steel casing sections should have a minimum yield strength of 36 ksi and filled with at least 4000 psi (28-day compressive strength) lean concrete/grout. Higher strength steel could be utilized. Steel reinforcing bars are generally installed inside the full length of the caisson (socket to cap) for structural capacity. The NYCBC requires that the limiting structural capacity of a caisson is based upon 25% of the grout design compressive strength and 50% of the reinforcing steel yield strength.

For preliminary rock socket design, a grout/rock adhesion of 150 psi and 40 tsf end bearing could be considered for competent rock (Class 2-65 rock or better), and 75 psi side shear and 8 tsf end bearing should be utilized for caissons founded in weathered rock (Class 4-65). For uplift resistance a side shear of 50 psi should be used. Due to the fractured nature of the upper portion of the rock, the first 2 ft should not be considered in the socket capacities. Table 5 presents several caisson sizes and typical capacities (download and uplift) that are based on Langan's experience in New York City and the recommended adhesion values. The values given assume that the top 2 ft of the socket is in fractured rock and does not contribute to socket capacity. Actual design capacities should be determined based on additional studies (after the design parameters of the building are defined).

Considerations for dewatering, cleaning, and inspection of the drilled sockets must be addressed by the Contractor. The bottom of the drilled socket should be cleaned of all loose debris prior to concrete placement, particularly if the caisson is designed as end-bearing. It is also important that no air voids occur in the caisson during concrete/grout placement. The contractor should submit his bottom cleaning and verification procedures along with his bid submittal for review and acceptance by the project design team.

Foundation Consideration for Building Siting

As previously discussed, a significant thickness of weathered rock is present in the eastern third of the site; about 120 ft from the eastern property line. In this region, the weathered rock stratum is relatively thick, with the depth to competent schist bedrock often exceeding 200 ft or more. This may make installation of high capacity driven piles difficult (due to increased length), and high capacity caissons expensive (due to longer or belled rock sockets). Therefore, it is recommended that any structure to be situated in the eastern most 120 ft of the site be designed with lower column loads, if possible.

Load Tests

The NYC Building Code requires that load tests be performed if individual loads for piles bearing on rock exceed 40 tons, and friction (timber and tapered) piles exceed 30 tons. The test pile or caisson must be loaded to twice the proposed design capacity. The number of load tests and duration depends on the pile type, bearing material, and pile capacity. However, the building code does not require that drilled piles (caissons) with 18 inch diameter and greater be load tested. Table 6 summarizes the NYCBC pile load test requirements.

Design axial loads higher than those given in Table 6 must be substantiated through a more extensive load testing program. In these instances, one load test per 10,000 sq ft

must be performed and the test load held for 96 hrs. For the Kips Bay site, seven pile load tests are estimated in order to exceed the basic allowable axial pile loads.

Although the use of 30-ton timber piles will not require a compression load test per the Building Code, it is our recommendation that a series of index piles should be driven and at least two piles be load tested. This will be helpful to more accurately determine pile lengths, identify unusual driving conditions, and confirm pile capacities and pile driving criteria.

Several index piles/caissons should be installed and then the proper number selected for test loading. Vibrations should also be monitored during the installation of the index piles/caissons to verify the acceptance of the installation method based on allowable vibration criteria. The load test should be applied to a pile/caisson that was installed with the method to be used during production.

Seismic Evaluation

It is assumed that the proposed building will be classified as Occupancy Category IV (Standard Occupancy Structure), with an Importance Factor of 1.0. According to the NYC Seismic Code (Local Law 17/95), the site has a S_3 soil profile type characterized by a soil profile where the overburden depth exceeds 75 ft and contains between 20 and 40 ft of soft to medium clays or loose sands. A site coefficient of 1.5 is assigned to this profile. New York City is within Seismic Zone 2A with an effective zero-period acceleration of 0.15g in S_1 type rock.

Soils below the groundwater table and less than 50 ft below the ground surface must be evaluated for liquefaction potential. Figure 7 shows a plot of the SPT N-values versus depth superimposed on the NYC Seismic Code liquefaction limits. For the assumed occupancy category (IV), N-values that fall within the "Probable Liquefaction" zone must be considered as liquefiable. As seen on Figure 7, the initial analysis indicates that soils are liquefiable. During the design phase we recommend that more detailed seismic evaluation be conducted. An in-depth analysis may indicate that the underlying natural sands are not susceptible to liquefaction. The underlying weathered rock and mica schist is not susceptible to liquefaction, and therefore does not have to be evaluated for liquefaction.

Liquefiable soils must be considered to have no lateral resistance or bearing capacity during and earthquake, and as such cannot contribute to the support of foundation elements. The selected foundation system must bypass soils that are susceptible to liquefaction.

Permanent Tiedown Anchors

Depending on the final building design, permanent tiedowns anchored into the mica schist bedrock may be required at selected columns to resist uplift forces. Double corrosion protected Dywidag threaded bars meeting ASTM A-22 requirements can be used for this application. Bond lengths should be designed using an allowable peripheral shear of up to 150 psi along the grout-rock interface. The free stressing length and the bond length should not be less than 10 and 20 ft, respectively.

Ten percent (10%) of the tiedown anchors should be performance tested (creep) to 150% of their design load. The remaining anchors should be proof tested to 150% their design load. Successfully tested anchors should be locked-off at a load exceeding the sum of the design load, seating loss, and long term losses.

Floor Slabs

The existing fill material, and portions of the natural sand stratum are considered liquefiable and not suitable for support of a floor slab. In addition, the basement elevation could be below the groundwater table, which was measured at about 8 to 11 ft below the existing ground level. Therefore, the floor slab should be designed as a structural slab, supported by deep foundations.

A design groundwater level of approximately 5 ft below existing grade provides for a rise in the water table due to seasonal fluctuations, prolonged rainfall events, and/or water line breaks. It is recommended that the basement floor slabs be designed as pressure-resisting "sandwich" slabs. The slab would consist of a bottom slab (several feet in thickness) overlain by a 1-ft thick layer of crushed stone with perforated pipes leading to a sump pit. The stone layer would be covered with a concrete wearing slab. The porous layer would capture any water that may seep through cracks in the bottom slab. A subfloor drainage system is not considered feasible, as it would generate significant volumes of water for disposal.

As previously stated, timber piles are not adequate to provide uplift resistance due to difficulty in structurally connecting the pile to the concrete pile cap. As such, for basement slabs situated below the groundwater table should not be supported on timber piles. If a basement is not constructed, timber piles could be used to support the ground floor slab. A structural slab may also be designed to provide lateral bracing for the pile caps.

Utilities constructed below the ground level could be hung from the framed slab. Utility lines and their supports should have adequate strength to carry the weight of the utility and soil cover. Alternately, reinforced concrete chases hung from the structural slab could

be constructed to accommodate the utilities. Flexible connections may be needed at some locations where the utilities transition from beneath the buildings to grade supported locations. Specific recommendations can be made based on final determination of utility locations and grade changes.

If moisture is a concern in the lowest basement level, the pressure resisting floor slab could be designed to include a waterproofing membrane into the slab design to limit intrusion of water into the basement areas. Either an impermeable membrane or an applied coating is a suitable media.

Lateral Earth Pressures for Subgrade Walls

Lateral earth pressure parameters recommended for the construction of this project are discussed below. Figure 7 shows the recommended preliminary lateral earth pressures for both temporary excavation support structures and permanent below grade walls.

Temporary Excavation Support

Temporary excavation support will be required along the perimeters of the site during excavation of any basement levels. Temporary retaining systems can be designed to resist "active" lateral pressures. A uniform, rectangular pressure equal to 25 H, where H is the vertical height of the soil excavation adjacent to the temporary retaining wall should be applied. Additional lateral loads should be applied to the excavation supports to account for traffic and temporary construction loads. This additional lateral load should be applied as a uniform, rectangular lateral pressure equal to the surcharge times a lateral earth pressure coefficient (k) of 0.33. Following NYC Transit Authority guidelines, a surcharge loading of 600 psf should be considered. The contractor's engineer should design the actual temporary retaining system.

Permanent Below Grade Walls

Below grade walls should be designed to retain a triangular lateral pressure distribution with a maximum pressure of 55H, where H is the vertical height of soil adjacent to the wall. This is equivalent to applying a hydrostatic pressure of a fluid having a unit weight of 55 lb/ft^3 (pcf). Additional lateral loads should be considered for the subgrade walls to account for surficial loads applied by sidewalk and vehicular traffic. An additional load of 200 psf could be considered and should be uniformly distributed and equal to the surcharge times a lateral earth pressure coefficient (k) of 0.50.

The foundation walls should be designed as pressure resistant structural elements. An additional hydrostatic pressure assuming a groundwater elevation of 5 ft below the existing ground surface should be included. The below grade walls of the structure must

also be designed to resist a lateral earthquake force. Figure 9 presents a schematic of recommended lateral earth pressures for permanent subgrade walls.

Steam Tunnel and Utility Corridors

A new Con Edison steam tunnel is proposed adjacent to the site along First Avenue. During the design phase, information regarding exact horizontal and vertical tunnel location should be obtained. Meetings should be held with Con Edison to discuss the possible existence of utility corridors beneath East 35th and East 36th Streets and protection requirements of such during construction. New construction should not impose additional lateral loads on the steam tunnel or utility duct banks and excavation adjacent to these areas will require careful construction techniques, including the installation of tie-back anchors for excavation support systems.

Groundwater Control/Dewatering

During our field investigation (April-May 2001 and September 2001), the groundwater level was observed at depths of about 10 to 15 ft below the existing ground surface. This corresponds to about el -3 to el -8. Due to the close proximity to the East River, the groundwater table is influenced by the tidal fluctuations in the East River, especially adjacent to the FDR Drive. For design purposes, a groundwater elevation of about el 2 is recommended. This will allow for temporary rises due to seasonal fluctuations and utility breaks.

Significant seepage will occur into the excavation due to the proximity of the East River. A groundwater control method will be required to prevent soils from becoming unstable and to allow construction of foundation elements. The following presents possible alternatives for construction dewatering. The actual groundwater control method should be evaluated once the building geometry and number of subgrade levels are determined.

Cutoff Walls

A perimeter cutoff wall could be considered to cutoff water entering from the perimeter of the site and to retain the sides of the excavation. Sheet pile walls and/or diaphragm (slurry) walls could be used for this purpose. The wall should be advanced down to rock along the perimeter of the western portion of the excavation. The difficulty in installing a cutoff wall will be along FDR Drive where the depth to rock exceeds about 50 to 60 ft. It may not be possible to install sheet piles deep enough to reach the underlying bedrock (>110-ft depth). In this area, the sheets may be able to terminate in the strata overlying the bedrock.

Sheet pile walls could be driven into an impervious layer to cutoff groundwater flow, or to a significant depth below the bottom of the excavation to reduce base instabilities. The effectiveness of sheet piling will depend on the tightness of the interlocks between sheets. However, due to the variable content of the overburden fill layer, sheet piling may be hindered and the interlocking sheets could separate. Should driving difficulties be encountered, pre-excavation of the surficial fill and backfilling with clean soil prior to installation of the sheet piles is recommended to facilitate proper interlocking of the sheets. Extreme caution should be taken to limit vibrations adjacent to the ConEd steam tunnel and any utility corridors surrounding the site.

A reinforced concrete diaphragm wall, installed by the slurry trench method, could be used to cutoff water entering from the perimeter of the site and to retain the sides of the excavation. The diaphragm wall could then be utilized as part of the permanent foundation structure.

Heaving of the excavation base and instability due to hydrostatic uplift and seepage forces would have to be evaluated. These forces would be effected by the depth of the excavation. Several tiers of pre-stressed anchors socketed into rock will likely be needed for lateral support of the sheet pile or diaphragm walls. Pumping at the bottom of the excavation (with sumps or stone filled trenches and pumps) would likely be required to remove water entering from seeps in the wall and the base of the excavation.

Super Jet-Grouting

To possibly eliminate the need to drive sheets or excavate a slurry trench significantly below the depth of excavation, an impermeable base slab should be considered using the super jet-grouting method. This method of soil improvement constructs 10 to 15-ft diameter grout columns in the subsurface by "jetting" out the existing soil, and replacing it with grout. The columns are overlapped, creating a thick continuous mat across the site. The super jet-grout mat could be designed to resist uplift by gravity (self weight) or could be designed to utilize resistance developed along the sides of drilled shafts or piles. The cut-off wall would be extended several feet below the top of the super jet-grout mat. The grout mat would serve as a bottom strut for the cutoff wall.

A general construction sequence for this method is anticipated as follows:

1. Install cut-off wall to required depth,
2. Install piles and/or drilled shafts for foundation system,
3. Perform super jet-grouting operations between piles or drilled shafts, encasing the piles/shafts in the grout column mat; and,
4. Excavate site in stages, installing tie-backs through the cutoff wall as required.

Pre-Lowering the Groundwater Table

A wellpoint system could be considered for lowering the groundwater level during construction. However, the number and location of the wellpoints will depend on the final excavation depth and basement geometry. During pumping, monitoring wells should be installed to measure drawdown throughout the site. A NYCDEP permit will be required for disposal of more than 10,000 gallons per day. NYCDEP will need to be contacted to evaluate whether the local sewers can handle the pumped water.

Lowering the groundwater table will likely result in settlement of the soils surrounding the site. If this method is selected, the impacts of temporarily lowering the water table on adjacent buildings and utilities must be evaluated. Further, the use of well-points can draw contaminants from off-site into the dewatering system, requiring additional disposal and/or treatment costs.

Permanent Groundwater Control

As previously discussed, due to the site's proximity to the East River groundwater levels can be expected to be tidally influenced and fluctuate accordingly. As a result, pumping of large volumes of water would be required if an underdrain system is installed beneath the basement slab. Therefore, the basement floor slabs and perimeter foundation walls should be designed to resist full hydrostatic pressure assuming a design groundwater level of approximately 2 ft below existing grade (~el 0). We recommend designing the basement floor slab as a "sandwich" slab, consisting of two concrete slabs with a gravel drain layer between the slabs.

Backfill and Compaction

It is anticipated that the overlying sandy fill soil will be excavated for basement construction. These materials are potentially contaminated, therefore, guidelines provided in the TRC report should be followed to insure compliance with all federal, state, and local laws governing excavation and removal of contaminated materials.

Any fill material that are contaminated are not suitable for use as structural fill and should not be used as backfill against basement walls. Imported material may be necessary when compacted structural fill is required. Imported fill should consist of sand and/or gravel having less than 15% by dry weight passing the No. 200 sieve. Suitable fill should be free of organics and other deleterious materials and should have a maximum particle size no greater than 4 inches. The fill should be placed in uniform loose lifts of maximum 12-inch thickness and compacted to at least 95% of its maximum dry density as determined by ASTM D1557. A vibratory smooth drum roller having a static drum weight of 10 tons should be used. Within confined spaces, thinner lifts and lighter compaction

equipment can be utilized. The water content at the time of compaction should be within two percentage points of the optimum water content.

Grain size distribution, maximum dry density, and optimum water content determinations should be made on representative samples of the imported fill materials proposed by the Contractor. Prior to structural fill placement, the exposed subgrade should be inspected by a geotechnical engineer to verify that the subgrade is suitable. All fill placement and compaction should be subject to inspection and testing. No fill material should be placed on areas where free water is standing, on frozen subsoil areas, or on surfaces that have not been approved by the on-site geotechnical engineer.

VII. ADDITIONAL GEOTECHNICAL CONSIDERATIONS

Monitoring of Adjacent Buildings

Vibrations induced during pile and sheet-pile driving or caisson installation should be monitored to assess the magnitude of the vibrations and evaluate their effects on adjacent structures, (i.e. settlement). Due to the distance to adjacent buildings, it is not anticipated that pile driving would cause excessive vibrations. Pre-drilling, pre-excavation, etc. at pile or caisson locations will reduce vibrations. Vibration monitoring during drilled pile installation should not be required, unless the casing is installed by driving (rather than drilling).

It would be prudent to perform a pre-construction conditions survey which documents the existing conditions of all adjacent structures. Areas of structural duress and water seepage should be noted. Precise monitoring of adjacent buildings for movement during construction should also be performed. Movements (vertical and horizontal) can be measured by optical survey techniques to the nearest 0.005-ft. Monitoring should begin at the earliest stages of construction (i.e. demolition, underpinning, dewatering).

Quality Assurance/Quality Control

The NYCBC requires controlled engineering inspection of construction activities such as underpinning and retaining systems, foundation bearing surfaces, pile/caisson installation, load test, foundation walls, and backfill placement and compaction. Langan Engineering and Environmental Services, PC should provide on-site construction inspection. In this manner, field conditions can be monitored for deviation from the design assumptions and contractor questions can be handled quickly.

Recommendations contained in this report should be incorporated into the project specifications. The recommendations given herein should be adequately addressed in the technical specifications and contract documents.

Test Boring Requirements

For the 69,500 sq ft site footprint, the NYCBC requires 44 test borings for a building supported on a deep foundation. To date, 26 borings have been performed. For a deep foundation (i.e. piles or caissons), 18 additional borings are needed to satisfy the NYCBC. It is recommended that the additional borings be conducted within the footprint of the proposed building, following demolition of any remaining existing structures.

VIII. LIMITATIONS

The conclusions and recommendations provided herein are based on information obtained through our field investigation and the design information provided to us. The recommendations are given contingent upon one another and no recommendation shall be followed independently of the others. This report has been prepared to assist the Architects and Structural Engineers in their design and is intended for use with regard to the given information.

The boring and test pit logs approximate subsurface conditions only at the locations indicated. Subsurface conditions between boreholes and/or test pits are inferred and may vary from conditions encountered at the boring and test pit locations. Groundwater conditions described refer only to those observed at the time and location of observation. These conditions may vary seasonably and/or as a result of construction. The recommendations presented in this report assume that the subsurface conditions do not deviate appreciably from those disclosed by the borings and test pits.

This report was produced for the Kips Bay portion of the Con Edison 1st Avenue Properties site, located along First Avenue in Manhattan, New York. Langan Engineering and Environmental Services, PC cannot assume responsibility for the use of this report to generate foundation criteria other than at the specific site addressed in this report.

Table I

Rock Fracture Orientation – BORING B29-KB (OC)

Reference to Manhattan North

5/29/01 - 5/30/01

	Depth (ft)	Strike Direction	Dip Angle	Direction
	RUN #1			
	35' - 40'	→ regular core.		
	RUN # 2	(40' - 45')		
//	40' - 45'	N 15° E	20°	NW
	RUN # 3	(45' - 50')		
	45'			
//	47' 10"	N 60° E	42°	NW
⊥	48'	S 60° E	10°	NE
	50'	mechanical		
	RUN # 4			
	50'			
//	51' 3"	W	48°	N
⊥	51' 9"	N 80° W	10°	SW
//	53' 5"	W	56°	N
⊥	54' 5"	S 80° W	24°	SE
	55'	mechanical		

By: Ilkay Cam

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B, 12th Floor
625 Broadway, Albany, New York 12233-7016
Phone: (518) 402-9768 • **Fax:** (518) 402-9773
Website: www.dec.ny.gov

Joe Martens
Commissioner

September 13, 2012

Mr. Thomas Murphy
New York City School Construction Authority
30-30 Thomas Avenue
Long Island City, New York 11101

RE: **Brownfield Cleanup Project**
Former Kips Bay Fuel Terminal
Site No.: C231014
PS/281 Temporary Dewatering for Sewer Installation

Dear Mr. Murphy:

This is a follow-up to the May 2, 2012 Notice of Determination of Jurisdiction letter you received from Mr. John Cryan, the Regional Permit Administrator in the Division of Environmental Permits, in response to the jurisdictional determination request submitted by Moretrench on behalf of the New York City School Construction Authority on April 10, 2012. The Department has received input from the Division of Water on the issuance of an individual State Pollutant Discharge Elimination System (SPDES) permit for the subject site, and has determined that a formal SPDES permit is not required since the site is being managed under the Brownfields Cleanup Program. However, the site is still required to meet the substantial technical requirements of a SPDES equivalency permit. This means that the levels shown in the attachment shall be met with respect to all discharges from the site. The monitoring frequency should be as consistent as possible with the SPDES equivalent. The monitoring results should be sent to the attention of Mr. James Moras at the above address on a monthly basis. A copy of the effluent results should also be sent to:

Mr. Robert Elburn
Regional Water Engineer
Region 2
NYSDEC
47-40 21st Street
Long Island City, NY 11101

Soils Handling

The Department notes that the proposed scope of work will involve excavation from below the Development Depth within an area immediately adjacent to the Former Kips Bay Fuel Terminal Site located at 616 First Avenue, New York, New York. This work area is also immediately adjacent to the original project area for which the Department issued a SPDES equivalency permit on January 21, 2011. The Development Depth is defined in the approved

Site Management Plan (SMP), dated September 27, 2011, as the depth to competent bedrock or the groundwater table, whichever is higher. Soils excavated from the below the Development Depth may be placed back below the Development Depth during the work associated with the installation of the proposed sewer line and the new Con Edison concrete transformer vault, provided it does not exhibit obvious signs of contamination based on visual, olfactory, or instrument-based soil screening. Soils that exhibit obvious signs of contamination must be removed for off-site disposal in accordance with Section 5.3 through Subsection 5.3.2 of the SMP. Erosion and dust control measures must be implemented during the excavation work in accordance with Section 5.2 of the SMP. In addition, all excavation activities must be conducted in accordance with the health and safety procedures outlined in Section 6.0 through 6.2 of the SMP.

Dewatering Fluids Management

Since the excavation for the proposed sewer line and Con Edison transformer vault installation is likely to extend below the Development Depth, it is understood that this work will require dewatering. The Division of Water, following a review of the water sample test results collected from the excavation for the proposed Con Edison transformer vault, has determined that the groundwater at the site may contain pollutants at levels of concern, including, but not necessarily limited to metals and volatile organic compounds. Based on this, it has been determined that treatment is required for the proposed discharge. The Department understands that Moretrench will be utilizing the same temporary dewatering treatment system as described in their October 27, 2010 SPDES permit application, and that the dewatering treatment system will achieve a peak discharge of 200 gallons per minute during excavation activities. Based on our review, the Department finds the proposed treatment of the dewatering fluids prior to discharge to the existing highway storm sewer (located on East 35th Street between First Avenue and the FDR Drive) to be acceptable.

If you have any questions, please contact me at (518) 402-9768.

Sincerely,

Ronnie E. Lee

Ronnie E. Lee, P.E.
Project Manager
Remedial Bureau B
Division of Environmental Remediation

Enclosure

ec: J. Moras, P. Kolakowski, R. Elburn, J. Cryan, C. Chakrabarti, S. Southwell – NYSDEC
J. Crua, D. Hettrick - NYSDOH
M. Tumulty - STV, Inc.
J. Mahon - Moretrench

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning September, 2012

and lasting until December 31, 2016

the discharges from the treatment facility to water index number ER , Class I , East River shall be limited and monitored by the operator as specified below:

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements	
	Monthly Avg.	Daily Max		Measurement Frequency	Sample Type
Outfall 001 - Treated Groundwater Remediation Discharge:					
Flow	Monitor	Monitor	GPD	Continuous	Meter
pH (range)	6.5 to 8.5		SU	Monthly	Grab
Total Suspended Solids	Monitor	50	mg./l	Monthly	Grab
Oil & Grease	Monitor	15	mg./l	Monthly	Grab
Copper	Monitor	0.07(W)	mg./l	Monthly	Grab
Lead	Monitor	0.08(W)	mg/l	Monthly	Grab
Nickel	Monitor	0.08(W)	mg/l	Monthly	Grab
Zinc	Monitor	0.70(W)	mg/l	Monthly	Grab
Benzene	Monitor	190(W)	ug/l	Monthly	Grab
Toluene	Monitor	92(W)	ug/l	Monthly	Grab
Xylenes (Total Sum of 1,2-,1,3-and 1,4)	Monitor	19(W)	ug/l	Monthly	Grab
Ethylbenzene	Monitor	4.5(W)	ug/l	Monthly	Grab

(W) Indicates Water Quality Based Limit, Guidance values for organics used.

Footnotes:

(1) The discharge rate may not exceed the effective treatment system design capacity.

Additional Conditions:

(1) Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

James Moras, Chief, Section C
Remedial Bureau B
Division of Environmental Remediation
NYSDEC, 625 Broadway, Albany, New York 12233-7016

With a copy sent to:

Bob Elburn, RWE, R-2
NYSDEC
47-40 21st Street
Long Island City, NY 11101

(2) Only site generated wastewater is authorized for treatment and discharge.

(3) Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

(4) Both concentration (mg/l or µg/l) and mass loadings (lbs/day) must be reported to the Department for all parameters except flow and pH.

(5) Any use of corrosion/scale inhibitors, biocidal-type compounds, or other water treatment chemicals used in the treatment process must be approved by the department prior to use.

(6) This discharge and administration of this discharge must comply with the substantive requirements of 6NYCRR Part 750.