NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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June 1, 2018

SENT VIA FIRST CLASS MAIL AND BY
ELECTRONIC MAIL
Jeanj@ddc.nyc.gov

Mr. Jean M. Jean-Louis, Asst. Commissioner
NYC Dept. of Design and Construction
Safety & Site Support - Program Management Division
3030 Thomson Avenue
Long Island City, NY 11101

RE: Memorandum of Agreement
City of New York and East Side Coastal Resiliency Project
Index No.: CO 2-20170614-01

Dear Mr. Jean-Louis:

Enclosed to complete your files is the fully executed Memorandum of Agreement between the New York State Department of Environmental Conservation and the City of New York referencing the East Side Coastal Resiliency Project.

If you have any further questions or concerns relating to this matter, please contact Dolores Tuohy at 518-402-9185 or via email at Dolores.tuohy@dec.ny.gov.

Sincerely,

Maria Mastroianni
Remediation Bureau
Office of General Counsel

Enclosure

ec: D. Tuohy, Esq., NYSDEC

ec: continued

Cavy Chu, DDC
chuCa@ddc.nyc.gov

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PauH@ddc.nyc.gov

Thu-Loan Dinh, DDC
Dinhth@ddc.nyc.gov

Memorandum of Agreement

between

New York State Department of Environmental Conservation

and

The City of New York

Index Number CO 2-20170614-01

WHEREAS,

1. A. The New York State Department of Environmental Conservation ("Department") is responsible for inactive hazardous waste disposal site remedial programs pursuant to Article 27, Title 13 of the Environmental Conservation Law ("ECL") and Part 375 of Title 6 of the Official Compilation of Codes, Rules and Regulations ("6 NYCRR").

B. The Department is responsible for carrying out the policy of the State of New York to conserve, improve, and protect the state's natural resources and environment and control water, land, and air pollution consistent with the authority granted to the Department and the Commissioner by Article 1, Title 3 of the ECL.

C. The Department may enter into agreements consistent with the authority granted to the Commissioner by such statute.

2. The City of New York ("City") is a municipal corporation of the State of New York formed for the purpose of exercising such powers and discharging such duties of local government and administration of public affairs as may be imposed or conferred upon it by law.

3. The City is implementing the East Side Coastal Resiliency Project ("ESCR Project"), a public works initiative involving construction of walls, levees, and deployable gates to reduce flood risks due to coastal storms and sea level rise in an area of lower Manhattan extending approximately from Montgomery Street to 25th Street.

4. Funding for the ESCR Project is provided by the City and the United States Department of Housing and Urban Development.

5. Elements of funding for the ESCR Project are tied to undertaking and completing project milestones in a timely manner.

6. Certain locations within the ESCR Project area are impacted by contamination associated with the following former manufactured gas plant ("MGP") sites formerly owned and/or operated by Consolidated Edison Company of New York, Inc. ("Con Ed") or its predecessors-in-interest: the CE - E. 11th St. MGP Site (V00534); the CE - E. 14th

St. (StuyTown) Works Site (V00535); and the CE – E. 21st St. Works Site (V00536) ("MGP Sites"). Con Ed is and remains legally liable for on-site and off-site MGP and related contamination associated with these MGP Sites.

7. This Agreement relates to ground intrusive work, subsurface construction, contaminant mitigation work, and associated materials management undertaken by the City in connection with the design and construction of the ESCR Project as it pertains to MGP-related contamination located in Reaches J, K, M, N, O, and P as identified on the map attached as Exhibit "A" ("ESCR Agreement Project Area"). Should the City and the Department ("parties") find additional areas impacted by MGP-related contamination that intersect with areas of ESCR project construction, they may mutually agree to amend the definition of the ESCR Agreement Project Area and Exhibit A to include those areas without having to amend this agreement.

8. Under this Agreement the City will develop and implement a Mitigation Work Plan with the goal of preventing Non-Aqueous Phase Liquid ("NAPL") accumulation against the below grade wall and the migration of NAPL beyond its current fate and transport pathways. The parties expect that Con Ed will operate and maintain any wells installed pursuant to the Mitigation Work Plan pursuant to a separate Consent Order between Con Ed and the Department.

9. The City will provide work plans, as defined herein, to the Department for review and approval in a time-frame sufficient to provide the Department adequate time to review, comment upon, and, if approvable, approve them.

10. The primary purposes of this Agreement are to (i) ensure that activities related to this Agreement are undertaken in a manner protective of public health and the environment and in accordance with Department-approved work plans; (ii) provide liability protection to the City regarding MGP-related contamination encountered as part of the ESCR Project; and (iii) ensure the reimbursement of State Costs.

11. This Agreement does not address the City's response to, management of, and liability related to (i) contamination of any kind not addressed by work plans approved by the Department pursuant to the terms of this Agreement.

12. The parties expect that Con Ed will operate and maintain any wells, and accordingly, any Site Management obligations will be undertaken by Con Ed pursuant to a separate order currently under negotiation between the Department and Con Ed to replace the current Voluntary Cleanup Agreement ("VCA") for the MGP Sites.

13. The City's execution of this Agreement does not represent an admission or finding of liability of any kind.

NOW THEREFORE, the Department and the City agree upon the following provisions:

I. Definitions

Unless otherwise expressly provided herein, the terms used in this Agreement which are defined in the ECL or in regulations promulgated thereunder shall have the meaning assigned to them under said statute or regulations or amendments thereto.

II. Mitigation Work Plans Necessary for ESCR Project

A. Appended to this agreement as Exhibit "B" is a Department-approved Mitigation Work Plan ("Mitigation Work Plan") for: (i) design and construction of a mobile Non-Aqueous Phase Liquid recovery system to be located on the inland side of the ESCR Project wall and (ii) a description of the procedures to be implemented during each element of the ESCR Project for which MGP-related contamination is known or anticipated to be encountered.

B. Any amendments to the Mitigation Work Plan, or any additional work plans, shall include a general description of ESCR Project work to be undertaken and provide a detailed description of the MGP-related contamination mitigation to be undertaken and a project schedule. All work plans must be prepared under the supervision of, and signed and sealed by, a New York State licensed Professional Engineer. Upon the Department's written approval of a work plan amendment or additional work plan, such amendment or work plan shall be incorporated into and become an enforceable part of this Agreement, subject to the City's right to submit amendments to the work plan(s) as set forth in this Agreement. In the event the Department disapproves a proposed work plan or amendment, the Department's written notice shall include an explanation of the basis for the disapproval. Within ten (10) business days after the City's receipt of the written notice of disapproval, the City shall elect in writing to either: (i) modify or expand the proposed work plan(s) to address the Department's concerns; or (ii) invoke the dispute resolution procedures contained in 6 NYCRR § 375-1.5(b)(2).

C. The Department shall make best efforts to communicate its approval or disapproval of each work plan within twenty (20) business days of the Department's receipt of the work plan.

D. All work pursuant to this Agreement shall be performed pursuant to a Department-approved work plan(s). During all field activities subject to Department-approved work plan(s), the City shall have on-site a representative who is qualified to supervise the activities undertaken. Such representative may be a consultant retained by the City to perform such supervision.

E. If revisions or supplements to the work plan(s) are deemed necessary or desirable by the City, the undersigned parties to this Agreement will negotiate such revisions or supplements which, upon mutual agreement of the parties, shall be attached to and incorporated into the relevant work plan(s) and which shall be enforceable under this Agreement. If the parties cannot agree upon revisions to the

relevant work plan(s), then the City may invoke dispute resolution procedures contained in 6 NYCRR § 375-1.5(b)(2).

F. In accordance with the schedule contained in a work plan, the City shall submit a final report, as provided at 6 NYCRR § 375-1.6(b), including, if required by the Department, "as built" drawings.

G. In the event any element of a Department-approved work plan requires site management, the City shall assist Con Ed in its development and implementation of a Site Management Plan as set forth in 6 NYCRR § 375-1.2(at). As described in paragraph 12, the parties expect that Con Ed will conduct the required site management under an order between Con Ed and the Department that is currently under negotiation. If site management is required beyond what is covered by that order, or before the order is finalized, the City shall submit a Site Management Plan as set forth in 6 NYCRR § 375-1.2(at), without any prejudice to any claim or action the City may have against Con Ed.

H. Upon successful completion of all work detailed by Department-approved plans and the Department's approval of all final reports, the Department shall issue a "No Further Action" letter that substantially conforms with the model form attached as Exhibit "C."

III. Review of Submittals Other Than Work Plans

A. The Department will use best efforts to timely notify the City in writing of its approval or disapproval of each submittal by the City other than a work plan. All Department-approved submittals shall be incorporated into and become an enforceable part of this Agreement.

B. If the Department disapproves a submittal covered by this paragraph, it shall specify the reasons for its disapproval and may request the City to modify or expand the submittal. Within twenty (20) business days after receiving written notice that the City 's submittal has been disapproved, the City shall elect in writing to either: (i) modify or expand it; or (ii) invoke the dispute resolution procedures of 6 NYCRR § 375-1.5(b)(2).

IV. Enforcement

A. The purpose of the Agreement is to provide for Department oversight of remedial work and construction activities related to the City's implementation of the ESCR Project within the ESCR Agreement Project Area. The Department hereby waives any right to bring any action or proceeding against the City provided that: (a) the City complies with the ECL, the Navigation Law, the terms and conditions of the Agreement, Department-approved work plans, institutional and engineering controls, and approved schedules to the reasonable satisfaction of the Department; (b) no new information related to the ESCR Project or the ESCR Agreement Project Area arises which was unknown at the time this Agreement was issued and which indicates that this Agreement cannot be implemented with sufficient protection of human health and the environment; (c) no actions by the City exacerbate conditions at the ESCR Project Area,

such that a greater risk is posed to human health or the environment; and (d) the City or its agents did not commit fraud in entering into or implementing the Agreement.

B. The City shall not suffer any penalty or be subject to any proceeding or action if it cannot comply with any requirement of this Agreement as a result of a Force Majeure Event including, without limitation, an act of God, fire, explosion, epidemic, riot, war, rebellion, sabotage, terrorism, or any other fact or circumstance beyond the reasonable control of the City, provided the City notifies the Department in writing within ten (10) business days of when it obtains or should have obtained knowledge of any such event. The City shall include in such notice the measures taken and to be taken to prevent or minimize any delays resulting from any Force Majeure Event and shall request an appropriate extension or modification of this Agreement.

C. The City shall have no obligation to implement the Mitigation Work Plan if the ESCR Project is not implemented and Mitigation Work Plan field work has not been commenced. In the event Mitigation Work Plan field work has been commenced, but the ESCR Project is not implemented, the City shall submit to the Department an amended work plan to close out field work and leave the ESCR Project area in a condition that is protective of public health and the environment.

V. Entry upon Site

The City agrees to provide access to any portion of the ESCR Agreement Project Area owned by it or under its control and subject to work or other activity addressed by this Agreement to the Department and any employee, agent, consultant, contractor, or other person so authorized in writing by the Commissioner, consistent with the provisions of ECL §§ 27-1309(3) and (4) and 27-1313(8).

VI. Payment of State Costs

A. The City shall make payments to the Department to reimburse for State costs (including, but not limited to, direct labor and fringe benefits, overhead, travel, analytical costs and contractor costs) incurred after the effective date of this Agreement and associated with the activities to be performed by the Department (i) pursuant to this Agreement, and (ii) in overseeing activities undertaken pursuant to this Agreement ("State Costs"). The City shall pay to the Department sums of money which shall represent reimbursement of State Costs within sixty (60) days after receipt of an itemized invoice from the Department for State Costs. Such payments shall be payable to the Commissioner of NYSDEC and sent to the following address:

Director, Bureau of Program Management
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7012

B. The City shall not be responsible for reimbursement of State Costs incurred prior to the effective date of this Agreement.

C. Cost Documentation

State Costs shall be invoiced and documented pursuant to the provisions of 6 NYCRR § 375-1.5 (b)(3)(ii) and shall be sent to the City at the following address:

Jean Jean-Louis
Division of Program Management
3030 Thomson Avenue
Long Island City, Queens 11101
JEANJ@ddc.nyc.gov

Thu-Loan Dinh (copy via e-mail)
Division of Infrastructure
3030 Thomson Avenue
Long Island City, Queens 11101DinhTh@ddc.nyc.gov

D. Objection to an Invoice

If the City objects to any invoiced cost under this Agreement, the provisions of 6 NYCRR § 375-1.5(b)(3)(v) and (vi) shall apply. Objections shall be sent to the Department as provided under subparagraph VI.A above.

E. Payment/Reimbursement

The City's payment obligations under this Agreement represent payment for or reimbursement of State Costs and shall not be deemed to constitute any type of fine or penalty.

F. Changes of Addresses Related to Invoices

The Department shall provide written notification to the City of any change in the addresses provided in this section. The City shall provide written notification to the Department (at the foregoing address) of any changes to the invoice contact and address provided in this section.

VII. Communications

A. All written communications required by this Agreement shall be transmitted by United States Postal Service, private courier, or hand delivery.

1. Communication from the City shall be sent to:

George Heitzman. P.E. (1 hard copy (unbound for Work Plans) & 1 electronic copy)

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233
george.heitzman@dec.ny.gov

Krista Anders (electronic copy only)
New York State Department of Health
Bureau of Environmental Exposure Investigation
Empire State Plaza
Corning Tower Room 1787
Albany, NY 12237
krista.anders@doh.ny.gov

Dolores A. Tuohy, Esq. (correspondence only)
New York State Department of Environmental Conservation
Office of General Counsel
625 Broadway
Albany, New York 12233-1500
dolores.tuohy@dec.ny.gov

2. Communication from the Department to the City shall be sent to:

Jean Jean-Louis
Division of Program Management
3030 Thomson Avenue
Long Island City, Queens 11101
JEANJ@ddc.nyc.gov

Cavy Chu (electronic copy only)
Division of Program Management
3030 Thomson Avenue
Long Island City, Queens 11101
ChuCa@ddc.nyc.gov

How Sheen Pau (electronic copy only)
Division of Infrastructure
3030 Thomson Avenue
Long Island City, Queens 11101
PAUH@ddc.nyc.gov

Thu-Loan Dinh (electronic copy only)
Division of Infrastructure
3030 Thomson Avenue
Long Island City, Queens 11101
DinhTh@ddc.nyc.gov

B. The Department and the City reserve the right to designate additional or different addressees for communication on written notice to the other.

C. Each party shall notify the other within ninety (90) calendar days of any change in the contacts or addresses listed in this Paragraph.

VIII. Miscellaneous

A. Each party shall have the right to take samples and to obtain split samples, duplicate samples, or both, of all substances and materials sampled by the other party. The Department shall make the results of all sampling available to the City and the City shall make the results of its sampling available pursuant to its reporting obligations.

B. The City shall allow the Department to attend, and shall notify the Department at least seven (7) calendar days in advance of, any field activities to be conducted pursuant to this Agreement, as well as any pre-bid meeting, job progress meeting, substantial completion meeting and inspection, and/or final inspection and associated meeting.

C. The City shall use "best efforts" to obtain all permits, easements, rights-of-way, rights-of-entry, approvals, or authorizations necessary to perform the City's obligations under this Agreement, except that the Department may exempt the City from the requirement to obtain any state permit for any activity that is conducted on the ESCR Project Area and that the Department determines satisfies all substantive technical requirements applicable to like activity conducted pursuant to a permit. If any permits, easements, rights-of-way, rights-of-entry, approvals, or authorizations required to perform this Agreement are not obtained despite best efforts, the City shall promptly notify the Department, and shall include in that notification a summary of the steps the City has taken to attempt to obtain access. The Department may, as it deems appropriate and within its authority, assist the City in obtaining access. The City shall not be deemed to have violated the terms of this Agreement if, despite its best efforts, the City is unable to obtain the access needed to carry out the activities required under this Agreement.

D. The City shall not be considered an operator of the ESCR Agreement Project Area solely by virtue of having executed and/or implemented this Agreement.

E. The paragraph headings set forth in this Agreement are included for convenience of reference only and shall be disregarded in the construction and interpretation of any provisions of this Agreement.

F. The terms of this Agreement shall constitute the complete and entire Agreement between the Department and the City. No term, condition, understanding, or agreement purporting to modify or vary any term of this Agreement shall be binding unless made in writing and subscribed by the party to be bound. No informal advice, guidance, suggestion, or comment by the Department regarding any report, proposal, plan, specification, schedule, or any other submittal shall be construed as relieving the City of the City's obligation to obtain such formal approvals as may be required by this

Agreement If the City desires that any provision of this Agreement be changed, the City shall make written application to the Department and the Department shall timely respond.

G. The City consents to and agrees not to contest the authority and jurisdiction of the Department to enter into or enforce this Agreement.

H. The City shall provide a copy of this Agreement to each contractor and subcontractor hired to perform work required by this Agreement and to each person representing the City with respect to the ESCR Project. Further, the City shall require all contracts entered into in order to carry out the obligations identified in this Agreement to be in compliance with the terms of this Agreement.

I. Nothing herein shall be construed as barring, diminishing, adjudicating, or in any way affecting any legal or equitable rights or claims, actions, suits, causes of action or demands whatsoever that the City may have against Con Ed or any other person or entity other than the Department, including, but not limited to, rights of contribution under § 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B), and that the Department may have against anyone other than the City that was or is liable under law for the development and implementation of a Remedial Program at or near the ESCR Agreement Project Area.

J. The City shall be entitled to receive contribution protection to the extent authorized by 6 NYCRR § 375-1.5(b)(5).

K. The City shall indemnify and hold the Department, the State of New York, and their representatives and employees harmless as provided by 6 NYCRR § 375-2.5(a)(3)(i).

L. Notwithstanding any other provision in this Agreement, nothing herein shall be construed as barring, diminishing, adjudicating, or in any way affecting any legal or equitable rights or claims, actions, suits, causes of action, or demands whatsoever, including, but not limited to, those for natural resources damages, that the Department has or may have against Con Ed in connection with any contamination, including on-site and off-site contamination associated with the CE - E. 11th St. MGP Site (V00534); the CE - E. 14th St. (StuyTown) Works Site (V00535); and the CE – E. 21st St. Works Site (V00536), whether such contamination is located on the inland side, within, or on the East River side of the ESCR Agreement Project Area or any other location.

M. In the event of identification of a spill of petroleum or any other substance within the ESCR Agreement Project Area that is not specifically addressed by this Agreement's approved work plans, the City shall notify the Division of Environmental Remediation representative identified in Paragraph VII.A.1 within two hours of such identification.

N. The Department reserves all rights to enforce environmental laws and regulations including those related to (i) contamination of any kind encountered outside

the ESCR Agreement Project Area, and (ii) contamination other than MGP-related contamination within the ESCR Agreement Project Area

O. This Agreement may be executed for the convenience of the parties hereto, individually or in combination, in one or more counterparts, each of which shall be deemed to have the status of an executed original and all of which shall together constitute one and the same.

P. The effective date of this Agreement is the day it is signed by the Commissioner or the Commissioner's designee.

DATED: MAY 23 2018

BASIL SEGGOS
COMMISSIONER
NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

By:

Michael J. Ryan, P.E., Director
Division of Environmental Remediation

DATED: 5/16/18 DAA

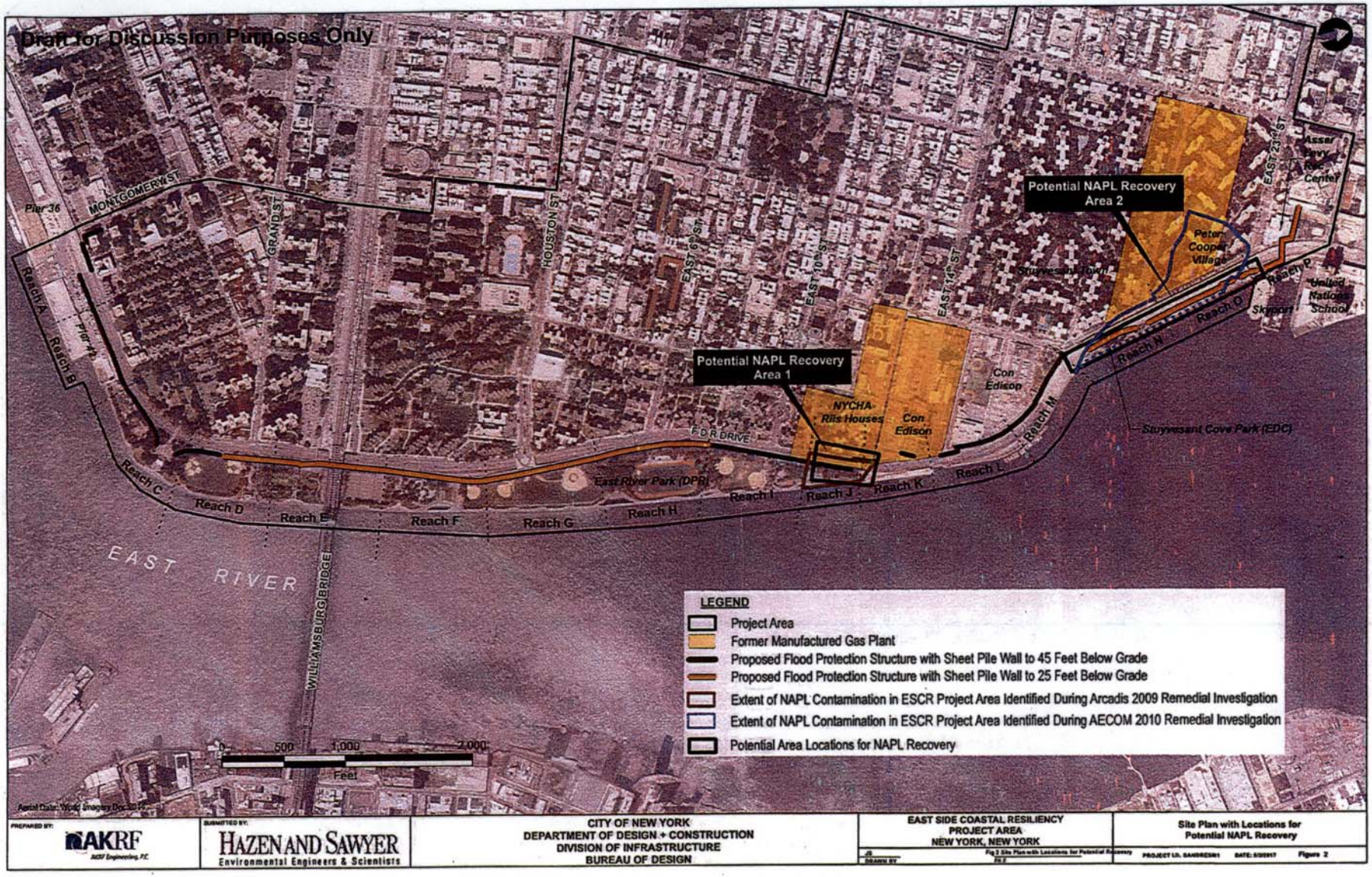
THE CITY OF NEW YORK

By: _____

Eric Macfarlane P.E.
Deputy Commissioner
New York City Department of Design
and Construction

Exhibit "A"

Map of ESCR Agreement Project Area



PREPARED BY: AKRF Engineering, P.C.	SUBMITTED BY: HAZEN AND SAWYER Environmental Engineers & Scientists	CITY OF NEW YORK DEPARTMENT OF DESIGN + CONSTRUCTION DIVISION OF INFRASTRUCTURE BUREAU OF DESIGN	EAST SIDE COASTAL RESILIENCY PROJECT AREA NEW YORK, NEW YORK	Site Plan with Locations for Potential NAPL Recovery
			JB / DRAWN BY: Fig 2 Site Plan with Locations for Potential Recovery.mxd	PROJECT LO. SANDRESN1 DATE: 5/2/2017 Figure 2

Exhibit "B"

Department-approved Mitigation Work Plan

Mitigation Work Plan
for Manufactured Gas Plant-Related Non-Aqueous Phase Liquid Contamination

for

East Side Coastal Resiliency

NYCDDC CAPIS ID: SANDRESM1

Prepared for:

New York City Department of Design and Construction
30-30 Thomson Avenue, 5th Floor
Long Island City, NY 11101

In Partnership with:
New York City Mayor's Office of Recovery and Resiliency

Prepared by:

Hazen | AKRF
AKRF Engineering, P.C.
a joint venture

New York City Department of Design and Construction Consultant

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OCTOBER 30, 2017

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TABLE

Table 1 – Anticipated Recovery Well Construction Specifications

APPENDICES

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CERTIFICATION

I, Michelle Lapin, certify that I am currently a New York State registered Professional Engineer as defined in 6 NYCRR Part 375 and that this Mitigation Work Plan (MWP) was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10). I have primary direct responsibility for implementation of the mitigation program for the East Side Coastal Resiliency site.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

NYS Professional Engineer #073934-1

1/16/18
Date

Signature

List of Acronyms	
AOC	Area of Concern
CAMP	Community Air Monitoring Plan
CDBG-DR	Community Development Block Grant – Disaster Recovery
CEP	Community Engagement Plan
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CIP	cast-in-place
DDC	Department of Design and Construction
DEIS	Draft Environmental Impact Statement
DEP	Department of Environmental Protection
DOT	Department of Transportation
DPR	Department of Parks and Recreation
ECL	Environmental Conservation Law
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESCR	East Side Coastal Resiliency
FDR	Franklin D. Roosevelt
FEIS	Final Environmental Impact Statement
GPR	ground penetrating radar
HASP	Health and Safety Plan
HUD	U.S. Department of Housing and Urban Development
JV	Joint Venture
MGP	manufactured gas plant
MOA	Memorandum of Agreement
MWP	Mitigation Work Plan
NAPL	non-aqueous phase liquid
NEPA	National Environmental Policy Act
NTU	nephelometric turbidity units
NYC	New York City
NYCDDC	New York City of Department of Design and Construction
NYCHA	New York City Housing Authority
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
OER	Mayor's Office of Environmental Remediation
OMB	Office of Management and Budget
ORR	Office of Recovery and Resiliency
OSHA	U.S. Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PID	photoionization detector
SEQRA	State Environmental Quality Review Act
TCLP	Toxicity Characteristic Leaching Procedure
USGS	U.S. Geological Survey
VOC	volatile organic compound

1.0 INTRODUCTION

This Mitigation Work Plan (MWP) has been prepared by the Hazen and Sawyer/AKRF Engineering, P.C., Joint Venture (JV) on behalf of the New York City Department of Design and Construction (DDC) and the New York City Mayor's Office of Recovery and Resiliency (ORR) for the East Side Coastal Resiliency (ESCR) Project site in Manhattan, New York (the Project). The ESCR Project involves the construction of an approximately 2.5-mile flood protection structure along the East River and Franklin D. Roosevelt East River Drive (FDR Drive). In two areas of the flood protection structure's alignment, hereafter the "Site", its associated sub-grade components may intersect with mobile non-aqueous phase liquid (NAPL) associated with former manufactured gas plant (MGP) operations, which are located in close proximity to the Site. The MGP-related NAPL and associated contamination is being investigated and remediated by the Consolidated Edison Company of New York (Con Edison) as the Responsible Party under the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program (Sites V00534 and V00536) or successor agreements or consent orders. The Responsible Party referenced throughout this document refers to Con Edison. This MWP will be carried out pursuant to a Memorandum of Agreement (MOA) between the New York State Department of Environmental Conservation (NYSDEC) and the City of New York (City) to eliminate or minimize the influence of the Project on the fate and transport of MGP-related NAPL from off-site sources. The purpose of the MWP and MOA is to enable the City to acquire liability protection against future remediation of MGP-related NAPL and associated contaminants and to preserve the City's rights to recovery of costs associated with management of MGP-related NAPL. The proposed ESCR flood protection structure location and the location of the former MGP facilities are shown on Figure 1.

The first objective of this MWP is the construction of a recovery well network to enable mobile NAPL recovery to avoid NAPL migration into previously unaffected areas. The second objective is to establish an MGP Waste Management Plan to address MGP-related wastes encountered during construction of the flood protection structure and during construction of the recovery well network. The MGP Waste Management Plan will be prepared as part of the forthcoming MWP Design Plan, which will also include a site-specific Community Air Monitoring Plan (CAMP) and a Health and Safety Plan (HASP). The Project design plans are currently in the conceptual design stage. Once the Project design plans are advanced further, inclusive of the design depths being more definitive, the MWP Design Plan will be prepared with more details concerning the recovery well network construction specifications. The MWP Design Plan will be submitted to NYSDEC for approval and the approved version will be appended to the MOA between NYSDEC and the City.

1.1 Project Location, Description, and Purpose

In 2012, Super Storm Sandy greatly impacted the east side of Manhattan, highlighting the need for the City to increase its efforts to protect vulnerable populations and critical infrastructure during major storm events. The Project will provide a reliable coastal flood protection system for a population of over 160,000 residents during a 100-year flood event within the Federal Emergency Management Agency-designated flood hazard area, taking into consideration sea level rise.

To implement the Project, the City has entered into a grant agreement with the United States Department of Housing and Urban Development (HUD). In addition to HUD, the Project is also being funded by the City. Construction groundbreaking is currently anticipated to occur in 2019 and is projected to take approximately five years to complete.

The Project will be constructed to prevent coastal flooding along the East River waterfront from Montgomery Street to East 25th Street. The Project is composed of two project areas: Project Area

One and Project Area Two, further broken down into Reaches A through the southern portion of K, and the northern portion of Reach K through Reach P, respectively. Project Area One extends along Montgomery Street from Cherry Street to Pier 42, and continues north along the waterfront to East 13th Street. Project Area One consists primarily of the FDR Drive right-of-way, Pier 42, and East River Park. Project Area Two extends north along the waterfront from East 13th Street to East 25th Street and west across Asser Levy Place to the Veterans Affairs New York Harbor Health Care Center (VA Medical Center). Project Area Two consists primarily of the FDR Drive right-of-way, a Con Edison generating station complex, Captain Patrick J. Brown Walk, Murphy's Brother's Playground, Stuyvesant Cove Park, and Asser Levy Recreation Center & Playground.

Portions of Project Area One and Project Area Two are impacted by MGP-related NAPL and associated contamination stemming from the former MGP facilities. The flood protection structure consists of above- and sub-grade structures. Sub-grade structures, if not managed properly, could impact the MGP-related NAPL contamination, potentially contaminating new areas and/or impacting the ability of the Responsible Party to remediate the contamination. Additionally, MGP-related contamination encountered during construction of the flood protection structure will be managed under this MWP along with the forthcoming MGP Waste Management Plan.

Previous subsurface investigations performed for the ESCR Project and on behalf of the Responsible Party within the Project area, identified MGP-related NAPL in two general areas (introduced as the "Site" above), Area of Concern (AOC) 1 and AOC 2. Both AOCs lie in the subsurface, generally below the water table. These NAPL AOCs are shown on Figure 2.

AOC 1 is located within Project Area One, specifically within Reaches J and the southern portion of Reach K, eastern- and southeastern-adjacent to the former MGP facilities known as East 11th Street Works and East 14th Street Works, respectively. The NAPL in AOC 1 is located predominantly beneath the original source area previously owned and operated by the Responsible Party on what is now New York City Housing Authority (NYCHA) Riis Houses property and the Con Edison generating station complex expanding across the FDR Drive into the northern portion of East River Park, between East 10th Street and East 13th Street.

AOC 2 is located within Project Area Two, specifically within Reaches N and O and east-adjacent to the former MGP facility known as the East 21st Street Works. AOC 2 encompasses Stuyvesant Cove Park in its entirety and the Solar One site.

To eliminate or minimize the influence of the Project on the fate and transport of MGP-related NAPL from off-site sources, this MWP has been developed to supplement the Project design. The proposed Environmental Action consists of: (1) the installation of NAPL recovery wells prior to, or in conjunction with, the construction of the proposed ESCR Project; and (2) implementation of an MGP Waste Management Plan during the installation of the NAPL recovery wells and construction of the flood protection structure. The MGP Waste Management Plan would govern the handling, storage, and disposal of any encountered MGP-related contaminated soil and the treatment requirements for any MGP-related contaminated dewatering fluid. All encountered soil/fill will be screened. Any identified MGP-related contaminated soil/fill would be segregated, contained for sampling in accordance with the receiving disposal facilities requirements, and transported in compliance with applicable laws and regulations to the selected disposal facilities. Installation of multiple recovery wells are proposed within both of these AOCs to provide the Responsible Party with a means to monitor and recover MGP-related NAPL, as required by NYSDEC. After construction of the recovery well network, the Responsible Party will perform all NAPL recovery and well monitoring, operation, maintenance, and decommissioning duties required by NYSDEC.

The MWP presents a conceptual plan for accomplishing the objectives of the MWP previously stated; however, the Project is currently at the conceptual design stage and is insufficiently defined to complete engineering design of the MWP program elements. It is anticipated that the Project will be sufficiently defined when the 40% design is released, anticipated in January 2018, to support the design of the environmental action measures, and contaminant-related health and safety, CAMP and MGP-related waste management protocols. Once the 40% design has been accomplished, the Project team will develop an MWP Design Plan for submission to NYSDEC for approval. The MWP Design Plan will provide any additional design details emerging from the flood protection structure design process. The MWP Design Plan will also include an MGP Waste Management Plan, HASP, and CAMP for the construction of the flood protection structure in areas impacted by MGP-related wastes and the MWP NAPL recovery well construction program. The MWP implementation is currently tentatively anticipated for mid to late 2018, while the Project groundbreaking is currently anticipated to occur in 2019.

2.0 SITE BACKGROUND

2.1 Former Manufactured Gas Plant Operations

Historic MGP operations were conducted adjacent to the Project area from approximately 1848 to 1968, and consisted of two main operation facilities: East 11th Street Works and East 21st Street Works, where MGP-related contamination from these historic MGP operations has migrated into the area of the Project. These facilities were operated by predecessors of the Responsible Party.

These MGP facilities existed before the construction of natural gas pipelines. The plants converted coal, or a combination of coke or coal, oil and water in the form of steam into a gas that could be distributed and used as a fuel for heating, cooking, and lighting. Byproducts of the gas production conducted at the former MGP facilities, such as coal tar, impacted the soil and groundwater in the vicinity of plant operations. Herein, these impacts are described as MGP-related contamination in this MWP. The East 11th Street Works and East 21st Street Works MGP-related contamination affected portions of the Project Area. A third facility, the East 14th Street Works, also operated near the Project Area, but MGP-related contamination from this facility reportedly remains on-site and is not anticipated to intersect the area of the flood protection structure construction.

The East 11th Street Works operated between approximately 1859 and 1968. Historical records indicate that the coal carbonization process was initially used until approximately 1903, when the Lowe Carburetted Water Gas Process was implemented at the facility. During operation, the facility contained 17 gas holders ranging in capacity from approximately 50,000 cubic feet to 5,000,000 cubic feet. Several gas holders were converted to liquid storage of naphtha, tar, or gas oil. The original gas holders were constructed in the late 1800s and the tank bottoms were located below-grade. The gas holders were later replaced by larger holders constructed at grade. Additional activities and structures located on the facility included retorts, fuel/gas oil tanks, tar separators, purifying houses, condensers, and scrubbers. MGP operations were discontinued by 1933 at the East 11th Street Works.

The former East 21st Street Works was utilized for manufacturing gas, gas purification, and storage and was in operation beginning in approximately 1848. Major structures included generators, retorts, condensers, scrubbers, purifiers, gas holders, and meter houses. The facility expanded through 1927, with the addition of two water gas sets. By 1849, the first telescopic gas holder in New York City was reportedly put into service at the East 21st Street Works. The facility operated until approximately 1945, when the land was sold to Stuyvesant Town Corporation and MetLife in 1944 and 1945, respectively. According to a 2010 Remedial Investigation performed by AECOM conducted on behalf of the Responsible Party, MGP-related NAPL from this facility has migrated at depth below the Project Area and into the East River.

Typical MGP wastes that may have been generated and stored at the former MGP facilities include tar, purifier wastes (wood or other solids), clinkers (consolidated ash-like material), condensates (liquids), and oils. Based on available information, there was no indication regarding how the wastes were managed, stored, and/or disposed of (on- or off-site).

2.2 MGP NAPL Contamination within Project Area

AOC-1

According to the 2007 and 2009 Remedial Investigations performed by Arcadis on behalf of the Responsible Party, MGP-related NAPL contamination originating from the East 11th Street Works has migrated below the northern portion of Project Area One (in the vicinity between East 9th Street

and East 13th Street) and extends beyond AOC-1 into East River sediments (in the vicinity between East 7th Street and East 13th Street). Within the northern portion of Project Area One, the MGP-related NAPL was noted at depths as shallow as 2 feet below ground surface (bgs) but more prominently beginning at 10 feet bgs and in certain areas extending to 46 feet bgs.

AOC-2

According to a 2010 Remedial Investigation performed by AECOM on behalf of the Responsible Party, MGP-related NAPL contamination originating from the East 21st Street Works has migrated below the majority of Project Area Two (in the vicinity between Avenue C Loop, approximately in line with extension of East 18th Street, and East 23rd Street) and extends beyond AOC-2 into East River sediments (near the extension of East 17th Street and East 22nd Street). The MGP-related NAPL was noted at depths of 10 feet bgs and in certain areas extending to 60 feet bgs within the majority of Project Area Two.

3.0 SUMMARY OF ESCR FLOOD PROTECTION PROJECT

The proposed construction plan for the ESCR Project described herein is based on conceptual design plans. Project design and the associated construction requirements may change as the Project design progresses and is finalized. The flood protection system construction depths described below are based on the conceptual design plans and will be updated in the forthcoming MWP Design Plan. Furthermore, the construction depths and heights in the following sections are referenced to the existing surface grade and not the Project's proposed design grades.

3.1 Flood Protection System in Areas of Concern

Within AOC 1 and AOC 2, the relevant flood protection system components that contain sub-grade features include floodwalls, landscaped berms, and closure structures. These components, along with above-grade components that do not require sub-grade features, taken together, will act as a continuous barrier system along the Project alignment to prevent coastal flooding in upland areas from Montgomery Street to the south and to East 25th Street to the north. Appendix A includes conceptual schematics displaying the flood protection related components. The components requiring subsurface features are described in further detail as follows:

- Floodwall - Floodwalls are narrow, vertical structures with sub-grade foundations (up to approximately 10 feet bgs) and are supported by sheet pile walls (approximately 25 to 45 feet bgs), and steel piles (up to approximately 85 feet bgs), which are designed to withstand both tidal storm surge and waves. Floodwalls are used where there are lateral space limitations, including locations where existing recreational facilities need to be protected by narrowing the footprint of the flood protection system or where roadways and infrastructure leave little room for at-grade structures. Two different types of floodwalls (I-Wall and L-Wall) are currently anticipated to be utilized within AOC 1 and AOC 2, and are described in further detail in Section 3.2 (Flood Protection Structure-Floodwall Construction).
- Landscaped Berm - Landscaped berms consist of a berm and floodwall and are used in areas where there are horizontal space limitations. In this combination, the floodwall provides the flood protection and the berm is an accessory landscape feature that helps to both mitigate the impact of the wall and more seamlessly integrate the flood protection into the park use experience. It is currently anticipated that this structure will be utilized in AOC 2.
- Closure Structure - In the flood protection system it is necessary to provide openings to accommodate day-to-day vehicular, bicycle, or pedestrian circulation along a street or sidewalk. In these instances, closure structures would be deployed to ensure protection during coastal flooding events, but would remain open at other times to maintain pedestrian access and traffic patterns. Typical closure structures include swing gates and roller gates, which would be supported by sheet pile walls (approximately 25 to 45 feet bgs) and a stabilization slab just below grade.

The flood protection system proposed in AOC 1 consists of a floodwall on the west side of the FDR Drive adjacent to the NYCHA Jacob Riis Houses property, where NAPL is known to be present. The floodwall would tie into the existing walls to the north that surround Con Edison's East 13th Street Generating Station and the East River Generating Station, which is currently being reinforced as part of Con Edison's resiliency efforts. In the northern portion of East River Park on the east side of FDR Drive, where NAPL is known to be present, the flood protection system would consist of floodwalls in combination with landscaped berms that are integrated into the park. In addition, the Project would include installation of an underground concrete box tunnel around the

existing Con Edison high-voltage transmission lines in East River Park, shown on Figure 3A, to protect and maintain access to this critical infrastructure.

The flood protection system proposed in AOC 2 consists of a floodwall, landscaped berms, and closure structures. The floodwall would connect to a series of closure structures that pass below the elevated FDR Drive viaduct, cross Avenue C, and run northward into Stuyvesant Cove Park. The majority of Stuyvesant Cove Park would be reconstructed as a landscaped berm to provide open space along with flood protection. At Stuyvesant Cove Park, closure structures at East 20th Street and Peter Cooper Road would allow east-west access to the esplanade and water's edge, and the continuance of the north-south bikeway/walkway. At the northern end of Stuyvesant Cove Park, a series of closure structures below the FDR Drive viaduct would cross Avenue C and tie into a floodwall west of the FDR Drive at the northern end of AOC 2. In addition, similar to that described above for AOC 1, existing Con Edison high-voltage transmission lines in Stuyvesant Cove Park would be protected by installing a concrete box tunnel around the lines. The high-voltage transmission lines are located beneath the existing bike path in Stuyvesant Cove Park, directly west-adjacent to the proposed floodwall location within AOC 2, as shown in Figure 3B. As described in Section 5 (Summary of Environmental Action), the proposed locations of the recovery wells in AOC 2 must be offset approximately 15 to 25 feet west of the floodwall due to the presence of transmission lines.

The abundance of utility infrastructure provides sub-grade construction limitations including limitations on placement of recovery wells. Utility infrastructure may require these wells to be offset from the wall by 15 to 25 feet in certain circumstances. The forthcoming MWP Design Plan will include figures of the proposed recovery well locations in relation to the existing utility infrastructure.

3.2 Flood Protection Structure-Floodwall Construction

Based on the conceptual design for the Project, floodwalls would mainly consist of I-walls and L-walls within the AOCs flood protection structure, each providing differing degrees of structural protection to withstand tidal surge and wave forces. Where space allows, floodwalls would be used in conjunction with a landscaped berm.

Construction of floodwalls and landscaped berms would typically require: excavation, installation of sheet pile walls up to 45 feet bgs, and steel piles up to 85 feet bgs; installation of pile caps and foundations; forming and pouring concrete walls from the foundation up to approximately 10 feet above grade; and/or placement of earth fill to form the landscaped berm. The construction of the floodwalls would likely produce spoils from excavation, jet-grouting and drilling piles. The depth of the floodwall foundation and sub-grade elements, and hence to what extent a specific flood protection measure will potentially intersect mobile NAPL, depends on the type of wall structure required along a given stretch of the flood protection structure.

I-WALL

I-Walls are vertical flood barriers that are embedded in the ground to form a line of protection against storm surge and waves. The I-Wall is relatively simple in design and relies on the flexural strength of the wall to resist lateral forces from hydrostatic pressure and wave forces. As the name suggests, the wall is in the shape of an "I" and is typically constructed of steel or reinforced concrete, or a combination of the two materials. The height and thickness of the wall can be adjusted as required to achieve the necessary flood protection elevation, prevent seepage beneath the wall, and resist the lateral forces associated with flood, wave, and debris impact.

Construction of the I-wall would require the installation of sheet pile walls to approximately 40 to 45 feet bgs using a vibratory or impact pile driver, and/or a hydraulic press-in hammer in areas where vibration control is critical. Following installation of the sheet pile walls, steel piles would be installed up to 85 feet bgs and a cast-in-place (CIP) concrete pile cap would be poured atop the portion of sheet pile wall exposed above the existing grade for water-tightness, corrosion protection, and visual aesthetics.

L-WALL

Similar to I-Walls, L-Walls are reinforced concrete flood protection components constructed to resist storm surge and wave forces, installed in a continuous line of protection. However, this type of wall can be designed to withstand greater forces (such as impact from vessels) and constructed to greater heights because the wall also has a foundation base slab. Like the vertical wall, the foundation is constructed of concrete that is placed in a horizontal position beneath the ground surface. The vertical stem or wall component stands at one end of the slab, essentially giving an "L" shape to the entire cross-section. Depending on the nature of the topography and site-specific requirement, L-Walls possess the flexibility of placing the vertical wall portion on either the flood side or protected side of the base slab. L-Walls are generally cast monolithically for a certain length along the line of protection. It is a common practice to cast monolithic sections of L-Wall in 40- to 50-foot long lengths.

Construction of the L-wall would require trench excavation. Conventional excavation equipment such as excavators, loaders, and dump trucks would be used during this first step of wall placement. Sheet pile walls would be installed to approximately 25 to 30 feet bgs after excavation is complete using a vibratory or impact pile driver, and/or a hydraulic press-in hammer in areas where vibration control is critical. Following installation of the sheet pile walls, steel piles would be installed up to approximately 45 feet bgs and a reinforced CIP L-wall would be cast on the supporting steel piles spaced at approximately eight-foot intervals.

3.3 Status of Design

The current ESCR Project schedule anticipates the release of the 40% project design in January 2018 and 100% completion of the design in December 2018. During this time period, the design is subject to modification.

3.4 Proposed Construction Schedule for Flood Protection System

Based on preliminary estimates, construction of the ESCR Project is anticipated to take approximately five years to complete. Groundbreaking is currently anticipated to occur in 2019.

Construction activities associated with the flood protection structure in Project Area One would be divided into three primary phases that would overlap at certain times: Phase I in Project Area One coincides with AOC 1 and encompasses construction from the northern end of East River Park at approximately East 13th Street south to the northern end of the Track and Field Complex at approximately East 7th Street; and Phases II and III encompass areas to the south to Montgomery Street. Construction activities are anticipated to proceed from north to south in Project Area One. The rationale for phasing lies in ensuring a vehicular access point to East River Park and optimizing public access to completed portions of East River Park during flood protection structure construction.

Construction activities in Project Area Two are also anticipated to proceed in three primary phases that would overlap at certain times: Phase I in Project Area Two encompasses the area from south

of the Con Edison Generating Station Complex at approximately East 14th Street north to Murphy's Brother's Playground near Avenue C; Phase II coincides with AOC 2 and encompasses construction within Stuyvesant Cove Park; and Phase III to the north encompasses the area around Asser Levy Recreation Center between East 23rd and East 25th Streets. Construction activities are anticipated to proceed from south to north in Project Area Two.

The construction sequence is subject to change to address community concerns, involved NYC agencies, and to meet critical Project funding deadlines. Currently, the Project phasing details as they relate to the specific construction timing of the individual flood protection structure components within AOC 1 and AOC 2 are unknown at this time. As the Project design develops, these details will be specified in the MWP Design Plan.

4.0 SUMMARY OF ENVIRONMENTAL CONDITIONS

4.1 Geology and Hydrogeology

SOIL AND BEDROCK STRATIGRAPHY

The generalized soil and bedrock stratigraphy of Manhattan is composed of historic fill underlain by layers of native sand, silt, clay, and/or gravel, followed by weathered bedrock and then competent bedrock. Historic topographic maps of the Project area, which lies on the current East River shoreline, indicate that much of the Project area is reclaimed land. The shape and size of lower Manhattan was altered dramatically by in-filling during the 18th and 19th Centuries, and historic topographic maps indicate that much of the current Project area was wetlands prior to reclamation. The depths in the following subsurface investigation descriptions reference existing surface grade and not the Project proposed design grades.

During the 2015 and 2016 ESCR Project subsurface investigations, historic fill composed of sand with silt, gravel, brick, and asphalt was encountered from the ground surface to an approximate depth range of 10 to 20 feet bgs. Specifically, historic fill was observed within AOC 1 to approximately 10 feet bgs and approximately 10 to 20 feet bgs within AOC 2. The historic fill layer was observed to be underlain by approximately 10 to 20 feet of sand and silt with little to trace gravel.

According to preliminary results from an ESCR Project geotechnical investigation performed by CH2M during 2017, bedrock was encountered at approximately 90 feet bgs in AOC 1. The 2010 AECOM Remedial Investigation Report for the Former East 21st Street Works notes bedrock at depths of approximately 100 to 140 feet bgs in AOC 2. Bedrock in AOC 1 is mapped on the United States Geologic Survey (USGS) Bedrock and Engineering Geologic Map (Baskerville 1994) as the contact between the Ravenswood Granodiorite, the Inwood Marble, and the Fordham Gneiss, while bedrock in AOC 2 is mapped as the Hartland Formation schist.

HYDROGEOLOGY

Groundwater flow is generally topographically driven and primarily flows from topographic highs in the central portion of Lower Manhattan in an easterly direction toward the East River across the Site. However, local groundwater flow can be affected by hydrogeologic factors (i.e., unit permeability, tidal influence, etc.), and by anthropogenic factors (i.e., impervious surface cover, local dewatering, and/or subterranean structures like sewers, subway tunnels, and building foundations). During the 2015 and 2016 ESCR Project subsurface investigations, groundwater was encountered at approximately 8 to 10 feet bgs in AOC 1, and 7 to 9 feet bgs in AOC 2. Groundwater is presumed to flow from west to east across the Site and is tidally influenced.

Based on the documented observed geologic strata present at the Site, the shallow surficial aquifer has a likely hydraulic conductivity between approximately 10 and 0.001 centimeters per second (cm/s), while the deeper unconsolidated surficial aquifer has a likely hydraulic conductivity between approximately 1 and $1x10^{-6}$ cm/s. Surficial groundwater flow in Manhattan is generally unconfined, or not isolated from the vadose zone by an impermeable layer.

4.2 Environmental Investigations

The previous environmental investigations relied upon for this MWP are summarized below in relation to their general findings concerning MGP-related NAPL contamination:

Remedial Investigation Report – East 11th Street Works – NYSDEC Site No. V00534, New York, New York, Arcadis, November 2007 (former MGP facility subsurface investigation)

- A total of 61 soil borings, 17 test trenches, and 19 monitoring wells were installed to characterize and delineate soil and groundwater MGP-related impacts, including NAPL associated with the East 11st Street Works.
- Soil NAPL impacts (from soil borings and test trenches) were observed at 35 locations between East 11th Street and East 13th Street, and at depths from 2 feet to 46 feet bgs.
- NAPL was noted in 3 monitoring wells between East 12th Street and East 13th Street.

Remedial Investigation Report for Operable Unit 2 – East 11th Street Works – NYSDEC Site No. V00534, New York, New York, Arcadis, December 2009 (former MGP facility subsurface investigation)

- A total of 37 sediment cores were advanced in the East River to delineate the extent of NAPL-impacted sediments associated with the East 11th Street Works. In an effort evaluate migration pathways to the East River, six soil borings were advanced in the upland areas adjacent to the NAPL impacted sediments between East 10th Street and East 13th Street.
- NAPL-impacted sediments were observed in 16 of the sediment cores and lie primarily within the upper 5 feet. NAPL-impacted sediments extend up to 100 feet (east) from the shoreline and approximately 1,500 feet (north-south) along the shoreline in the vicinity between an extension of East 8th Street and East 13th Street.
- NAPL was present in five soil borings between 10 and 45 feet bgs. The investigation concluded that NAPL appears to have migrated from the upland to the East River.

Remedial Investigation Report, Operable Unit 2 (OU2) – Former East 21st Street Works – Site #V00536, New York, New York, AECOM, September 2010 (former MGP facility subsurface investigation)

- A total of 20 soil borings, 76 sediment cores, and 19 monitoring wells were installed to further delineate the extent of off-site soil and groundwater MGP-related impacts, including NAPL, associated with the East 21st Street Works.
- Soil NAPL impacts extended east from the location of the former East 21st Street Works beneath the FDR Drive and Stuyvesant Cove Park into the East River. The NAPL impacts were observed to at least East 18th Street to the south and to East 23rd Street to the north, and at depths from 10 feet to 80 feet bgs (from 10 feet to more than 60 feet in the vicinity of the proposed flood protection structure).
- NAPL-impacted sediments were observed in 29 of the sediment cores. NAPL impacts within the East River surface sediments were in the vicinity between an extension of East 17th Street and East 22nd Street, and extended approximately 500 feet (east) from the shoreline and approximately 1,800 feet (north-south) along the shoreline.
- NAPL was noted in monitoring wells migrating off-site within Stuyvesant Cove Park in the vicinity between East 20th Street and East 23rd Street.

East Side Coastal Resiliency Project Area One: Subsurface Exploration Report - Borough of Manhattan, New York, AKRF-KSE JV, October 2015 (ESCR Project subsurface investigation)

- A total of 508 soil borings [440 shallow borings (4 feet bgs) and 68 deep borings (up to 40 feet bgs)] and 8 temporary monitoring wells were advanced along the entire length of Project Area One to evaluate the environmental quality of subsurface materials that may require special handling during the Project construction. Five shallow borings were advanced for every 10,000-foot grid (100 feet by 100 feet). Deep borings were advanced at an approximate frequency of one every 100 linear feet and temporary wells were installed at an approximate frequency of one every 700 linear feet.
- NAPL was not observed in any of the shallow borings; however, NAPL was observed in one deep boring in the northern portion of East River Park within AOC 1. The boring was located just south of the projection of East 12th Street into East River Park, beginning at the water table (approximately 10 feet bgs) extending to at least 32 feet bgs (terminal boring depth).

East Side Coastal Resiliency Project Area Two: Subsurface Exploration Report - Borough of Manhattan, New York, AKRF-KSE JV, October 2015 (ESCR Project subsurface investigation)

- A total of 55 soil borings [40 shallow borings (4 feet bgs) and 15 deep borings (up to 40 feet bgs)] and two temporary monitoring wells were installed along the entire length of the Project Area Two to evaluate the environmental quality of subsurface materials that may require special handling during the Project construction. Borings were not advanced in the area between the Con Edison Generating Station Complex and Murphy's Brother's Playground due to the presence of numerous utilities and access limitations. Five shallow borings were advanced for every 10,000-foot grid (100 feet by 100 feet). Deep soil borings were advanced at an approximate frequency of one every 100 linear feet and two temporary wells were installed approximately 400 linear feet apart.
- NAPL was observed in four deep soil borings located between East 20th Street and Peter Cooper Road (an extension of East 21st Street) at depths generally from the water table (approximately 10 feet bgs) to 40 feet bgs (terminal boring depth).
- NAPL was not observed in any of the temporary wells; however, a sheen was noted in the purge water from a temporary well located between East 20th Street and Peter Cooper Road (an extension of East 21st Street).

East Side Coastal Resiliency: Supplemental Subsurface Investigation - Borough of Manhattan, New York, Hazen-AKRF JV, November 2016 (ESCR Project subsurface investigation)

- A total of 70 soil borings and 15 temporary monitoring wells were installed in certain areas throughout the Project area where the conceptual design evolved or areas where the 2015 Subsurface Exploration program identified the needs for further sampling.
- NAPL was observed in 7 soil borings along the anticipated alignment of the flood wall located between East 20th Street and an extension of East 22st Street at depths generally just above the water table (approximately 10 feet bgs) and 20 feet bgs (terminal boring depth).
- NAPL was not observed in any of the temporary wells; however, a sheen was noted in the purge water from three temporary wells located within the central portion of East River Park just north of the Williamsburg Bridge, the northern portion of East River Park just

south of East 6th Street, and within Murphy's Brother's Park [located between East 16th Street and Avenue C Loop (approximately in line with extension of East 18th Street)].

4.3 Nature and Extent of MGP-Related NAPL

As introduced in Section 2.1 (Former Manufactured Gas Plant Operations), two former MGP facilities where MGP-related contamination has migrated into the Project Area were located west-adjacent to the Site: the East 11th Street Works and the East 21st Street Works. Previous subsurface investigations performed for the ESCR Project and within the former MGP facilities revealed coal tar contamination and apparent mobile NAPL in the subsurface of portions of the former MGP facilities and the Site. The depth and magnitude of NAPL varied throughout both AOCs.

During the 2015 and 2016 ESCR Project subsurface investigations, NAPL was observed in AOC 1 ranging from depths of approximately 10 feet bgs to greater than 30 feet bgs (terminal boring depth). This coincides with the horizontal extent of NAPL noted in the 2007 and 2009 Arcadis Remedial Investigation Reports for the former East 11th Street Works. Additionally, these reports note the depth of NAPL as up to 46 feet bgs and the extent as more than 500 linear feet along the flood protection structure alignment. Figure 3A shows the approximate extent of NAPL in AOC 1. Based on these data and the current Project conceptual design, it is currently anticipated that the floodwall sheet pile wall, according to the conceptual design, may intersect mobile NAPL in Reach J and the southern portion of Reach K at depths up to 40 to 45 feet bgs, the terminal depth of the sheet pile wall.

During the 2015 and 2016 ESCR Project subsurface investigations, NAPL was observed in AOC 2 ranging from depths of approximately 7 to greater than 40 feet bgs (terminal boring depth). The extent of NAPL was observed to be less severe in the southern and northern portions of AOC 2 and more extensive in the central portion from East 20th Street to Peter Cooper Road. This coincides with the horizontal extent of NAPL noted in the 2010 AECOM Remedial Investigation Report for the former East 21st Street Works. Additionally, the 2010 AECOM report notes the depth of NAPL as more than 60 feet bgs in the vicinity of the flood protection structure and the extent as more than 1,400 linear feet along the flood protection structure alignment. Figure 3B shows the approximate extent of NAPL in AOC 2. Based on these data, it is currently anticipated that the floodwall sheet pile wall, according to the conceptual design, may intersect mobile NAPL in Reaches N and O at depths up to 25 to 30 feet bgs, the terminal depth of the sheet pile wall.

5.0 SUMMARY OF ENVIRONMENTAL ACTION

5.1 Environmental Action Objectives

5.1.1 Management of MGP-Related Contamination within Project Alignment

5.1.1.1. Recovery Wells to Enable Recovery of Mobile NAPL

The first objective of this MWP is construction of a recovery well network on the upland side of the flood protection structure to enable NAPL recovery to prevent accumulation of MGP-related NAPL against the proposed sub-grade sheet pile walls of the floodwall, and to avoid NAPL migration into previously unaffected areas. To accomplish this objective, the MWP proposes to install multiple recovery wells on the upland side of the flood protection structure before or in conjunction with Project construction. The recovery wells will be installed in two phases (Phase A and B) based on criteria described below, and as determined by NYSDEC. The recovery wells will enable the Responsible Party to monitor and recover mobile NAPL within AOCs 1 and 2. Without the installation of the proposed recovery wells, MGP-related NAPL from the former MGP site sources would continue to migrate in an easterly direction toward the flood protection structure, where it could accumulate against the proposed sub-grade sheet pile walls of the floodwall, creating the potential for NAPL to migrate into previously unaffected areas. A two-phase approach to well installation will be employed. The initial installation (Phase A) is to be followed up by a 60-day period of well gauging to record NAPL levels. Upon evaluation of the results of the first round of recovery well installation and communication with, and approval by, NYSDEC, a second phase (Phase B) of mobile NAPL recovery wells will be installed in AOC 1 and AOC 2 to optimize NAPL recovery. Further details are provided in Section 5.2.4 (Timing of Design Plan and Recovery Well Installation).

The MWP proposed herein is not intended to remediate the MGP-related waste originating from off-site sources. As previously stated, the objective is to ensure that the construction and operation of the flood protection measure can be performed without causing redirection of MGP-related NAPL to new areas. This MWP proposes to install recovery wells along the alignment of the flood protection structure where the structure is likely to intersect MGP-related mobile NAPL. After the installation of the recovery wells, MGP-related mobile NAPL can accumulate within the recovery wells and can be removed to prevent accumulation against the sub-grade sheet pile walls of the proposed flood protection structure. Recovery of NAPL from the wells may be accomplished by multiple methods, which will be performed by the Responsible Party under a separate agreement or consent order with NYSDEC. The preferred method for NAPL recovery will be determined by NYSDEC and implemented by the Responsible Party.

5.1.1.2. Management of MGP-Related Waste During Floodwall Construction

The second objective of this MWP is to establish an MGP Waste Management Plan to address MGP-related wastes encountered during construction of the recovery well network and construction of the wall. The MGP Waste Management Plan will be prepared as part of the MWP Design Plan and will include a HASP and CAMP specific to areas affected by MGP-related contamination. These Plans will be submitted to NYSDEC for approval, and the approved version of the Plans will be appended to the MOA between NYSDEC and the City.

5.1.2 Address Regulatory Requirements

In accordance with discussions between NYSDEC and the City, the installation of mobile NAPL recovery wells in AOC 1 and 2 is required prior to, or in conjunction with, the construction of the flood protection structure. These wells will provide NYSDEC and the Responsible Party with a suitable NAPL recovery well network to develop an appropriate program for NAPL recovery.

5.1.3 Achieve Liability Release

Development and implementation of this MWP is intended to build a MGP-related NAPL recovery well network sufficient to enable the Responsible Party to implement NAPL recovery in the vicinity of the flood protection structure, as established in the agreement between NYSDEC and the City. The measures outlined in this MWP are well-established practices commonly used and accepted in the industry to recover mobile NAPL associated with MGP sites. The NAPL recovery wells outlined in this MWP would be installed prior to or in conjunction with construction of the flood protection structure, and the NAPL recovery efforts are expected to be initiated in advance of sub-grade sheet pile wall installation (associated with the flood protection structure). In addition, the City is taking appropriate measures regarding management of MGP-related wastes during floodwall construction under this Plan that are protective of public health and the environment. In consideration of the aggressive environmental measures proposed in this MWP, the City is taking reasonable precautions to address potential impacts associated with MGP-related waste during construction and MGP-related mobile NAPL migration after floodwall construction in support of a release from all environmental liability associated with the presence of MGP-related NAPL at or near the ESCR Project area.

5.1.4 Preserve Cost Recovery

To maintain the ESCR Project schedule and ensure that the recovery wells are integrated with the flood protection system design, the City intends to implement this MWP. The MGP Waste Management Plan, which will include a HASP and CAMP, will also be implemented during recovery well installation and Project construction. In parallel, the City will pursue cost recovery with the Responsible Party for work associated with the MGP-related contamination. The City will track the costs incurred in connection with this MWP to ensure reimbursement for all incremental costs associated with the development and implementation of this MWP as well as other work caused by MGP-related contamination.

5.2 Environmental Action

5.2.1 MWP Design Plan

The Project design plans are currently in the conceptual design stage. The conceptual design plans were developed prior to the Project geotechnical investigation. Once the Project design plans are advanced further to provide more definitive construction depths and extents, which will be informed by the geotechnical investigation, the MWP Design Plan will be prepared with more details concerning the recovery well network construction specifications, including well depths and screen intervals. The MWP Design Plan will be submitted to NYSDEC for review and approval, and the approved version will be appended to the MOA between NYSDEC and the City.

5.2.2 Recovery Well Design

Recovery wells will be installed on the upland side of the flood protection structure within AOCs 1 and 2. The MWP recovery well design will be included in more detail in the forthcoming MWP Design Plan. However, the presumed parameters to the recovery well design are described below and are based on the conceptual Project design plans.

Prior to installation of each recovery well, a soil boring will be advanced in each location up to 55 feet bgs in AOC 1 and up to 40 feet bgs in AOC 2 (10 feet deeper than the proposed deepest depth of the sheet pile wall supporting the floodwall) utilizing Rotosonic drilling technology with the collection of continuous soil cores from existing grade to the end of the boring. Geologic logging will utilize the method established by NYSDEC for the purpose of MGP-related waste mobility classification. The objective of the soil boring will be to identify the depth of mobile NAPL at each location to select the appropriate screen interval for the respective recovery well.

Using the sheet pile wall depths specified in the Project conceptual design plans, Table 1 provides a summary of potential and/or anticipated intervals of mobile NAPL based upon previous investigations conducted on behalf of the Responsible Party and investigations conducted for the ESCR Project. The vertical extent of mobile NAPL is highly variable and can range at specific locations from depths between 10 to 20 feet bgs or as much as 10 to more than 60 feet bgs (see Section 4.2 Environmental Investigations). Consequently, screen intervals for each recovery well will be selected based upon field observations of soil boring samples and data collected as part of the NAPL recovery well installation activities (as part of soil logging previously described), and in consultation with NYSDEC.

Table 1 provides a summary of preliminary screen interval depths for the proposed recovery wells. Potential mobile NAPL has been identified in AOC 1 at depths as shallow as 10 feet bgs and as deep as 45 or more feet bgs. At this time, the proposed screen intervals for the recovery wells in AOC 1 would range from 10 feet bgs to 45 feet bgs, with the bottom depth coinciding with the bottom of the sheet pile wall in AOC 1. Potential mobile NAPL has been identified in AOC 2 at depths as shallow as 10 feet bgs to more than 60 feet bgs. At this time, the proposed screen intervals for the recovery wells in AOC 2 would range from 10 feet bgs to 30 feet bgs, with the bottom depth coinciding with the bottom of the sheet pile wall in AOC 2.

While preliminary screen intervals have been identified in Table 1, the actual screen intervals for each recovery well will target intervals where NAPL has been identified in nearby boring locations in previous investigations and confirmatory soil boring and logging being conducted as part of this MWP (previously described). Screen intervals for the recovery wells will not start until at least a depth of 10 feet bgs (approximate depth to groundwater). The screen interval would straddle 5 feet above and 5 feet below the targeted NAPL zone. For example, if mobile NAPL is identified between 25 and 35 feet bgs, the screen interval for that recovery well would be 20 to 40 feet bgs. Another example would be where mobile NAPL is identified at 10 to 30 feet bgs; the screen interval would range from 10 feet bgs (the minimum starting depth, as previously discussed) to 35 feet bgs. A prevailing parameter would be that the bottom of the screen interval would not exceed the bottom depth of the associated sheet pile wall.

NYSDEC would be consulted for locations that indicate larger ranges of NAPL to determine whether shallow and deep recovery well clusters would be warranted to avoid the use of excessively long screen intervals (greater than 20 feet).

The proposed recovery wells will be constructed of a 6-inch diameter solid stainless-steel riser, 0.020-inch slotted stainless steel screen, and a 5-foot solid stainless-steel sump at the base. Each recovery well will be finished with a 10-inch diameter flush-mount steel well box surrounded by a 2-foot square by 6-inch thick concrete apron. A diagram illustrating the typical construction details for the proposed recovery wells is provided as Figure 4. The preliminary construction details are also summarized in Table 1.

5.2.3 Recovery Well Locations

As stated in Section 4.1 (Geology and Hydrogeology), groundwater is presumed to flow in an easterly direction towards the East River. Consequently, the preferred location for NAPL recovery wells is on the western (upland) side of the proposed flood protection structure. The locations of the recovery wells within both AOCs are limited spatially due to the presence of existing and planned underground utilities and related infrastructure and the FDR Drive.

The flood protection system proposed in AOC 1 will run from north to south along the west side of the FDR Drive, connecting a tie-in to existing walls that surround Con Edison's Generating Station facilities, to new flood walls adjacent to the NYCHA Jacob Riis Houses property, then crossing the FDR eastward via a closure structure connecting to the northern portion of East River Park, and south directly adjacent to the east side of FDR drive. The recovery wells located in AOC 1 are proposed to be installed on the western side of FDR Drive, on the upland side of the flood protection structure, either within the construction easement area on NYCHA Riis House property, on NYC DOT property directly adjacent to FDR Drive, or a combination of both. The planned location of the flood protection structure within the northern portion of East River Park, directly adjacent to the FDR Drive (to the west) limits the ability to install recovery wells on the upland (west) side of the flood protection structure located within the northern portion of East River Park. The majority of the proposed locations are approximately 10 to 15 feet west of the proposed flood protection alignment, as indicated on the typical cross-section for AOC 1 (Figure 5A), while the remaining are located approximately 100 feet west of the flood protection structure.

The flood protection system proposed in AOC 2 will run from north to south, from a floodwall west of the elevated FDR Drive at the northern end of AOC 2, and connect eastward via a series of closure structures below the FDR Drive viaduct that cross Avenue C into the northern end of Stuyvesant Cove Park. The structure would then run southward beneath the elevated FDR drive along the western edge of Stuyvesant Cove Park. At the south end of Stuyvesant Cove Park, a series of closure structures would pass below the FDR Drive viaduct westward and would connect to a floodwall adjacent to Murphy's Brother's Playground. High voltage transmission lines operated by Con Edison lie directly beneath the Stuyvesant Cove Park bike path within AOC 2, which is located west-adjacent to the flood protection structure. The existence of the transmission lines requires the recovery wells to be located approximately 15 to 25 feet west of the sheet pile walls of the flood protection structure. The proposed well locations are indicated on the typical cross-section for AOC 2 (Figure 5B). The recovery wells located in AOC 2 are proposed to be

installed on the western side of Stuyvesant Cove Park, within the adjacent City-owned parking lot located beneath the FDR Drive and parallel to the bike path.

The recovery wells are proposed to be initially (Phase A) installed every 25 linear feet within AOC 1. Within AOC 2 where the presence of NAPL is more extensive (central portion of AOC 2), Phase A recovery wells are proposed to be installed every 25 linear feet in and less frequently, every 50 linear feet, in areas where NAPL is known to be less extensive (southern and northern portions of AOC 2). Phase A recovery wells are designated as RW1-1A through RW1-8A in AOC 1 and RW2-1A through RW2-36A in AOC 2, as shown in Figures 6A and 6B, respectively, as well as in Table 1. The recovery wells installed as part of Phase A would be developed and subsequently gauged for the presence of NAPL for a minimum duration of 60 days to determine whether additional (Phase B) recovery wells would be installed.

Phase B wells would be installed spaced between and equidistant from Phase A wells (effectively 12.5 or 25 linear feet apart). These proposed locations may be adjusted upon evaluation of Phase A monitoring data and with input from NYSDEC. If deemed necessary based on Phase A monitoring data, the Phase B recovery well locations would be designated as RW1-1B through RW1-7B in AOC 1, and RW2-1B through RW2-35B in AOC 2, as shown on Figures 6A and 6B, respectively, as well as in Table 1. The naming convention for the Phase B recovery well may be adjusted depending on which Phase B recovery wells are determined to be necessary.

5.2.4 Timing of Design Plan and Recovery Well Installation

The recovery wells are proposed to be installed beginning in the Summer of 2018, or during the site preparation phase for the ESCR Project in the Summer or Fall of 2019. If the project schedule changes, the well installation may need to change accordingly.

It is anticipated that Phase A of the recovery well installation would take approximately two months, utilizing two Rotosonic drill rigs utilized simultaneously. As previously described, Phase A recovery wells would be gauged for the presence of NAPL for a minimum of 60 days to determine the requirement for, and locations of, Phase B recovery wells, which would be installed equidistant between Phase A recovery wells. If necessary, the Phase B recovery well installation would take up to 2 months, followed by a 60-day gauging period.

5.2.5 MGP-Related Waste Encountered During Flood Protection Structure Construction

An MGP Waste Management Plan for the work proposed under this MWP, including construction of the recovery wells and the flood protection structure, will be provided to NYSDEC for review prior to the commencement of field activities and will be appended to this MWP upon approval. All environmental activities performed under this MWP will be in full compliance with the MGP Waste Management Plan and all applicable environmental laws and regulations. The MGP Waste Management Plan will be prepared as part of the forthcoming MWP Design Plan previously described, which will include a CAMP and HASP.

The MGP Waste Management Plan would govern the handling, storage, and disposal of any MGP-related contaminated soil and construction-related spoils encountered, and the treatment requirements for any MGP-related contaminated dewatering fluid. All encountered soil/spoils will be screened for evidence of contamination visually, with a

photoionization detector (PID) and for odor. Any identified MGP-related contaminated soil/spoils would be segregated, sampled in accordance with the proposed receiving disposal facilities requirements, and transported in compliance with applicable laws and regulations to the selected disposal facility.

The following sections will apply to both the recovery well construction and flood protection structure construction in MGP-related contaminated areas, though it is anticipated that construction of the flood protection structure may require substantially greater implementation. A separate Environmental Management Plan will be submitted to the DEP for approval that will govern the handling, storage, and disposal procedures for all non-MGP impacted material along the Project alignment. The Environmental Management Plan will include a separate HASP and CAMP for these non-MGP impacted areas.

5.2.6 Health and Safety Plan (HASP)

A HASP for the work proposed under this MWP will be provided to NYSDEC for review and approval prior to site work and will be appended to this MWP upon approval. All environmental activities performed under this MWP will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal Occupational Safety and Health Administration (OSHA).

The City and its consultants and contractors preparing the remedial documents submitted to the NYSDEC and those performing the construction work will be responsible for the preparation of an appropriate HASP, and for the appropriate performance of work according to that plan and applicable laws.

The HASP and requirements defined in this MWP will pertain to all environmental activities associated with MGP-related wastes described in this MWP.

5.2.7 Community Air Monitoring Plan (CAMP)

A CAMP will be provided to NYSDEC for review prior to site work and will be appended to this MWP upon approval. The CAMP will pertain to all invasive work likely to expose MGP-related waste.

Community air monitoring will be performed at the perimeter of the work area(s) during intrusive work (drilling, excavation, etc.). Since continuous work zone monitoring under the HASP will be performed, continuous community air monitoring will be performed utilizing a fixed downwind monitoring station and handheld roving equipment around any active work area(s). The frequency of community air monitoring will be increased if persistent elevated readings are recorded in the work zone. Volatile organic compound (VOC) and particulate monitoring equipment will consist of a PID capable of detecting the VOCs found in the underlying soil , and real-time aerosol or particulate monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM_{10}). The equipment will be calibrated according to manufacturer specifications at the start of each day of field activities and documented in a dedicated field book. If an instrument fails calibration, a replacement instrument would be obtained and the failed equipment would be arranged for repair. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 per million (ppm) isobutylene standard gas. Both VOC and particulate monitoring equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the prescribed action levels.

If total VOC ambient air monitoring results indicate concentrations in excess of 5 ppm above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases below 5 ppm over background, work activities may resume with continued monitoring and concurrent measures taken to reduce vapors and continued monitoring. If, after halting work activities, total organic vapor levels persist at levels in excess of 5 ppm over background, work activities will be stopped, the source of vapors identified, corrective actions taken to abate emissions, and monitoring will be continued. If total VOC ambient air concentrations are repeatedly over 25 ppm above background, activities will be shut down and the Site work plan re-evaluated.

If monitoring results indicate a 15-minute average particulate concentration between 100 micrograms per cubic meter ($\mu g/m^3$) and 150 $\mu g/m^3$ above the background level, additional dust suppression techniques will be implemented to reduce the generation of fugitive dust and corrective action will be taken to protect Site personnel and to reduce potential for airborne contaminant migration. Should dust suppression measures not lower particulates to an acceptable level (e.g., below 150 $\mu g/m^3$ above the background level, and no visible dust from the work area), work will be suspended until appropriate corrective measures are implemented to remedy the situation.

Exceedances observed during implementation of the CAMP will be reported to the NYSDEC Project Manager and included in the Weekly Report discussed in Section 5.2.9 (Reporting).

5.2.8 Waste Management

An MGP Waste Management Plan will be provided to NYSDEC for review prior to site work and will be appended to this MWP upon approval and will include detailed plans for managing all MGP-related waste materials encountered and generated at the Site from activities associated with the flood protection structure construction and recovery well installation, such as drilling cuttings and fluids, decontamination fluids, and waste generated during well development and gauging activities, as wells as storage, transport, and disposal of MGP waste. The plan will include controls that will be applied to these efforts to assure effective, nuisance-free performance of the Environmental Action in compliance with all applicable Federal, State and local laws and regulations, and will include dust and odor control, good housekeeping, waste handling and disposal, and associated reporting to NYSDEC.

5.2.9 Reporting

Copies of all weekly and monthly reports, as discussed further below, will be included in the Final Environmental Action Report, which will be submitted to the NYSDEC at the conclusion of the MWP implementation.

Either weekly or monthly reports will be generated during the implementation of the MWP until a Final Environmental Action Report has been approved by NYSDEC. The weekly and monthly reports would be generated under the circumstances described below.

WEEKLY REPORTS

Separate weekly reports will be developed for AOC 1 and AOC 2 during implementation of the MWP. Weekly reports will be submitted to the NYSDEC Project Manager by the

end of each week of implementation of the MWP and will include summaries of work performed under the MWP including:

- Work force and visitors to the Site;
- An update on progress made during the reporting week;
- Locations of work presented in an AOC Site diagram and progress updates;
- Materials exported from the Site;
- Materials imported to the Site;
- Materials stockpiled on-site;
- A summary of any complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including exceedances and other reportable odor and dust issues;
- Apparent deviations from this MWP;
- An explanation of notable Site conditions;
- Corrective actions;
- Representative photos of Site work, including overview of the Site, demonstration of Site housekeeping (locations of ingress/egress, high traffic areas, areas in proximity to public use areas, etc.), localized work areas, disposal activities, if applicable, import and placement of materials, etc.;
- Weather conditions; and
- A summary of work anticipated during the subsequent week.

Weekly reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the MWP, or other sensitive or time-critical information. However, such conditions will be included in the weekly reports. Emergency conditions and changes to the MWP will be addressed directly to the NYSDEC Project Manager via personal communication (i.e., telephone call with follow-up e-mail for record-keeping purposes).

Weekly reports for each AOC will include a description of activities keyed to an AOC-specific map to identify specific work areas.

MONTHLY REPORTS

Monthly reports will be developed during implementation of the MWP and when the flood protection structure construction activities are subject to the MGP Waste Management Plan. The monthly report will be submitted to the NYSDEC Project Manager within one week following the end of the month of the reporting period and will include:

- Activities relative to the Site during the reporting period, including a quantitative presentation of work performed (e.g., quantity of wells installed, quantity of waste disposed, etc.);
- Summary of activities anticipated during the next reporting period;

- Description of approved activity modifications, including changes to work scope and/or schedule;
- Monitoring data, including field logs;
- An update of the Environmental Action schedule, including the percentage of project completion, discussion of unresolved delays encountered or anticipated that may affect the future schedule, and a description of efforts made to mitigate such delays; and
- Representative photos of the Site work, including an overview of the Site, monitoring activities, and Site housekeeping.

OTHER REPORTING

Photographs will be taken of all Environmental Action activities and submitted to the NYSDEC in digital (JPEG) format. Photos will illustrate all Environmental Action program elements and will be of acceptable quality. Representative photos of the Site will be provided prior to the commencement of any Environmental Action activities. Representative photos will be provided of each work area, and Site structures before, during and after Environmental Action. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies). CDs will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical Environmental Action components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos. Photos will be submitted on a monthly basis or another agreed upon time interval, as well as in the Final Environmental Action Report.

Job-site record keeping for all Environmental Action work will be appropriately documented. These records will be maintained on-site at all times during the implementation of this MWP and be available for inspection by NYSDEC staff.

COMPLAINT MANAGEMENT PLAN

Complaints from the public regarding Site Environmental Action activities will be communicated to the NYSDEC Project Manager immediately. The response action to the complaint will be coordinated in conjunction with NYSDEC input, as appropriate.

DEVIATIONS FROM THE ENVIRONMENTAL ACTION PLAN

Any material deviations from the NYSDEC-approved MWP will be communicated to the NYSDEC Project Manager in writing, including:

- Reasons for deviating from the approved MWP;
- Effect of the deviations on overall Environmental Action; and
- Necessary corrective actions taken.

NYSDEC approval will be sought prior to proceeding with work deviating materially from this MWP. In the event of an emergency change to the work plan, the NYSDEC Project Manager will be consulted immediately. All deviations will be summarized in the Final Environmental Action Report.

5.2.10 Well Gauging

After installation of the recovery wells, the recovery wells will be gauged during a 60-day period to determine the thickness of the NAPL. The thickness of any observed NAPL will influence the placement of Phase B recovery wells, as described in Section 5.2.3 (Recovery Well Locations). Gauging will be conducted on a weekly basis, or as otherwise determined by NYSDEC.

6.0 ENVIRONMENTAL ACTION DESIGN

6.1 Overview

A final design document for this MWP, titled MWP Design Plan, will be submitted to NYSDEC, as defined in the attached schedule included in Appendix B.

The ESCR Project design plans are currently in the conceptual design stage, which were developed prior to the Project geotechnical investigation. Once the Project design plans are advanced further to provide more definitive wall construction depths, which will be informed by the geotechnical investigation, the MWP Design Plan will be submitted to NYSDEC for approval. The approved version will be appended to this Environmental Action Plan and the MOA between NYSDEC and the City. The MWP Design Plan would include details pertaining to the design depths of the proposed recovery wells, as well as those program elements described in Section 5.2.

6.2 Underground Utility Survey

Prior to mobilizing to the Site, the NYC/Long Island One Call Center will be contacted to request a mark-out of utilities in the proposed recovery well locations. Prior to field activities for the 2015 and 2016 ESCR Project subsurface investigations, copies of plans from Con Edison were obtained showing their utilities near the Site, and copies of relevant environmental reports were obtained pertaining to contamination from the former MGP facilities that may be affecting subsurface conditions at the Site. The City and its contractors will confirm with Con Edison that the location of their utilities have not changed since the 2016 ESCR Project subsurface investigation and will coordinate the marking of potential critical infrastructure with Con Edison and their utility contractor near proposed recovery well locations. The City and its contractors will conduct a Site walk-through to review the utility locations and confirm appropriate recovery well locations prior to mobilization to the Site for performance of the recovery well installation.

Additionally, all recovery well installation locations will be coordinated with the flood protection structure design team to ensure that the maximum number of recovery wells may be protected and maintained for use subsequent to structure construction.

A geophysical survey, including ground penetrating radar (GPR) and magnetometry, will be performed in each of the proposed recovery well locations to confirm the location of mapped underground utilities and to investigate for the presence and location of any unknown and known utilities. GPR uses electromagnetic wave propagation and scattering to image and identify changes in electrical and magnetic properties in the ground. Magnetometers measure irregularities in the magnetic field in a given area. If any anomalies are identified during the GPR survey, the area will be marked out and the location and dimensions of any anomalies will be added to the Site plan. If a subsurface utility or other infrastructure location interferes with any proposed recovery well location(s), the proposed well location(s) will be modified to ensure a safe drilling operation. In addition, each proposed recovery well location will be pre-cleared using hand tools or vacuum extraction to approximately 5 feet bgs in an effort to identify potential subsurface obstructions and/or utilities not identified during the GPR survey prior to drilling.

Photographs will be taken to document pre-drilling, drilling, and post-drilling conditions. Prior to excavation, any interference with existing water and sewer infrastructure would be identified. Existing water and sewer infrastructure would be protected, supported, and maintained in place throughout the duration of work where possible. Utility work associated with the construction of floodwalls and berms may include relocation of existing water mains and combined sewer lines

within East River and Stuyvesant Cove Parks where protection, support, and maintenance of infrastructure in place is not feasible. Relocation of water mains or combined sewer lines would be undertaken without affecting the conveyance of flow through the existing water supply and sewer system. All relocation work of the existing water supply and sewer system would be performed in accordance with methods and standards approved by the DEP. Any other utilities will be relocated in conjunction with construction.

6.3 Access and Staging

Access will be coordinated with NYCHA through a license agreement prior to scheduling the field work for AOC 1 and with the New York City Economic Development Corporation (NYCEDC) for AOC 2. One approximately 10-foot by 20-foot staging area is proposed within the proposed easement area on the NYCHA Riis House property for AOC 1, as shown on Figure 7A. A second 10-foot by 20-foot staging area is proposed east-adjacent to FDR Drive in the parking lot north of the Solar One building, as shown on Figure 7B. Staging areas will be secured with a chain link fence with a locking gate.

6.4 Recovery Well Installation Preliminary Design

The recovery wells will be installed using a Rotosonic drill rig to obtain high-quality core samples. At each proposed recovery well location, soil cores will be collected in 5-foot long, 4-inch diameter dedicated plastic bags. Soil samples will be inspected by the City's contractor's field personnel, i.e., Qualified Environmental Professional, for evidence of contamination (e.g., odors, NAPL, staining, etc.), screened for the presence of VOCs with a PID, and logged using the modified Burmister soil classification system. Geologic logging will utilize the method established by NYSDEC for the purpose of MGP-related waste mobility classification. The PID will be calibrated in accordance with manufacturer's specifications prior to each work day and on an as-needed basis. Based on previous investigations at the Site, groundwater is expected to be encountered approximately 7 to 10 feet bgs.

The borings will be advanced per Section 5.2.2 (Recovery Well Design) and as updated in the MWP Design Plan. Total construction depths and screened intervals of the recovery wells will vary between wells and will be determined in the field based on lithology, depth to groundwater, and observed NAPL at each location.

Immediately following installation, each recovery well will be developed via pumping and surging to remove any accumulated fines and establish a hydraulic connection with the surrounding aquifer. Development will continue until turbidity within the well is less than 50 nephelometric turbidity units (NTUs) for three successive readings and until water quality indicators have stabilized to within 10% for pH, temperature and specific conductivity for three successive readings, or until at least three well volumes have been purged from the well. Wells containing NAPL are not expected to achieve a turbidity of less than 50 NTUs. Development water will be containerized in properly labeled New York State Department of Transportation (DOT)-approved 55-gallon drums for future off-site disposal at a permitted facility. Drums will be temporarily secured and stored in the designated staging area while bulk pickups for transport and disposal are coordinated. Well development details will be noted on groundwater development logs.

6.5 Field Observations

Field observations and measurements for all Environmental Action field activities will be recorded in a dedicated field book. These will be maintained on-site throughout the course of the field

activities and will be available for inspection by NYSDEC. Representative photographs will be taken of both AOCs prior to, during, and after any Environmental Action field activities. Photographs will be submitted with weekly and monthly reports, at the completion of the activities described in this MWP, and in the Final Environmental Action Report in digital format (i.e., JPEG files).

6.6 Disposal of Recovery Well Derived Waste

Soil cuttings and development water will be containerized in properly labeled DOT-approved 55-gallon drums for future off-site disposal at a permitted facility. The drums will be temporarily stored in a secure area with secondary containment in the proposed staging areas, pending waste disposal analysis and disposal facility approval. Disposal analysis will include toxicity characteristic leaching procedure (TCLP) VOCs by Environmental Protection Agency (EPA) Method 8260, VOCs by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, polychlorinated biphenyls (PCBs) by EPA Method 8082, TCLP metals extracted by EPA Method 1311 and analyzed by EPA Method 6010/7471, total petroleum hydrocarbons by EPA Method 8015, ignitability, corrosivity, and reactivity. It is anticipated that at least some of the drill cuttings and development water will display evidence of MGP-related contamination. Material visibly clean of MGP-related contamination will be containerized separately for testing and disposal consistent with NYCDEC-approved disposal protocols and any NYSDEC and NYC approved protocols established with the Responsible Party for MGP-related waste.

Disposable sampling equipment, including, spoons, gloves, bags, paper towels, etc., that have come in contact with contaminated environmental media will be double-bagged and disposed as municipal trash in a facility trash dumpster as non-hazardous trash. If decontamination fluids contain a sheen or NAPL, they will be containerized in properly labeled DOT-approved 55-gallon drums for future off-site disposal at a permitted facility. Drums will be temporarily secured and stored in the designated staging area(s) while bulk pickups are coordinated.

6.7 Recovery Well Protection During Flood Protection Construction

The recovery wells will be installed prior to or in conjunction with the construction of the proposed flood protection system; therefore, protection of the recovery wells will be necessary during construction of the flood protection system to avoid damage to the wells. The recovery wells will be initially installed with a flush-mount steel well box set within a concrete pad. If necessary, during construction of the flood protection structure, the concrete pad may be chipped out, the wells finished with a stick-up steel casing, and/or protected with orange construction fencing and/or plywood. High visibility cones and spray paint will be used as necessary. Once construction is complete, the protective measures will be removed and the well will be refinished with a flush-mount steel well box. Alternatively, steel plates would be placed over the wells prior to the start of construction. Photographs documenting the status of the wells before, during, and after construction of the flood protection structure will be collected. Any recovery wells damaged during construction will be repaired, if possible, or reinstalled.

6.8 Disposal of MGP-Related Waste Generated During Flood Protection Structure Construction

Methods for management of MGP-related wastes generated during the construction of the flood protection structure and installation of the recovery well network will be addressed in the MGP Waste Management Plan and will be subject to NYSDEC review and approval.

7.0 ENVIRONMENTAL REVIEW PROCESS

The City is the recipient of $4.214 billion of Community Development Block Grant – Disaster Recovery (CDBG-DR) funding from HUD to assist in disaster recovery and rebuilding efforts resulting from Super Storm Sandy. Included within that $4.214 billion is a $335 million Rebuild by Design award for the ESCR Project. The City allocated an additional $3 million of CDBG-DR funds to the Project. Consequently, implementation of an approved Action Plan is required to utilize the $338 million in CDBG-DR funds from HUD for this Project. Due to the nature of the funding, the ESCR Project has to follow the National Environmental Policy Act (NEPA) and State Environmental Quality Review Act (SEQRA)/City Environmental Quality Review (CEQR) processes.

It is the purpose of the environmental review process to provide a means for decision-makers to systematically consider environmental effects along with other aspects of project planning and design, to evaluate and compare reasonable alternatives, and to identify and mitigate, where practicable, any significant adverse environmental impacts. The NYC Office of Management and Budget (OMB) and NYC Parks, as the NEPA and SEQRA/CEQR Lead Agencies, respectively, have determined that the Proposed Action has the potential to result in significant adverse environmental impacts. Therefore, at OMB's request, HUD issued a Notice of Intent to Prepare an Environmental Impact Statement (EIS) (in accordance with 24 CFR Part 1502). OMB and NYC Department of Parks & Recreation (DPR) also prepared a Draft Scope of Work to describe the proposed content of the Draft EIS (DEIS) and the methodologies to be used in the impact analyses, and to allow for public and stakeholder participation as recommended by 6 NYCRR Part 617.

A Draft Scope of Work for the preparation of the DEIS was published on October 30, 2015, and a public scoping meeting was held on December 3, 2015. A Final Scope of Work will be issued that takes into account public comments received during the public input and review period that remained open until December 21, 2015. The DEIS and subsequent Final EIS (FEIS) will serve to fulfill the statutory obligations of NEPA, SEQRA, and CEQR. Once OMB and DPR have determined that the DEIS is complete, a Notice of Availability (pursuant to NEPA) and a Notice of Completion (pursuant to CEQR) will be prepared, distributed, and published in accordance with applicable regulations. The DEIS will then be subject to additional public review, in accordance with NEPA, SEQRA, and CEQR procedures, including a public hearing and a period for public comment. After the DEIS public comment period has closed, an FEIS will be prepared, which will include a summary of the comments received on the DEIS, responses to all substantive comments, and any necessary revisions to the DEIS to address those comments. No sooner than 30 days after publishing the FEIS, OMB, as NEPA Lead Agency, will prepare a Record of Decision and Statement of Findings that will describe the Preferred Alternative for the Project, its environmental impacts, and any required mitigation. Similarly, DPR, as the CEQR Lead Agency, will prepare a Statement of Findings, demonstrating that it has reviewed the impacts, mitigation measures, and alternatives in the FEIS prior to adopting its findings. OMB can proceed with the Federal action of requesting release of CDBG-DR grant funds from HUD once the environmental review process is concluded.

PUBLIC PARTICIPATION

The public involvement activities for this Project have been guided by the Community Engagement Plan (CEP), which was originally developed during the conceptual design for this Project as a "living" document that would be amended as the Project moved forward. The CEP will continue to be amended to reflect the ongoing outreach activities as the Project moves through the EIS phase. The key goal of the plan is to inform interested parties about the Proposed Action and to seek input on a wide range of issues. Additionally, the public scoping meeting and comment period provided opportunities for public

involvement. The public hearing and comment period on the DEIS will provide continued opportunities for public involvement.

8.0 FINAL ENVIRONMENTAL ACTION REPORT

A Final Environmental Action Report will be submitted to NYSDEC following implementation of the Environmental Action defined in this MWP and the MWP Design Plan. The Final Environmental Action Report will provide documentation that the Environmental Action work required under this MWP has been completed and has been performed in compliance with this plan.

The Final Environmental Action Report will include the following:

- A comprehensive account of the locations and characteristics of the Environmental Action at the Site including the surveyed map(s) of all recovery wells;
- Drawings for all constructed elements, certifications, manifests, and bills of lading;
- A description of the changes in the Environmental Action from the elements provided in this MWP and associated design documents;
- Written and photographic documentation of all Environmental Action work performed under this MWP;
- An accounting of the destination of all material removed from the Site, including drill cuttings and fluids, and waste generated during well development and gauging activities; and
- Documentation associated with disposal of all material will also include records and approvals for receipt of the material.

CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the Final Environmental Action Report. The certification will be signed by the Remedial Engineer who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

> I, _____, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the Environmental Action program for MGP-related NAPL contamination for the ESCR Project Site.
>
> I certify that the Environmental Action Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.
>
> I certify that the environmental activities were observed by Qualified Environmental Professionals under my supervision and that the remediation requirements set forth in the MWP and any other relevant provisions of ECL 27-1419 have been achieved.
>
> I certify that the export of all contaminated soil, fill, water or other material from the Site was performed in accordance with the MWP, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.
>
> I certify that all invasive work during the Environmental Action and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the MWP.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

9.0 ENVIRONMENTAL ACTION SCHEDULE

Estimated dates for performance of Environmental Action work and deliverables are provided below:

Milestone	Date
o MWP Design Plan (includes MGP Waste Management Plan, HASP, and CAMP) Submission to NYSDEC	March 2018
o Specification and Contractor Procurement	March through April 2018
o Implementation (Environmental Action Field Work)	July through December 2018
o Final Environmental Action Report Submission to NYSDEC	April 2019
o Flood Protection Structure Construction	2019 (Estimated 5-year Duration)
o MGP Waste Management Summary Report Submission to NYSDEC	2021-2023 (Contingent on Construction Phasing, Which is Not Determined at this Time)

This is a preliminary schedule and may be adjusted. The actual schedule may differ depending on such factors as contractor availability and sequencing, Site constraints, complexity, and access coordination. An updated schedule will be presented in the final MWP Design Plan. The NYSDEC Project Manager will be notified of significant changes to the schedule.

10.0 REFERENCES

1. *East Side Coastal Resiliency: Supplemental Subsurface Investigation* - Borough of Manhattan, New York, Hazen-AKRF JV, November 2016 (ESCR Project subsurface investigation).
2. *East Side Coastal Resiliency Project Area One: Subsurface Exploration Report* - Borough of Manhattan, New York, AKRF-KSE JV, October 2015 (ESCR Project subsurface investigation).
3. *East Side Coastal Resiliency Project Area Two: Subsurface Exploration Report* - Borough of Manhattan, New York, AKRF-KSE JV, October 2015 (ESCR Project subsurface investigation).
4. *Remedial Investigation Report, Operable Unit 2 (OU2) – Former East 21st Street Works* – Site #V00536, New York, New York, AECOM, September 2010 (former MGP facility subsurface investigation).
5. *Remedial Investigation Report for Operable Unit 2 – East 11th Street Works Site* – NYSDEC Site No. V00534, New York, New York, Arcadis, December 2009 (former MGP facility subsurface investigation).
6. *Remedial Investigation Report – East 11th Street Works*– NYSDEC Site No. V00534, New York, New York, Arcadis, November 2007 (former MGP facility subsurface investigation).
7. *Site Characterization Study Report for the Former East 11th Street Works*, by TRC Environmental Corporation, March 2005 (former MGP facility subsurface investigation).
8. *United States Geologic Survey Bedrock and Engineering Geologic Maps of New York County and Parts of Kings and Queens Counties*, New York, and Parts of Bergen and Hudson Counties, New Jersey, by Charles A. Baskerville (1994).

FIGURES

EAST SIDE COASTAL RESILIENCY PROJECT AREA NEW YORK, NEW YORK

SITE LOCATION MAP

PREPARED BY:

Hazen | AKRF

a joint venture

AKRF Engineering, P.C.

DATE: 9/7/2017

PROJECT No.: 80282

FIGURE: 1

PREPARED BY: Hazen AKRF

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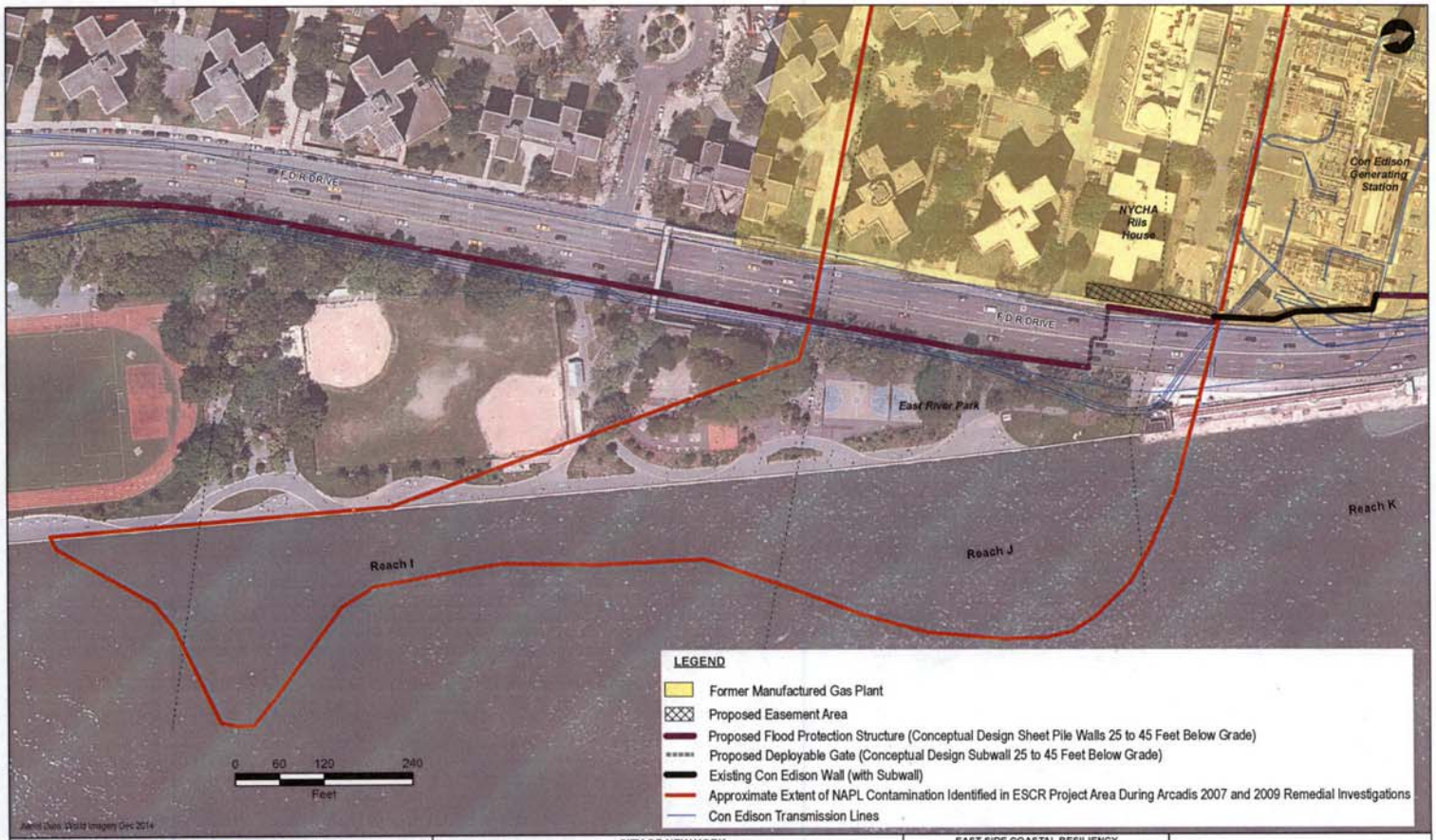
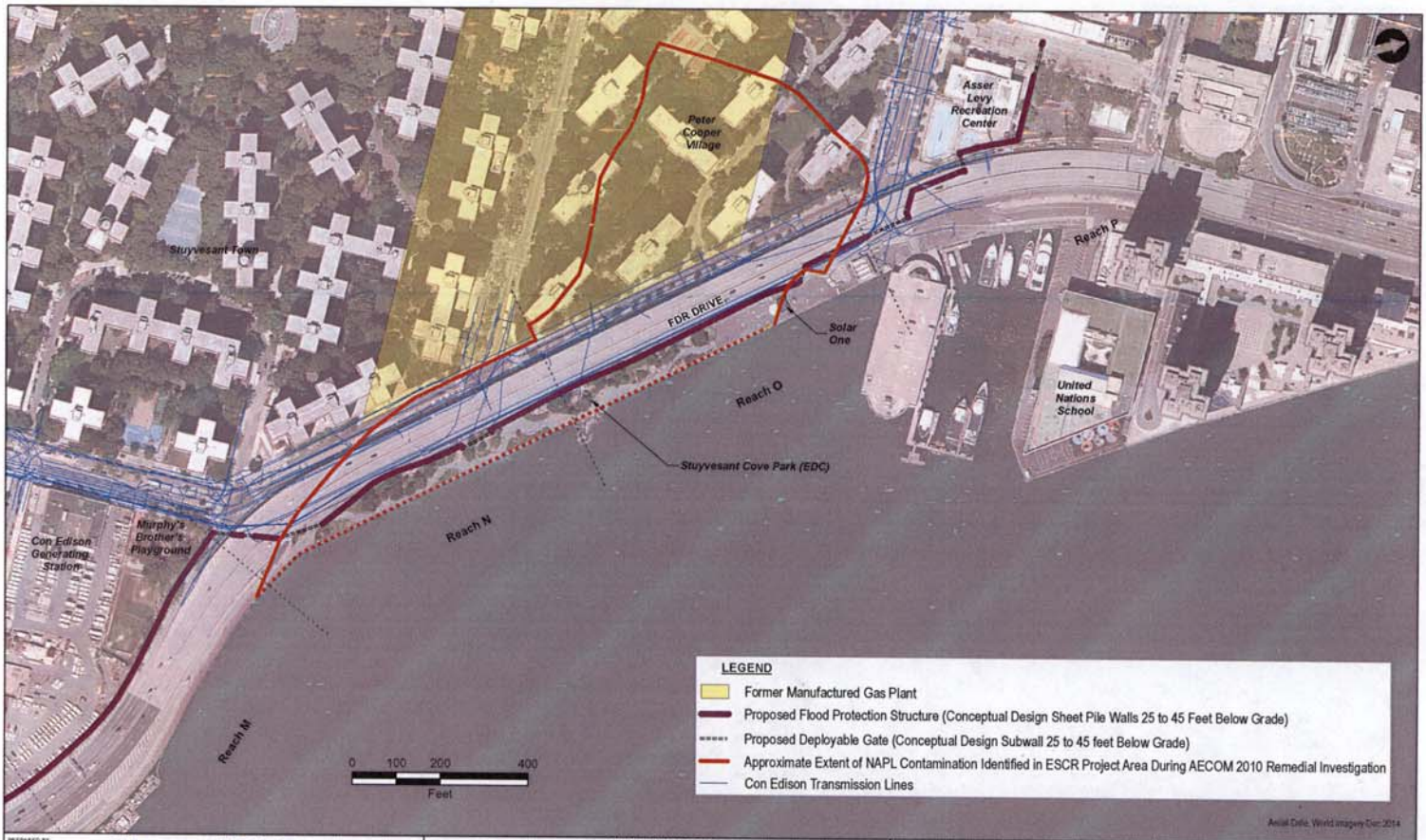
DEPARTMENT OF DESIGN + CONSTRUCTION
DIVISION OF INFRASTRUCTURE
BUREAU OF DESIGN

EAST SIDE COASTAL RESILIENCY
PROJECT AREA
NEW YORK, NEW YORK

Site Plan and NAPL Areas of Concern (AOCs)



PREPARED BY: Hazen AKRF	CITY OF NEW YORK DEPARTMENT OF DESIGN + CONSTRUCTION DIVISION OF INFRASTRUCTURE BUREAU OF DESIGN	EAST SIDE COASTAL RESILIENCY PROJECT AREA NEW YORK, NEW YORK	NAPL Extent in AOC 1
		JB / Fig 3A NAPL Extent in AOC 1 DRAWN BY / FILE	PROJECT I.D. SANDRESM1 DATE: 10/13/2017 Figure 3A



PREPARED BY: Hazen AKRF

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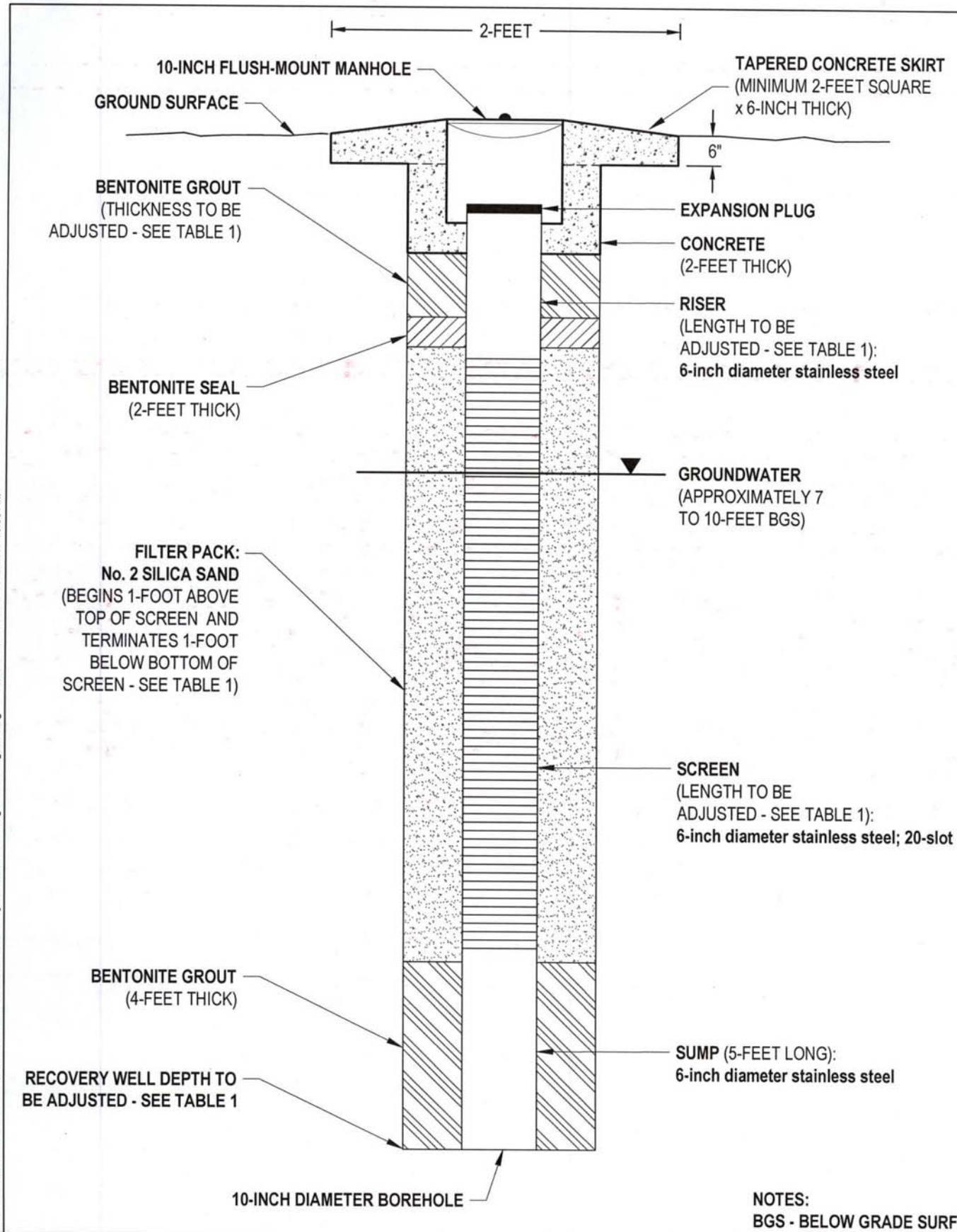
BUREAU OF DESIGN

EAST SIDE COASTAL RESILIENCY
PROJECT AREA
NEW YORK, NEW YORK

Fig 3B NAPL Extent in AOC 2

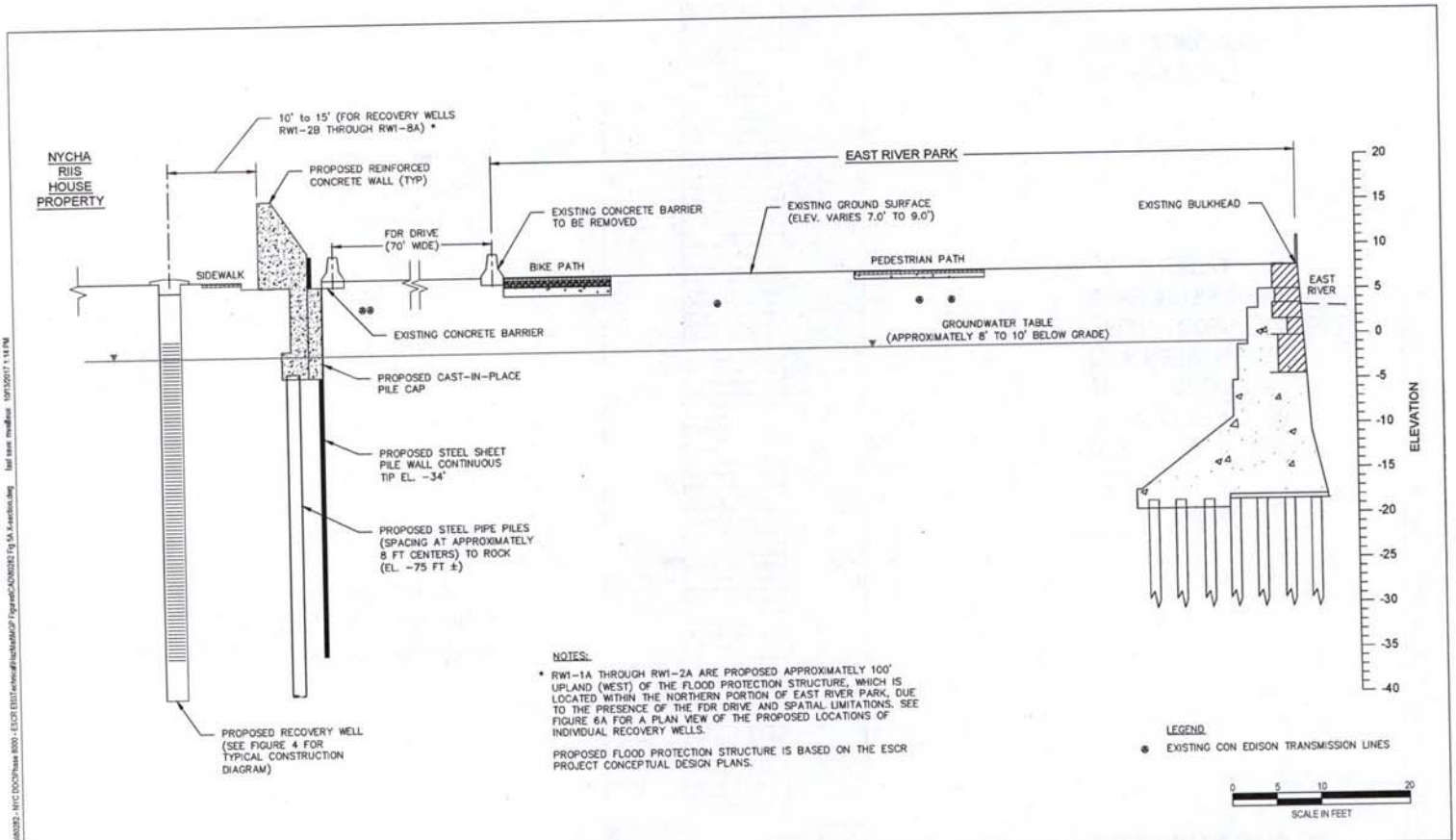
NAPL Extent in AOC 2

PROJECT I.D. SANDRESM1 DATE: 10/11/2017 Figure 3B



NOTES:
BGS - BELOW GRADE SURFACE

EAST SIDE COASTAL RESILIENCY PROJECT AREA New York, New York	Hazen | AKRF AKRF Engineering, P.C. a joint venture	DATE **7/28/2017**
		PROJECT NO. **80282**
TYPICAL RECOVERY WELL CONSTRUCTION		FIGURE **4**



PREPARED BY: Hazen | AKRF

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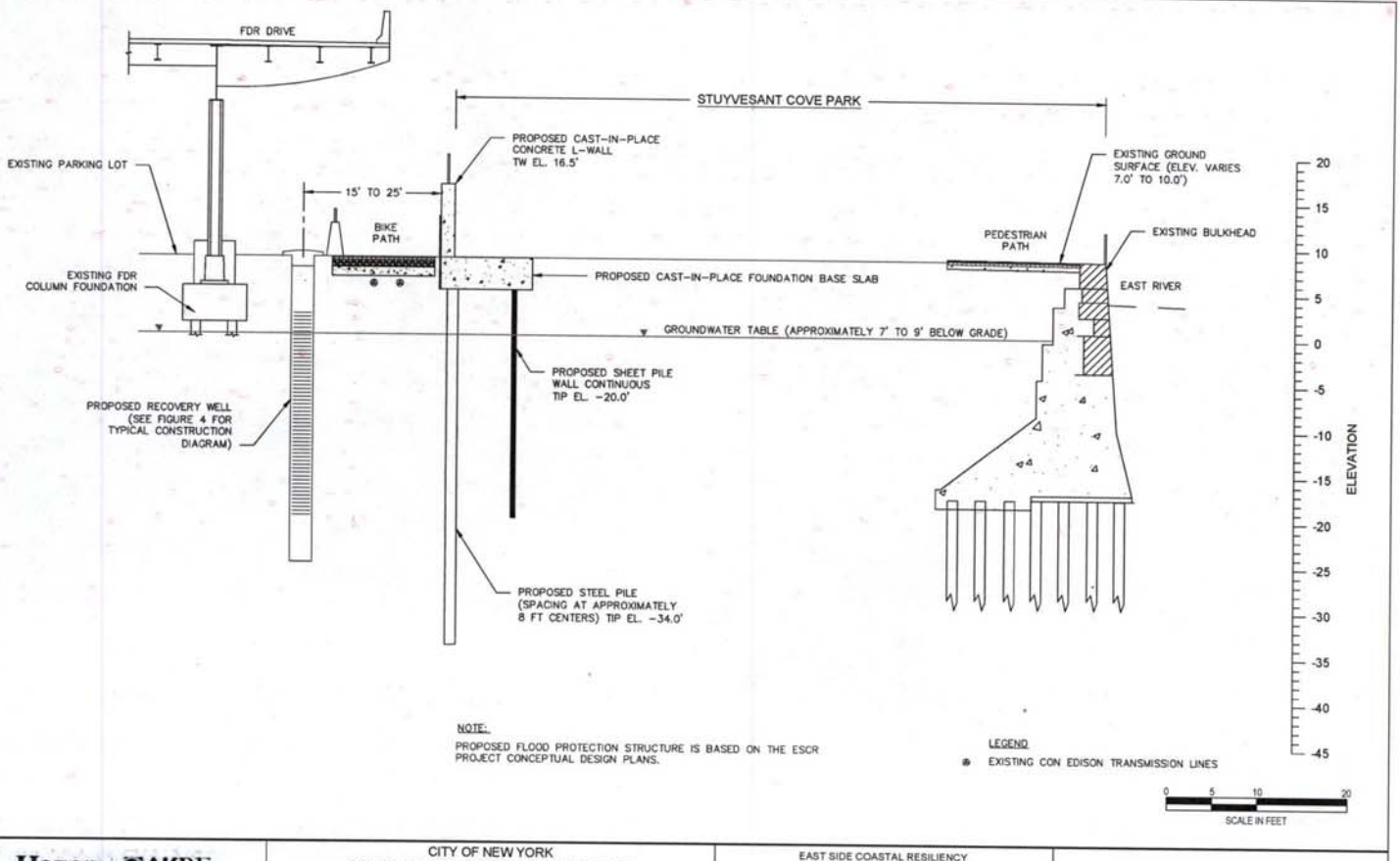
EAST SIDE COASTAL RESILIENCY
PROJECT AREA
NEW YORK, NEW YORK

DRAWN BY: MRV
FILE: 80282 Fig 5A X-section.dwg

Typical Cross-Section - AOC 1

PROJECT I.D.: SANDRESM1
DATE: 10/13/2017
Figure 5A



PREPARED BY: Hazen | AKRF

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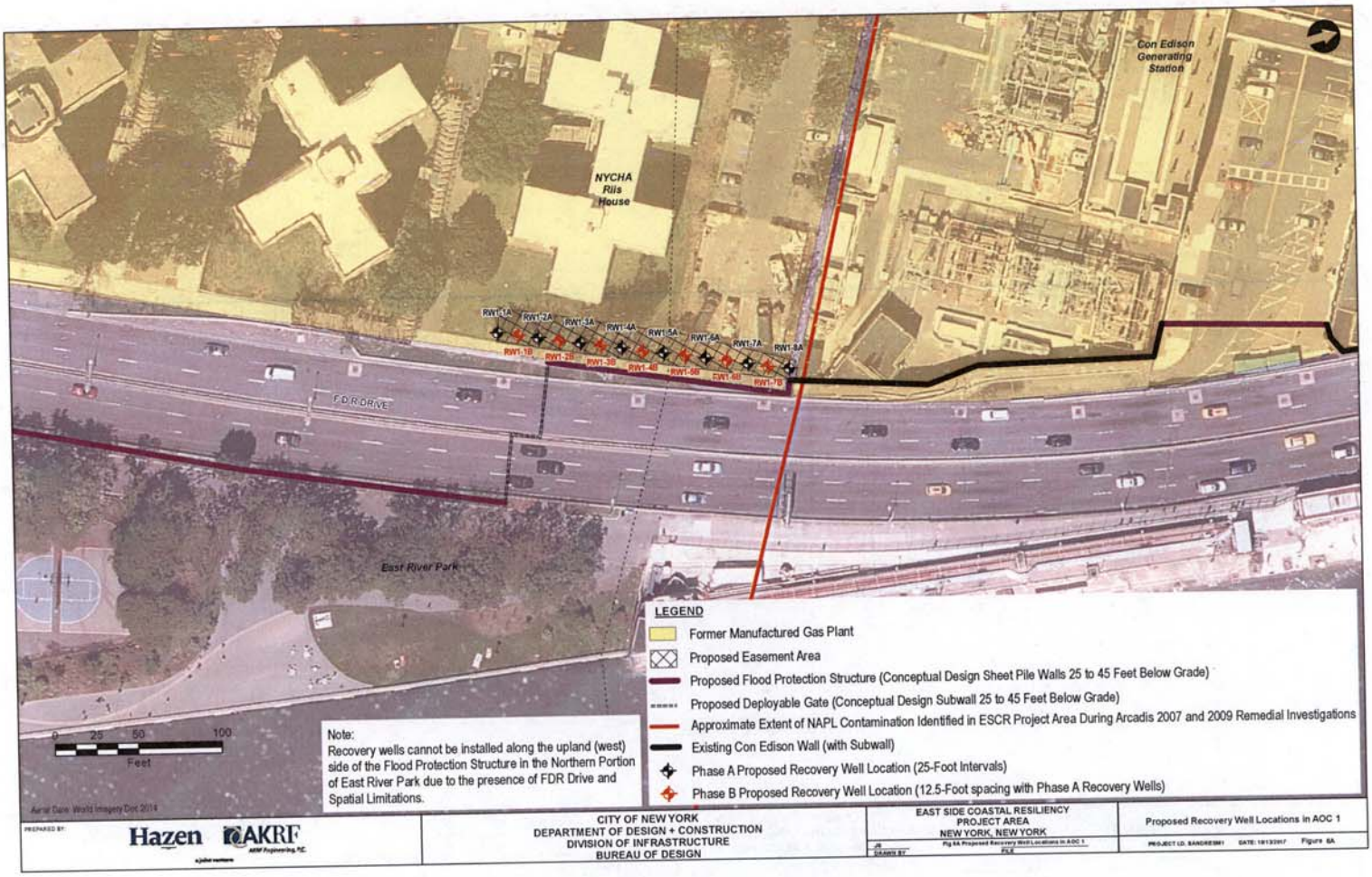
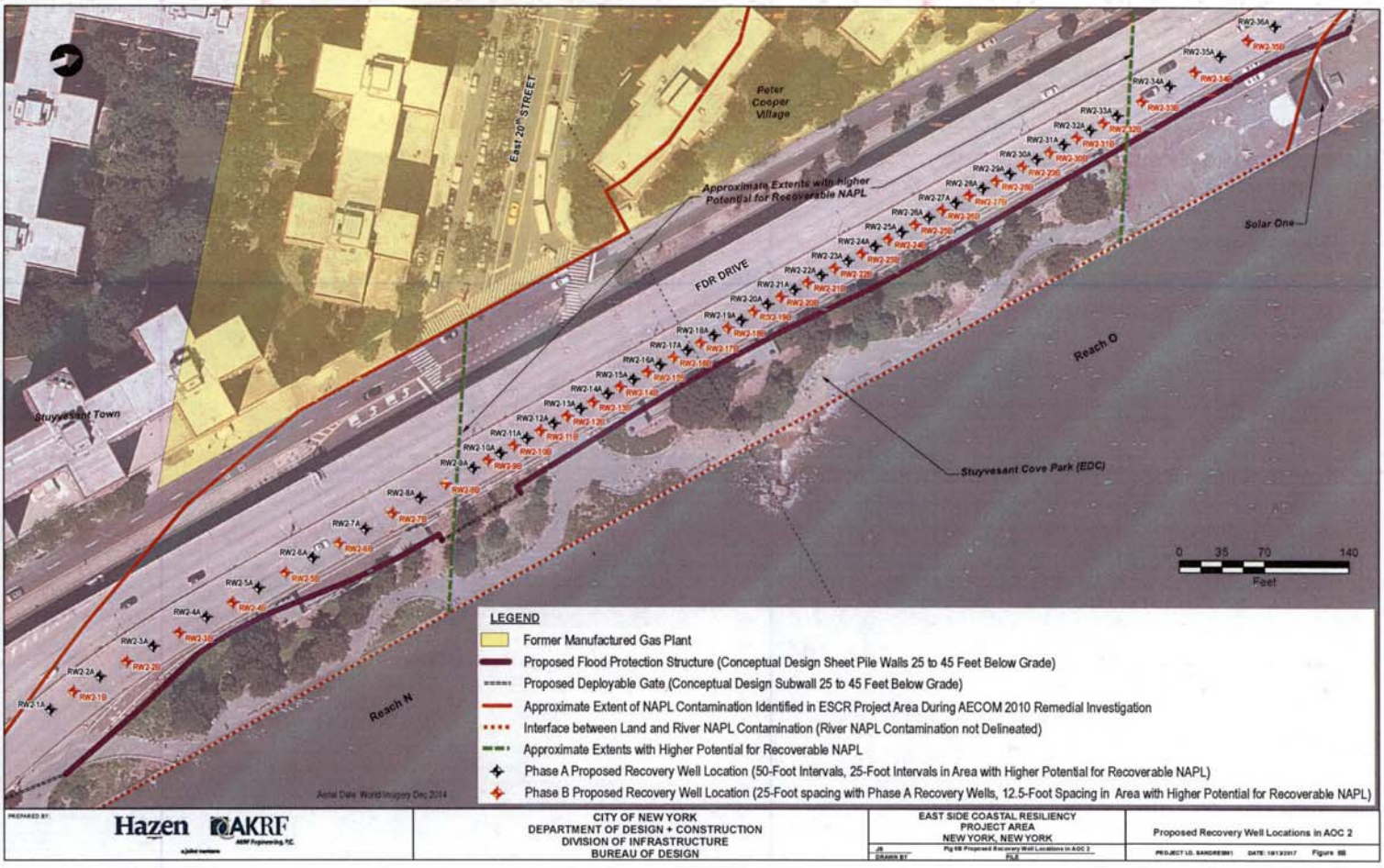
EAST SIDE COASTAL RESILIENCY
PROJECT AREA
NEW YORK, NEW YORK

DRAWN BY: MRV
FILE: 80282 Fig 58 X-section.dwg

Typical Cross-Section - AOC 2

PROJECT I.D.: SANDRESM1
DATE: 10/13/2017
Figure 58


Con Edison Generating Station
NYCHA Riis House
RW1-1A
RW1-2A
RW1-3A
RW1-4A
RW1-5A
RW1-6A
RW1-7A
RW1-8A
RW1-1B
RW1-2B
RW1-3B
RW1-4B
RW1-5B
RW1-6B
RW1-7B
F.D.R. DRIVE
East River Park
0 25 50 100
Feet
Aerial Date: World Imagery Dec 2014
Note:
Recovery wells cannot be installed along the upland (west) side of the Flood Protection Structure in the Northern Portion of East River Park due to the presence of FDR Drive and Spatial Limitations.
LEGEND
Former Manufactured Gas Plant
Proposed Easement Area
Proposed Flood Protection Structure (Conceptual Design Sheet Pile Walls 25 to 45 Feet Below Grade)
Proposed Deployable Gate (Conceptual Design Subwall 25 to 45 Feet Below Grade)
Approximate Extent of NAPL Contamination Identified in ESCR Project Area During Arcadis 2007 and 2009 Remedial Investigations
Existing Con Edison Wall (with Subwall)
Phase A Proposed Recovery Well Location (25-Foot Intervals)
Phase B Proposed Recovery Well Location (12.5-Foot spacing with Phase A Recovery Wells)
PREPARED BY:
Hazen
AKRF
CITY OF NEW YORK
DEPARTMENT OF DESIGN + CONSTRUCTION
DIVISION OF INFRASTRUCTURE
BUREAU OF DESIGN
EAST SIDE COASTAL RESILIENCY
PROJECT AREA
NEW YORK, NEW YORK
Fig 6A Proposed Recovery Well Locations in AOC 1
JR
DRAWN BY
FILE
Proposed Recovery Well Locations in AOC 1
PROJECT I.D. SANDRESM1
DATE: 10/13/2017
Figure 6A



PREPARED BY: Hazen AKRF

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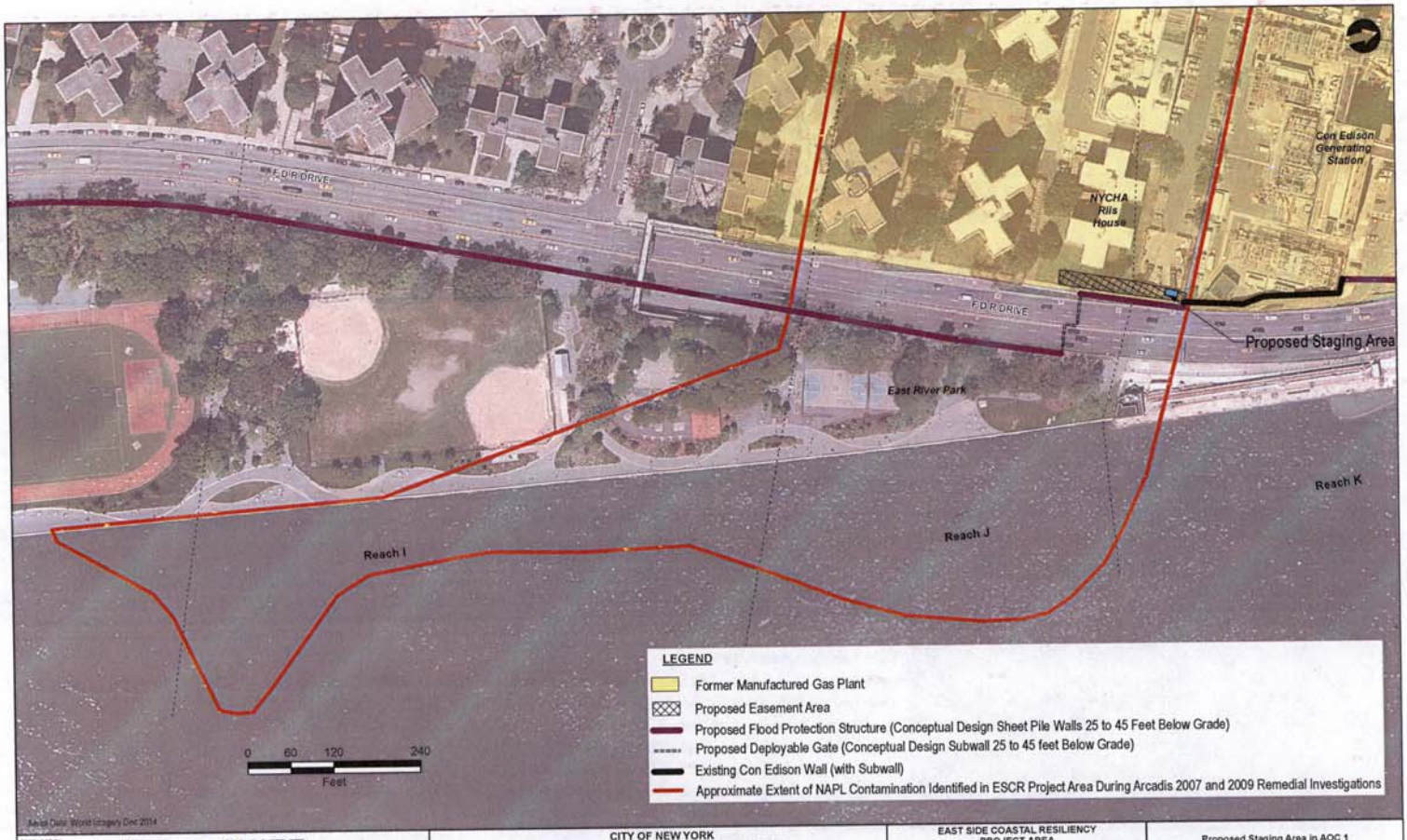
BUREAU OF DESIGN

EAST SIDE COASTAL RESILIENCY
PROJECT AREA
NEW YORK, NEW YORK

Proposed Recovery Well Locations in AOC 2

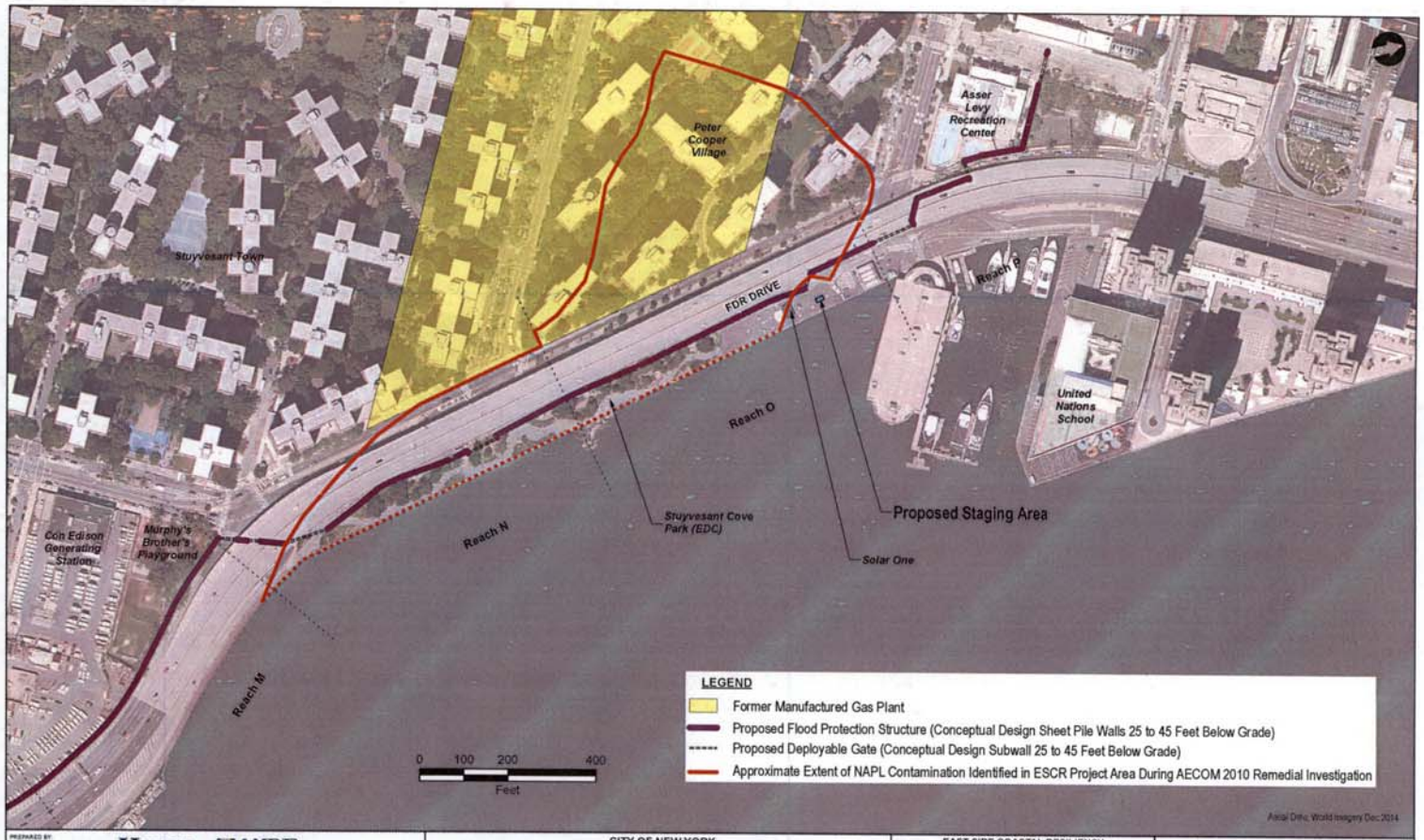
JB | Fig 6B Proposed Recovery Well Locations in AOC 2 | PLE

PROJECT I.D. SANDRES961 | DATE: 10/13/2017 | Figure 6B



Aerial Date: World Imagery Dec 2014

PREPARED BY: Hazen AKRF	CITY OF NEW YORK DEPARTMENT OF DESIGN + CONSTRUCTION DIVISION OF INFRASTRUCTURE BUREAU OF DESIGN	EAST SIDE COASTAL RESILIENCY PROJECT AREA NEW YORK, NEW YORK DRAWN BY: JS Fig 7A Proposed Staging Area in AOC 1 FILE	Proposed Staging Area in AOC 1 PROJECT I.D. SANDRE9901 DATE: 10/13/2017 Figure 7A



PREPARED BY: Hazen AKRF	CITY OF NEW YORK DEPARTMENT OF DESIGN + CONSTRUCTION DIVISION OF INFRASTRUCTURE BUREAU OF DESIGN	EAST SIDE COASTAL RESILIENCY PROJECT AREA NEW YORK, NEW YORK	Proposed Staging Area in AOC 2
		JR / DRAWN BY: Fig 7B Proposed Staging Area in AOC 2 / FILE	PROJECT I.D. SANDRES001 DATE: 10/11/2017 Figure 7B

TABLE

Table 1
East Side Coastal Resiliency
Manhattan, NY
Anticipated Recovery Well Construction Specifications

NAPL Area of Concern	Recovery Well ID	Potential NAPL Interval (Feet BGS)*	Approximate Sheet Pile Wall Depth**	Well Depth (Feet BGS)	Screened Interval (Feet BGS)	Sump Interval (Feet BGS)
1	RW1-1A	10-46	45	50	10-45	45-50
1	RW1-1B	10-46	45	50	10-45	45-50
1	RW1-2A	10-46	45	50	10-45	45-50
1	RW1-2B	10-46	45	50	10-45	45-50
1	RW1-3A	10-46	45	50	10-45	45-50
1	RW1-3B	10-46	45	50	10-45	45-50
1	RW1-4A	10-46	45	50	10-45	45-50
1	RW1-4B	10-46	45	50	10-45	45-50
1	RW1-5A	10-46	45	50	10-45	45-50
1	RW1-5B	10-46	45	50	10-45	45-50
1	RW1-6A	10-46	45	50	10-45	45-50
1	RW1-6B	10-46	45	50	10-45	45-50
1	RW1-7A	10-46	45	50	10-45	45-50
1	RW1-7B	10-46	45	50	10-45	45-50
1	RW1-8A	10-46	45	50	10-45	45-50
2	RW2-1A	10-60	30	35	10-30	30-35
2	RW2-1B	10-60	30	35	10-30	30-35
2	RW2-2A	10-60	30	35	10-30	30-35
2	RW2-2B	10-60	30	35	10-30	30-35
2	RW2-3A	10-60	30	35	10-30	30-35
2	RW2-3B	10-60	30	35	10-30	30-35
2	RW2-4A	10-60	30	35	10-30	30-35
2	RW2-4B	10-60	30	35	10-30	30-35
2	RW2-5A	10-60	30	35	10-30	30-35
2	RW2-5B	10-60	30	35	10-30	30-35
2	RW2-6A	10-60	30	35	10-30	30-35
2	RW2-6B	10-60	30	35	10-30	30-35
2	RW2-7A	10-60	30	35	10-30	30-35
2	RW2-7B	10-60	30	35	10-30	30-35
2	RW2-8A	10-60	30	35	10-30	30-35
2	RW2-8B	10-60	30	35	10-30	30-35
2	RW2-9A	10-60	30	35	10-30	30-35
2	RW2-9B	10-60	30	35	10-30	30-35
2	RW2-10A	10-60	30	35	10-30	30-35
2	RW2-10B	10-60	30	35	10-30	30-35
2	RW2-11A	10-60	30	35	10-30	30-35
2	RW2-11B	10-60	30	35	10-30	30-35
2	RW2-12A	10-60	30	35	10-30	30-35
2	RW2-12B	10-60	30	35	10-30	30-35
2	RW2-13A	10-60	30	35	10-30	30-35
2	RW2-13B	10-60	30	35	10-30	30-35
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2	RW2-15A	10-60	30	35	10-30	30-35
2	RW2-15B	10-60	30	35	10-30	30-35
2	RW2-16A	10-40	30	35	10-30	30-35
2	RW2-16B	10-40	30	35	10-30	30-35
2	RW2-17A	10-40	30	35	10-30	30-35
2	RW2-17B	10-40	30	35	10-30	30-35
2	RW2-18A	10-40	30	35	10-30	30-35
2	RW2-18B	10-40	30	35	10-30	30-35
2	RW2-19A	10-20	30	35	10-30	30-35
2	RW2-19B	10-20	30	35	10-30	30-35
2	RW2-20A	10-20	30	35	10-30	30-35
2	RW2-20B	10-20	30	35	10-30	30-35
2	RW2-21A	10-20	30	35	10-30	30-35
2	RW2-21B	10-20	30	35	10-30	30-35
2	RW2-22A	10-20	30	35	10-30	30-35
2	RW2-22B	10-20	30	35	10-30	30-35
2	RW2-23A	10-40	30	35	10-30	30-35
2	RW2-23B	10-40	30	35	10-30	30-35
2	RW2-24A	10-40	30	35	10-30	30-35
2	RW2-24B	10-40	30	35	10-30	30-35

Table 1
East Side Coastal Resiliency
Manhattan, NY
Anticipated Recovery Well Construction Specifications

NAPL Area of Concern	Recovery Well ID	Potential NAPL Interval (Feet BGS)*	Approximate Sheet Pile Wall Depth**	Well Depth (Feet BGS)	Screened Interval (Feet BGS)	Sump Interval (Feet BGS)
2	RW2-25A	10-40	30	35	10-30	30-35
2	RW2-25B	10-40	30	35	10-30	30-35
2	RW2-26A	10-40	30	35	10-30	30-35
2	RW2-26B	10-40	30	35	10-30	30-35
2	RW2-27A	10-60	30	35	10-30	30-35
2	RW2-27B	10-60	30	35	10-30	30-35
2	RW2-28A	10-60	30	35	10-30	30-35
2	RW2-28B	10-60	30	35	10-30	30-35
2	RW2-29A	10-60	30	35	10-30	30-35
2	RW2-29B	10-60	30	35	10-30	30-35
2	RW2-30A	10-40	30	35	10-30	30-35
2	RW2-30B	10-40	30	35	10-30	30-35
2	RW2-31A	10-40	30	35	10-30	30-35
2	RW2-31B	10-40	30	35	10-30	30-35
2	RW2-32A	10-40	30	35	10-30	30-35
2	RW2-32B	10-40	30	35	10-30	30-35
2	RW2-33A	10-20	30	35	10-30	30-35
2	RW2-33B	10-20	30	35	10-30	30-35
2	RW2-34A	10-20	30	35	10-30	30-35
2	RW2-34B	10-20	30	35	10-30	30-35
2	RW2-35A	10-20	30	35	10-30	30-35
2	RW2-35B	10-20	30	35	10-30	30-35
2	RW2-36A	10-20	30	35	10-30	30-35

Notes:

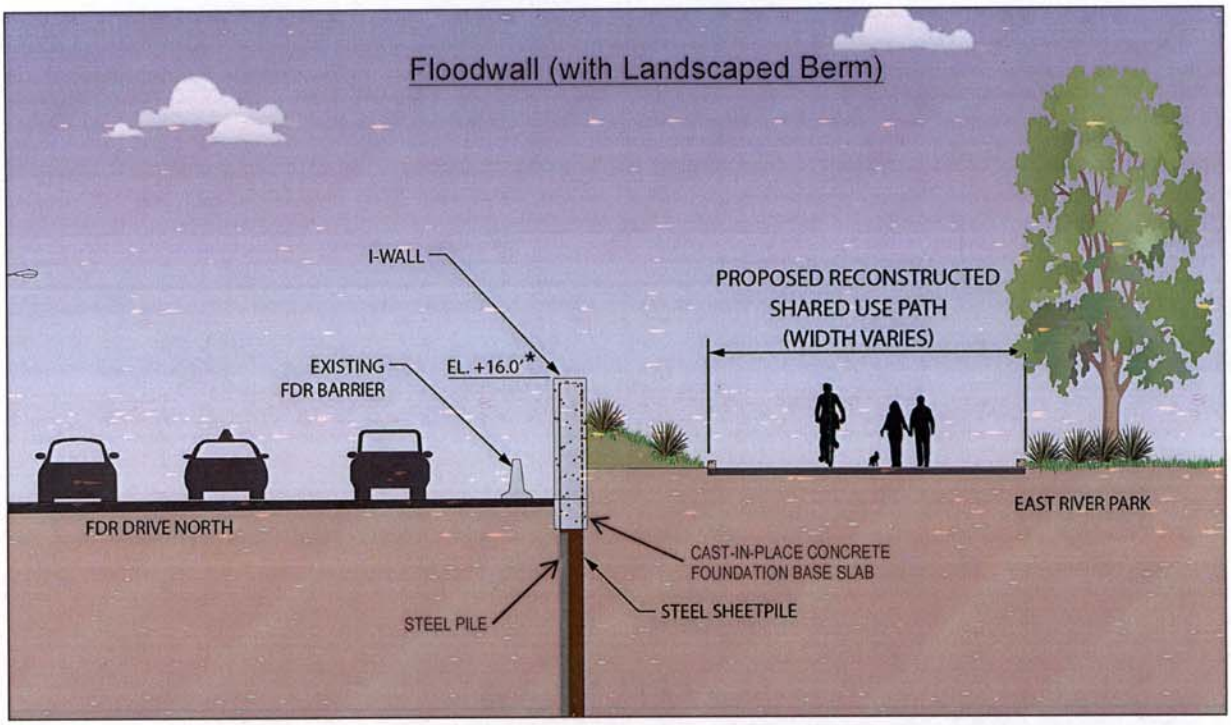
* The potential presence of NAPL and the potential NAPL depths are based on the Arcadis 2007 and 2009 Remedial Investigation Reports for the former East 11th Street Works, AECOM 2010 Remedial Investigation Report for the former East 21st Street Works, and the 2015 and 2016 ESCR Project subsurface investigations (borings for the ESCR Project subsurface investigations were advanced to shallower depths and did not delineate the presence of NAPL).

** Proposed sheet pile wall depth may change with the release of the 40% Design Plans.

BGS - Below Ground Surface

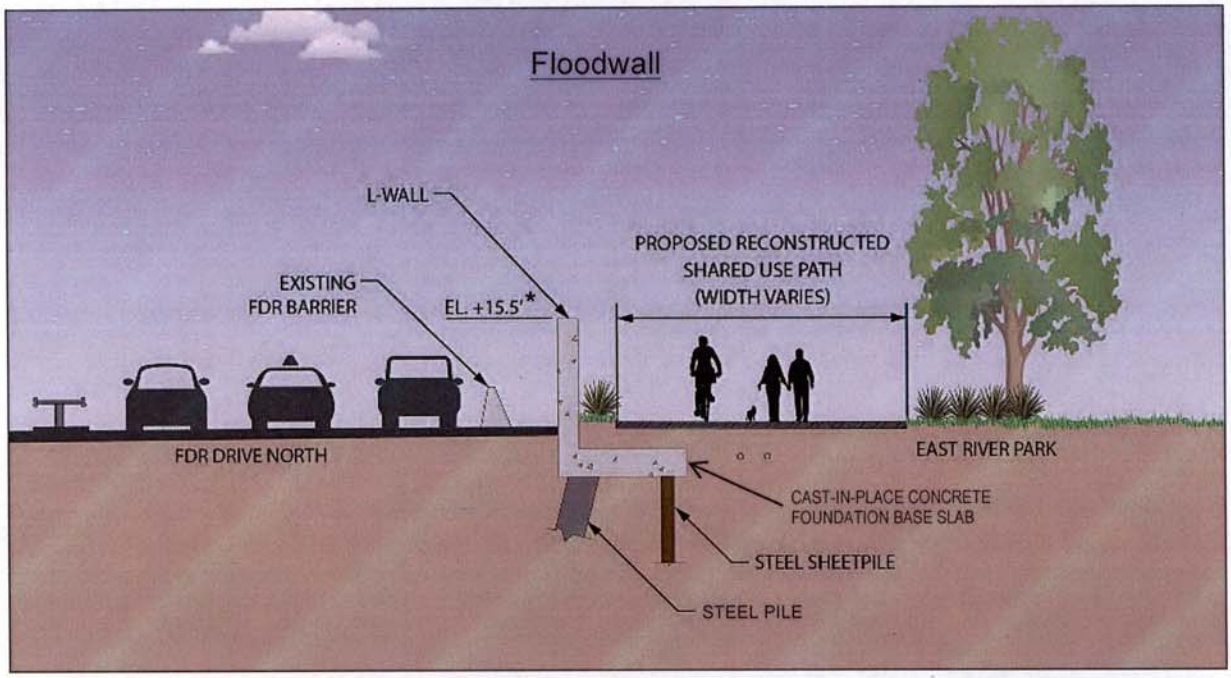
APPENDIX A

SCHEMATIC/CONCEPTUAL WALL DESIGN



**The elevation is in North American Vertical Datum of 1988 (NAVD88)*
Depending on location, the height of the floodwall is approximately 6 to 10 feet above grade.

Typical I-Wall Cross-Section, Project Area One

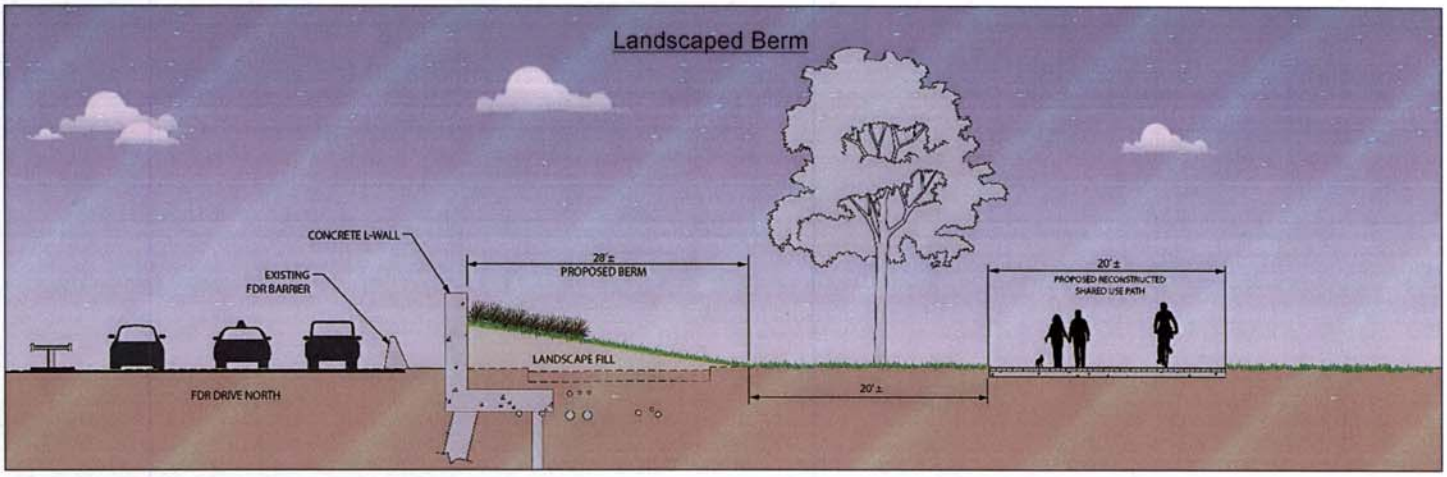


**The elevation is in North American Vertical Datum of 1988 (NAVD88)*
Depending on location, the height of the floodwall is approximately 6 to 10 feet above grade.

Typical L-Wall Cross-Section, Project Area One

NOTE: Preliminary Illustrative Design Concept

Typical Floodwall Cross-Sections
Figure 2.0-4



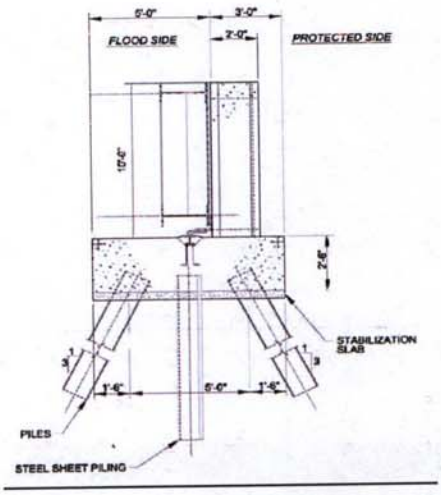
NOTE: Preliminary Illustrative Design Concept

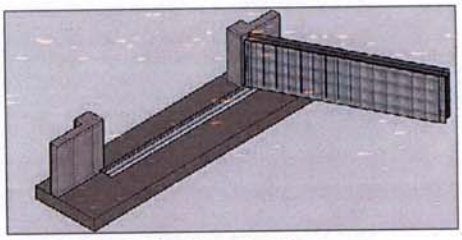
NYC DDC Capital Project: SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Typical Floodwall & Berm Cross-Sections
Figure 2.0-5

Closure Structures

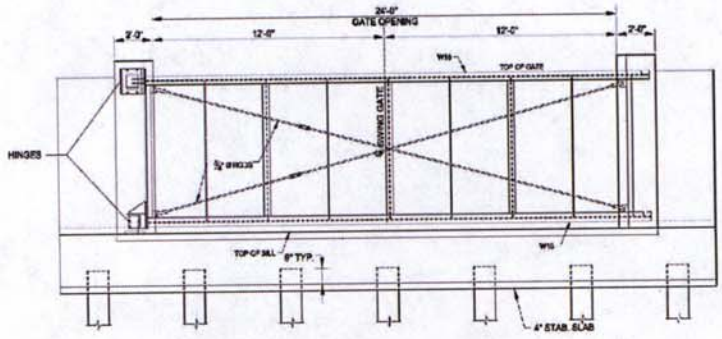
Typical Section



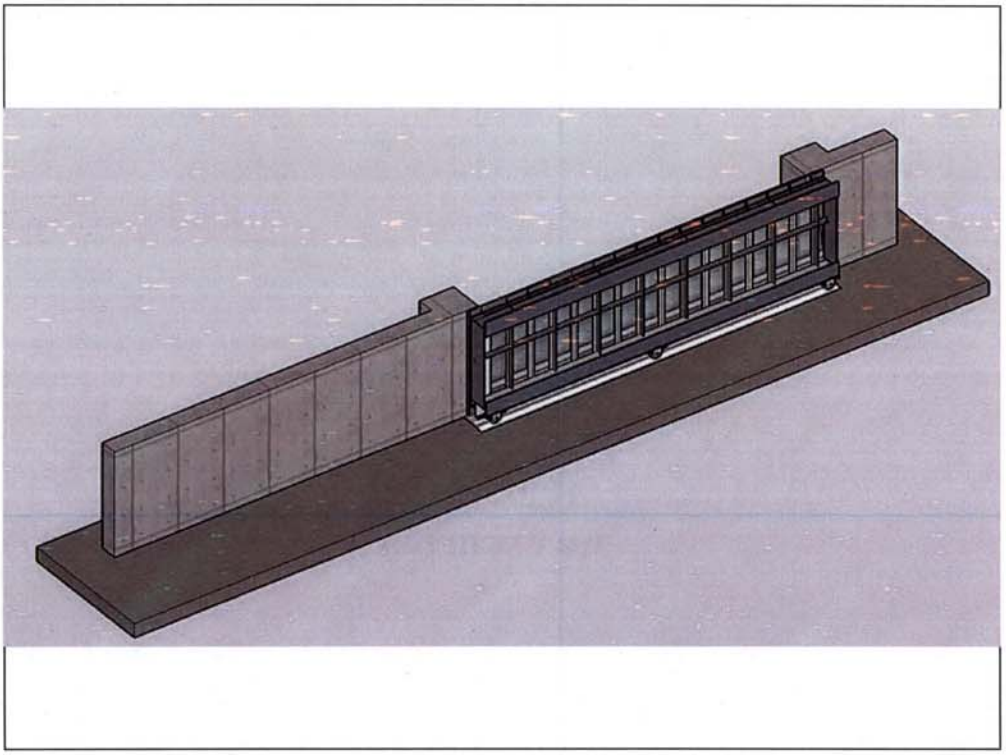


Swing Gate in the Open Position

Swing Gate in the Closed Position



Typical Swing Gate
Illustrative Designs
Figure 2.0-6



Typical Roller Floodgate
Illustrative Designs
Figure 2.0-7

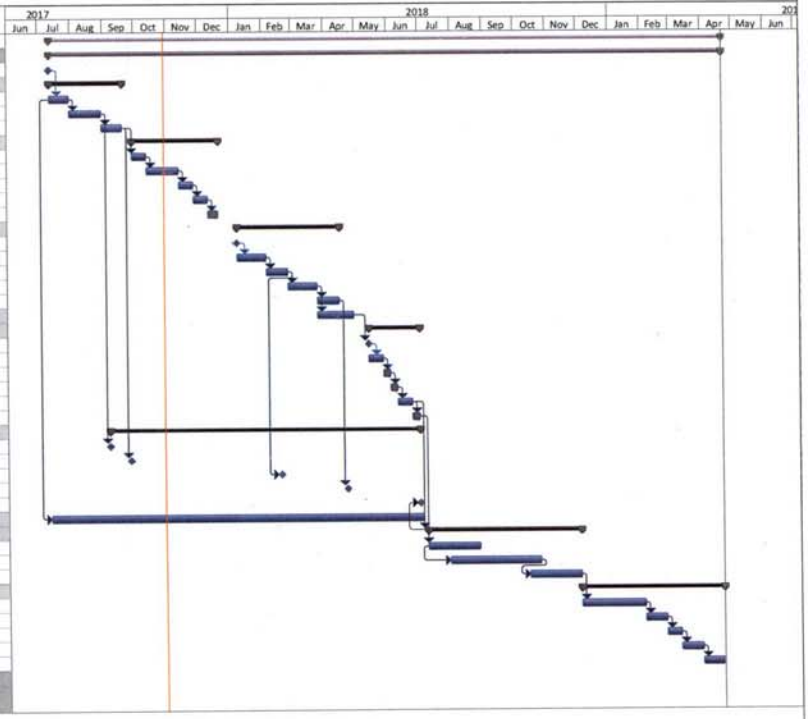
APPENDIX B

MWP SCHEDULE

DEPARTMENT OF DESIGN AND CONSTRUCTION
CAPITAL PROJECT:SANDRESM1
EAST SIDE COSTAL RESILIENCY
MITIGATION WORK PLAN FOR MGP-RELATED NAPL

NYC DDC Department of Design and Construction | Hazen | AKRF

ID	Task Name	Start	Finish
1	**SANDRESM1 - East Side Coastal Resiliency (ESCR)**	**Wed 7/12/17**	**Mon 4/22/19**
2	**Environmental Action for Manufactured Gas Plant-Related Contamination**	**Wed 7/12/17**	**Mon 4/22/19**
3	Notice to Proceed from DDC	Wed 7/12/17	Wed 7/12/17
4	**Preparation of Conceptual Mitigation Work Plan (MWP) for MGP Non-Aqueous Phase Liquid (NAPL) Contamination**	**Wed 7/12/17**	**Wed 9/20/17**
5	Prepare Draft Conceptual MWP	Wed 7/12/17	Mon 7/31/17
6	NYC Team to Review Draft Conceptual MWP and Submit to NYSDEC	Mon 7/31/17	Thu 8/31/17
7	NYSDEC to Review Draft Conceptual MWP	Thu 8/31/17	Wed 9/20/17
8	**Preparation of Draft MWP for MGP NAPL Contamination**	**Fri 9/29/17**	**Thu 12/21/17**
9	Prepare Draft MWP	Fri 9/29/17	Fri 10/13/17
10	NYC Team to Review Draft MWP and Circulate to NYC Agencies	Fri 10/13/17	Mon 11/13/17
11	Prepare Draft MWP for Submission to NYSDEC	Mon 11/13/17	Mon 11/27/17
12	NYSDEC to Review Draft MWP	Mon 11/27/17	Mon 12/11/17
13	Finalize MWP	Mon 12/11/17	Thu 12/21/17
14	**MWP Design Plan - Upon Issuance of 40% ESCR Project Design (Includes HASP, CAMP, and MGP Waste Management Plan)**	**Mon 1/8/18**	**Mon 4/16/18**
15	40% Project Design Complete (Anticipated Date Based on Current ESCR Project Schedule)	Mon 1/8/18	Mon 1/8/18
16	Prepare Draft MWP Design Plan	Mon 1/8/18	Mon 2/5/18
17	NYC Team to Review Draft MWP Design Plan	Mon 2/5/18	Mon 2/26/18
18	Prepare Draft MWP Design Plan for Submission to NYSDEC	Mon 2/26/18	Mon 3/26/18
19	NYSDEC to Review Draft MWP Design Plan	Mon 3/26/18	Mon 4/16/18
20	**Preparation of Specifications and Bid Form for Contractor Procurement of MWP Implementation Activities**	**Mon 3/26/18**	**Mon 4/30/18**
21	**Update MWP Design Plan Prior to the Start of Construction**	**Mon 5/14/18**	**Mon 7/2/18**
22	Selection of Contractors for Recovery Well Installation Work Covered in the MWP (Tentative Date)	Mon 5/14/18	Mon 5/14/18
23	Update MWP Design Plan Prior to the Start of Construction	Mon 5/14/18	Mon 5/28/18
24	NYC Team to Review Updated MWP Design Plan Prior to the Start of Construction	Mon 5/28/18	Mon 6/4/18
25	Prepare Updated MWP Design Plan for Submission to NYSDEC	Mon 6/4/18	Mon 6/11/18
26	NYSDEC to Review Updated MWP Design Plan	Mon 6/11/18	Mon 6/25/18
27	Finalize MWP Design Plan	Mon 6/25/18	Mon 7/2/18
28	**Meetings and Conference Call Pertaining to MWP**	**Thu 9/7/17**	**Mon 7/2/18**
29	After NYC Team Review of Conceptual MWP	Thu 9/7/17	Thu 9/7/17
30	After NYSDEC Review of Conceptual MWP	Wed 9/27/17	Wed 9/27/17
31	After Release of the 40% ESCR Project Design and Prior to Submission of the MWP Design Plan	Mon 2/19/18	Mon 2/19/18
32	After NYSDEC Review of the MWP Design Plan	Mon 4/23/18	Mon 4/23/18
33	Prior to the Start of MWP Implementation (Tentative Date)	Mon 7/2/18	Mon 7/2/18
34	**Integration of Reports and Graphics into the Environmental Impact Statement**	**Wed 7/12/17**	**Thu 7/5/18**
35	**Implementation of MWP (2 Rotosonic Drill Rigs Drilling Simultaneously)**	**Mon 7/9/18**	**Tue 12/4/18**
36	Phase A Recovery Well Installation	Mon 7/9/18	Tue 8/28/18
37	Well Gauging (60 Day Duration for Each Well; Gauging to Begin Once a Well has Been Installed)	Mon 7/30/18	Fri 10/26/18
38	Phase B Recovery Well Installation	Mon 10/15/18	Tue 12/4/18
39	**Final Environmental Action Report**	**Tue 12/4/18**	**Mon 4/22/19**
40	Prepare Draft Environmental Action Report	Tue 12/4/18	Mon 2/4/19
41	NYC Team to Review Draft Environmental Action Report	Mon 2/4/19	Mon 2/25/19
42	Prepare Draft Environmental Action Report for Submission to NYSDEC	Mon 2/25/19	Mon 3/11/19
43	NYSDEC to Review Draft Environmental Action Report	Mon 3/11/19	Mon 4/1/19
44	Finalize Environmental Action Report	Mon 4/1/19	Mon 4/22/19
45	**Commencement of Flood Protection Structure Construction (Anticipated Date, Subject to Change): 2019**		
46	**MGP Waste Management Summary Report - Anticipated Submission to NYSDEC (Contingent on Construction Phasing, Which is not Determined at This time): 2021-2023**		



Status Date: Mon 10/30/17 | Project Duration | Task Order Summary | Task Summary | Task | Milestone

Notes:
This is a critical path schedule. Tasks are contingent upon preceding tasks.

Exhibit "C"

Satisfactory Completion Letter Form

[date]

[The City of New York]
[address]

RE: Satisfactory Completion Letter
Agreement Index Number CO 2-20170614-01
New York City East Side Coastal Resiliency Project

Dear _____:

The New York State Department of Environmental Conservation's ("Department's") issuance of this Satisfactory Completion Letter ("Letter") to the City of New York (the "City") recognizes the satisfactory completion of all work detailed by Department-approved workplan(s) ("Work Plans") for work undertaken pursuant to Agreement Index Number CO 2-20170614-01, dated [ ], related to the City's East Side Coastal Resiliency Project ("Agreement"). Based upon the Department's inspection of the East Side Coastal Resiliency Agreement Project Area, the Department's review of documents submitted by the City, and other relevant information, the Department has determined that the City carried out all Work Plan(s) and produced Work Plan reports and other submittals in accordance with the terms and conditions of the Agreement and that no actions by the City have exacerbated conditions at the ESCR Project Area, such that a greater risk is posed to human health or the environment.

Based on the actual knowledge of the Department and its staff related to the environmental and public health conditions at and in connection with the Work Plan areas, the Department has determined the City has no further obligation to undertake Work Plan(s) work within the East Side Coastal Resiliency Agreement Project Area pursuant to the terms of the Agreement. Nevertheless, the Department and the City acknowledge that the Work Plan areas may not have been fully investigated or remediated and that nothing contained in this Satisfactory Completion Letter or the Agreement shall be construed as barring, diminishing, adjudicating, or in any way affecting (i) the Department's authority to require parties other than the City, including the Consolidated Edison Company of New York, Inc., to undertake additional work, and (ii) the Department's exercise of any of the Department's other rights or authorities, including rights concerning any claim for natural resource damages, against parties other than the City, including the Consolidated Edison Company of New York, Inc.

Nothing contained in this letter affects any of the City's ongoing obligations pursuant to the Agreement including the obligations to (a) make timely payments of the amounts specified in Paragraph VI (State costs), (b) provide indemnification, as provided in Paragraph IX.K, and (c) facilitate Con Ed's implementation of a Department-approved Site Management Plan, as described in Paragraph II.G.

Nothing contained in this letter shall be construed to prohibit the Commissioner or his duly authorized representative from exercising any summary abatement powers.

If you have any questions, please do not hesitate to contact [name of Project Manager], the Department's project manager, at [Project Manager's phone #].

Sincerely,

Name, Director

Division of Environmental Remediation

cc: K. Anders - NYSDOH