PERIODIC REVIEW REPORT

For the Property Located at
West 19th Street Development Site, New York, NY

Prepared for
IAC/InterActiveCorp
550 West 18th Street
New York, NY 10011

Prepared by

61 Broadway
Suite 1601
New York, NY 10006

March 16, 2018

CONTENTS

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

BBL	Blasland, Bouck and Lee, Inc.
BCA	Brownfield Cleanup Agreement
Con-Ed	Consolidated Edison Company of New York
EC	engineering control
IAC	IAC/Georgetown 19th Street LLC
IC	institutional control
Integral	Integral Engineering, P.C.
MGP	manufactured gas plant
MP	monitoring plan
NYSDEC	New York State Department of Environmental Conservation
OMP	operations and maintenance plan
PRR	periodic review report
SMP	Site Management Plan
Starbrite	Starbrite Waterproofing Co., Inc.

1 INTRODUCTION

1.1 SITE SUMMARY

The Site, 80 Eleventh Avenue (Block 690, Lot 12 and Block 690, Lot 54), is one parcel of numerous parcels that comprise the former West 18th Street Gas Works Site, a former manufactured gas plant (MGP) operated by predecessors of Consolidated Edison Company of New York (Con-Ed). Former MGP operations impacted subsurface soil, groundwater, and soil vapor conditions on the Site.

The Site was redeveloped with a modern 10-story office building and was concurrently remediated circa 2008. Remediation was conducted pursuant to a Brownfield Cleanup Agreement (BCA), Index No. W2-1012-04-07, between the volunteers (multiple entities) and the New York State Department of Environmental Conservation (NYSDEC). In August 2006, Remedial Engineering, P.C. submitted a Final Engineering Report to NYSDEC that presented the results of environmental remediation as required by the NYSDEC. On August 31, 2006, NYSDEC issued a Certificate of Completion approving the completion of the active remediation outlined in the Site BCA.

The institutional and engineering controls that comprised part of the Site remedy are summarized below.

1.1.1 Institutional Control (IC)

An environmental easement was recorded for the Site on August 2, 2006. The environmental easement imposes Site use restrictions, required monitoring and maintenance of the engineering controls, and prohibits any modification or removal of the engineering controls without prior notification and/or approval of the NYSDEC.

1.1.2 Engineering Controls (ECs)

Two engineering controls comprise a portion of the Site remedy:

- Subsurface barriers, consisting of:
  - A barrier layer (comprised of a mud slab, waterproof/vapor barrier membrane, structural concrete slab and foundation walls)
  - Site perimeter watertight sheeting and grouting.
- Continuous venting of the garage sub level of the building with an active mechanical venting system.

The Site perimeter watertight sheeting and grouting is located beneath the building foundation, and is therefore presumed to be in place and functional.

1.2 EFFECTIVENESS OF REMEDIAL PROGRAM

The Site Management Plan (SMP) prepared by Turner Construction Company and dated July 18, 2006, outlines the inspection, operation and maintenance activities for the barrier layer and the venting system. Following initial occupancy (January 2008), IAC/Georgetown 19th Street LLC (IAC) has implemented the Monitoring Plan (MP) and Operations and Maintenance Plan (OMP) contained within the SMP. The institutional and engineering controls have been certified and approved on an annual basis between 2007 and 2018. The most recent certification was submitted to NYSDEC on March 13, 2017.

The Site remediation, with the exception of the ongoing monitoring, and operations and maintenance, has been completed. Each annual certification, including the certification for 2018 discussed herein, has demonstrated that that remedy continues to be effective in achieving the remedial objective for the Site: the protection of human health and the environment.

1.3 COMPLIANCE

No areas on non-compliance relative to the SMP were identified during the reporting period.

1.4 RECOMMENDATIONS SUMMARY

No changes to the SMP are recommended at this time. Changes to the frequency for submittal of periodic review reports (PRRs) or for discontinued Site management are not recommended at this time.

2 SITE OVERVIEW

2.1 SITE LOCATION

The Site (Tax Block 690, Lot 46) is located in the West Chelsea neighborhood of Manhattan, between West 18th and West 19th streets and Tenth and Eleventh avenues. The Hudson River is approximately 200 feet to the west. The area around the Site contains a mix of commercial, residential, and industrial establishments. High-rise residential buildings are located on blocks immediately to the north, east and south of the Site.

Prior to remediation, the Site consisted of a two-story brick structure (demolished prior to the start of remediation) that served as a mid- to long-term parking garage and a small vacant lot in the southwestern part of the property. Remedial investigations were performed in 2002 and 2003 by Blasland, Bouck and Lee, Inc. (BBL). Soil, groundwater, and soil vapor were found to be contaminated primarily with volatile and semivolatile compounds.

2.2 REMEDIATION CHRONOLOGY

The Remedial Action Work Plan prepared by BBL was developed to achieve several remedial goals, including the removal of impacted soil to a depth of 15 feet, limiting the migration of subsurface contaminants on and off the Site, and preventing the exposure of future Site occupants to any vapors or impacted material.

In 2005, foundation piles were installed and excavation of impacted soil commenced. Across the Site, the excavation depth varied from 12 to 25 feet. A subsurface perimeter barrier wall was installed to ensure any remaining contamination is contained such that it cannot migrate off the Site. As part of the foundation construction design, a barrier layer was installed to prevent the potential intrusion of volatile organic vapors into the building. Once the foundation was completed, a basement level mechanical venting system was installed to prevent vapors from accumulating in the unlikely event of a vapor barrier breach. The NYSDEC issued a Certificate of Completion on August 31, 2006.

No changes to the selected remedy or the Site have occurred since remedy selection.

3 EVALUATION OF REMEDY

IAC has completed 11 certifications (2007–2017) for the IC/ECs at the Site which have been approved by NYSDEC. Each year, the inspection of the venting system has concluded that the system continues to function as designed, and the initial inspection of the barrier layer has identified cracks, staining, efflorescence or observations of water that typically require repair. Each year, as necessary, repairs have been made to the barrier layer system and re-inspection has concluded that the barrier layer continues to function as designed. At the completion of the inspection/repair process, a certification has been made to NYSDEC that the engineering controls continue to function as designed and the remedy remains protective of public health and the environment.

4 IC/EC PLAN COMPLIANCE REPORT

4.1 IC/EC REQUIREMENTS AND COMPLIANCE

4.1.1 Institutional Control

The institutional control for the Site is an environmental easement. The easement stipulates the following:

1. Designates the Site for commercial and/or industrial use only (not residential use)
2. Requires monitoring and maintenance of the engineering controls developed for the Site
3. Grants NYSDEC uncontrolled access to the Site
4. Stipulates that any disturbance or alteration to the barrier layer may occur only after notification to and/or approval from the NYSDEC
5. Requires annual certification of the engineering controls.

The SMP further restricts the use of groundwater at the Site without proper treatment or permission from the NYSDEC.

John E. Osborn, P.C., as part of the 2018 annual certification, has confirmed with the City of New York Register's Office for the Borough of Manhattan that the easement remains in place, and no changes or legal amendments have been made to the easement filing.

4.1.2 Engineering Controls

Two engineering controls comprise a portion of the Site remedy:

- Subsurface barriers, consisting of:
  - A barrier layer (comprised of a mud slab, waterproof/vapor barrier membrane, structural concrete slab and foundation walls)
  - Site perimeter watertight sheeting and grouting.
- Continuous venting of the garage sub level of the building with an active mechanical venting system.

The Site perimeter watertight sheeting and grouting is located beneath the building foundation, and is therefore presumed to be in place and functional. The SMP does not provide an OMP or an MP for this engineering control.

4.1.2.1 Barrier Layer

As part of the 2018 certification process, Integral Engineering, P.C. (Integral) visited the Site on February 9, 2018 and inspected the perimeter foundation walls and the foundation slab. Integral observed isolated evidence of water infiltration at three locations in the basement concrete walls. As a result of the observations, Integral recommended grout injection to repair the locations. Grout injection was performed by Starbrite Waterproofing Co., Inc. (Starbrite) on March 2, 2018, in accordance with the OMP. Integral re-inspected the locations at the completion of the grout repair program and concluded that the barrier layer was effectively inhibiting water infiltration.

4.1.2.2 Venting System

As part of the 2018 certification process, Integral performed an inspection of the venting system to verify that the fans are meeting design air flows consistent with the requirements of the SMP. While individual fans were operating at about 90% of individual design flow, others were above the design flow such that the total flow of all fans was consistent with the total design flow. Therefore, Integral found the system to be operating consistent with or above design criteria. The datasheets are included in Appendix A.

4.2 IC/EC CERTIFICATION

Integral has concluded that the barrier layer and venting systems continue to function as designed. John E. Osborn, P.C. has concluded that the environmental easement remains in place. As such, Integral concludes that the remedy continues to be protective of human health and the environment. The ICs and ECs have been certified in the Engineering Controls Certification Form (Appendix B).

5 BARRIER LAYER INSPECTION

5.1 OBSERVATIONS

As part of the 2018 certification process, Integral visited the Site on February 9, 2018, and inspected the perimeter foundation walls and the foundation slab.

At the time of the visual inspection, the below-grade level of the building was being used for parking, storage, and mechanical equipment. The building was occupied at the time of the inspection and cars were parked in the garage portion of the below-grade level. Integral inspected the unobstructed concrete floor slab and foundation walls for visible cracks and any evidence of water infiltration, as well as looked for areas of stain growth, sediment deposits, and efflorescence build-up.

5.1.1 Foundation Slab Observations

A traffic-bearing waterproofing coating is applied to the foundation slab in the parking portion of the below-grade level, as well as in the mechanical and storage rooms along the north and east perimeter walls. The traffic-bearing waterproofing coating prevents the determination of whether there are small-width (hairline) cracks in the concrete slab on grade. However, Integral did not observe cracks through the traffic-bearing waterproofing coating, and did not notice any pockets of water trapped under the traffic-bearing waterproofing coating.

Traffic-bearing waterproofing coating is not applied in the storage rooms along the west foundation wall, and the floors in these rooms showed no evidence of water infiltration during this reporting period.

5.1.2 Foundation Wall Observations

The foundation wall is a cast-in-place reinforced concrete wall that encloses the entire perimeter of the below-grade space. The interior of the wall is typically painted with white or gray paint. In locations where the slab on grade has a traffic-bearing waterproofing coating, the coating extends vertically up the wall for 4 to 6 inches. There are also several penetrations through the north foundation wall where underground utilities enter the building.

5.1.2.1 January 2018 Foundation Wall Exposure

Prior to January 19, 2018, a portion of the eastern foundation wall was exposed during redevelopment of the western-adjacent parcel. As part of this construction, loose portions of the waterproofing membrane were removed, and then repaired, as described in Section 5.3.1 below.

5.1.2.2 February 2018 Inspection

During the inspection, Integral observed three instances of active water infiltration. There was one instance each in the following areas: the eastern Fan Room, western Store Room, and the stairwell located in the northwest corner of the building. Integral also observed historical evidence of staining or efflorescence (but not active water infiltration) at various locations around the perimeter foundation wall. See Figure 1 for the locations of these observations.

5.2 DISCUSSION AND RECOMMENDATIONS

Integral's discussion and recommendations for repairs to the barrier-layer system, as part of the OMP, are below.

5.2.1 Observations of and Recommendations for 2017 Repairs

In March 2017, one location with evidence of water infiltration and one location with staining were repaired with grout injection. Integral inspected this location during the 2018 inspection and found that it remained effective in terms of preventing water infiltration.

5.2.2 Foundation Slab Recommendations

Consistent with previous years' findings, the pattern and size of the small-width cracks in the concrete topping slab inside of the storage rooms are typical for concrete shrinkage cracks. These cracks result from the loss of moisture from the surface of the concrete during curing, are typically shallow in depth, and would not allow water to penetrate through the slab. Therefore, Integral believes that they do not represent a breach or significant damage to the barrier-layer system. The isolated growth of the cracks may be attributed to environmental factors, such as temperature and humidity. Integral recommends no remedial action be taken at this time in this area.

5.2.3 Foundation Wall Recommendations

5.2.3.1 January 2018 Wall Exposure

After exposing the western foundation wall, it was repaired, as recommended and as described in Section 5.3.1 below.

5.2.3.2 February 2018 Inspection

Per the OMP, only cracks where the water is actively discharging through the crack are required to be repaired, and suspected breaches in the barrier-layer system should be monitored. Accordingly, upon completion of the 2018 inspection, Integral recommended that the three

active water infiltration locations listed in Section 5.1.2 above be repaired using the grout injection technique described in the OMP.

5.3 REPAIRS

5.3.1 January 2018 Wall Exposure Repairs

The exposed western foundation wall was repaired, following the direction of an engineer, with new Bituthene waterproofing. The OMP doesn't contemplate exterior waterproofing repairs (only grout injection from the interior), and, therefore, the repair work was conducted as prescribed by an engineer with experience with waterproofing application. To perform the repair, the contractor prepared the bare wall by filling in divots in the concrete with Bituthene liquid membrane. Then, the contractor applied Bituthene primer, and after allowing time for the primer to dry, applied new Bituthene 3000 waterproofing. Additional details of the repair are included in the *Waterproofing Repair Observation Memo* located in Appendix C.

5.3.2 March 2018 Grout Injection Repairs

The repair of the three locations identified by the 2018 inspection was performed by Starbrite on March 2, 2018, under the observation of Integral. The areas were grout injected following the OMP guidelines.

The location of the repairs made during this reporting period is shown in plan view on Figure 1. Pictures of the repairs can be found in Appendix D.

6 MONITORING PLAN COMPLIANCE & OMP COMPLIANCE

6.1 COMPONENTS

The OMP was developed to provide procedures to operate and maintain institutional and engineering controls on the Site. The OMP includes a detailed protocol to be followed in the event that any compliance issues are noted in connection with the environmental easement during annual inspection of the institutional controls. The OMP also includes repair procedures for the engineering controls that are part of the Site remedy. These repairs may become necessary as determined through evaluation of Site information gathered in accordance with the MP. These operation and maintenance actions ensure that the Site remedy continues to be effective for the protection of public health and the environment through continued implementation of the engineering and institutional controls.

6.1.1 Barrier Layer

IAC instructs its management team to perform preventative maintenance of the barrier layer. The team has been instructed to monitor daily activities that have the potential to compromise the integrity of the barrier layer. Examples of such activities would include, but are not limited to:

1. Movement or storage of heavy objects with the potential to affect the integrity of the barrier layer
2. Installation of floor drains, elevator pits or other building features that may compromise the barrier layer
3. Spilled liquid or chemicals in direct contact with the barrier layer
4. Activities (e.g., foundation construction) at adjacent properties.

The management team has been instructed to look for and report to the Building Manager any actions or conditions that have the potential to compromise the intended remedial function of the barrier layer. The Building Manager will immediately contact a dedicated qualified professional to determine if these activities have impacted the integrity of the barrier layer and if the barrier layer requires repair.

6.1.2 Venting System

The OMP requires the venting system to be maintained and operated in accordance with its manufacturer's specifications. IAC has instructed their management team to be aware of the

operating standards of the venting system and to make observations that may indicate that the system is not in compliance with its operation standards, including but not limited to:

1. Persistent odors or exhaust in the cellar of the building
2. Fans that are not operational.

The management team has been instructed to look for and report any actions or conditions that have the potential to compromise the intended function of the venting system to the Building Manager. The Building Manager will immediately contact the dedicated, qualified professional to determine if these activities have impacted the function of the venting system and if the venting system requires repair. As necessary, preventative maintenance (e.g., replacing filters, cleaning lines, etc.) repairs and/or adjustments will be made to ensure the system's continued effectiveness.

6.2 SUMMARY OF OPERATIONS AND MAINTENANCE COMPLETED

Monitoring consistent with the protocol described in Section 6.1 was performed by the building management team during the reporting period.

6.3 CONCLUSIONS/RECOMMENDATIONS FOR MONITORING PLAN COMPLIANCE

Based on the results of the operations and maintenance activities completed during the reporting period, the engineering controls continue to perform as designed. The operating engineering controls are protective of human health and the environment.

7 OVERALL PRR CONCLUSIONS AND RECOMMENDATIONS

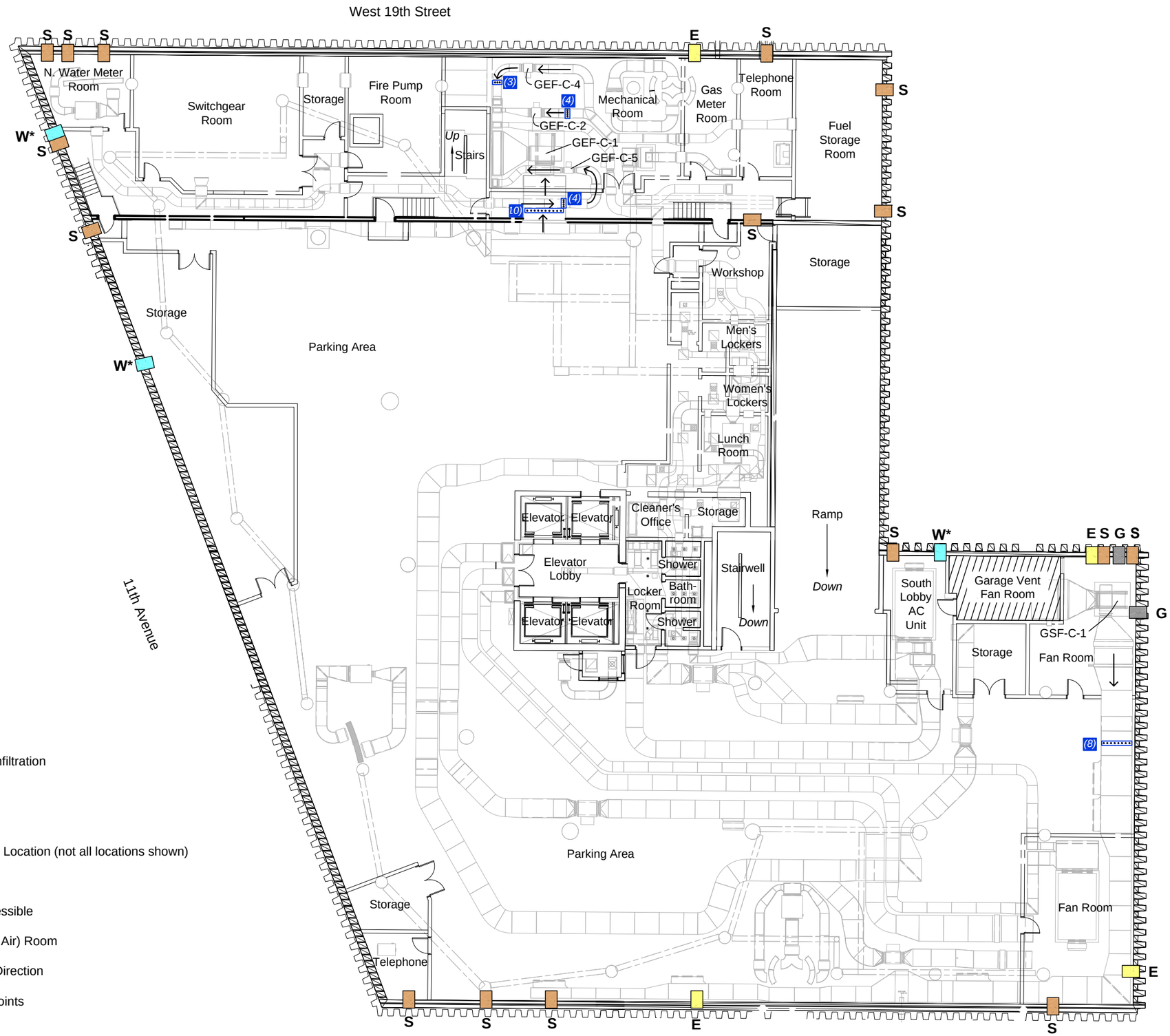
The requirements of the SMP were met during the reporting period. As part of the 2018 annual certification process, both the ICs and ECs for the Site have been documented to be currently in place and functional as designed. Integral concludes that the remedy continues to be protective of human health and the environment.

Integral does not recommend changing the frequency of the submittal of Periodic Review Reports at this time.

Please feel free to contact Keith P. Brodock, P.E., at Integral (212.440.6702) with any questions regarding this Periodic Review Report.

FIGURE 1

VAPOR BARRIER OBSERVATIONS & REPAIR



W Active Water Infiltration

E Efflorescence

S Staining

G Previous Grout Location (not all locations shown)

Inaccessible

Partially Inaccessible

Exterior (Open Air) Room

Duct Air Flow Direction

(#) Duct Access Points

*Repaired 2018

REV	DATE	DESCRIPTION	APP
0			

DRN	DES	CHK	DWG SCALE	DWG No.	PROJ No.
EB	DATE	DATE	1" = 20'	Site_plan_2017.dwg	E014
3-13-2018					

integral engineering pc
61 BROADWAY, SUITE 1601
NEW YORK, NEW YORK 10007
www.integral-corp.com

PERIODIC REVIEW REPORT
IAC BUILDING
550 WEST 18TH STREET
NEW YORK, NY 10011

Vapor Barrier Observations and Repair

FIGURE

1

OF **1**

APPENDIX A

FAN INSPECTION REPORT

Summary

Project:	IAC Fan Inspection
Engineer:	Keith Brodock
Date:	February 9, 2018

System	Design Flow	Actual Flow	% of Design
GSF-C-1	26,000 CFM	29,437 CFM	113%
GEF-C-1	26,000 CFM	23,385 CFM	90%
GEF-C-2	800 CFM	1,502 CFM	188%
GEF-C-4	898 CFM	898 CFM	90%
GEF-C-5	800 CFM	737 CFM	92%
Total	**54,498 CFM**	**55,959 CFM**	**103%**

GSF-C-1

Project: IAC Fan Inspection
Engineer: Keith Brodock
Date: February 9, 2018

General

Motor HP:	20	Motor RPM:	1,776
Voltage Rated:	208V	Voltage Actual:	*Not measured*
Amperage Rated:	57A	Amperage Actual:	43.4A

Velocity Readings (FPM)

2,436	2,414	2,673	2,404	1,839	2,227	2,406	2,645
2,088	2,514	2,460	2,216	2,055	2,137	2,186	2,384
1,981	2,347	2,449	2,256	1,716	2,072	2,141	2,299

Calculations

Duct Shape	Rectangular	Average Velocity	2,264 FPM
Height	26 inches	Design Flow	26,000 CFM
Width	72 inches	**Total Flow**	**29,437 CFM**
Area	13 ft²	% of Design	113.2%

GEF-C-1

Project: IAC Fan Inspection
Engineer: Keith Brodock
Date: February 9, 2018

General

Motor HP:	20	Motor RPM:	1,795
Voltage Rated:	208V	Voltage Actual:	*Not measured*
Amperage Rated:	54A	Amperage Actual:	34A

Velocity Readings (FPM)

1,678	1,612	2,243	1,974	1,912	1,905	2,034	1,975	2,027	1,602
1,898	1,050	1,973	1,831	1,864	1,736	2,031	1,651	1,808	1,464
1,616	798	1,596	1,687	1,433	1,864	1,730	1,191	1,771	1,333
1,599	844	1,256	1,212	1,058	1,760	1,502	1,103	1,742	1,370
1,370	836	1,063	941	1,005	1,555	1,216	998	1,638	1,136
1,124	1,118	785	920	973	1,251	1,052	1,057	1,875	1,049
cavitation					*cavitation*				

Calculations

Duct Shape	Rectangular	Average Velocity	1,462 FPM
Height	24 inches	Design Flow	26,000 CFM
Width	96 inches	**Total Flow**	**23,385 CFM**
Area	16 ft²	% of Design	89.9%

GEF-C-2

Project: IAC Fan Inspection
Engineer: Keith Brodock
Date: February 9, 2018

General

Motor HP:	0.5	Motor RPM:	1,736
Voltage Rated:	208V	Voltage Actual:	*Not measured*
Amperage Rated:	1.8A	Amperage Actual:	1.6A

Velocity Readings (FPM)

902	1,064	1,045	934
864	1,034	1,053	1,010
705	1,080	1,142	964

Calculations

Duct Shape	Rectangular	Average Velocity	983 FPM
Height	10 inches	Design Flow	800 CFM
Width	22 inches	**Total Flow**	**1,502 CFM**
Area	1.5 ft²	% of Design	187.7%

GEF-C-4

Project: IAC Fan Inspection
Engineer: Keith Brodock
Date: February 9, 2018

General

Motor HP:	0.5	Motor RPM:	1,731
Voltage Rated:	208V	Voltage Actual:	*Not measured*
Amperage Rated:	2.5A	Amperage Actual:	1.7A

Velocity Readings (FPM)

687	676	597
610	668	683
601	658	701

Calculations

Duct Shape	Rectangular	Average Velocity	653 FPM
Height	11 inches	Design Flow	1,000 CFM
Width	18 inches	**Total Flow**	**898 CFM**
Area	1.4 ft²	% of Design	89.8%

GEF-C-5

Project: IAC Fan Inspection
Engineer: Keith Brodock
Date: February 9, 2018

General

Motor HP:	20	Motor RPM:	1,642
Voltage Rated:	208V	Voltage Actual:	*Not measured*
Amperage Rated:	2.5A	Amperage Actual:	1.8A

Velocity Readings (FPM)

646	672	676	578
676	729	691	637

Calculations

Duct Shape	Rectangular	Average Velocity	663 FPM
Height	8 inches	Design Flow	800 CFM
Width	20 inches	**Total Flow**	**737 CFM**
Area	1.1 ft²	% of Design	92.1%

APPENDIX B

INSTITUTIONAL AND ENGINEERING CONTROLS CERTIFICATION FORM

ENCLOSURE 2
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Box 1

Site Details

Site No.	**C231017**
Site Name	**19th Street Development Site**
Site Address:	80 11th Avenue Zip Code: 10011
City/Town:	New York
County:	New York
Site Acreage:	0.7
Reporting Period:	February 9, 2017 to February 9, 2018

	YES	NO
1. Is the information above correct?	☑	☐
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☑
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 275-1.11(d))?	☐	☑
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	☑
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	☑

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Commercial and Industrial	☑	☐
7. Are all ICs/ECs in place and functioning as designed?	☑	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Site Owner, Remedial Party or Designated Representative

Date

Box 3

SITE NO. C231017

Description of Institutional Controls

Parcel	Owner	Institutional Control
690-12	Responsive Realty, LLC	Landuse Restriction Site Management Plan
690-54	Responsive Realty, LLC	Landuse Restriction Site Management Plan

Box 4

Description of Engineering Controls

Parcel	Institutional Control
690-12	Subsurface Barriers Vapor Mitigation
690-54	Subsurface Barriers Vapor Mitigation

Engineering Controls Details for Site No. C231017

Parcel: 690-12

An Environmental Easement for the property was filed on July 21, 2006, restricting future use to industrial/commercial, and requiring: 1) monitoring and maintenance of the subsurface barrier, 2) continuous operation of a sub-level ventilation system and 3) annual certification.

Parcel: 690-54

An Environmental Easement for the property was filed on July 21, 2006, restricting future use to industrial/commercial, and requiring: 1) monitoring and maintenance of the subsurface barrier, 2) continuous operation of a sub-level ventilation system and 3) annual certification.

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

    a. The Periodic Review Report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

    b. To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and complete.

YES	NO
☑	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional Control or Engineering Control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

    a. The Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in place, or was last approved by the Department;

    b. Nothing has occurred that would impair the ability of such Control, to protect human health and the environment;

    c. Access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

    d. Nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

    e. If a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☑	☐

IF THE ANSWER TO EITHER QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Site Owner, Remedial Party or Designated Representative

Date

Box 6

Control Certifications
Site No. C231017

Site Owner or Designated Representative Signature

I certify that all information and statement in Boxes 1, 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Tom Panissidi (print name) at 555 W 18th St, New York, NY (print business address)

am certifying as Owner's Representative (Owner or Remedial Party)

for the site named in the Site Details section of this form.

Tom Panissidi — Signature of Site Owner or Representative Rendering Certification

3/12/10 — Date

IC/EC CERTIFICATIONS

Box 7

Professional Engineer Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Keith P. Brodock, P.E. at 61 Broadway STE 1601, New York, NY

print name — print business address

am certifying as a Professional Engineer for the Owner.

Owner or Remedial Party

Signature of Professional Engineer, for the Owner or Remedial Party, Rendering Certification	Stamp (Required for PE)	Date
		3/16/2018

APPENDIX C

WATERPROOFING REPAIR OBSERVATION MEMO

LANGAN

Memorandum

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444

To: Thomas Panissidi (IAC Christian)

From: Tasos Papathanasiou, Marc Gallagher

Info: Scott Fehmel (Related); File

Date: 26 January 2018

Re: Waterproofing Repair Observation
IAC Headquarters
Manhattan, New York
Langan Project No.: 005586407

INTRODUCTION

This letter summarizes Langan's observations of waterproofing repair work performed on the east parapet foundation wall of the IAC building at 555 West 18th Street. Langan was engaged by IAC to observe and document the waterproofing repair work.

REPAIR PROCEDURE

The foundation waterproofing repair procedure was prepared by Mueser Rutledge Consulting Engineers (MRCE). In general terms the repair procedure consisted of the following steps:

- Removing the old membrane except for 4 inches at the bottom of the wall;
- Parging the wall surface with repair mortar such as Sika 223 or equal;
- Installing Bituthene 3000 membrane and overlapping it with the original intact horizontal Preprufe membrane at the bottom of the wall; and
- Sealing the lap with a Termination bar and Bituthene Liquid Membrane (LM).

The detailed repair procedure and sketch prepared by MRCE is attached as Appendix A.

OBSERVATIONS

The repair work was completed in 4 days by East Coast Drilling ("contractor"). Below is a summary of daily site activities. Daily site observation reports prepared by Langan are attached as Appendix B.

Day 1 – 01/19/2018

Langan met with the contractor, MRCE waterproofing inspector and Related's representative on site. The work had started prior to Langan arrival at the site. We observed that the contractor was not following the procedure outlined on MRCE directive of parging the wall; instead applied primer and installed three panels of Bituthene 3000 membrane. Langan informed Related that this was not per MRCE's procedure.

Day 2 – 01/20/2018

The contractor informed Langan that they planned to continue repairs without parging the wall first. During a field meeting with Related and MRCE to address this matter, MRCE inspector stated that "filling" wall irregularities with LM is an acceptable alternative to parging the wall. The contractor installed termination bars at the bottom of the wall to seal the existing Preprufe membrane and applied LM over it. The contractor also continued filling voids in the wall with LM and installing Bituthene Membrane over the wall.

Day 3 – 01/22/2018

The contractor applied LM over the Preprufe-Bituthene 3000 overlap at the bottom of the wall. The contractor started installing termination bars at the top of the wall. Langan, MRCE, and Related, identified locations where the Bituthene membrane did not adhere properly to the wall; these areas were delineated for repair.

Day 4 – 01/23/2018

Contractor applied LM over the top termination bar and repaired the poorly adhered areas. Contractor installed Hydroduct (prefabricated drainage panels) over the Bituthene membrane.

CONCLUSION

The waterproofing repair work on east foundation wall of the IAC building was performed in general accordance with the repair procedures recommended by MRCE. The repair work was observed by both MRCE and Langan and is considered complete.

APPENDIX A

(WATERPROOFING REPAIR PROCEDURE BY MRCE)

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET NO. OF
FILE 12320
MADE BY RKR DATE 1/17/18
CHECKED BY DATE

FORM 3M

FOR W 18TH ST

SUBJECT: WP REPAIR @ EAST PL

RECOMMENDED REPAIR PROCEDURE

(1) REMOVE EXISTING UNBONDED PREPRUFE 300 MEMBRANE

(2) EXCAVATE ALONG BOTTOM OF EXISTING VERTICAL WALL TO EXPOSE MIN 4" STRIP OF EXISTING PREPRUFE MEMBRANE.

(4) THOROUGHLY CLEAN SURFACE OF CONCRETE & REMAINING 4" STRIP OF PREPRUFE LAP

(5) FILL-IN ANY LARGE DIVITS OR VOIDS IN EXISTING CONCRETE W/ A NON-SHRINK / FAST SET REPAIR MORTAR SUCH AS SIKA 223 OR EQUAL TO PROVIDE LEVEL CONCRETE SURFACE.

(6) APPLY LIQUID MEMBRANE UNDER REMAINING 4" MIN LAP STRIP PREPRUFE MEMBRANE IF NOT BONDED TO CONCRETE & INSTALL TERMINATION BAR W/ FASTENERS.

(7) APPLY LIQUID MEMBRANE OVER TERMINATION BAR & 4" PREPRUFE STRIP.

(8) APPLY BITUTHENE PRIMER B2 TO CONCRETE SURFACE. ALLOW TO DRY 1-HOUR.

(9) APPLY BITUTHENE 3000 LOW TEMP MEMBRANE TO CONCRETE & LAP 4" ONTO PREPRUFE STRIP.

(10) APPLY LIQUID MEMBRANE TO PREPRUFE/BITHUTENE LAP

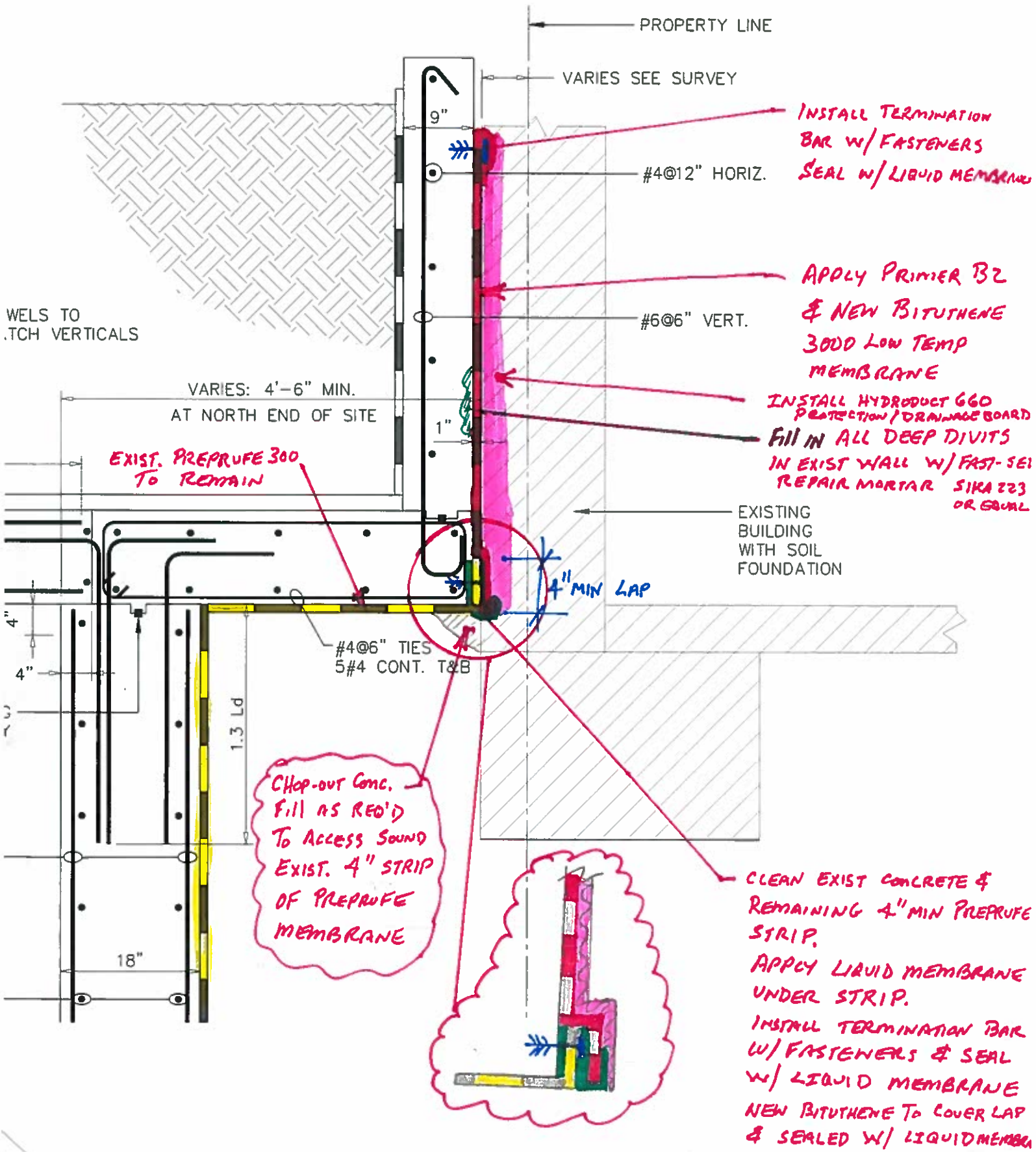
(11) INSTALL TERMINATION AT TOP OF WALL + ALL EDGE TERMINATION & SEAL W/ LIQUID MEMBRANE.

(12) APPLY HYDROPRODUCT 660 PROTECTION/DRAINAGE BOARD TO WALL.

CONSTRUCT NEW GUIDEWALL

W 18TH ST
WATERPROOFING REPAIR @ EAST PROPERTY LINE

MRCE # 12320
MADE BY: RKR
1/18/18



Bituthene® 3000 and Bituthene Low Temperature

Self-adhesive, rubberized asphalt/polyethylene waterproofing membranes for plaza and parking decks

Advantages

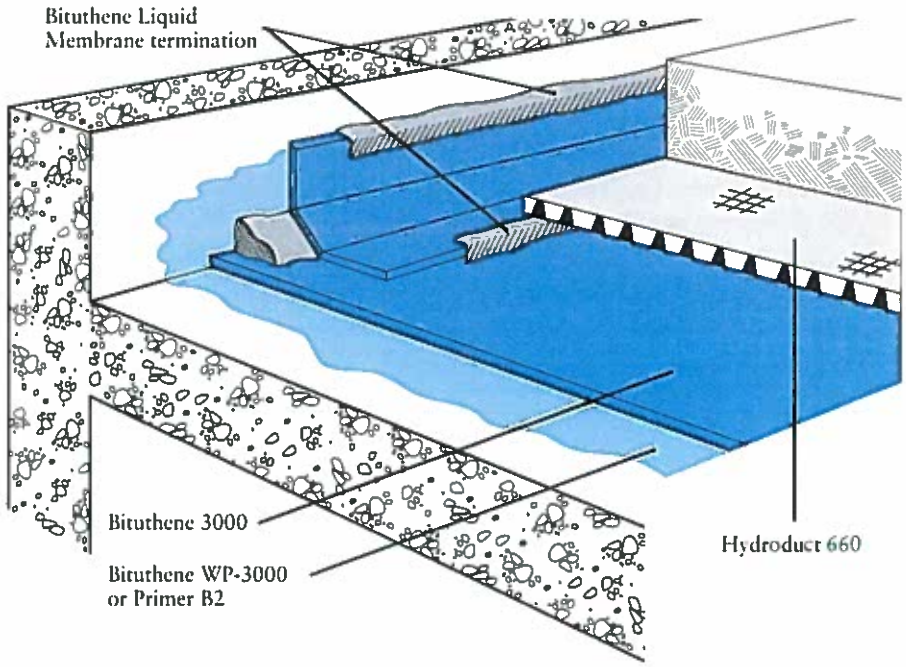
- Waterproof – high hydrostatic head resistance
- Cross laminated film – provides dimensional stability, high tear strength, puncture and impact resistance
- Cold applied – no flame hazard; self-adhesive overlaps ensure continuity
- Flexible – accommodates minor settlement and shrinkage movement
- Controlled thickness – factory made sheet ensures constant, non-variable site application
- Wide application window –
  - Bituthene® Low Temperature surface and ambient temperatures between -4°C (25°F) and 16°C (60°F)
  - Bituthene 3000 surface and ambient temperatures at 5°C (40°F) or above
- New or rehab construction – use with Bituthene Deck Prep® as a leveling agent and non-structural repair material
- RIPCORD™ - This "split release on demand" feature allows the splitting of the membrane into two (2) pieces for ease of installation in detailed areas.

Use

Bituthene is ideal for waterproofing concrete decks where in-service temperatures will not exceed 54°C (130°F). It can be applied to split slab construction, such as in plaza areas and parking decks. Interior uses may include mechanical rooms, laboratories, kitchens and bathrooms. (For below grade applications, see "Below Grade Waterproofing Bituthene 3000 and Bituthene Low Temperature.")

Bituthene is 1.5 mm (1/16 in.) thick, 0.9 m (3 ft) wide and 20 m (66.7 ft) long and is supplied in rolls. It is unrolled sticky side down onto concrete slabs primed with Bituthene Primer WP-3000 or Primer B2. Continuity is achieved by overlapping a minimum 50 mm (2 in.) and firmly rolling the joint.

Bituthene is extremely flexible. It is capable of bridging shrinkage cracks in the concrete and will accommodate minor differential movement throughout the service life of the structure.



GRACE Construction Products

Application Procedures

Safety, Storage and Handling Information

Bituthene products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable. Grace Protection Board Adhesive is extremely flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at www.graceconstruction.com and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

Surface Preparation

Surfaces should be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Concrete must be properly dried (minimum 7 days for normal structural concrete and 14 days for lightweight structural concrete).

If time is critical, Bituthene Primer B2 may be used to allow priming and installation of membrane on damp surfaces or "green" concrete. Priming may begin in this case as soon as the concrete will maintain structural integrity. Use form release agents which will not transfer to the concrete. Remove forms as soon as possible from below horizontal slabs to prevent entrapment of excess moisture. Excess moisture may lead to blistering of the membrane. Cure concrete with clear, resin-based curing compounds which do not contain oil, wax or pigment. Except with Primer B2, allow concrete to thoroughly dry following rain. Do not apply any products to frozen concrete.

Repair defects such as spalled or poorly consolidated areas. Remove sharp protrusions and form match lines. For rough or uneven deck surfaces use Bituthene Deck Prep as a repair and leveling agent. See "Above Grade Waterproofing Bituthene Deck Prep" product information sheet for details. On masonry surfaces, apply a parge coat to rough concrete block and brick walls or trowel cut mortar joints flush to the face of the concrete blocks.

Temperature

- Apply Bituthene 3000 Membrane only in dry weather and at air and surface temperatures of 5°C (40°F) and above.
- Apply Bituthene Low Temperature Membrane only in dry weather and when air and surface temperatures are between -4°C (25°F) and 16°C (60°F).
- Apply Bituthene Primer WP-3000 in dry weather above 5°C (40°F).
- Apply Bituthene Primer B2 in dry weather above -4°C (25°F). (See separate product information sheet.)

Priming

- Apply Bituthene Primer WP-3000 by spray or roller at a coverage rate of 12-15 m^2/L (500-600 ft^2/gal). Allow to dry one hour or until concrete returns to original color.
- Apply Bituthene Primer B2 by a lamb's wool roller at a coverage rate of 6-8 m^2/L (250-350 ft^2/gal). Allow primer to dry one hour or until tack-free.
- Dry time may be longer in cold temperatures. Reprime areas if contaminated by dust. If the work area is dusty, apply membrane as soon as the primer is dry.
- **Do not apply any primer to Bituthene membrane.**

Corner Details

The treatment of corners varies depending on the location of the corner. For detailed information on Bituthene Liquid Membrane, see separate product information sheet.

- At plaza deck to wall inside corners –
  Option 1:
  Apply membrane on wall and deck to within 25 mm (1 in.) of corner. Treat the inside corner by installing a 20 mm (¾ in.) fillet of Bituthene Liquid Membrane. Extend Bituthene Liquid Membrane at least 65 mm (2½ in.) onto deck membrane, and 65 mm (2½ in.) onto wall membrane. Terminate top of wall flashing with Bituthene Mastic, Bituthene Liquid Membrane or termination bar.
  Option 2:
  Apply membrane on deck to within 25 mm (1 in.) of corner. Treat the inside corner by installing a 20 mm (¾ in.) fillet of Bituthene Liquid Membrane. Extend Bituthene Liquid Membrane at least 65 mm (2½ in.) onto wall.
  Option 3:
  Apply membrane on deck to within 25 mm (1 in.) of corner. Treat the inside corner by installing a 20 mm (¾ in.) fillet of Bituthene Liquid Membrane. Apply membrane flashing sheet on wall, over fillet and 150 mm (6 in.) onto deck membrane. Apply 25 mm (1 in.) wide troweling of Bituthene Mastic or Bituthene Liquid Membrane over all terminations and seams within 300 mm (12 in.) of corner. Terminate top of wall flashing with mastic, Bituthene Liquid Membrane or termination bar.
- In planters, reflecting pools and fountains, apply membrane on wall and deck to within 25 mm (1 in.) of corner. Treat the inside corner by installing a 20 mm (¾ in.) fillet of Bituthene Liquid Membrane. Extend Bituthene Liquid Membrane at least 65 mm (2½ in.) onto deck membrane, and 65 mm (2½ in.) onto wall membrane. Terminate top of wall membrane with Bituthene Liquid Membrane or termination bar.
- Wall to wall inside corner, apply 300 mm (12 in.) sheet membrane strip centered on corner. Press membrane tightly into corner to assure full contact. Cover the

Expansion Joints in Concrete Construction

Bituthene membrane is not an expansion joint filler or sealant, but may be used as an expansion joint cover only in limited, special situations, as shown in Figures 1 and 2.

To adequately waterproof an expansion joint requires the use of materials specifically designed to do that job. Bituthene waterproofing systems can, in most cases, be tied into expansion joint waterproofing and/or covering systems to provide full waterproofing protection on a project.

Project designers and/or contractors should consult with expansion joint sealant and covering manufacturers for design and installation details. A partial listing of manufacturers is included in Technical Letter 11. Also, Section 05800 of Sweets, *Expansion Control*, and Section 07920, *Sealant and Caulking*, provide information on manufacturers and design possibilities.

Designers should consider using gutters under critical expansion joints to provide a second line of defense against seal failure.

Use of Bituthene Membrane as an Expansion Joint Cover

Figures 1 and 2 illustrate the use of Bituthene membrane as an expansion joint cover.

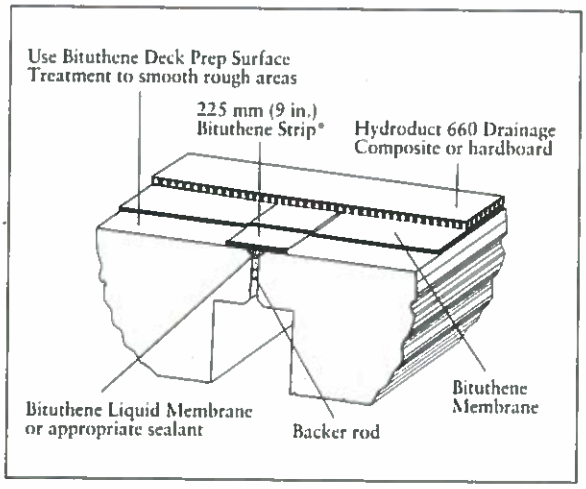


Figure 1 Passive Joint Cover

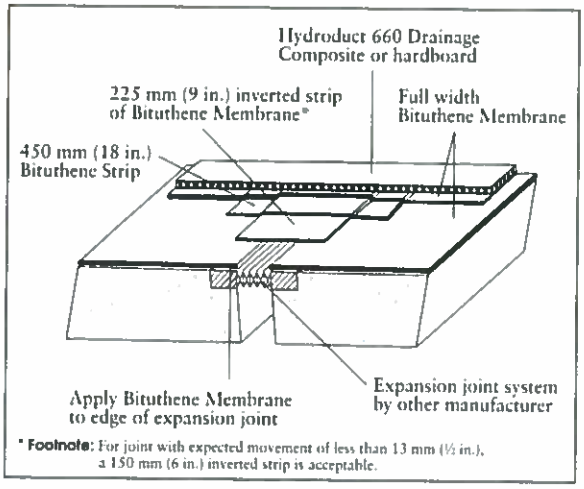


Figure 2 Active Movement Joint

treated corner with a full sheet of membrane to ensure 2-ply coverage.

- Outside corners, apply 300 mm (12 in.) sheet membrane strip centered on corner. Cover the treated corner with a full sheet of membrane to ensure 2-ply coverage.

Insulation

Always apply Bituthene membrane directly to primed or conditioned structural substrates. Insulation, if used, must be applied over the membrane. Do not apply Bituthene membranes over lightweight insulating concrete.

Approvals

- City of Los Angeles Research Report RR 24386
- U.S. Department of Housing and Urban Development (HUD) HUD Materials Release 628E
- Bituthene 3000 and Low Temperature Membranes carry a Underwriters' Laboratory Class A Fire Rating (Building Materials Directory, File #R7910) when used in either of the following constructions:
  - Limited to noncombustible decks at inclines not exceeding 6 mm (¼ in.) to the horizontal 0.3 m (1 ft). One layer of Bituthene waterproofing membrane, followed by one layer of 3 mm (⅛ in.) protection board, encased in 50 mm (2 in.) minimum concrete monolithic pour.
  - Limited to noncombustible decks at inclines not exceeding 6 mm (¼ in.) to the horizontal 0.3 m (1 ft). One layer of Bituthene waterproofing membrane, followed by one layer of DOW Styrofoam PD Insulation Board [50 mm (2 in.) thick]. This is covered with one layer of 0.6 m x 0.6 m x 50 mm (2 ft x 2 ft x 2 in.) of concrete paver topping.

Warranty

Five year material warranties covering Bituthene and Hydroduct® products are available upon request. Contact your Grace sales representative for details.

Technical Services

Support is provided by full time, technically trained Grace representatives and technical service personnel, backed by a central research and development staff.

Supply

Bituthene 3000 or	
Bituthene Low Temperature	0.9 m x 20 m roll (18.6 m^2) 3 ft x 66.7 ft (200 ft^2)
Roll weight	38 kg (83 lbs) gross
Palletization	25 rolls per pallet
Storage	Store upright in dry conditions below +35°C (95°F).
Ancillary Products	
Bituthene WP-3000	18.9 L (5 gal) pail/24 pails per pallet
Bituthene Primer B2	18.9 L (5 gal) pail/48 pails per pallet
Bituthene Liquid Membrane	5.7 L (1.5 gal) pail/125 pails per pallet or 15.1 L (4 gal) pail/48 pails per pallet
Hydroduct Tape	2.5 cm x 61.0 m (1 in. x 200 ft) roll/6 rolls per carton
Bituthene Deck Prep	15.1 L (4 gal) pail/24 pails per pallet
Complimentary Materials	
Hydroduct	See separate data sheets.
Protection Board Adhesive	18.9 L (5 gal) pail/36 pails per pallet

Equipment by Others: Soft broom, utility knife, brush or roller for priming

Physical Properties

Property	Typical Value	Test Method
Color	Dark gray-black	
Thickness	1.5 mm (1/16 in.) nominal	ASTM D3767 – Method A
Flexibility, 180° bend over 25 mm (1 in.) mandrel at -32°C (-25°F)	Unaffected	ASTM D1970
Tensile Strength, Membrane, Die C	2240 kPa (325 lbs/$in.^2$) minimum	ASTM D412 Modified[1]
Tensile Strength, Film	34.5 MPa (5,000 lbs/$in.^2$) minimum	ASTM D882 Modified[1]
Elongation, Ultimate Failure of Rubberized Asphalt	300% minimum	ASTM D412 Modified[1]
Crack Cycling at -32°C (-25°F), 100 Cycles	Unaffected	ASTM C836
Lap Adhesion at Minimum Application Temperature	3000: 700 N/m (4 lbs/in.) Low Temp: 880 N/m (5 lbs/in.)	ASTM D1876 Modified[2]
Peel Strength	1576 N/m (9 lbs/in.)	ASTM D903 Modified[3]
Puncture Resistance, Membrane	222 N (50 lbs) minimum	ASTM E154
Resistance to Hydrostatic Head	60 m (200 ft) of water	ASTM D5385
Permeance	2.9 ng/m^2sPa (0.05 perms) maximum	ASTM E96, Section 12 – Water Method
Water Absorption	0.1% maximum	ASTM D570

Footnotes:
1. The test is run at a rate of 50 mm (2 in.) per minute.
2. The test is conducted 15 minutes after the lap is formed and run at a rate of 50 mm (2 in.) per minute at 5°C (40°F).
3. The 180° peel strength is run at a rate of 300 mm (12 in.) per minute.

For Technical Assistance call toll free at 866-333-3SBM (3726).

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GRACE Construction Products

Bituthene® Primer B2

Specially formulated primer for use with Bituthene membranes and Grace underlayments on "green" concrete or damp substrates

Description

Bituthene® Primer B2 is a rubber-based primer in solvent specially formulated to provide good initial adhesion of Bituthene waterproofing membranes and Grace underlayments.

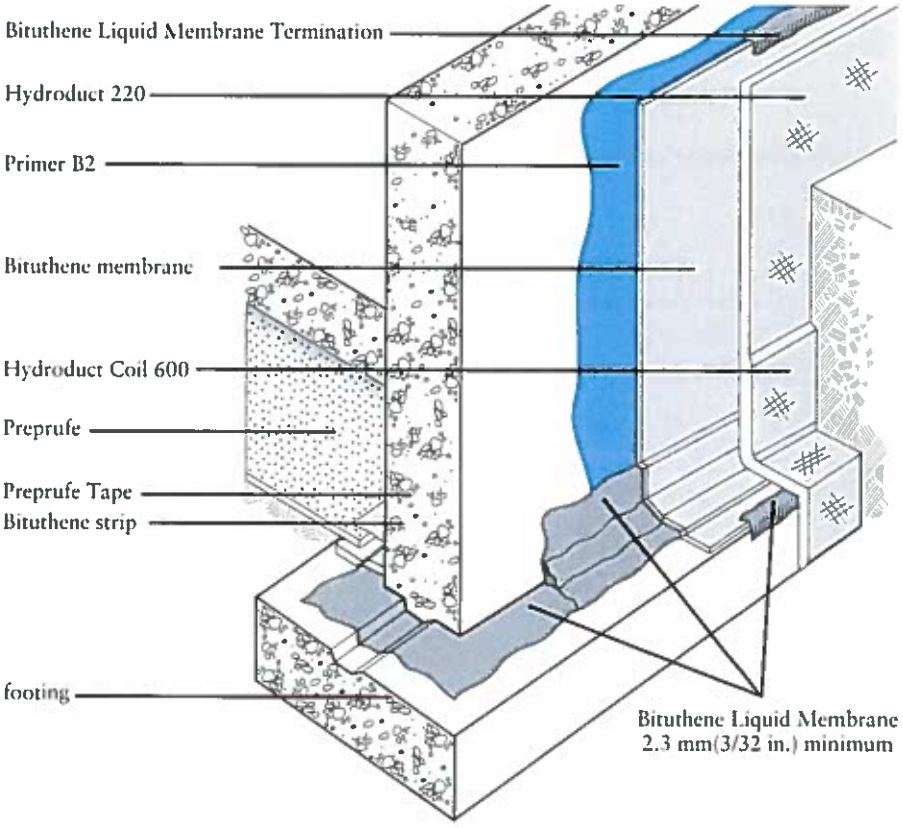
In addition, its patented formulation promotes the adhesion of Bituthene membranes to "green" concrete and damp surfaces.

The VOC (Volatile Organic Compound) content is 440 g/L and it meets the U.S E.P.A. Volatile Organic Compound Emissions Standards for Architectural Coatings.

Use

Bituthene Primer B2 is used to prime "green" concrete (less than seven day cure for normal structural concrete). It is also used to prime damp concrete, masonry or wood surfaces on which Bituthene waterproofing membranes or Grace underlayments will be applied.

Bituthene Primer B2 is used for vertical and horizontal applications at -4°C (25°F) or above.



GRACE
Construction Products

Supply

Product	Unit Size	Weight	Units per Pallet	Coverage
Bituthene® Primer B2	18.9 L (5 gal) pail	20 kg (44 lbs)/pail	48 pails	6-8 m^2/L (250-350 ft^2/gal)

Application Procedures

Safety, Storage and Handling Information

Bituthene products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable. Grace Protection Board Adhesive is extremely flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

Application

Bituthene Primer B2 may be applied by roller or brush. Use a heavy nap roller made of natural material, such as lamb's wool.

Apply it to clean, dirt free, frost-free surfaces at a coverage rate of 6-8 m^2/L (250-350 ft^2/gal). Do not apply to frozen concrete or to areas with standing or visible water. Do not use during wet weather. Allow Bituthene Primer B2 to dry one hour or until tack-free. Deep puddles of primer should be avoided as this will lengthen drying time. Rollers or brushes should be dipped into pans. Avoid pouring primer directly onto a horizontal substrate. Do not apply directly to Bituthene membrane.

In general, priming should be limited to an area that can be covered with membrane within 24 hours. Areas that accumulate significant amounts of dust or dirt must be reprimed before membrane is applied.

Although it may be used on green concrete and damp surfaces, moisture may become trapped under the membrane. This may result in blistering, particularly on warm, sunny days. Therefore, cover the membrane as soon as possible to minimize blistering. If blistering occurs, allow membrane to cool and re-roll with heavy roller. Blisters over 100 mm (4 in.) in diameter should be cut and patched.

Clean tools with mineral spirits at the end of each day. Mineral spirits is a combustible liquid and should be used only in accordance with the manufacture's safety recommendations. **Do not use solvents to clean hands or skin.**

Bituthene® Liquid Membrane

Two component, elastomeric, liquid applied detailing compound for use with Grace waterproofing membranes

Advantages

- Liquid applied – conforms to irregular profiles
- Waterproof – resistant to water vapor and water pressure
- Tough, rubber-like – flexible and damage resistant
- Chemically cured – unaffected by in-service temperature variations
- Cold applied – no flame hazard
- System compatible – formulated for use with Grace waterproofing membrane systems

Description

Bituthene® Liquid Membrane is a two component, elastomeric, cold applied, trowel grade material designed for a variety of uses with the Grace waterproofing systems. The VOC (Volatile Organic Compound) content is 10 g/L.

Use

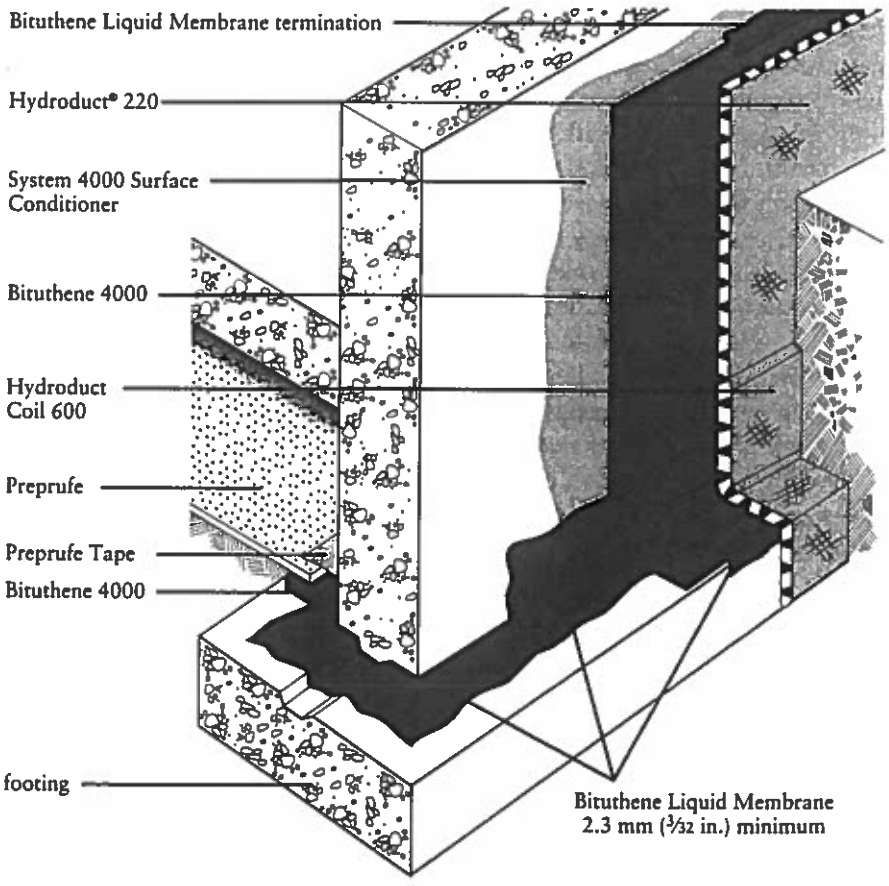
Bituthene Liquid Membrane is ideally suited for the following uses:

- Fillet material at inside corners
- Reinforcement material at inside corners
- Flashing material around drains, protrusions, curbs and parapets
- Sealing material at terminations
- Repair material for defects on concrete surfaces
- Flashing material at corners

The two parts of Bituthene Liquid Membrane are mixed on site and trowelled on to provide a simple and quick waterproofing detailing aid in conjunction with Bituthene, Preprufe® and Procor® systems.

Compatibility

Bituthene Liquid Membrane is completely compatible with Bituthene, Preprufe and Procor and with existing asphalt or coal tar-based waterproofing materials. It is also compatible with cured silicone and polyurethane sealants. It is not compatible with creosote, pentachlorophenol, linseed oil or polysulfide-based sealants.



GRACE
Construction Products

Supply

Bituthene Liquid Membrane (Parts A & B)		
Unit size	5.7 L (1.5 gal)	151 L (4 gal)
Weight per unit	8 kg (16 lbs)	20 kg (44 lbs)
Units per pallet	100	24

Physical Properties

Property	Typical Value	Test Method
Color Part A Part B Mixture of Parts A and B	 Black Clear Black	
Solids Content	100%	ASTM D 1644
Elongation	250% minimum	ASTM D 412
Peel Strength	880 N/m (5 lbs/in.) minimum	ASTM D 903
Flexibility, 180° bend over 25 mm (1 in.) mandrel at -32°C (-25°F)	Unaffected	ASTM D 1970

Application Procedures

Safety, Storage and Handling Information

Bituthene products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable. Grace Protection Board Adhesive is extremely flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at www.graceconstruction.com and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

Surface Preparation

All surfaces must be dry and free from dirt, grease, oil, dust or other contaminants. Bituthene Liquid Membrane may be applied at temperatures of -4°C (25°F) or above. Below 5°C (40°F), store in a warm place before application.

Mixing

Add the entire contents of the Part B container to Part A and mix for 3 to 5 minutes until uniform. Part A is black and Part B is clear. Take care to scrape material from the side and bottom of the containers to assure thorough mixing. A low speed (150 rpm) mechanical mixer with flat paddle blades is required. Do not apply any material if streaks can be seen due to insufficient mixing.

Once mixed, Bituthene Liquid Membrane must be applied by trowel within 1.5 hours. More time is available at lower temperatures. At high temperatures, thickening and curing will be faster. Material that has thickened must be discarded. The material will cure to a very flexible rubber-like material.

Bituthene Liquid Membrane must be applied at a minimum thickness of 2.3 mm (3/32 in.) unless otherwise noted on details. In fillet applications, the face of the fillet should be a minimum of 20 mm (3/4 in.). In corner flashing application details, it should extend 150 mm (6 in.) in each direction from the corner. Bituthene Liquid Membrane will adhere to primed or unprimed concrete.

Bituthene Liquid Membrane should be allowed to cure at least 24 hours before flood testing.

Coverage

As a fillet material, 3.8 L (1 gal) will cover approximately 30 m (100 linear feet). As a flashing material, 3.8 L (1 gal) will cover approximately 1.6 m^2 (17 ft^2). As a fillet and reinforcement, 3.8 L (1 gal) will cover approximately 4.3 m (14 linear feet).

Cleaning

Clean tools and equipment with mineral spirits before Bituthene Liquid Membrane has cured. Mineral spirits is a combustible liquid and should be used only in accordance with the manufacturer's safety recommendations. Do not use solvents to clean hands or skin.

For Technical Assistance call us toll free at 866-333-3SBM (3726).

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GRACE Construction Products

Hydroduct® 660

High impact, creep-resistant geocomposite and protection layer for use with Grace waterproofing membranes on all horizontal applications

Advantages

- **Universal horizontal application** – suitable for all overburdens including concrete
- **Damage and creep-resistant** – high compressive strength core resists traffic loads and site damage to maintain drainage flow
- **High flow capacity** – drains 200 L/min./m (16 gals/min./ft) width
- **Enhances waterproofing** – eliminates hydrostatic head build up
- **Securely bonded fabric** – restricts intrusion into core
- **Polymeric backing film** – compatible with both sheet and liquid waterproofing membranes
- **Lightweight** – easy to install without special equipment
- **Simple, convenient, drainage and protection layer** – robust membrane protection

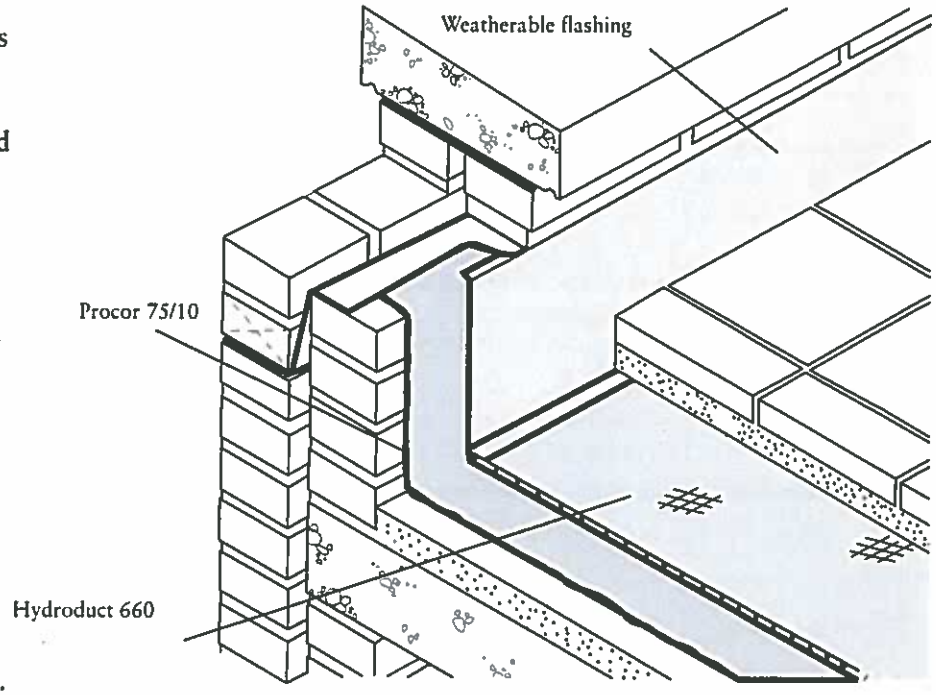
Description

Hydroduct® 660 is a highly robust, preformed, 11 mm (0.433 in.) thick geocomposite drainage sheet system, comprising a high impact, studded polystyrene core. This is covered on one side with a non-woven, needle punched polypropylene filter fabric and on the other side with a smooth polymeric film. This film provides extra protection for softer waterproofing such as Procor® and should not be removed.

Use

Hydroduct 660 Drainage Composite is designed to collect and transport water to drainage outlets. It can be used on all horizontal applications regardless of the type of overburden and serves as a combination drainage and protection course for all Grace waterproofing membranes.

The high strength, nonwoven geotextile is designed to maintain pemittivity while protecting the drainage composite from job site damage prior to, and during, the installation of the overburden. The high permittivity of the nonwoven geotextile facilitates the removal of water from a concrete pour, thus enhancing the concrete cure, as well as providing drainage after installation. The geotextile is securely bonded to the core to prevent intrusion of the fabric into the core during service. The high modulus backing film ensures compatibility when used with either Procor® fluid applied waterproofing membranes, or with Bituthene® waterproofing membranes.



GRACE
Construction Products

Supply

Hydroduct 660

Roll Size	1.2 m x 15.2 m (4 ft x 50 ft) 18.6 m² (200 ft²)
Packaging	6 rolls/pallet
Weight	21 kgs (50 lbs)/ roll

Complementary Materials

Hydroduct Tape	25 mm x 61.0 m (1 in. x 200 ft) rolls [2 x 15.2 m (50 ft) stripes per roll of Hydroduct]
Hydroduct Coil 600	15.2 m (50 ft) roll

Physical Properties

Property	Typical Value	Test Method
Drainage Core		
Polymer	High Impact Polystyrene	
Thickness	11 mm (0.433 in.) nominal	ASTM C 366 Method B
Compressive Strength	1000 kPa (21,000 lbs/ft²)	ASTM D 1621
Flow Rate (gradient 1.0, load 172 kPa)	200 L/min./m (16 gal/min./ft)	ASTM D 4716
Geotextile		
Type	Nonwoven	
Polymer	Polypropylene	
Weight	270 g/m² (8.0 oz/yd²)	ASTM D 3776
Tensile Strength	1000 N (225 lbs)	ASTM D 4632
Apparent Opening Size	0.147 mm (100 U.S. sieve)	ASTM D 4751
Flow Rate	3250 L/min./m² (80 gal/min./ft²)	ASTM D 4491
Mullen Burst	4790 kPa (695 lbs/in.²)	ASTM D 3786
Puncture Strength	720 N (162 lbs)	ASTM D 4833

Application Procedures

Safety, Storage and Handling Information

All construction products must be handled properly. Grace Protection Board Adhesive is extremely flammable. Material Safety Data Sheets (MSDS) are available at www.graceconstruction.com and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

Installation

Hydroduct 660 can be placed over waterproofing membranes, concrete or wood providing job site conditions allow the composite to remain as placed. Additional ballast consideration should be given in high wind exposures. Abut all edges tightly with the excess geotextile placed over the adjacent roll in shingle fashion.

To secure Hydroduct 660 around protrusions, apply Hydroduct® Tape around the protrusion in a picture frame configuration. Cut Hydroduct 660 to fit snugly around the protrusion. Press Hydroduct 660 core firmly into the Hydroduct Tape.

Hydroduct 660 should be covered promptly. Do not leave Hydroduct 660 exposed to sunlight for more than two weeks. Motor vehicles, construction equipment or other trades should not be allowed directly on the Hydroduct 660.

For Technical Assistance call us toll free at 866-333-3SBM (3726).

web Visit our web site at www.graceconstruction.com

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GRACE Construction Products

APPENDIX B

(SITE OBSERVATION REPORTS)

SITE OBSERVATION REPORT

PROJECT NO.:	005586407			**DATE:**	Friday, January 19, 2018
PROJECT:	IAC Building Christian	**CLIENT:**	InterActiveCorp	**WEATHER:**	Clear, 30s ^{0}F
LOCATION:	Manhattan, NY			**TIME:**	2:00 p.m. to 5:15 p.m.
CONSTRUCTION MANAGER:	Related			**OBSERVER:**	Vijay Veluchamy
CONTRACTOR:	East Coast Drilling (ECD)				

CONTRACTOR'S EQUIPMENT:	**PRESENT AT SITE:** **Day 1**
Various hand tools	Vijay Veluchamy (Langan) Ali (MRCE) Max Rappaport (Related) Michael Quasarano (ECD)

PROJECT SUMMARY

Langan is on site to observe the waterproofing installation on the exterior face of the east parapet wall of the existing IAC building at 555 West 18th Street. The existing waterproofing membrane on this wall was damaged during excavation at 515 West 18th Street. Langan was engaged by the owner of the IAC building to observe the waterproofing repair work on their wall.

GENERAL OBSERVATIONS:

Langan arrived on site at the above mentioned time and met with Related, ECD and MRCE to discuss the work to be performed for the day. Work performed was as follows:

1. Langan met with the contractor, MRCE waterproofing inspector and Related's representative on site.
2. Langan noticed that the contractor had not parged the wall per MRCE's waterproofing repair procedure. Langan advised the contractor to follow the approved procedure by parging the wall to form a smooth surface.
3. Contractor ignored Langan's advise and proceeded with applying Primer B2 LVC on the wall and installed three panels of Bituthene 3000 membrane. Langan informed Related that this was not per MRCE's procedure.
4. Langan left the site at 5:15 p.m.

Cc:	Hamid Fallah, Tasos Papathanasiou, Marc Gallagher, File	By:	Vijay Veluchamy ***LANGAN***

SITE OBSERVATION REPORT

Photos:

Photo 1: West wall of IAC building prior to beginning waterproofing work (facing northwest)

Photo 2: End of waterproofing work for the day (facing northwest).

Cc:	Hamid Fallah, Tasos Papathanasiou, Marc Gallagher, File	By:	Vijay Veluchamy ***LANGAN***

SITE OBSERVATION REPORT

PROJECT NO.:	005586407	**CLIENT:**	InterActiveCorp	**DATE:**	Saturday, January 20, 2018
PROJECT:	IAC Building Christian			**WEATHER:**	Clear, 40s ^{0}F
LOCATION:	Manhattan, NY			**TIME:**	7:30 a.m. to 2:00 p.m.
CONSTRUCTION MANAGER:	Related			**OBSERVER:**	Vijay Veluchamy
CONTRACTOR:	East Coast Drilling (ECD)				

CONTRACTOR'S EQUIPMENT:	**PRESENT AT SITE:** **Day 2**
Various hand tools	Vijay Veluchamy (Langan) Megan (MRCE) Eustace Chapman (Related) Michael Quasarano (ECD)

PROJECT SUMMARY

Langan is on site to observe the waterproofing installation on the exterior face of the east parapet wall of the existing IAC building at 555 West 18th Street. The existing waterproofing membrane on this wall was damaged during excavation at 515 West 18th Street. Langan was engaged by the owner of the IAC building to observe the waterproofing repair work on their wall.

GENERAL OBSERVATIONS:

Langan arrived on site at the above mentioned time and met with Related, ECD and MRCE to discuss the work to be performed for the day. Work performed was as follows:

1. Langan attended a site meeting with Scott Fehmel and Eustace Chapman from Related, Megan from MRCE and Mike from ECD. During the meeting, ECD told the team that they are not willing to parge the wall but were willing to use Liquid Membrane to reinforce waterproofing at all surface irregularities. MRCE engineer confirmed that this is an acceptable alternative to parging the wall.
2. Contractor installed termination bars at the bottom of the wall to seal the existing Preprufe membrane and applied Liquid Membrane over it.
3. Contractor parged all irregularities with Liquid Membrane, reprimed the wall and applied Bituthene 3000 membrane to the entire wall.
4. After installing Bituthene membrane, contractor sealed the bottom Preprufe-Bituthene overlap with Liquid membrane.
5. Before the bottom termination liquid membrane coat could be completed, contractor ran out of material and hence stopped work for the day.
6. Langan left the site at 2:00 p.m.

Cc:	Hamid Fallah, Tasos Papathanasiou, Marc Gallagher, File	By:	Vijay Veluchamy ***LANGAN***

SITE OBSERVATION REPORT

Photos:

Photo 1: Contractor installing Bituthene membrane over the west wall (facing west)

Photo 2: View of Preprufe termination at the bottom of the wall

Cc:	Hamid Fallah, Tasos Papathanasiou, Marc Gallagher, File	By:	Vijay Veluchamy ***LANGAN***

LANGAN

SITE OBSERVATION REPORT

PROJECT NO.:	005586407			**DATE:**	Monday, January 22, 2018
PROJECT:	IAC Building Christian	**CLIENT:**	InterActiveCorp	**WEATHER:**	Clear, 40s ^{0}F
LOCATION:	Manhattan, NY			**TIME:**	7:15 a.m. to 11:15 a.m.
CONSTRUCTION MANAGER:	Related			**OBSERVER:**	Vijay Veluchamy
CONTRACTOR:	East Coast Drilling (ECD)				

CONTRACTOR'S EQUIPMENT:	**PRESENT AT SITE:** **Day 3**
Various hand tools	Vijay Veluchamy (Langan) Ali (MRCE) Max Rappaport (Related) Michael Quasarano (ECD)

PROJECT SUMMARY

Langan is on site to observe the waterproofing installation on the exterior face of the east parapet wall of the existing IAC building at 555 West 18th Street. The existing waterproofing membrane on this wall was damaged during excavation at 515 West 18th Street. Langan was engaged by the owner of the IAC building to observe the waterproofing repair work on their wall.

GENERAL OBSERVATIONS:

Langan arrived on site at the above mentioned time and met with Related, ECD and MRCE to discuss the work to be performed for the day. Work performed was as follows:

1. Contractor started installing termination bars at the top of the wall.
2. Contractor informed Langan that they ran out of Liquid Membrane.
3. Along with MRCE and Related, Langan identified locations where the Bituthene membrane did not adhere properly to the wall. MRCE advised the contractor on how to rectify these areas.
4. Langan left the site at 11:15 a.m.

Cc:	Hamid Fallah, Tasos Papathanasiou, Marc Gallagher, File	By:	Vijay Veluchamy ***LANGAN***

SITE OBSERVATION REPORT

PROJECT NO.:	005586407		**DATE:**	Tuesday, January 23, 2018	
PROJECT:	IAC Building Christian	**CLIENT:** InterActiveCorp	**WEATHER:**	Rain, 50s ^{0}F	
LOCATION:	Manhattan, NY		**TIME:**	7:15 a.m. to 11:00 a.m., 2:30 p.m. to 3:15 p.m. and 4:15 p.m. to 5:15 p.m.	
CONSTRUCTION MANAGER:	Related		**OBSERVER:**	Vijay Veluchamy	
CONTRACTOR:	East Coast Drilling (ECD)				

CONTRACTOR'S EQUIPMENT:	**PRESENT AT SITE:** **Day 4**
Various hand tools	Vijay Veluchamy (Langan) Ali (MRCE) Max Rappaport, Eustace Chapman (Related) Michael Quasarano (ECD)

PROJECT SUMMARY

Langan is on site to observe the waterproofing installation on the exterior face of the east parapet wall of the existing IAC building at 555 West 18th Street. The existing waterproofing membrane on this wall was damaged during excavation at 515 West 18th Street. Langan was engaged by the owner of the IAC building to observe the waterproofing repair work on their wall.

GENERAL OBSERVATIONS:

Langan arrived on site at the above mentioned time and met with Related, ECD and MRCE to discuss the work to be performed for the day. Work performed was as follows:

1. Langan arrived on site and observed that the contractor had finished installing termination bar at the top and applied Liquid Membrane to the bottom termination bar and to most parts of the top termination bar. However, the contractor had not repaired any of the poorly adhered Bituthene spots from Day 3.
2. Contractor informed Langan that they ran out of materials at the end of Day 3 and that new materials should arrive shortly.
3. Langan waited on site till 11a.m. and left after informing Related and MRCE because no waterproofing work was being performed.
4. Langan came back to the site at 2:30 p.m. to observe waterproofing repair progress. Contractor had patched most of the areas previously marked-up by the team and was continuing to patch areas. Langan left the site at 3:15 p.m.
5. Langan came back to the site at 4:15 p.m. and observed that the contractor had finished patching all areas. Langan and MRCE advised the contractor to repair some fish-mouths at Bituthene overlaps and install Hydroduct (prefabricated drainage panels) membrane.
6. Langan left the site at 5:15 p.m.

Cc:	Hamid Fallah, Tasos Papathanasiou, Marc Gallagher, File	By:	Vijay Veluchamy ***LANGAN***

SITE OBSERVATION REPORT

Photos:

Photo 1: Contractor repairing the Bituthene membrane along the west wall (facing north)

Photo 2: MRCE engineer inspecting completed waterproofing (facing south)

Cc:	Hamid Fallah, Tasos Papathanasiou, Marc Gallagher, File	By:	Vijay Veluchamy ***LANGAN***

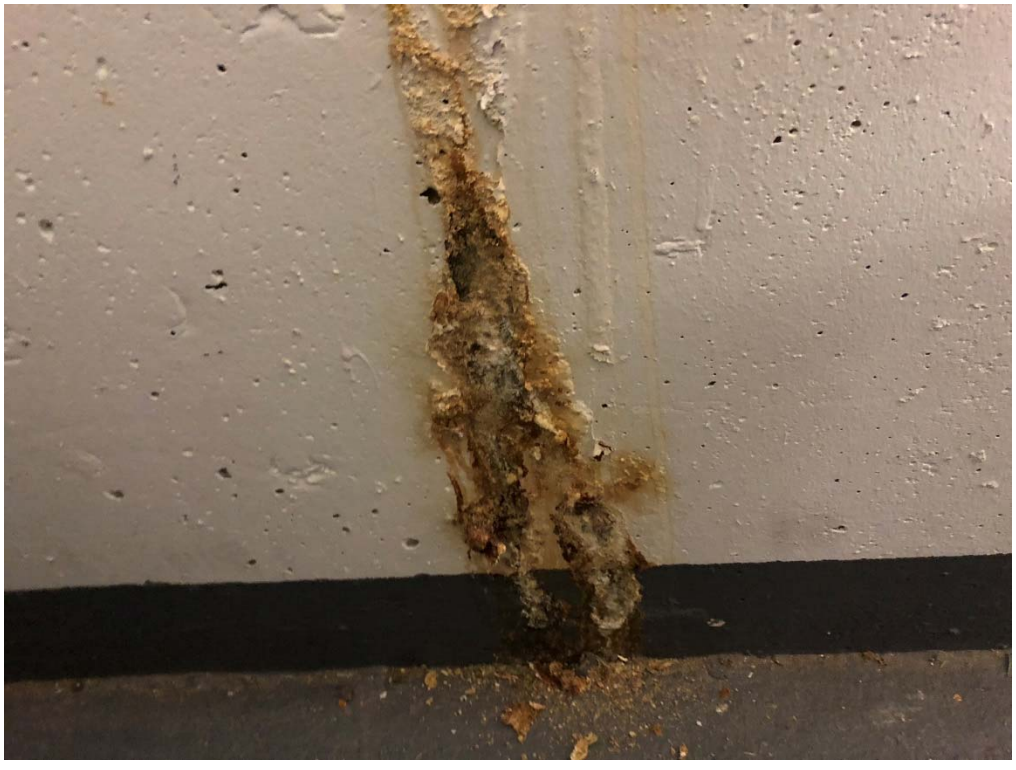
APPENDIX D

PHOTO LOG

- APPENDIX D1 INSPECTION PHOTOS
- APPENDIX D2 REPAIR PHOTOS

IAC/InterActive Corp.
Appendix D1 Inspection Photos
Site Photographs from February 9, 2018

Photograph 1. Water infiltration and dried grout in northeast corner of South Lobby AC Room



Photograph 2. Water infiltration in Storage Room

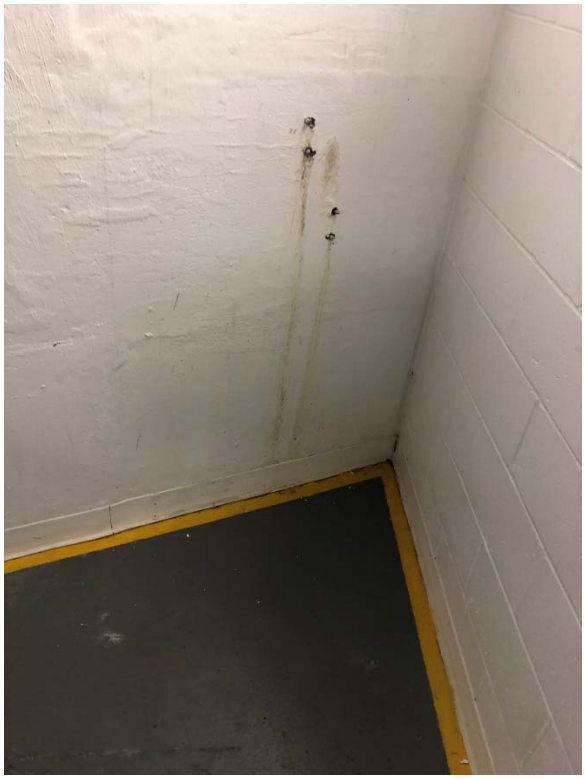
IAC/InterActive Corp.
Appendix D1 Inspection Photos
Site Photographs from February 9, 2018

Photograph 3. Water infiltration in northwest basement stairwell

Photograph 4. Water infiltration in northwest basement stairwell (same area as Photo 3, closer picture to show damage detail)

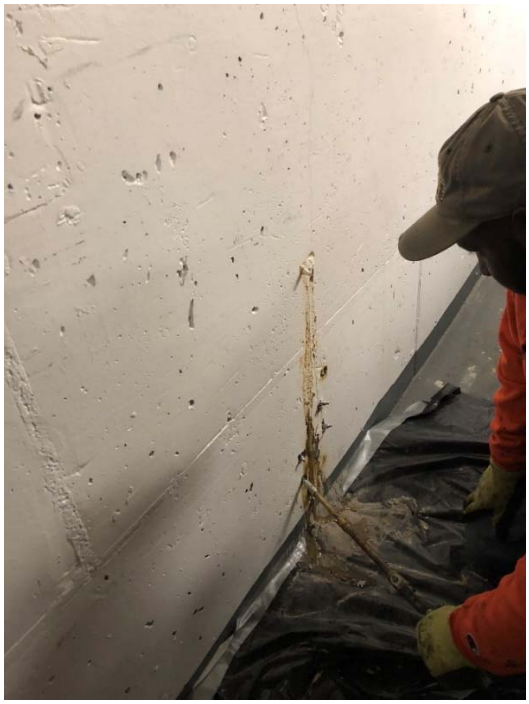
IAC/InterActive Corp.
Appendix D2 Repair Photos
Site Photographs from March 2, 2018

Photograph 1. Contractor drilling holes in the foundation wall for grout injection (northwest corner of building stairwell)



Photograph 2. Contractor injected grout into 4 points in the northwest corner of the building stairwell

IAC/InterActive Corp.
Appendix D2 Repair Photos
Site Photographs from March 2, 2018



Photograph 3. Contractor injecting grout into points to seal the foundation vapor barrier (western building perimeter in Storage Room)

Photograph 4. Injected grout is seeping out of the injection points as it sets (western building perimeter in Storage Room)