Jamaica Central Control Building
144-41 94th Avenue, 4th Floor
Mail Code 1944
Jamaica, NY 11435

Phillip Eng
President

Lori Ebbighausen, PH.D.
Vice President – Corporate Safety

MTA Long Island Rail Road

November 30, 2020

Michael Haggerty
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233

Re: Indoor Air Quality Survey Work Plan
Morris Park Yard, Richmond Hill, NY
NYSDEC Site No. 241130
Richmond Hill, New York

Dear Mr. Haggerty:

MTA Long Island Rail Road ("LIRR") has prepared this Indoor Air Quality (IAQ) Survey Work Plan (Work Plan) for a locomotive maintenance facility and Quonset hut under construction at the Morris Park Yard, located at 91-53 121st Street, Richmond Hill, New York (the Site). The Site location is presented on **Figure 1**. LIRR entered into an Order on Consent in 1992 with the New York State Department of Environmental Conservation (NYSDEC) and Site No. 241130 has been assigned. The Site has been remediated under the New York State (NYS) Resource Conservation and Recovery Act (RCRA) Program in accordance with a Statement of Basis issued by NYSDEC in 2015. The Site Management Plan (SMP) was approved by NYSDEC in September 25, 2019. This Work Plan has been prepared to evaluate potential soil vapor intrusion (SVI) at the structures under construction at the Site in accordance the SMP.

The locomotive facility consists of office spaces, maintenance shops, and storage spaces, and the structure encompasses an area of approximately 47,000 square feet. The Quonset hut encompasses approximately 5,400 square feet of floor space. Since the locomotive facility and Quonset hut are being constructed with 10-inch floor slabs and the locomotive facility construction includes Liquid Boot® vapor barrier, proposed activities are limited to indoor and ambient air sampling. Construction drawings and documentation of vapor barrier installation are presented in **Attachment A**.

Indoor Air Quality Scope of Work

The following tasks will be performed as part of the proposed scope of work:

Indoor and Ambient Air Sampling

Indoor and ambient air sampling will include the following:

- Pre-sampling chemical inventory and inspection. In accordance with the New York State Department of Health (NYSDOH) "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York", dated October 2006 (NYSDOH Guidance), sample locations and adjacent spaces will be inspected and screened with a part per billion (ppb) range photoionization detector (PID) to determine if interfering conditions such as open containers of cleaning supplies or

petroleum products are present. The NYSDOH Guidance "Indoor Air Quality Questionnaire and Building Inventory" form will be completed.

- If interfering conditions are noted, LIRR will implement mitigation measures. Mitigation measures could include removal and isolation of interfering items to the extent feasible and ventilation of the affected areas. The interfering items will be isolated by closing them in storage/maintenance closets away from the proposed sampling locations and sealing the closet doors using painter's tape and/or plastic sheeting.

- Collection of 8-hour duration indoor/ambient air samples in SUMMA canisters. Indoor air samples will be collected at a frequency of one per 5,000 square feet for each structure. In total, 12 indoor air samples will be collected, 10 from the locomotive facility and two from the Quonset hut. One ambient air sample per day of sampling will be collected.

- Analysis of the indoor air and ambient air samples by United States Environmental Protection Agency (USEPA) Method TO-15.

Each SUMMA canister will be individually certified by the analytical laboratory and low-level sensitivity analyses (i.e., low level detection limits, in accordance with NYSDOH guidance) will be performed on the samples. The SUMMA canisters will be placed at typical breathing zone height (3 to 5 feet above the floor) in each designated sampling location, and vacuum readings will be collected at the start, approximately half-way through, and at the end of the sampling period. After sample collection, the indoor air and ambient air samples will be shipped overnight to Eurofins TestAmerica, a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory, for analysis for volatile organic compounds (VOCs) by USEPA Method TO-15, with 10-day turnaround time (TAT). USEPA Method TO-15 will provide detection limits of 1.0 micrograms per cubic meter for all analytes except for vinyl chloride, trichloroethene (TCE), cis-1,2-dichloroethene, 1,1-dichloroethene and carbon tetrachloride. The detection limits for vinyl chloride, TCE, cis-1,2-dichloroethene, 1,1-dichloroethene and carbon tetrachloride will be 0.20 micrograms per cubic meter. This will allow for comparison with the lowest action levels for these compounds in the NYSDOH Guidance.

Reporting

Results of IAQ monitoring will be included in the Site Periodic Review Report (PRR). The PRR will document the results of the sampling effort, present the results of the indoor and ambient air sampling, and include comparisons of the analytical data to the appropriate guidelines and regulations, as published by the USEPA, NYSDEC and the NYSDOH. The report will also include an evaluation of the quality of the analytical data and the reliability of the data for its intended use.

Analytical results for the indoor air samples will be compared to the NYSDOH Air Guideline Values (AGVs) and to background levels of VOCs in indoor air presented in the NYSDOH Guidance, including Upper Fence Limit Indoor Air Values from "Table C-1, NYSDOH 2003: Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes", 90th Percentile Indoor Air Values from "Table C-2, EPA 2001: Building Assessment and Survey Evaluation (BASE) Database, SUMMA Canister Method"; the 95th Percentile Indoor Air Values from Table C-5, HEI 2005: Relationship of Indoor, Outdoor and Personal Air (RIOPA) published in the NYSDOH Vapor Intrusion Guidance Document, Appendix C; the NYSDOH's September 2013 AGV for tetrachloroethene (PCE) of 30 micrograms per cubic meter (0.03 milligrams per cubic meter); and the NYSDOH's August 2015 AGV for trichloroethene (TCE) of 2

micrograms per cubic meter (0.002 milligrams per cubic meter). The comparison criteria to be used for formaldehyde in indoor air will be the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) of 19.6 micrograms per cubic meter.

Analytical results for the ambient air samples will be compared to the NYSDOH AGVs and to background levels of VOCs in outdoor air presented in the NYSDOH Guidance, including Upper Fence Limit Outdoor Air Values from "Table C-1, NYSDOH 2003: Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes"; 90th Percentile Indoor Air Values from "Table C-2, EPA 2001: Building Assessment and Survey Evaluation (BASE Database, SUMMA Canister Method"; the 95th Percentile Indoor Air Values from Table C-5, HEI 2005: Relationship of Indoor, Outdoor and Personal Air (RIOPA) published in the NYSDOH Guidance, Appendix C; the NYSDOH's September 2013 AGV for tetrachloroethene (PCE) of 30 micrograms per cubic meter (0.03 milligrams per cubic meter); and the NYSDOH's August 2015 AGV for trichloroethene (TCE) of 2 micrograms per cubic meter (0.002 milligrams per cubic meter).

Schedule

Upon receipt of approval of this Work Plan from NYSDEC and NYSDOH, LIRR will arrange for the sampling to begin. Laboratory data is expected to be received 10 business days after the date of delivery of samples to the laboratory. In accordance with the SMP, the Site PRR will be submitted to NYSDEC no later than January 25, 2021. LIRR anticipates the results of IAQ sampling of the locomotive facility will be included in the January 2021 PRR. However, construction of the Quonset hut is not expected to be completed until January 2021. Therefore, results of IAQ sampling of the Quonset hut will likely not be included in the PRR.

Please do not hesitate to contact me at (347) 494-6034 if you have any questions.

Sincerely,

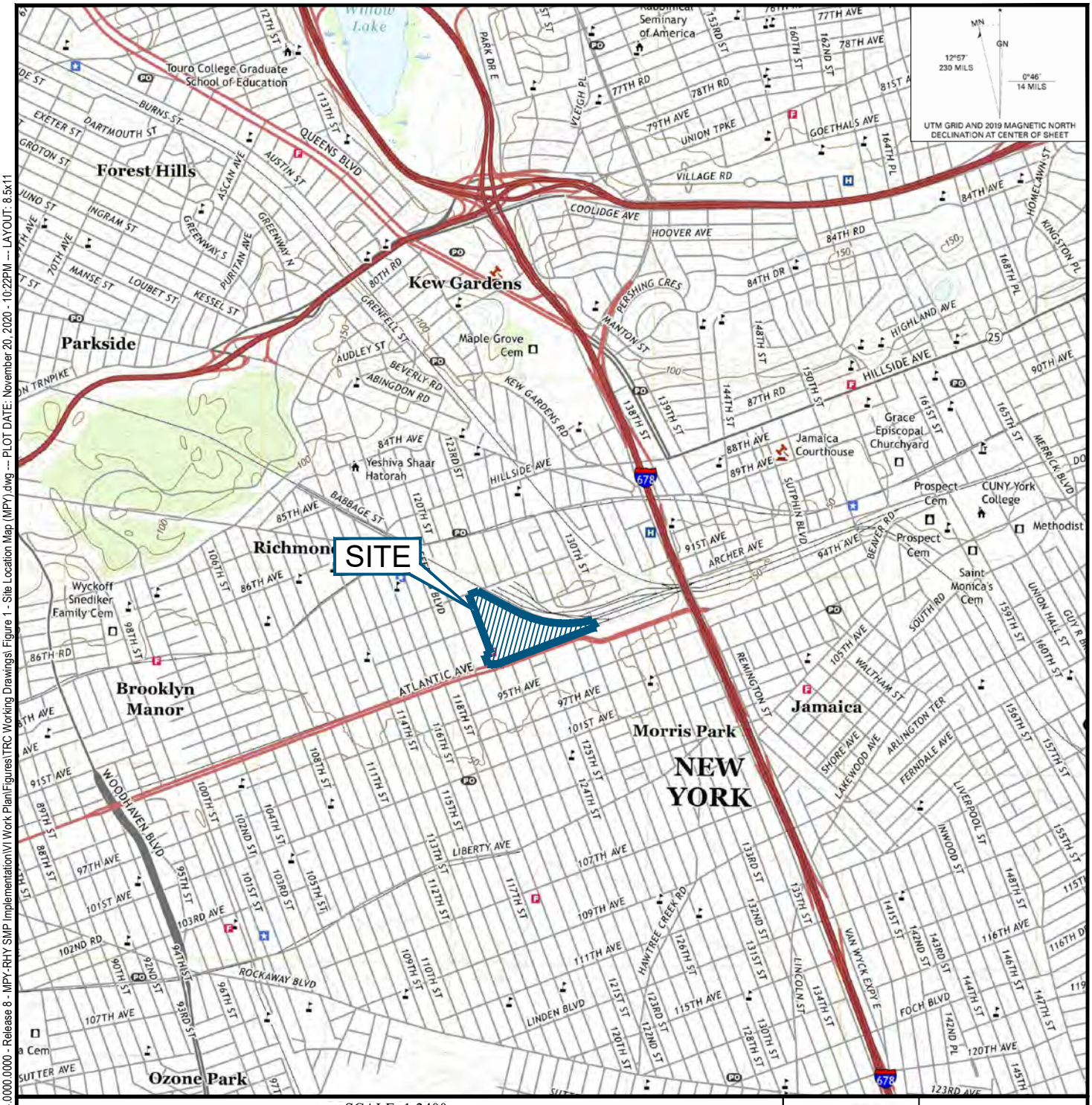
Magdalena Rychtecka

Magdalena Rychtecka on behalf of Kathleen Green
Director – Environmental Planning & Compliance
Corporate Safety Department

cc: D. Warren, TRC
K. Myers, TRC
E. Cordero, TRC

Enclosures: Figure 1 – Site Location Map
Figure 2 – Locomotive Facility - Proposed Sampling Locations
Figure 3 - Quonset Hut - Proposed Sampling Locations
Attachment A – Construction Documents

FIGURES



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1 0.5 0 KILOMETERS 1 2

1000 500 0 METERS 1000 2000

1 0.5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

MAP INCLUDES INFORMATION FROM THE FOLLOWING MAP SHEET(S): TP, JAMAICA, NY, 7.5 MINUTE DATED 2019.

MAP OBTAINED THROUGH USE OF TOPOVIEW WITH THE INTERFACE CREATED BY THE NATIONAL GEOLOGIC MAP DATABASE PROJECT (NGMDB), IN SUPPORT OF THE TOPOGRAPHIC MAPPING PROGRAM, MANAGED BY THE USGS NATIONAL GEOSPATIAL PROGRAM (NGP).

TRC
1430 Broadway, 10th Floor
New York, NY 10018
Phone: 212.221.7822
www.TRCcompanies.com

PROJECT: **METROPOLITAN TRANSPORTATION AUTHORITY**
INDOOR AIR QUALITY SURVEY WORK PLAN
MORRIS PARK YARD
RICHMOND HILL, NEW YORK

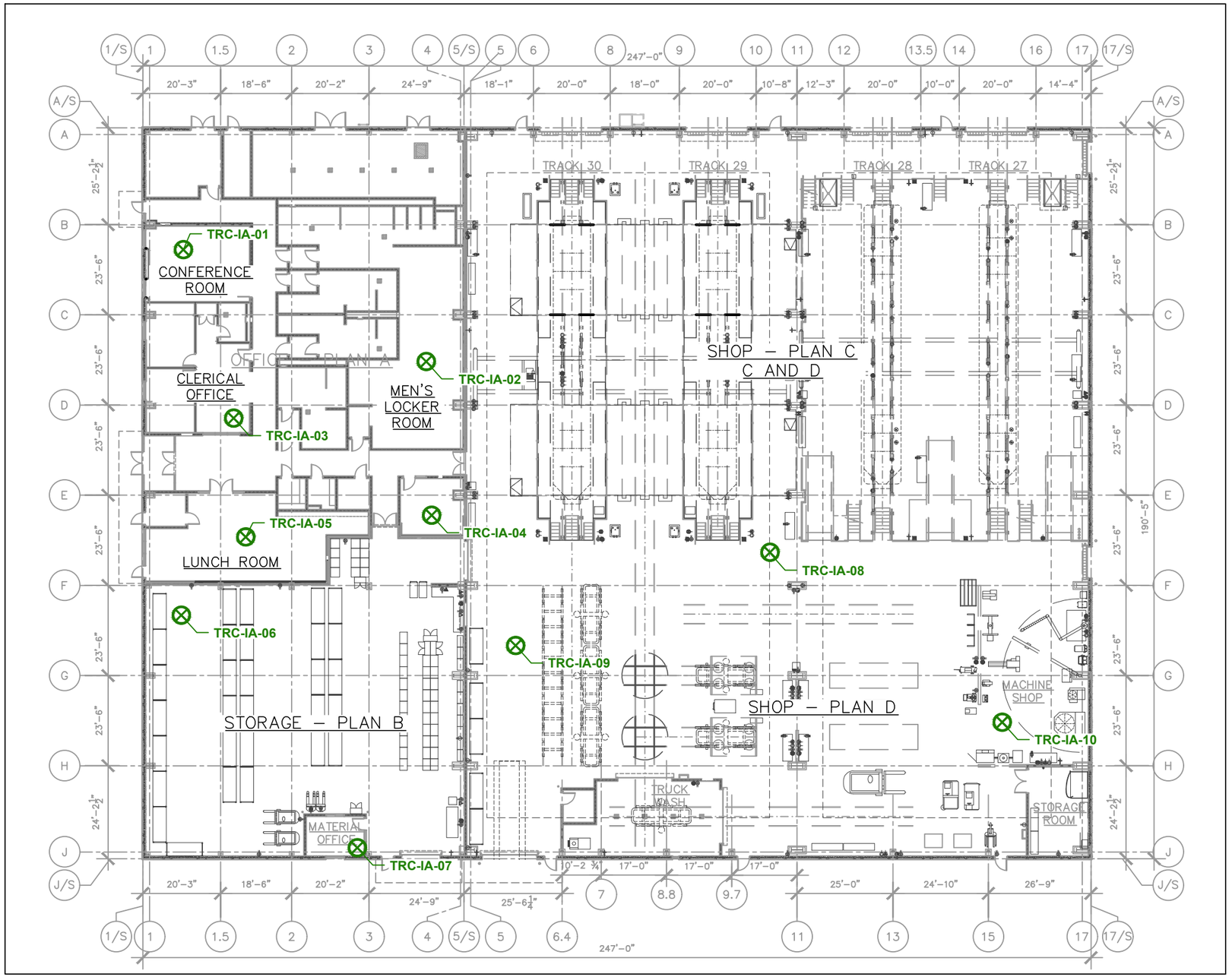
TITLE:

SITE LOCATION MAP

DRAWN BY:	H. DELGADO
CHECKED BY:	E. CORDERO
APPROVED BY:	K. MYERS
DATE:	NOVEMBER 2020
PROJ. NO.:	405164.0000.0000
FILE:	Figure 1 - Site Location Map (MPY).dwg

FIGURE 1

8.5x11 --- ATTACHED XREFS: --- ATTACHED IMAGES: NY_Jamaica_20190919_TIM;
DRAWING NAME: I:\Projects\LIRR On-Call Environmental Services\405164.0000.0000 - Release 8 - MPY-RHY SMP Implementation\V\ Work Plan\Figures\TRC Working Drawings\ Figure 1 - Site Location Map (MPY).dwg --- PLOT DATE: November 20, 2020 - 10:22PM --- LAYOUT: 8.5x11



LEGEND (SYMBOLS NOT TO SCALE):

TRC-IA-## — PROPOSED INDOOR AIR SAMPLING LOCATION AND IDENTIFICATION NUMBER

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES ARE APPROXIMATE.
2. DRAWING SOURCED FROM DRAWING NUMBER A-100 MORRIS PARK LOCOMOTIVE SHOP TITLED "OVERALL BUILDING FLOOR PLAN" DATED 07/27/2018 BY AECOM AND B. THAYER ASSOCIATES FOR MTA LONG ISLAND RAIL ROAD.

0 30' 60'

SCALE: 1" = 30'
SHEET SIZE: 11" BY 17"

PROJECT:
METROPOLITAN TRANSPORTATION AUTHORITY
INDOOR AIR QUALITY SURVEY WORK PLAN
MORRIS PARK YARD
RICHMOND HILL, NEW YORK

TITLE:
PROPOSED SAMPLING LOCATIONS - LOCOMOTIVE FACILITY

DRAWN BY:	H. DELGADO	PROJ NO.:	405164.0000.0000
CHECKED BY:	E. CORDERO		
APPROVED BY:	K. MYERS		**FIGURE 2**
DATE:	NOVEMBER 2020		

TRC
1430 Broadway, 10th Floor
New York, NY 10018
Phone: 212.221.7822
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FILE NO.: Figure 2 - Prop. Samp. Loc. - Loco. Fac. (MPY).dwg

LEGEND (SYMBOLS NOT TO SCALE):

TRC-IA-##	PROPOSED INDOOR AIR SAMPLING LOCATION AND IDENTIFICATION NUMBER

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES ARE APPROXIMATE.
2. DRAWING SOURCED FROM DRAWING NUMBER S-1 MORRIS PARK QUONSET HUT FOUNDATION TITLED "GENERAL NOTES, SECTION & FOUNDATION PLAN" DATED 07/26/2019 BY MTA LONG ISLAND RAIL ROAD.

0 10' 20'

SCALE: 1" = 10'
SHEET SIZE: 11" BY 17"

PROJECT:
METROPOLITAN TRANSPORTATION AUTHORITY
INDOOR AIR QUALITY SURVEY WORK PLAN
MORRIS PARK YARD
RICHMOND HILL, NEW YORK

TITLE:
PROPOSED SAMPLING LOCATIONS - QUONSET HUT

DRAWN BY:	H. DELGADO	PROJ NO.:	405164.0000.0000
CHECKED BY:	E. CORDERO		**FIGURE 3**
APPROVED BY:	K. MYERS		
DATE:	NOVEMBER 2020		

TRC
1430 Broadway, 10th Floor
New York, NY 10018
Phone: 212.221.7822
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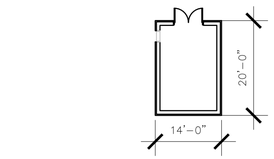
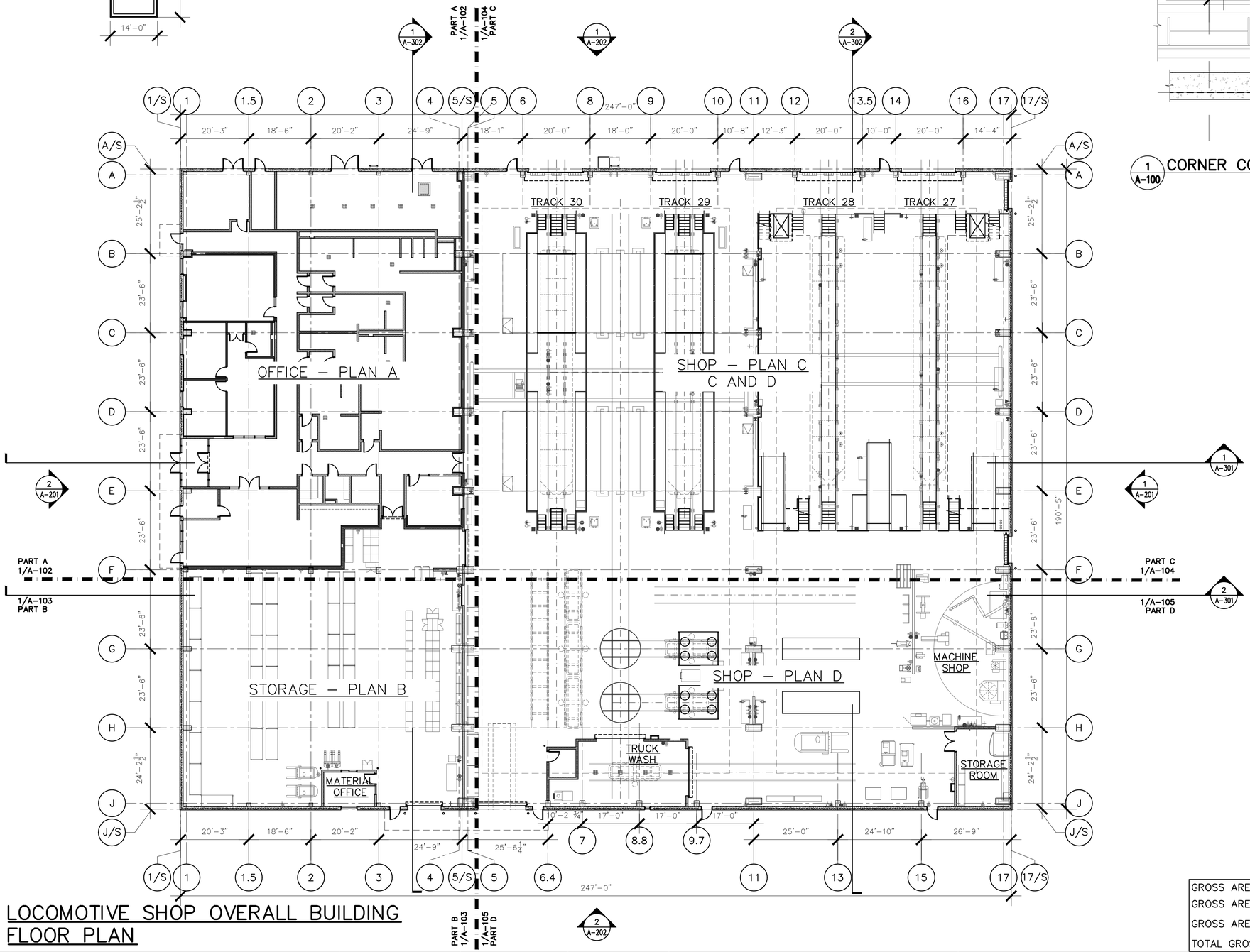
FILE NO.: Figure 3 - Prop. Samp. Loc. - Quonset Hut. (MPY).dwg

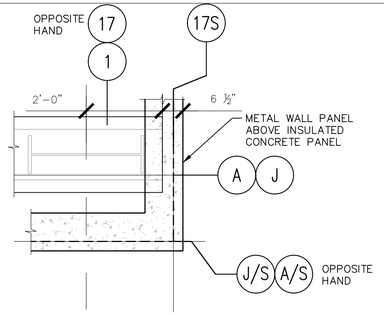
ATTACHMENT A



FIRE PUMP BUILDING



LOCOMOTIVE SHOP OVERALL BUILDING FLOOR PLAN



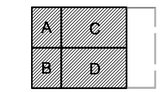
1 A-100 CORNER COLUMN DETAIL

SCALE IN FEET: 1/2" = 1'-0"

NOTES

1. SEE A-601 FOR PARTITION SCHEDULE.
2. SEE A-611 FOR DOOR SCHEDULE.
3. SEE A-621 FOR WINDOW AND LOUVER SCHEDULES.
4. REFER TO LOW VOLTAGE DRAWINGS CM SERIES FOR SECURITY CAMERA DETAILS. REFER TO NOTES ON CM DRAWINGS FOR DETAILS OF HEIGHTS ETC. DEVICES NOT SHOWN ON THE INTERIOR OF THESE DRAWINGS.
5. REFER TO INDUSTRIAL "Q" SERIES FOR EQUIPMENT INFORMATION.
6. REFER TO DRAWING A-060 FOR SLAB EDGE PLAN.

GROSS AREA – SHOP C/D	30,650 SF
GROSS AREA – STORAGE B	6,275 SF
GROSS AREA – EMPLOYEE WELFARE AND OFFICE A	7,172 SF
TOTAL GROSS AREA	44,097 SF



KEY PLAN NTS

SCALE IN FEET: 1/16" = 1'-0"

NO.	DATE	MODIFICATION	DRAWN	CHKD.	APPRVD.

REVISIONS

PROFESSIONAL ENGINEER

REGISTERED ARCHITECT BHIMSEN THAYER NEW YORK

DATE:

DESIGNED	MS
DRAWN	RE
CHECKED	CS
APPROVED	NM

AECOM

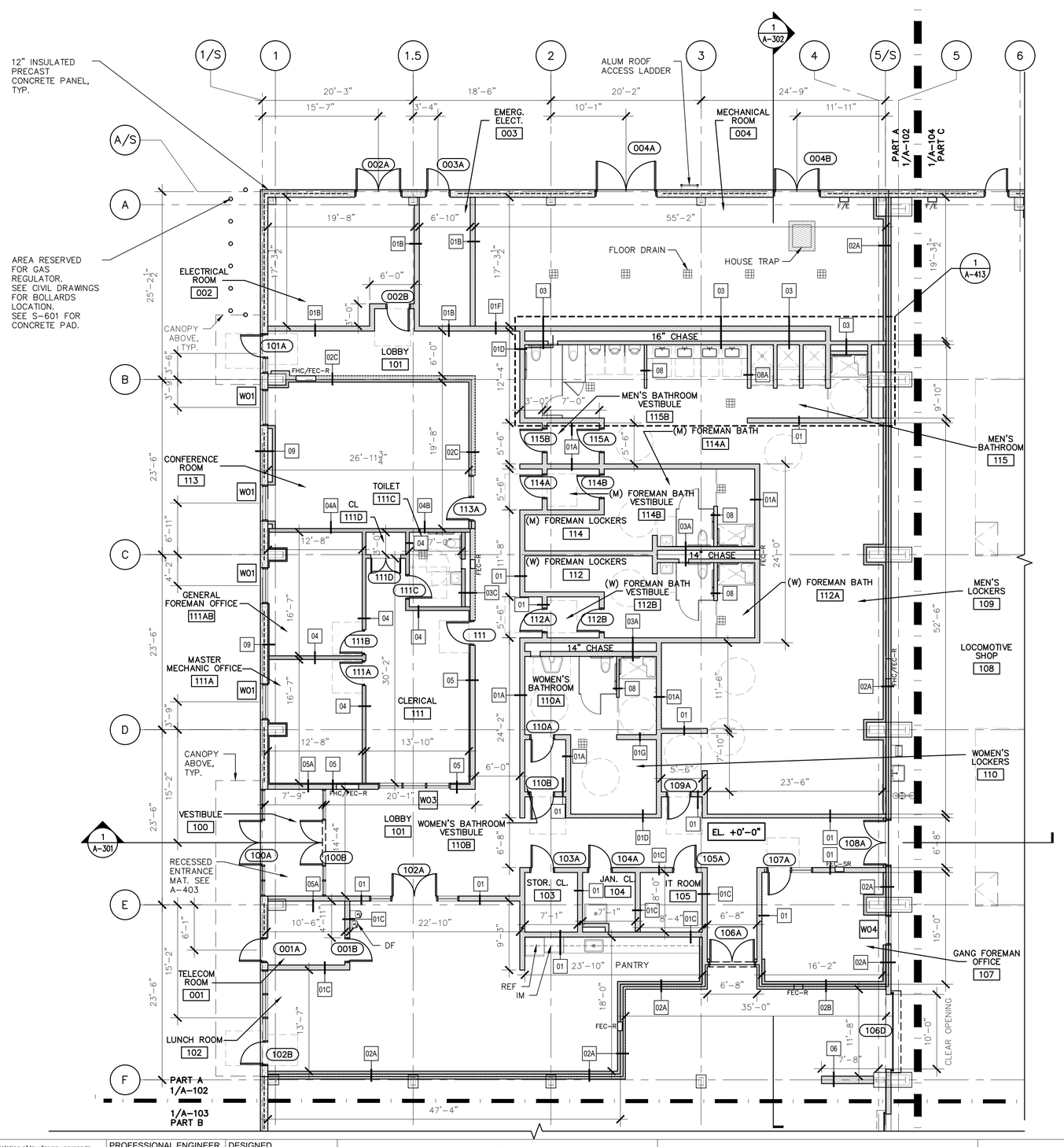
B THAYER ASSOCIATES

MTA Long Island Rail Road

MORRIS PARK LOCOMOTIVE SHOP

OVERALL BUILDING FLOOR PLAN

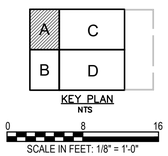
PHASE: 100% DESIGN SUBMISSION	CONTRACT NUMBER: 6241
SCALE: AS NOTED	DATE: 07/27/2018
DRAWING NUMBER: A-100	
SHEET: 14	OF: 276



1 A-102 CONSTRUCTION PLAN A – OFFICE

NOTES

1. SEE A-601 FOR PARTITION TYPES.
2. SEE A-602 FOR WALL, FLOOR TREATMENTS
3. SEE A-611 FOR DOOR SCHEDULE.
4. REFER TO SERIES A-400 FOR ENLARGED PLANS.
5. FLOOR SLAB IS AT 0'-0".
6. REFER TO STRUCTURAL DRAWINGS FOR FLOOR SLAB THICKNESS.
7. REFER TO S-601 FOR CONCRETE PADS.
8. REFER TO LOW VOLTAGE DRAWINGS CM SERIES FOR SECURITY CAMERA DETAILS. REFER TO NOTES ON CM DRAWINGS FOR DETAILS OF HEIGHTS ETC. DEVICES NOT SHOWN ON THE INTERIOR OF THESE DRAWINGS.
9. REFER TO INDUSTRIAL "Q" SERIES DRAWINGS FOR EQUIPMENT INFORMATION.
10. SEE ENLARGED PLANS ON A-401 THROUGH A-403.
11. ALL PENETRATIONS IN IT AND TELECOM ROOM TO BE LEAK PROOF. ROOMS ARE EQUIPPED W/ GAS FIRE SUPPRESSION SYSTEM.
12. ALL OUTLET AND DATA BOXES TO BE RECESSED IN WALL CAVITY.
13. REFER TO STRUCTURAL DRAWINGS FOR MISCELLANEOUS STEEL FOR SUPPORT OF EXTERIOR LADDERS, SIGNAGE, EXTERIOR LIGHT FIXTURES AND CAMERAS, MAIN GAS LINE, PIPE GUARDRAILS, PLUMBING, ELECTRICAL RISERS AND FUEL OIL LINES, EXTERIOR ROLL UP DOORS, SUPPORT OF DAC UNITS AND OTHER EQUIPMENT LOCATED AT PERIMETER OF WALLS IN SHOP AREA.
14. SEE A-141 & A-142 FOR FURNITURE PLAN AND LOCKERS/ACCESSORIES.



NO.	DATE	MODIFICATION	DRAWN	CHKD.	APPRVD.

REVISIONS

PROFESSIONAL ENGINEER

REGISTERED ARCHITECT BARBARA THAYER NEW YORK

DATE:

DESIGNED	MS
DRAWN	RE
CHECKED	CS
APPROVED	NM

AECOM

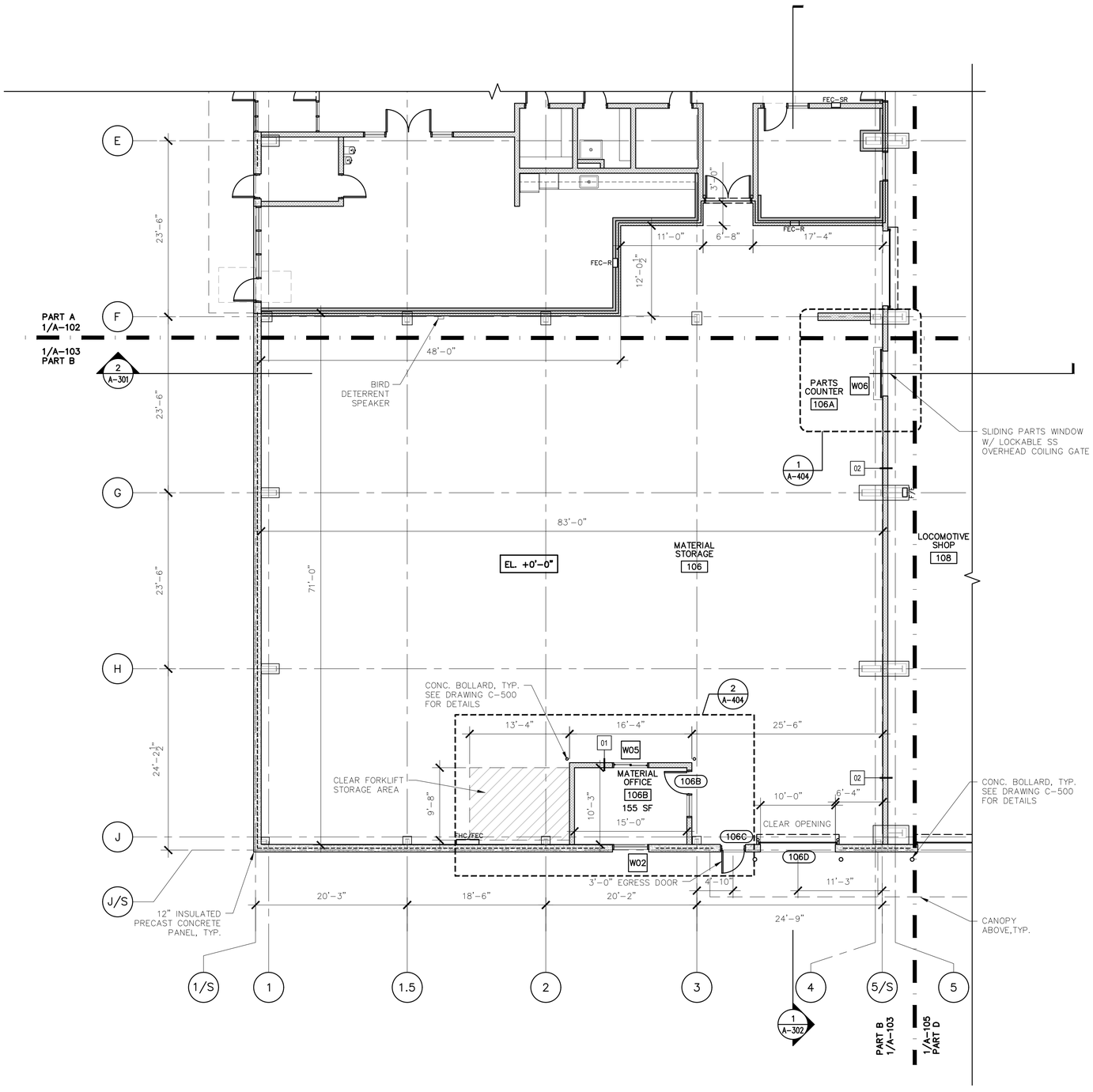
B THAYER ASSOCIATES

MTA Long Island Rail Road

MORRIS PARK LOCOMOTIVE SHOP

CONSTRUCTION PLAN A – OFFICE

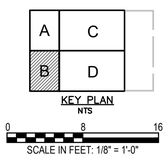
PHASE: 100% DESIGN SUBMISSION	CONTRACT NUMBER: 6241
SCALE: AS NOTED	DATE: 07/27/2018
DRAWING NUMBER: A-102	
SHEET: 16	OF: 276



NOTES

1. SEE A-601 FOR PARTITION TYPES.
2. SEE A-602 FOR WALL, FLOOR TREATMENTS
3. SEE A-611 FOR DOOR SCHEDULE.
4. REFER TO SERIES A-400 FOR ENLARGED PLANS.
5. FLOOR SLAB IS AT 0'-0".
6. REFER TO STRUCTURAL DRAWINGS FOR FLOOR SLAB THICKNESS.
7. REFER TO S-601 FOR CONCRETE PADS.
8. REFER TO LOW VOLTAGE DRAWINGS CM SERIES FOR SECURITY CAMERA DETAILS. REFER TO NOTES ON CM DRAWINGS FOR DETAILS OF HEIGHTS ETC. DEVICES NOT SHOWN ON THE INTERIOR OF THESE DRAWINGS.
9. REFER TO INDUSTRIAL "Q" SERIES DRAWINGS FOR EQUIPMENT INFORMATION.
10. SEE ENLARGED PLANS ON A-401 THROUGH A-403.
11. ALL PENETRATIONS IN IT AND TELECOM ROOM TO BE LEAK PROOF. ROOMS ARE EQUIPPED W/ GAS FIRE SUPPRESSION SYSTEM.
12. ALL OUTLET AND DATA BOXES TO BE RECESSED IN WALL CAVITY.
13. REFER TO STRUCTURAL DRAWINGS FOR MISCELLANEOUS STEEL FOR SUPPORT OF EXTERIOR LADDERS, SIGNAGE, EXTERIOR LIGHT FIXTURES AND CAMERAS, MAIN GAS LINE, PIPE GUARDRAILS, PLUMBING, ELECTRICAL RISERS AND FUEL OIL LINES, EXTERIOR ROLL UP DOORS, SUPPORT OF DAC UNITS AND OTHER EQUIPMENT LOCATED AT PERIMETER OF WALLS IN SHOP AREA.
14. SEE A-534 FOR STAIR DETAILS.
15. BIRD DETERRENT SPEAKERS TO BE WALL MOUNTED AT 12'-0" AFF

1 A-103 CONSTRUCTION PLAN B – STORAGE



NO.	DATE	MODIFICATION	DRAWN	CHKD.	APPRVD.

REVISIONS

PROFESSIONAL ENGINEER

REGISTERED ARCHITECT
BARBARA A. THAYER
STATE OF NEW YORK

DATE:

DESIGNED	MS
DRAWN	RE
CHECKED	CS
APPROVED	NM

AECOM

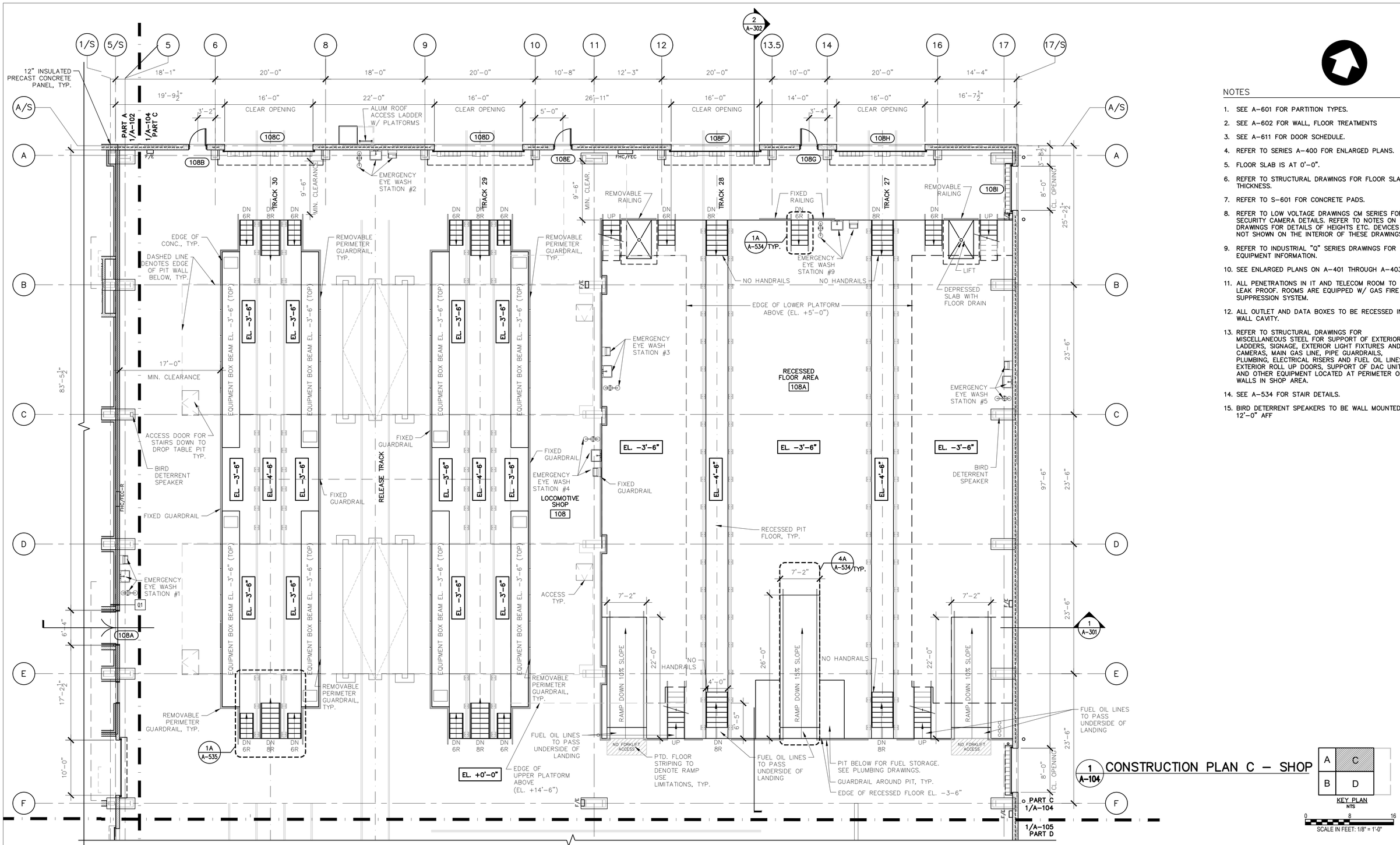
B THAYER ASSOCIATES

MTA Long Island Rail Road

MORRIS PARK LOCOMOTIVE SHOP

CONSTRUCTION PLAN B – STORAGE

PHASE: 100% DESIGN SUBMISSION	CONTRACT NUMBER: 6241
SCALE: AS NOTED	DATE: 07/27/2018
DRAWING NUMBER: A-103	
SHEET: 17	OF: 276



NOTES

1. SEE A-601 FOR PARTITION TYPES.
2. SEE A-602 FOR WALL, FLOOR TREATMENTS
3. SEE A-611 FOR DOOR SCHEDULE.
4. REFER TO SERIES A-400 FOR ENLARGED PLANS.
5. FLOOR SLAB IS AT 0'-0".
6. REFER TO STRUCTURAL DRAWINGS FOR FLOOR SLAB THICKNESS.
7. REFER TO S-601 FOR CONCRETE PADS.
8. REFER TO LOW VOLTAGE DRAWINGS CM SERIES FOR SECURITY CAMERA DETAILS. REFER TO NOTES ON CM DRAWINGS FOR DETAILS OF HEIGHTS ETC. DEVICES NOT SHOWN ON THE INTERIOR OF THESE DRAWINGS.
9. REFER TO INDUSTRIAL "Q" SERIES DRAWINGS FOR EQUIPMENT INFORMATION.
10. SEE ENLARGED PLANS ON A-401 THROUGH A-403.
11. ALL PENETRATIONS IN IT AND TELECOM ROOM TO BE LEAK PROOF. ROOMS ARE EQUIPPED W/ GAS FIRE SUPPRESSION SYSTEM.
12. ALL OUTLET AND DATA BOXES TO BE RECESSED IN WALL CAVITY.
13. REFER TO STRUCTURAL DRAWINGS FOR MISCELLANEOUS STEEL FOR SUPPORT OF EXTERIOR LADDERS, SIGNAGE, EXTERIOR LIGHT FIXTURES AND CAMERAS, MAIN GAS LINE, PIPE GUARDRAILS, PLUMBING, ELECTRICAL RISERS AND FUEL OIL LINES, EXTERIOR ROLL UP DOORS, SUPPORT OF DAC UNITS AND OTHER EQUIPMENT LOCATED AT PERIMETER OF WALLS IN SHOP AREA.
14. SEE A-534 FOR STAIR DETAILS.
15. BIRD DETERRENT SPEAKERS TO BE WALL MOUNTED AT 12'-0" AFF

1 A-104 CONSTRUCTION PLAN C – SHOP

NO.	DATE	MODIFICATION	DRAWN	CHKD.	APPRVD.

REVISIONS

It is a violation of law for any person to alter a document in any way, unless acting under the direction of a licensed professional engineer or registered architect. If this document bearing the seal of an engineer/architect is altered, the altering engineer/architect shall affix to the document their seal and the notation "altered by" followed by their signature and the date of such alteration, and a specific description of the alteration.

PROFESSIONAL ENGINEER

REGISTERED ARCHITECT DANIEL J. GENTILE

DATE:

DESIGNED	MS
DRAWN	RE
CHECKED	CS
APPROVED	NM

AECOM

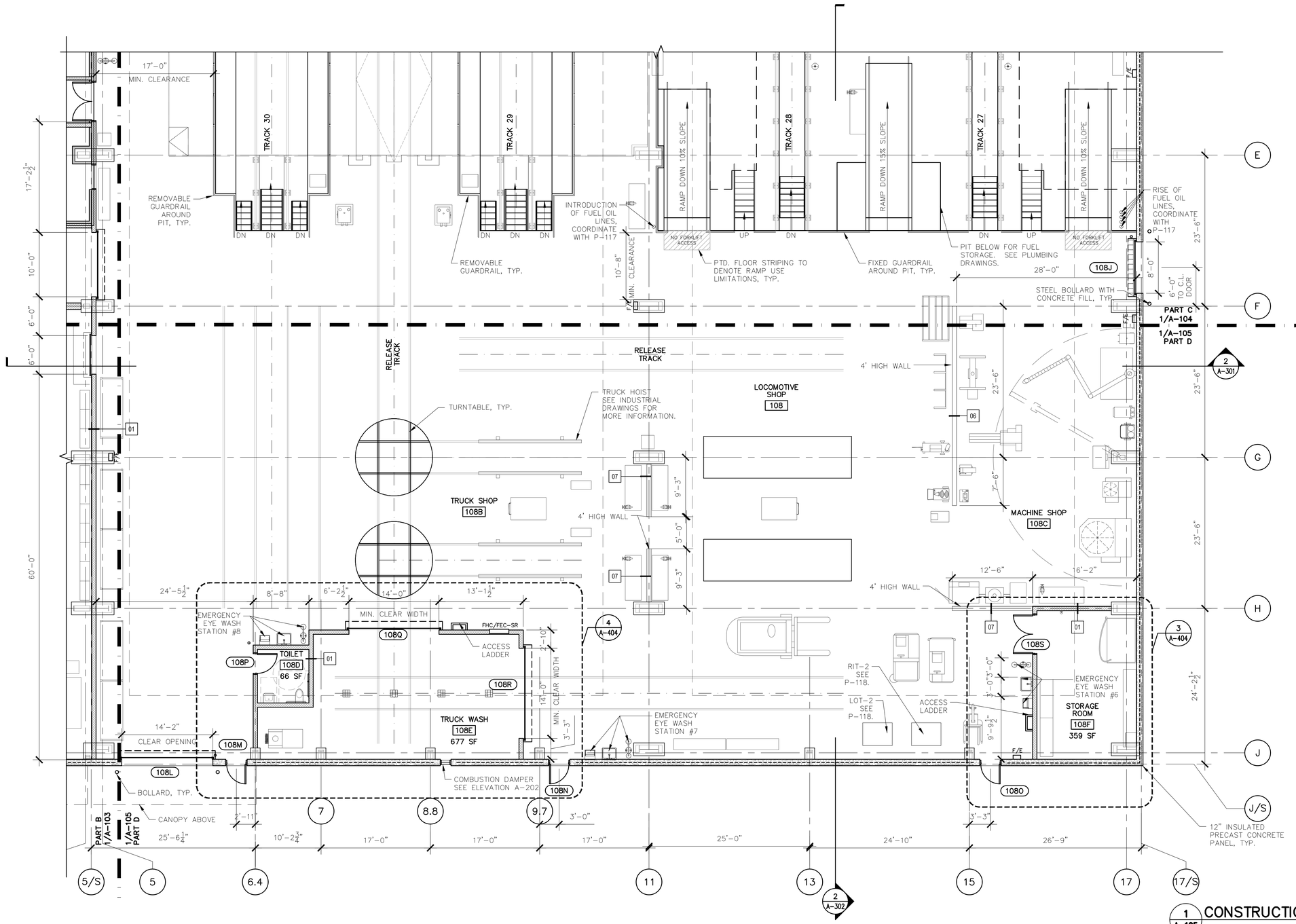
B THAYER ASSOCIATES

MTA Long Island Rail Road

MORRIS PARK LOCOMOTIVE SHOP

CONSTRUCTION PLAN C – SHOP

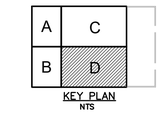
PHASE: 100% DESIGN SUBMISSION	CONTRACT NUMBER: 6241
SCALE: AS NOTED	DATE: 07/27/2018
DRAWING NUMBER: A-104	
SHEET: 18	OF: 276



NOTES

1. SEE A-601 FOR PARTITION TYPES.
2. SEE A-602 FOR WALL, FLOOR TREATMENTS
3. SEE A-611 FOR DOOR SCHEDULE.
4. REFER TO SERIES A-400 FOR ENLARGED PLANS.
5. FLOOR SLAB IS AT 0'-0".
6. REFER TO STRUCTURAL DRAWINGS FOR FLOOR SLAB THICKNESS.
7. REFER TO S-601 FOR CONCRETE PADS.
8. REFER TO LOW VOLTAGE DRAWINGS CM SERIES FOR SECURITY CAMERA DETAILS. REFER TO NOTES ON CM DRAWINGS FOR DETAILS OF HEIGHTS ETC. DEVICES NOT SHOWN ON THE INTERIOR OF THESE DRAWINGS.
9. REFER TO INDUSTRIAL "Q" SERIES DRAWINGS FOR EQUIPMENT INFORMATION AND TRACK INFORMATION.
10. SEE ENLARGED PLANS ON A-401 THROUGH A-403.
11. ALL PENETRATIONS IN IT AND TELECOM ROOM TO BE LEAK PROOF. ROOMS ARE EQUIPPED W/ GAS FIRE SUPPRESSION SYSTEM.
12. ALL OUTLET AND DATA BOXES TO BE RECESSED IN WALL CAVITY.
13. REFER TO STRUCTURAL DRAWINGS FOR MISCELLANEOUS STEEL FOR SUPPORT OF EXTERIOR LADDERS, SIGNAGE, EXTERIOR LIGHT FIXTURES AND CAMERAS, MAIN GAS LINE, PIPE GUARDRAILS, PLUMBING, ELECTRICAL RISERS AND FUEL OIL LINES, EXTERIOR ROLL UP DOORS, SUPPORT OF DAC UNITS AND OTHER EQUIPMENT LOCATED AT PERIMETER OF WALLS IN SHOP AREA.

1 A-105 CONSTRUCTION PLAN D – SHOP



0 8 16
SCALE IN FEET: 1/8" = 1'-0"

NO.	DATE	MODIFICATION	DRAWN	CHKD.	APPRVD.

REVISIONS

PROFESSIONAL ENGINEER

REGISTERED ARCHITECT BRIAN S. THAYER STATE OF NEW YORK

DATE:

DESIGNED	MS
DRAWN	RE
CHECKED	CS
APPROVED	NM

AECOM

B THAYER ASSOCIATES

MTA Long Island Rail Road

MORRIS PARK LOCOMOTIVE SHOP

CONSTRUCTION PLAN D – SHOP

PHASE: 100% DESIGN SUBMISSION	CONTRACT NUMBER: 6241
SCALE: AS NOTED	DATE: 07/27/2018
DRAWING NUMBER: A-105	
SHEET: 19	OF: 276

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 5/24/2018
TRANSMITTAL #: 217

RCC / AMCC - A JOINT VENTURE

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	**From:**	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		**Phone:**	
Fax:		**Fax:**	
Email:	tgeorge@lirr.org	**Email:**	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-008:Liquid Boot Spec/Installation Instructions	1	Submited for Approval	
Submittal Register	72600-009:Liquid Boot QA/QC Plan	1	Submited for Approval	
Submittal Register	72600-010:Liquid Boot PD	1	Submited for Approval	
Submittal Register	72600-011:Dwg SD001 - Under-Slab Vapor Barrier Floor Plan	1	Submited for Approval	
Submittal Register	72600-012:Dwg SD002 - Under-Slab Vapor Barrier Details 1	1	Submited for Approval	
Submittal Register	72600-013:Dwg SD003 - Under-Slab Vapor Barrier Details 2	1	Submited for Approval	
Submittal Register	72600-014:Dwg SD004 - Under-Slab Vapor Barrier Details 3	1	Submited for Approval	
Submittal Register	72600-015:Liquid Boot Sample Warranties	1	Submited for Approval	

Additional Notes: PC1702-046

Alex Chung, PMP

Letter of Transmittal

AECOM

To: Alex Chung
AMCC Corp
50-18 Vernon Blvd.
Long Island City, NY 11101

Date: 5/24/2018
Job Number 6241
Re: LIRR Morris Park Locomotive Shop & Employee Fac
Submittal Number:
72600_008-015
Subject:
Liquid Boot Package

The following is being transmitted:

[X] Shop Drawings [ ] Prints [ ] Plans [ ] Samples

[ ] RFI Response [ ] Copy of Letter [ ] Change Order [ ] Other

Copies	Date	Description
1	5/24/2018	Submittal Number: 72600_008-015
		Liquid Boot Package

Transmitted via:

[ ] Federal Express [ ] US Postal Service [ ] Hand Delivery [ ] Registered Mail

[ ] UPS [ ] Courier [X] Email [ ] iPMIS

Submitted For:

[ ] Approval [X] Your use [ ] As requested [ ] Review

Remarks:

Attached is AECOM's review of Shop Drawing Submittal Numbe 72600_008-015 for your use.

Signed:

Matthew Sipola, P.E.
Project Engineer

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 5/24/2018
TRANSMITTAL #: 204

To: Eran Bachar, PE
AECOM
One Penn Plaza, Suite 600
New York, NY 10119-0698
Phone:
Fax:
Email: Eran.Bachar@aecom.com

CC:

From: Alex Chung, PMP
Railroad Const/AMCC Corp, JV
75-77 Grove Street
Paterson, NJ 07503
Phone:
Fax:
Email: AChung@amcccorp.com

Attached and/or enclosed are the following documents.

Doc Type	Document #	Copies	Status	Remarks
Submittal Register	72600-008:Liquid Boot Installation Instructions	1	Open	
Submittal Register	72600-009:Liquid Boot QA/QC Plan	1	Open	
Submittal Register	72600-010:Liquid Boot PD	1	Open	
Submittal Register	72600-011:Dwg SD001 - Under-Slab Vapor Barrier Floor Plan	1	Open	
Submittal Register	72600-012:Dwg SD002 - Under-Slab Vapor Barrier Details 1	1		
Submittal Register	72600-013:Dwg SD003 - Under-Slab Vapor Barrier Details 2	1		
Submittal Register	72600-014:Dwg SD004 - Under-Slab Vapor Barrier Details 3	1		
Submittal Register	72600-015:Liquid Boot Sample Warranties	1		

Additional Notes: PC1702-046

Alex Chung, PMP

NOTES:
1. COORDINATE LIQUID BOOT WITH ALL PENETRATIONS.
2. COORDINATE VERTICAL AND HORIZONTAL EXTENTS OF VAPOR BARRIER WITH FINAL FOUNDATION PACKAGE.
3. SEE COMMENTS THROUGHOUT SUBMITTAL.
4. WHERE CRUSHED STONE IS USED AS A SUBBASE, PROVIDE MINIMUM 1" THICK LAYER OF 1/4" CRUSHED STONE AT TOP OF SUBBASE (SEE PART 3 - EXECUTION SECTION).

SHOP DRAWING REVIEW

Shop Drawing No: 72600_008-015
Consulting Engineer's Review:

( ) Approved
(X) Approved as Noted
( ) Examined and Returned for Correction
( ) For Information Only
( ) Not Reviewed

Consulting Engineer's review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the project plans and specifications nor departure therefrom. The contractor remains responsible for details and accuracy, for confirming, and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, and for performing his work in a safe manner.

Consulting Engineer: AECOM USA

By: Matthew S. Sipola Date: 5/24/2018

Under-Slab Vapor Barrier
SUBMITTAL

Project:

LIRR Morris Park Locomotive Shop & Employee Facility

93 121st Street
Richmond, NJ 07306

Submitted By:

EAI, Inc.
50 Prescott Street • Jersey City, NJ 07304
Ph: (201) 395-0010 F: (201) 395-0020

Submitted To:

AMCC Corp
50- 18 Vernon Boulevard • Lond Island City, NY 11101
Ph: (718) 472-9500 • F: (718) 472-2250

Date Submitted:

May 24th, 2018

TABLE OF CONTENTS

1) PRODUCT DATA

VI-20™ GEOMEMBRANE

HIGH-PERFORMANCE VAPOR INTRUSION BARRIER

DESCRIPTION

VI-20™ is a 7-layer co-extruded geomembrane made using high quality virgin-grade polyethylene and EVOH resins that provide unmatched impact strength as well as superior resistance to VOC vapor transmission. EVOH technology serves as a highly resilient underslab and vertical wall barrier designed to restrict methane, radon and other harmful chemicals. Applications for EVOH originated in the manufacturing of automotive fuel systems to control emissions of hydrocarbons, whose use was mandated by the US EPA and the CA Air Resources Board (CARB) to reduce VOC emissions.

APPLICATION

VI-20™ is a 20-mil, high performance polyethylene-EVOH copolymer geomembrane, specially designed for use as a VOC barrier when used in conjunction with Liquid Boot® spray-applied vapor intrusion membrane to minimize vapor intrusion and nuisance water (non-hydrostatic conditions) migration into buildings. VI-20™ is ideal for applications with chlorinated solvents, BTEX and other PAHs.

BENEFITS

- Polyethylene layers provide excellent chemical resistance and physical properties
- EVOH barrier technology provides superior protection against diffusion of chemicals when compared to typical HDPE geomembranes
- Manufactured at ISO 9001:2008 certified plant

INSTALLATION

For use as a component of the Liquid Boot® Plus system, VI-20™ geomembrane is rolled out on prepared sub-grade, overlapping seams a minimum of six inches (6”). The geomembrane is cut around penetrations so that it lays flat on the sub-grade and tight at all inside corners. A thin (20 mil) tack coat of Liquid Boot® (“A” side without catalyst) is sprayed within the seam overlap. Once the VI-20™ geomembrane is installed, penetrations are then treated with VI-20™ Detailing Fabric prior to installation of the Liquid Boot® spray-applied vapor intrusion membrane and UltraShield™ G-1000 protection course.

EVOH technology provided in VI-20™ geomembrane has been shown to have VOC diffusion coefficients 20 times lower than an 80 mil (2 mm) HDPE geomembrane.

PACKAGING

VI-20™ Geomembrane is available in the following packaging option:

- 10 ft. x 150 ft. (3 m x 45 m) Rolls

VI-20™ GEOMEMBRANE

HIGH-PERFORMANCE VAPOR INTRUSION BARRIER

VI-20™ CHEMICAL & PHYSICAL PROPERTIES		
CHEMICAL PROPERTY	TEST METHOD	RESULT
Benzene Diffusion Coefficient	EPA Method 8260	4.5×10^{-15} m²/s
Ethylbenzene Diffusion Coefficient	EPA Method 8260	4.0×10^{-15} m²/s
m&p-Xylenes Diffusion Coefficient	EPA Method 8260	3.7×10^{-15} m²/s
Methane Permeance	ASTM D1434	$< 1.7 \times 10^{-10}$ m²/d•atm
o-Xylene Diffusion Coefficient	EPA Method 8260	3.7×10^{-15} m²/s
Radon Diffusion Coefficient	SP Test Method	$<0.25 \times 10^{-12}$ m²/s
Toluene Diffusion Coefficient	EPA Method 8260	4.2×10^{-15} m²/s
PHYSICAL PROPERTY	TEST METHOD	RESULT
Membrane Composite Thickness	ASTM D5199	20 mil (0.5 mm)
Impact Resistance	ASTM D1709	2,600 g
Tensile Strength	ASTM E154 Section. 9	58 lbf/in (1.0 N/m)
Water Vapor Transmission	ASTM E154 & E96	0.004 grains/hr-ft² (0.0028 g/hr-m²)
Water Vapor Retarder Classification	ASTM E1745	Class A, B & C

NOTE:
These are typical property values.

North America: 847.851.1800 | 800.527.9948 | www.cetco.com

UPDATED: MAY 2017

FORM: TDS_VI-20_GEOMEMBRANE_AM_EN_201705_V2

TECHNICAL DATA

LIQUID BOOT® Trowel Grade

TROWEL-APPLIED GAS VAPOR BARRIER

DESCRIPTION

Liquid Boot® is a trowel-applied, water-based membrane containing no VOCs, which provides a barrier against vapor intrusion into structures. Liquid Boot® Trowel Grade is installed in conjunction with the Liquid Boot® gas vapor barrier to minimize vapor and nuisance water migration. Liquid Boot® Trowel Grade offers additional protection around penetrations, providing for a fully-adhered gas vapor barrier system.

APPLICATIONS

Liquid Boot® Trowel Grade is used for detailing around penetrations and for repairs in Liquid Boot® gas vapor barrier applications.

BENEFITS

- Trowel application provides excellent sealing of penetrations
- Seamless, monolithic membrane means no mechanical fastening required
- Protection from methane gas, VOCs, chlorinated solvents and other contaminates
- Also protects against water vapor

In addition to superior chemical resistance performance, Liquid Boot® Trowel Grade effectively seals penetrations, which are considered critical vapor intrusion pathways.

LIMITATIONS

- Do not allow materials to freeze in containers.
- Store Liquid Boot® Trowel Grade at site in strict compliance with manufacturer's instructions.
- When applying material below 45°F, contact your local technical sales manager.

PACKAGING

Liquid Boot® Trowel Grade is available in the following packaging options:

- 1 Gallon Bucket
- 8 oz. bottle of catalyst uncluded)

TESTING DATA

CHEMICAL & PHYSICAL PROPERTIES		
CHEMICAL PROPERTY	**TEST METHOD**	**RESULT**
Acid Exposure (10% H_2SO_4 for 90 days)	ASTM D543	Less than 1% weight change
Benzene Diffusion Test	Tested at 43,000 ppm	2.90 x 10^{-11} m^2/sec
Chemical Resistance: VOCs, BTEXs (tested at 20,000 ppm)	ASTM D543	Less than 1% weight change
Chromate Exposure (10% Chromium6+ salt for 31 days)	ASTM E96	Less than 1% weight change
Diesel (1000 mg/l), Ethylbenzene (1000 mg/l), Naphthalene (5000 mg/l) and Acetone (500 mg/l) Exposure for 7 days	ASTM D543	Less than 1% weight change; Less than 1% tensile strength change
Hydrogen Sulfide Gas Permeability	ASTM D1434	None Detected
Methane Permeability	**ASTM 1434-82**	**Passed***
Microorganism Resistance	**ASTM D4068-88**	**Passed***
Oil Resistance	**ASTM D543-87**	**Passed***
PCE Diffusion Coefficient	Tested at 6,000 mg/m^3	2.74 x 10^{-14} m^2/sec
Radon Permeability	Tested by US Dept. of Energy	Zero permeability to Radon (222Rn)
TCE Diffusion Coefficient	Tested at 20,000 mg/m^3	8.04 x 10^{-14} m^2/sec

2870 Forbs Avenue, Hoffman Estates, IL 60192
800.527.9948 | http://remediation.cetco.com

LIQUID BOOT® Trowel Grade

TROWEL-APPLIED GAS VAPOR BARRIER

TESTING DATA cont'd.

PHYSICAL PROPERTY	TEST METHOD	RESULT
Accelerated Weathering and Ultraviolet Exposure	ASTM D822	No adverse effect after 500 hours
Air Infiltration	ASTM E283-91	0 cfm/sq. ft.
Bonded Seam Strength Tests	ASTM D6392	Passed*
Coefficient of Friction (with geotextile both sides)	ASTM D5321	0.72
Cold Bend Test	ASTM D146	Passed. Ø cracking at -25°F
Dead Load Seam Strength	City of Los Angeles	Passed*
Electric Volume Resistivity	ASTM D257	1.91 x 1010 ohms-cm
Elongation	ASTM D412	1,332% Ø reinforcement, 90% recovery
Elongation w/8 oz. non-woven geotextile both sides	ASTM D751	100% (same as geotextile tested separately)
Environmental Stress-Cracking	ASTM D1693-78	Passed*
Flame Spread	ASTM E108	Class A with top coat (comparable to UL790)
Freeze-Thaw Resistance (100 Cycles)	ASTM A742	Meets criteria. Ø spalling or disbondment
Heat Aging	ASTM D4068-88	Passed*
Hydrostatic Head Resistance	ASTM D751	Tested to 138 feet or 60 psi
Potable Water Containment	ANSI/NSF 61	NSF Certified for tanks >300,000 gal
Puncture Resistance w/8 oz. non-woven geotextile both sides	ASTM D4833	286 lbs. (travel of probe = 0.756 in)
Sodium Sulfate (2% water solution)	ASTM D543, D412, D1434	Less than 1% weight change
Soil Burial	ASTM E154-88	Passed
Tensile Bond Strength to Concrete	ASTM D413	2,556 lbs/ft^2 uplift force
Tensile Strength	ASTM D412	58 psi without reinforcement
Tensile Strength w/8 oz. non-woven geotextile both sides	ASTM D751	196 psi (same as geotextile tested separately)
Toxicity Test	22 CCR 66696	Passed
Water Penetration Rate	ASTM D2434	<7.75 x 10^{-9} cm/sec
Water Vapor Permeability	ASTM E96	0.24 perms
Water Vapor Transmission	ASTM E96	0.10 grains/h-ft^2

2870 Forbs Avenue, Hoffman Estates, IL 60192
800.527.9948 | http://remediation.cetco.com

LIQUID BOOT® 500

SPRAY-APPLIED GAS VAPOR BARRIER

DESCRIPTION

LIQUID BOOT® 500 is a seamless, spray-applied, water-based membrane containing no VOCs, which provides a barrier against vapor intrusion into structures. LIQUID BOOT® 500 sprayapplication directly to penetrations, footings, grade beams, pile caps and other irregular surfaces, provides for a fully-adhered gas vapor barrier system.

APPLICATIONS

LIQUID BOOT® 500 is used as an underslab gas vapor barrier, used to minimize vapor migration into buildings. LIQUID BOOT® 500 is ideal for methane migration control.

BENEFITS

- Can be installed more economically than LIQUID BOOT®, resulting in greater savings
- LIQUID BOOT® 500 is comprised of the same elements as LIQUID BOOT®
- Unique formulation provides superior protection from methane gas

INSTALLATION

Protect all adjacent areas not to receive gas vapor barrier. Ambient temperature shall be within manufacturer's specifi cations. All plumbing, electrical, mechanical and structural items to be under or passing through the gas vapor barrier shall be secured in their proper positions and appropriately protected prior to membrane application. Gas vapor barrier shall be installed before placement of reinforcing steel. Expansion joints must be fi lled with a conventional waterproof expansion joint material. Surface preparation shall be per manufacturer's specifi cation. A minimum thickness of 60 dry mils, unless specifi ed otherwise.

PACKAGING

LIQUID BOOT® 500 is available in the following packaging options:

- 55 Gallon Drum
- 275 Gallon Tote

EQUIPMENT

- COMPRESSOR: Minimum output of 155–185 cubic feet per minute (CFM)
- PUMPS: For "A" drum, an air-powered piston pump of 4:1 ratio (suggested model: Graco, 4:1 Bulldog). For "B" drum, an air-powered diaphragm pump (0–100 psi)

LIQUID BOOT® 500 spray-application effectively seals penetrations, footings, grade beams and other irregular surfaces that are considered critical vapor intrusion pathways.

- HOSES: For "A" drum, ½" wire hose with a solvent resistant core (for diesel cleaning flush), hose rated for 500 psi minimum. For "B" drum, a 3/8" fl uid hose rated at only 300 psi may be used.
- SPRAY WAND: Only the spray wand sold by CETCO is approved for the application of LIQUID BOOT®.
- SPRAY TIPS: Replacement tips can be purchased separately from CETCO.

LIQUID BOOT® 500

SPRAY-APPLIED GAS VAPOR BARRIER

TESTING DATA

CHEMICAL & PHYSICAL PROPERTIES		
PROPERTY	TEST METHOD	RESULT
Elongation	ASTM D 412	800%
Bonded Seam Strength Tests	ASTM D 6392	Passed
Methane Permeability	ASTM D 1434	None Detected
Chemical Resistance:	Tested at 20,000 ppm	<1% weight change
Micro Organism Resistance (Soil Burial):	ASTM D4068-88	Passed
Oil Resistance Test	ASTM D543-87	Passed
Heat Aging:	ASTM D4068-88	Passed
Dead Load Seam Strength	City of Los Angeles	Passed
Environmental Stress-Cracking	ASTM D1693-78	Passed
Water Vapor Permeability	ASTM E96	0.22 perms
Adhesion to Concrete	ASTM C-836	Passed
Hardness	ASTM C-836	Passed
Hydrostatic Head Resistance (Tested at 20 psi)	ASTM D-751	Passed

North America: 847.851.1800 | 800.527.9948 | www.cetco.com

UPDATED: DECEMBER 2017

FORM: TDS_LIQUID_BOOT_500_AM_EN_201712_V1

LIQUID BOOT®

SPRAY-APPLIED GAS VAPOR BARRIER

DESCRIPTION

LIQUID BOOT® is a seamless, spray-applied, water-based membrane containing no VOCs, which provides a barrier against vapor intrusion into structures. LIQUID BOOT® is installed under slab and on below grade vertical walls as a gas vapor barrier to minimize vapor and nuisance water migration into buildings. LIQUID BOOT® spray-application directly to penetrations, footings, grade beams, pile caps and other irregular surfaces, provides for a fully-adhered gas vapor barrier system.

APPLICATIONS

LIQUID BOOT® is used as an underslab and below-grade vertical wall gas vapor barrier, used to minimize vapor and nuisance water (non-hydrostatic conditions) migration into buildings. LIQUID BOOT® is ideal for methane migration control. LIQUID BOOT® is also NSF® certified for use as a potable water liner in concrete water reservoirs and tanks greater than 300,000 gallons to protect the concrete from water seepage.

BENEFITS

- Spray-application provides excellent sealing of penetrations, eliminating the need for mechanical fastening
- Seamless, monolithic membrane eliminates seaming-related membrane failures
- Unique formulation provides superior protection from methane gases and water vapor
- Fully adhered system reduces risk of gas migration
- Protection from methane gas, VOCs, chlorinated solvents and other contaminates

INSTALLATION

Protect all adjacent areas not to receive gas vapor barrier. Ambient temperature shall be within manufacturer's specifications. All plumbing, electrical, mechanical and structural items to be under or passing through the gas vapor barrier shall be secured in their proper positions and appropriately protected prior to membrane application. Gas vapor barrier shall be installed before placement of rein-forcing steel. Expansion joints must be filled with a conventional waterproof expansion joint material. Surface preparation shall be per manufacturer's specification. A minimum thickness of 60 dry mils, unless specified otherwise.

CONFIRM THICKNESS ON WALLS

LIMITED WARRANTY

CETCO warrants its products to be free of defects. This warranty only applies when the product is applied by Approved Applicators trained by CETCO. As factors which affect the result obtained from this product, including weather, equipment, construction, workmanship and other variables are all beyond CETCO's control, we warrant only that the material herein conforms to our product specifications. Under this warranty we will replace at no charge any product proved to be defective within 12 months of manufacture, provided it has been applied in accordance with our written directions for uses we recommend as suitable for this product. This warranty is in lieu of any and all other warranties expressed or implied (including any implied warranty of merchantability or fitness for a particular use), and the Manufacturer shall have no further liability of any kind including liability for consequential or incidental damages resulting from any defects or any delays caused by replacement or otherwise. This warranty shall become valid only when the product has been paid for in full.

In addition to superior chemical resistance performance, LIQUID BOOT® spray-application effectively seals penetrations, footings, grade beams and other irregular surfaces that are considered critical vapor intrusion pathways.

EQUIPMENT

- COMPRESSOR: Minimum output of 155–185 cubic feet per minute (CFM)
- PUMPS: For "A" drum, an air-powered piston pump of 4:1 ratio (suggested model: Graco, 4:1 Bulldog). For "B" drum, an air-powered diaphragm pump (0–100 psi)
- HOSES: For "A" drum, ½" wire hose with a solvent resistant core (for diesel cleaning flush), hose rated for 500 psi minimum. For "B" drum, a 3/8" fluid hose rated at only 300 psi may be used.
- SPRAY WAND: Only the spray wand sold by CETCO is approved for the application of LIQUID BOOT®.
- SPRAY TIPS: Replacement tips can be purchased separately from CETCO.

PACKAGING

LIQUID BOOT® is available in the following packaging options:

- 55 Gallon Drum
- 275 Gallon Tote

LIQUID BOOT®

SPRAY-APPLIED GAS VAPOR BARRIER

TESTING DATA

CHEMICAL & PHYSICAL PROPERTIES		
CHEMICAL PROPERTY	TEST METHOD	RESULT
Acid Exposure (10% H_2SO_4 for 90 days)	ASTM D543	Less than 1% weight change
Benzene Diffusion Test	Tested at 43,000 ppm	2.90 x 10^{-11} m^2/day
Chemical Resistance: VOCs, BTEXs (tested at 20,000 ppm)	ASTM D543	Less than 1% weight change
Chromate Exposure (10% Chromium6+ salt for 31 days)	ASTM E96	Less than 1% weight change
Diesel (1000 mg/l), Ethylbenzene (1000 mg/l), Naphthalene (5000 mg/l) and Acetone (500 mg/l) Exposure for 7 days	ASTM D543	Less than 1% weight change; Less than 1% tensile strength change
Hydrogen Sulfide Gas Permeability	ASTM D1434	None Detected
Methane Permeability	**ASTM 1434-82**	**Passed***
Microorganism Resistance	**ASTM D4068-88**	**Passed***
Oil Resistance	**ASTM D543-87**	**Passed***
PCE Diffusion Coefficient	Tested at 120 mg/L	1.32 x 10^{-13} m^2/sec
Radon Permeability	Tested by US Dept. of Energy	Zero permeability to Radon (222Rn)
TCE Diffusion Coefficient	Tested at 524 mg/L	9.07 x 10^{-13} m^2/sec

LIQUID BOOT®

SPRAY-APPLIED GAS VAPOR BARRIER

TESTING DATA

CHEMICAL & PHYSICAL PROPERTIES		
PHYSICAL PROPERTY	TEST METHOD	RESULT
Accelerated Weathering and Ultraviolet Exposure	ASTM D822	No adverse effect after 500 hours
Air Infiltration	ASTM E283-91	0 cfm/sq. ft.
Bonded Seam Strength Tests	ASTM D6392	Passed*
Coefficient of Friction (with geotextile both sides)	ASTM D5321	0.72
Cold Bend Test	ASTM D146	Passed. Ø cracking at –25°F
Dead Load Seam Strength	City of Los Angeles	Passed*
Electric Volume Resistivity	ASTM D257	1.91 x 1010 ohms-cm
Elongation	ASTM D412	1,332% Ø reinforcement, 90% recovery
Elongation w/8 oz. non-woven geotextile both sides	ASTM D751	100% (same as geotextile tested separately)
Environmental Stress-Cracking	ASTM D1693-78	Passed*
Flame Spread	ASTM E108	Class A with top coat (comparable to UL790)
Freeze-Thaw Resistance (100 Cycles)	ASTM A742	Meets criteria. Ø spalling or disbondment
Heat Aging	ASTM D4068-88	Passed*
Hydrostatic Head Resistance	ASTM D751	Tested to 138 feet or 60 psi
Potable Water Containment	ANSI/NSF 61	NSF Certified for tanks >300,000 gal
Puncture Resistance w/8 oz. non-woven geotextile both sides	ASTM D4833	286 lbs. (travel of probe = 0.756 in)
Sodium Sulfate (2% water solution)	ASTM D543, D412, D1434	Less than 1% weight change
Soil Burial	ASTM E154-88	Passed
Tensile Bond Strength to Concrete	ASTM D413	2,556 lbs/ft² uplift force
Tensile Strength	ASTM D412	58 psi without reinforcement
Tensile Strength w/8 oz. non-woven geotextile both sides	ASTM D751	196 psi (same as geotextile tested separately)
Toxicity Test	22 CCR 66696	Passed
Water Penetration Rate	ASTM D2434	$<7.75 \times 10^{-9}$ cm/sec
Water Vapor Permeance	ASTM E96	0.069 perms

North America: 847.851.1800 | 800.527.9948 | www.cetco.com

UPDATED: DECEMBER 2017

FORM: TDS_LIQUID_BOOT_AM_EN_201712_V3

ULTRASHIELD™ G-1000

NON-WOVEN GEOTEXTILE FABRIC

DESCRIPTION

ULTRASHIELD™ G-1000 is a polypropylene, staple fiber, non-woven geotextile. The fibers are needled-punched, forming a stable network that retains dimensional stability relative to each other. The geotextile is resistant to ultraviolet degradation and biological and chemical environments found in soils. Manufacturing Quality Control tests have been performed and are accredited by the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP).

APPLICATION

ULTRASHIELD™ G-1000 is designed for use as a underslab adhesion protection course specially designed and required for underslab LIQUID BOOT® applications where the membrane must remain attached to the underslab of the building. This is to ensure the membrane remains in place despite soil settlement, which is common when building is on a landfill.

BENEFITS

ULTRASHIELD™ G-1000 is installed directly over the finished LIQUID BOOT® vapor intrusion barrier, providing superior protection from other trades.

PACKAGING

- 15 ft. x 180 ft. (4.5 m x 55 m) Rolls

ULTRASHIELD™ G-1000 is a needle-punched, non-woven geotextile with superior tensile strength and puncture resistance.

TESTING DATA

PHYSICAL PROPERTIES			
PROPERTY	TEST METHOD	RESULT (ENGLISH)	RESULT (METRIC)
Tensile Bond Strength to Concrete[3]	ASTM C 297-94	7 psi	
Mass/Unit Area	ASTM D 5261	10.0 oz/yd²	339 g/m²
Thickness	ASTM D 5199	105 mils	2.7 mm
Tensile Strength	ASTM D 4632	270 lbs.	1202 N
Elongation	ASTM D 4632	50%	50%
CBR Puncture Strength	ASTM D6241	725 lbs.	3226 N
Trapezoid Tear	ASTM D 4533	105 lbs.	467 N
UV Resistance	ASTM D 4355	70%	70%
A.O.S.	ASTM D 4751	100 U.S. Sieve	0.150 mm
Permittivity	ASTM D 4491	1.2 sec^{-1}	1.2 sec^{-1}
Permeability	ASTM D 4491	0.30 cm/sec	0.30 cm/sec
Water Flow Rate	ASTM D 4491	85 gal/min//ft²	3463 l/min/m²

NOTES:

1. The property values listed above are effective 04/2011 and are subject to change without notice.
2. All values shown are in weaker principal direction and are Minimum average roll values (MARV), except for AOS, which is a Maximum average roll value.
3. Historical value, based on past testing.

North America: 847.851.1800 | 800.527.9948 | www.cetco.com

UPDATED: MAY 2017

FORM: TDS_ULTRASHIELD_G-1000_AM_EN_201705_V2

2) SPECIFICATIONS

***LIQUID BOOT® 500 PLUS* - Brownfield Membrane and Vent Systems Specifications**

Se~ io~ 0! ~"~~#^ $ %&' r~(~0^~)S*+erse, es - .. revio*s Versio~s/
Versio~ 5~^

T(is 5*i, e s+e~i7~' io~ (' s 6ee~ +re+' re, '~~or, i~5 o (e +ri~~i+.es es '6.is(e, i~ (e &'~*'. o7 r'~i~e +*6.is(e, 61 (e ¸o~s r*~ io~ S+e~i7~' io~ l~s i* e'~, 0'1 ('ve~('~5e, ~T(ere7ore, +.e' se~o~7r0 (' (is s+e~i7~' io~ is s i.. ~*rre~ '~, ('s~o 6ee~ s*+erse, e, 61~(e~9i~5' ;;;~e~o~~o0 or 61~'..i~5^2E0025~!2$$AE7or (e 0os re~e~ versio~~

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

-~ Ge~er'.'~, S*++.e0 e~'r1¸o~, i io~s'~, Divisio~^2Ge~er'.3e4*ire0 e~s'++.ies o (is se~ io~~ rovi, e 5's v'+or 6'rrier's i~, i~'e, , s+e~i7e, '~, re4*ire, ~

1.02 WORK SUMMARY

-~ 8 or9 i~ (is se~ io~ 2+ri~~i+'.i e0 s i~~.*, e:
^~ G's v'+or 6'rrier +rovi, i~5 +ro e~ io~ 7o0 (e 7o..o; i~5 5'ses: &e('~e, o(er<1, ro~'r6o~ v'+ors i~ ~o~~e~ r' io~s *+ o~0,000++0, <1, ro5e~ S*.7i, e, 3', o~~
~~ Soi. v'+or e=r'~ io~ +i+i~5'~, .o; +ro7i.e ve~ i~5 s1s e0 6e~e' ((e 5's v'+or 0 e0 6r'~e~

1.03 RELATED REQUIREMENTS:

-~ O(er s+e~i7~' io~ Se~ io~s; (i~(, ire~.1 re.' e o (e; or9 o7 (is se~ io~ i~~.*, e, 6* 're~o .i0 i e, o, (e 7o..o; i~5:
^~ Divisio~ 0# Se~ io~ >¸'s 2i~2.'~e¸o~~re e>7or~o~~re e s.' 6s~
~~ Divisio~ 0! Se~ io~ >Se.72-, (eri~5 S(ee 8' er+roo7i~5~?
#~ Divisio~ 0! Se~ io~ >¸o., @*i, 2-++.ie, 8' er+roo7i~5~?
A~ Divisio~ 0! Se~ io~ >¸r1s'..i~e 8' er+roo7i~5~?
5~ Divisio~ ~" Se~ io~ B¸o~, *i'~, o(er°.e~ri~'. e~e r' io~s~?
"~ Divisio~ #^ Se~ io~ B*'r(; or9, °=~'v' io~'~, @.., S(ori~5~?
!~ Divisio~ ## Se~ io~ BGeo~o0 +osi e @@*~, ' io~ Dr' i~'5e~?

1.04 SYSTEM DESCRIPTION

-~ rovi, e 5' sQ' +or 6' rrier s1s e0 ; i(+re7 6ri~'e, ~o0 +osi e ve~ i~5 s1s e0 o 0 i i5' e (e +'ss' 5e o75' s or v'+or'~, i~s'..; i(o* , e7e~ s, , '0' 5e or 7 i.*re~ G's v'+or 6'rrier s('..6e (i5(+er7or0'~~e VI2~0; i(°VO< ~ore e~(~o.o51, Li4*i, Boo 500, U.r' S(ie., +ro e~ io~ ~o*rse'~, '++.i~'6.e'~~essor1 +ro, *~s

1.05 SUBMITTALS

-~ Ge~er'.: re+'re'~, s*60 i s+e~i7e, s*60 i'.s i~'~~or, '~~e; i(>¸o~, i io~s o7 (e¸o~r'~>'~, Divisio~^S*60 i'.s Se~ io~s~

B~ ro, *~ D''': S*60 i 0'~*7~*rer3 +ro, *~ ,'', ; i(~o0 +.e e 5e~er'.'~, s+e~i7~ i~s'..' io~ i~s r*~ io~s, re~o0 0 e~, ' io~s, '~, .i0 i' io~s~

¸~ ro, *~ S'0 +.es: S*60 i re+rese~' ive s'0 +.es o7 (e 7o..o; i~5 7or'++rov'.:
^~ GeoVe~ %.o; +ro7i.e v'+or e=r'~ io~ s1s e0~
~~ VI2~0 %(i5(, e~si 1 +o.1e (1.e~e)0 LLD °/'~, e (1.e~e vi~1.'.~o(o.)° VO</~o0 +osi e 0 e0 6r'~e~
#~ Li4*i, Boo De'i.i~5 @6ri~ %e (1.e~e vi~1.'.~o(o.)° VO</'~, +o.1+ro+1.e~e~o0 +osi e 0 e0 6r'~e~
A~ Li4*i, Boo 5002's+('..' e=s+r'1'++.ie, 5's v'+or 6'rrier 0 e0 6r'~e~
5~ U.r' S(ie., G2~000 %+o.1+ro+1.e~e~ee, .e +*~~(e, +ro e~ io~ ~o*rse~

D~ ¸o~r'~or ¸er i7~' e: - i0 e o7 6i, , s*60 i ; ri e~ ~er i7~' io~ (' i~s'..er ('s ~*rre~ - ++rove, - ++.i~'or s'*s ; i(5's v'+or 0 e0 6r'~e 0'~*7~*rer~

1.06 QUALITY ASSURANCE

-~ &'~*7~*rer Q*'.i7~' io~s: G's v'+or 0 e0 6r'~es'~, '..'~~essor1 +ro, *~s s('..6e +rovi, e, 61' si~5.e 0'~*7~*rer ; i(' 0 i~i0 *0 o7 ~5 1e' rs e=+erie~~e i~ (e, ire~ +ro, *~ io~'~, s'.es o75's v'+or s1s e0 s~&'~*7~*rer s('..6e'++rovi~5'~'~~e+'6.e i~s'..erC++.i~' or '~, re~o0 0 e~, i~5'++ro+ri' e i~s'..' io~ 0 e(o, s~

B˘ l˜s ' ..er Q*' .i7' ' io˜s: - 7r0 (' is r' i˜e, ' ˜, ' ++rove, 61 (e 5' s v' +or 6' rrier s1s e0 0 ' ˜ * 7 ˜ * rer 7or i˜s ' ..' io˜ o7 (e 5' s v' +or 6' rrier s1s e0 re4* ire, 7or (is rofe˜ ˜ T(e i˜s ' ..i˜5 ˜o0 +' ˜1 s(o*., (' ve ' .e' s (ree)#/ 1e' rs e=+erie˜ ˜e i˜ ; or9 o7 (e 1+e re4* ire, 61 (is se˜ io˜, ; (o˜' ˜ ˜o0 +.1 ; i (0 ' ˜ * 7 ˜ * rer3 ; ' rr' ˜ 1 re4* ire0 e˜ s˜

¸ ˘ re2˜s ' ..' io˜ ¸ o˜7ere˜ ˜e: - +re2˜s ' ..' io˜ ˜o˜7ere˜ ˜e s(' .. 6e (e., ' (e si e +rior o ˜o0 0 e˜ ˜e0 e˜ o7 7e., i˜s ' ..' io˜ o es ' 6.is(+ro˜e, * res o 0 ' i˜ ' i˜ re4* ire, ; or9i˜5 ˜o˜, i io˜s ' ˜, o ˜oor, i˜ ' e (is ; or9 ; i (re.' e, ' ˜, ', F˜e˜ ; or9˘ Veri7l (' 7i˜ ' . 5' s v' +or 6' rrier ˜o0 +o˜e˘ s ' ˜, s1s e0 , e ' i.s ˜o0 +.1 ; i (5' s v' +or 6' rrier 0 ' ˜ * 7 ˜ * rer3 ˜ * rre˘ i˜s ' ..' io˜ re4* ire0 e˜ s ' ˜, re˜o0 0 e˜, ' io˜s˘ re2˜o˜ 0 ee i˜5 ' e˜, ees s(o*., i˜˜.*, e re+rese˜ ' ives 7or (e o; ˜er, ' r˜(i e˜, i˜s+e˜ io˜ 7ir0, 5e˜er' . ˜o˜ r' ˜ or, 5' s v' +or i˜s ' ..erC++.i˜' or, ˜o˜˜re e ˜o˜ r' ˜ or, e=˜' v' i˜5(5 ' 97i..˜o˜ r' ˜ or, ' ˜, 0 e˜(' ˜i˜' . ' ˜, e.e˜ ri˜' . ˜o˜ r' ˜ ors i7; or9 +e˜e r' es (e 5' s v' +or 0 e0 6r' ˜e˘

D˘ l˜, e+e˜, e˘ l˜s+e˜ io˜: O; ˜er s(' .. 0 ' 9e ' .. ' rr' ˜ 5e0 e˘ s ' ˜, +' 10 e˘ s 7or ' ˜ i˜, e+e˜, e˘ i˜s+e˜ io˜ servi˜e o 0 o˜i or 5' s v' +or 0 e0 6r' ˜e 0 ' eri' . i˜s ' ..' io˜ ˜o0 +.i' ˜˜e ; i ((e +rofe˜ ˜o˜ r' ˜ , o˜*0 e˘ s ' ˜, 0 ' ˜ * 7 ˜ * rer3 +*6.is(e, .i er' * re ' ˜, si e s+e˜ i7i˜, e ' i.s˘ l˜, e+e˜, e˘ l˜s+e˜ io˜ @r0 s(' .. 6e ' ˜ ' ++rove, ˜o0 +' ˜1 +' r i˜i+' i˜5 ; i ((e 5' s v' +or 0 e0 6r' ˜e 0 ' ˜ * 7 ˜ * rer3 ¸ er i7e, l˜s+e˜ io˜ ro5r' 0 ˜l˜s+e˜ io˜ servi˜e s(' .. +ro, * ˜e re+or s ' ˜, , i5i ' . +(o o5r' +(s , o˜*0 e˘ i˜5 e' ˜(i˜s+e˜ io˜ ˜3e+or s s(' .. 6e 0 ' , e ' v' i.' 6.e o (e ¸ o˜ r' ˜ or, 5' s v' +or 0 e0 6r' ˜e i˜s ' ..er, 5' s v' +or 0 e0 6r' ˜e 0 ' eri' . 0 ' ˜ * 7 ˜ * rer, ' ˜, - r˜(i e˜ ˜ l˜s+e˜ io˜s s(o*., i˜˜.*, e s*6s r' e e=' 0 i˜' io˜, 6e5i˜ ˜i˜5 o7 5' s v' +or 0 e0 6r' ˜e i˜s ' ..' io˜, +erio, i˜ i˜ erv' .s, ' ˜, 7i˜' . i˜s+e˜ io˜ +rior o ˜o˜˜re e or 6' ˜97i.. +.' ˜e0 e˘ ' 5' i˜s (e 5' s v' +or 6' rrier˘

1.07 DELIVERY, STORAGE AND HANDLING

- ˘ De.iver1 ' ˜, <' ˜, .i˜5: De.iver 0 ' eri' .s i˜ 7 ˜ or1 se' .e, ' ˜, .' 6e.e, +' ˜9' 5i˜5˘ Se4* e˘ ˜e, e.iveries o ' voi, , e.' 1s, ; (i.e 0 i˜i0 iH˜5 o˜2si e s or' 5e˘ <' ˜, .e ' ˜, s ore 7o..o; i˜5 0 ' ˜ * 7 ˜ * rer3 i˜s r* ˜ io˜s, re˜o0 0 e˘, ' io˜s ' ˜, 0 ' eri' . s' 7e 1 , ' ' s(ee s˘ ro e˜ 7ro0 ˜o˜s r* ˜ io˜ o+er' io˜ re.' e, , ' 0 ' 5e, ' s ; e.. ' s, , ' 0 ' 5e 7ro0 ; e' (er, e=˜essive e0 +er' * res ' ˜, +ro.o˜5e, s* ˜.i5(˜3e0 ove , ' 0 ' 5e, 0 ' eri' . 7ro0 si e ' ˜, , is+ose o7i˜ ' ˜˜or, ' ˜˜e ; i (' ++.i˜' 6.e re5*.' io˜s˘

B˘ Do˜o ' ..o; 0 ' eri' . o 7reeHe i˜ ˜o˜ ' i˜ers

¸ ˘ 3e0 ove ' ˜, re+.' ˜e .i4* i, 0 ' eri' .s (' ˜' ˜˜o 6e ' ++.ie, ; i (i˜ (eir s ' e, s(e.7.i7e˘

1.08 JOB CONDITIONS

- ˘ °˜viro˜0 e˘ ' . Li0 i ' io˜s: - ++.1 5' s v' +or 6' rrier s1s e0 ; i (i˜ (e r' ˜5e o7 ' 0 6ie˘ ' ˜, s* 6s r' e e0 +er' * res re˜o0 0 e˜, e, 61 0 ' ˜ * 7 ˜ * rer˘ Do˜o ' ++.1 5' s v' +or 6' rrier s1s e0 o ' , ' 0 + or ; e s* 6s r' e, ; (e˘ re.' ive (* 0 i, i 1 e=˜ee, s E5 +er˜e˘ , or ; (e˘ e0 +er' * res ' re .ess (' ˜ 5 , e5 @)# , e5 ¸ / ' 6ove , e; +oi˜ ˜

B˘ Do˜o ' ++.1 5' s v' +or 6' rrier s1s e0 i˜ s˜o; , r' i˜ , 7o5 or 0 is , or ; (e˘ s* ˜(; e' (er˜o˜, i io˜s ' re i0 0 i˜ e˘ , * ri˜5 ' ++.i˜' io˜ ' ˜, ˜* ri˜5 +erio, ˘

¸ ˘ &' i˜ ' i˜ ', e4* ' e ve˘ i.' io˜ , * ri˜5 ' ++.i˜' io˜ ' ˜, ˜* ri˜5 o75' s v' +or 6' rrier s1s e0 0 ' eri' .s˘

D˘ - 0 6ie˘ e0 +er' * re s(' .. 6e ; i (i˜ 0 ' ˜ * 7 ˜ * rer3 s+e˜ i7i˜' io˜s˘ l7; i˜ er ˜o˜, i io˜s ' ++.1, ; e re˜o0 0 e˘, (e * se o7 s+' ˜e (e' ers ' ˜, ˘e˜ess' r1 ˜over)i˜e˘ vis4* ee˘ / o 6ri˜5 (e ' 0 6ie˘ e0 +er' * re o ' .e' s l A5J@* ˘ i. (e +ro e˜ io˜ ˜o* rse ' ˜, s r* ˜ * r' . s.' 6 re6' r or ' 0 *, s.' 6 +ro e˜ io˜ ˜o* rse (' s 6ee˘ +.' ˜e, ˘

° ˘ S* r7 ˜e +re+' r' io˜ s(' .. 6e +er 0 ' ˜ * 7 ˜ * rer3 s+e˜ i7i˜' io˜ ˘

1.09 COORDINATION

- ˘ ¸ oor, i˜' e ' ++.i˜' io˜ o75' s v' +or 6' rrier ; i (i˜ s ' ..' io˜ o7o (er ˜o˘ s r* ˜ io˘ ˘

  ^ ˘ osi ive.1 se˜* re +.* 0 6i˜ 5, e.e˜ ri˜' ., 0 e˜(' ˜i˜' ., ' ˜, s r* ˜ * r' . i e0 s o 6e * ˘, er or +' ssi˜ 5 (ro* 5((e 5' s v' +or 6' rrier i˜ (eir +ro+er +osi io˘ s ' ˜, ' ++ro+ri' e.1 +ro e˜ e, +rior o 0 e0 6r' ˘e ' ++.i˜' io˘ ˘

  ˝ ˘ l˜s ' .. 5' s v' +or 6' rrier 6e7ore +.' ˜e0 e˘ o7rei˜ 7or˜i˜5 s ee.˘ 8 (e˘ ˘o +ossi6.e, 0 ' s9 ' .. e=+ose, rei˜ 7or˜i˜5 s ee. +rior o 0 e0 6r' ˘e ' ++.i˜' io˘ ˘

1.10 PRODUCT WARRANTY

- ˘ U+o˘ , e.iver1 ' ˜, ' ˜˜e+ ' ˜˜e 61 (e O; ˘er o7 0 ' eri' . s+e˜ i7e, 61 (is Se˜ io˘, (e 0 ' eri' .s 0 ' ˜ * 7 ˜ * rer ; i.. +rovi, e ' ; ri e˘ o˘e 1e' r s ' ˜, ' r, 0 ' eri' . i˜, i˜' i˜5 (e 0 ' eri' . ˜o˘ 7or0 s o i s +ro, * ˜ s+e˜ i7i˜' io˜s ' ˜, is 7ee o7 0 ' eri' . , e7e˜ s˘ @˜ ors ' 7e˜ i˜5 (e res* . s o6 ' i˜e, 7ro0 * si˜5 (is +ro, * ˜ i˜˜.*, i˜5 ; e' (er, e4* i+0 e˘ * i.iHe, , ˜o˘ s r* ˜ io˘, ; or90 ' ˜s(i+ ' ˜, o (er v' ri' 6.es ' re ' .. 6e1o˘, (e 0 ' ˜ * 7 ˜ * rer3 ˜o˘ ro.˘

  U˘, er (is +ro, * ˜ ; ' rr' ˘ 1, 0 ' ˜ * 7 ˜ * rer ; i.. +rovi, e re+.' ˜e0 e˘ 0 ' eri' ., ' ˘o ˜(' r5e, 7or ' ˜1 +ro, * ˜ +rove˘ ˜o o 0 ee (e 0 ' eri' . +ro+er ies .is e, i˘ (e +* 6.is(e, +ro, * ˜ .i er' * re T(is ; ' rr' ˘ 1 is i˘ .ie* o7 ' ˜1 ' ˜, ' .. o (er ; ' rr' ˘ ies e=+resse, or i0 +.ie,)i˜˜.*, i˜5 ' ˜1

i0 +.ie, ; ' rr' ˘ 1 o70 er˜ (' ˘ ' 6i.i 1 or 7i ˘ ess 7or ' +' r i˜ *.' r * se/, ' ˘, 0 ' ˘ *7 ˜ * rer s(' .. (' ve ˘ o 7*r (er .i' 6i.i 1 o7' ˘ 1 9i˜ , i˜ ˜.*, i˜ 5 .i' 6i.i 1 7or ˜ o˘ se4* e˘ i' . or i˜ ˜i, e˘ ' . , ' 0 ' 5es res* . i˜ 5 7ro0 ' ˘ 1 , e7e˜ s or , e.' 1s ˜ ' * se, 61 re+.' ˜e0 e˘ or o (er; ise˘

PART 2 - PRODUCTS

2.01 MANUFACTURER

- ˘ rovi, e Li4* i, Boo 500 .* s 0 e0 6r' ˘ es, ve˘ i˜ 5 s1s e0 ' ˘, ' ++.i˜ ' 6.e ' ˜˜essories ' s 0 ' ˘ *7 ˜ * re, 61 ˛ o..oi, °˘ viro˘ 0 e˘ ' . Te˜ (˘ o.o5ies ˛ o0 +' ˘ 1)˛ ° T˛ O/, ˝ E! 0 @r6s - ve, < o7 0 ' ˘ ° s ' es, IL " 0ˆ $˝ ,, US- ˘ (o˘ e:)EA! / E5ˆ 2 E00K@ =:)EA! / E5ˆ 2 E$$K8 e62si e:˘ (+:Œe0 e, i' io˘ ˜˜ e ˜ o˜˜ o0 C

2.02 QUALIFICATIONS

- ˘ T(e 5' s v' +or 6' rrier 0 ' ˘ *7 ˜ * rer 0 * s (' ve +ro, * ˜ e, ' .e' s ˝˝ 0 i..io˘ s4* ' re 7ee)˝ 0 i..io˘ s4* ' re 0 e ers/ o75' s v' +or 6' rrier, ; i (' .e' s ˝˝ 0 i..io˘ s4* ' re 7ee)˝ ,000,000 s4* ' re 0 e ers/ i˜ s ' ..e, ˘

2.03 MATERIALS

- ˘ VI2' 0 is ' seve˘ 2' 1er ˜ o2e= r*, e, 0 e0 6r' ˘ e 0 ' , e 7ro0 e (1.e˘ e vi˜ 1. ' .˜ o(o.)° VO</ ' ˘, +o.1e (1.e˘ e o +rovi, e s re˘ 5 (' s ; e.. ' s resis ' ˘ ˜ e o VO˛ v' +or r' ˘ s0 issio˘ ˘ VI2' 0 0 e0 6r' ˘ e is ' ˘ *˘, er2s.' 6 6' rrier ; (e˘ * se, i˜ ˜ o˘ I* ˜˜ io˘ ; i (Li4* i, Boo ; i.. i˜ (i6i vo.' i.e or5' ˘ i˜ ˜ o0 +o* ˘˘, v' +or 0 i5r' io˘ (ro* 5((e ˜ o˘ ˜ re e˘

VI2' 0 5eo0 e0 6r' ˘ e 6' rrier +(1si˜ ' . +ro+er ies:

3 O ° 3 TI° S	T° ST & ° T< OD	V- LU°
Thi˜ 9˜ ess, ˘ o0 i˜ ' .	- STM D5ˆ $$	0˝5ˆ 0 0
8 ei5(	- STM D5˝ " ˆ	A$E 5Œ ˝
Te˘ si.e S re˘ 5 (	- STM ° ˆ 5A	˝ 5E L C0)5E .6Œ /
& e (' ˘ e er0 e' 6i.i 1	- STM D ˆ A#A	M5 = ˆ 0 2 0 0 ˝ Ç N 0
Be˘ He˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	A˜5 = ˆ 0 2 5 0 ˝ G
° (1.6e˘ He˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	A˜0 = ˆ 0 2 5 0 ˝ G
0 O+2P1.e˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	#˜! = ˆ 0 2 5 0 ˝ G
o2P1.e˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	#˜! = ˆ 0 2 5 0 ˝ G
To.* e˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	A˜˝ = ˆ 0 2 5 0 ˝ G
8 ' er V' +or Tr' ˘ s0 issio˘	- STM ° ˆ 5A O ° $"	0˝00˝ 5 US er0 s

B˘ @* i, ' ++.ie, 5' s v' +or 6' rrier s1s e0 2Li4* i, Boo 500 .* sK' si˜ 5.e ˜ o* rse, (i5(6* i., s, +o.10 er 0 o, i7e, ' s+(' . i˜ e0 * .sio˘ ˘ 8 ' er 6or˘ e ' ˘, s+r' 1 ' ++.ie, ' ' 0 6ie˘ e0 +er' * res˘ - 0 i˜ i0 * 0 (i˜ 9˜ ess o7A0 , r1 0 i.s o7Li4* i, Boo 500 o˘ o VI2' 0 Geo0 e0 6r' ˘ e, * ˘ .ess s+e˜ i7e, o (er; ise ' s so0 e ˜ i ies ' ˘, e˘ 5i˜ eers 0 ' 1 re4* ire ' (i˜ 9er 0 e0 6r' ˘ e˘ L o˘ 2o=i˜ ' ˘, o, or.ess˘ Li4* i, Boo Tro; e. Gr' , e (' s si0 i.' r +ro+er ies ; i (5re' er vis˜ osi 1 ' ˘, is ro; e.' ++.ie, ˘ & ' ˘ *7 ˜ * re, 61 ˛ ° T˛ O i˜ ˛ ' r ersvi..e, G-)! ! 0/ #E! 2 ! 00˘

LIQUID BOOT 500 .* s 5' s v' +or 6' rrier +(1si˜ ' . +ro+er ies:

GAS VAPOR MEMBRANE	TEST METHOD	VALUE
Bo˜ , e, Se' 0 S re˘ 5 (Tes s	- STM D" #$˝	' sse, N
& i˜ ro Or5' ˘ is0 3 esis ' ˘ ˜ e)Soi. B* ri' ./2' ver' 5e ; ei5(˜ (' ˘ 5e,	- STM DA0" E2EE	' sse, N
& e (' ˘ e er0 e' 6i.i 1	- STM D ˆ A#A2E˝	' sse, N
Oi. 3 esis ' ˘ ˜ e Tes 2' ver' 5e ; ei5(˜ (' ˘ 5e, ' ver' 5e e˘ si.e s re˘ 5 (˜ (' ˘ 5e, ' ver' 5e e˘ si.e s ress ˜ (' ˘ 5e, ' ver' 5e e.o˜ 5' io˘ ˜ (' ˘ 5e, 6o˜ , e, se' 0 s, 0 e (' ˘ e +er0 e' 6i.i 1	- STM D5A#2E!	' sse, N
<e' - 5i˜ 52' ver' 5e e˘ si.e s re˘ 5 (˜ (' ˘ 5e, ' ver' 5e e˘ si.e s ress ˜ (' ˘ 5e, ' ver' 5e e.o˜ 5' io˘ ˜ (' ˘ 5e, 6o˜ , e, se' 0 s	- STM DA0" E2EE	' sse, N
De' , Lo' , Se' 0 S re˘ 5 (	˛ i 1 o7Los - ˘ 5e.es	' sse, N
° ˘ viro˘ 0 e˘ ' . S ress2˛ r' ˜ 9i˜ 5	- STM D ˆ " $#2 E	' sse, N
Be˘ He˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	A˜5 = ˆ 0 2 5 0 ˝ G
° (1.6e˘ He˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	A˜0 = ˆ 0 2 5 0 ˝ G
0 O+2P1.e˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	#˜! = ˆ 0 2 5 0 ˝ G
o2P1.e˘ e Di7i* ssio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	#˜! = ˆ 0 2 5 0 ˝ G
To.* e˘ e Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	A˜˝ = ˆ 0 2 5 0 ˝ G
3 ' , o˘ Di7i* sio˘ ˛ oe7i˜ ie˘	° - & e (o, E˝ " 0	1.1 = ˆ 0 2 # 0 ˝ G

¸ ° Di7* sio˘ ¸ oe7ñ˜ ie˘	Tes e, ' ˆ˝0 0 5Œ	˝˘0 = ˆ 0²⁵ 0 ˙G
TC° Di7* sio˘ ¸ oe7ñ˜ ie˘	Tes e, ' 5˝A 0 5Œ	$˜˜ = ˆ 0²⁵ 0 ˙G
8 ' er V' +or Tr' ˘s0 issio˘	- STM ° $" ' ˘, °ˆ5A	0˜005ˆ US +er0 s
*˘˘ *re 3 esis ' ˘˜e	- STM °ˆ5A	ˆA$ .6s˘
Te˘ si.e S re˘ 5 (	- STM DEE˝	! ˆ .6s˜C˜
°.o˘ 5' io˘	- STM DEE˝	EA0Q
<1, ros ' i˜ 3 esis ' ˘˜e	- STM D! 5ˆ	ˆˆ# +si

NLIQUID BOOT 500 .*s - 5e˘˜1 - ++rov' ., ¸ i 1 o7Los - ˘5e.es 3 ese' r˜ (3 e+or R˝AE" 02- ++rove, 7or Be.o; 2Gr' , e 8 ' er+roo7˜ 5 ' ˘, G' s B' rrier"

¸ ˘ - ¸ ¸ ° SSO3 S G- S V- O3 B- 3 3 I° 3 3 ODU¸ TS: - .. ' ˜˜essor1 5' s v' +or 6' rrier 0 ' eri' .s s(' .. 6e +rovi, e, 61 (e 0 ' ˘*7˜ *rer or s(' .. (' ve 0 ' ˘*7˜ *rer3 ; ri e˘ ' ++rov' . 7or s*6s i * io˘˘

ˆ˘ GeoVe˘ %.o; +ro7.e v' +or e= r' ˜ io˘ s1s e0 ˘
i˘ Li4*i, Boo GeoVe˘ e˘, o* .e ˘
ii˘ Li4*i, Boo GeoVe˘ i˘ erior @o i˜ 5 S.eeves˘
iii˘ Li4*i, Boo GeoVe˘ @6ri˜ 3 ei˘ 7or˜ e, T' +e˘
˝˘ Li4*i, Boo De ' i.i˜ 5 @6ri˜ %e (1.e˘ e vi˘ 1. ' .˘o(o.)° VO</ ' ˘, +o.1+ro+1.e˘ e ˜o0 +osi e 0 e0 6r' ˘ e˘
#˘ O+ io˘ ' . 2ver i˜ ' .' ++.i˜ ' io˘ s, Li4*i, Boo B' se@6ri˜ T2A0 or T2' 0 % (er0 ' ..1 6o˘ , e, ˘o˘ ; ove˘ +o.1+ro+1.e˘ e 7 6ri˜
A˘ U. r' S(ie., %+o.1+ro+1.e˘ e ˘ee, .e +*˘˘(e, +ro e˘ io˘ 0 ' ˘
5˘ - , (esive s1s e0 7or Li4*i, Boo U. r' S(ie., ' ˘, Li4*i, Boo U. r' Dr' i˜ : Use Li4*i, Boo U. r' Gri+˘
"˘ <' r, ˜' s ¸ 3 T ˆ" 0˝ T' +e #?; i, e %˜ overi˜ 5 ˜o., f6i˜ s, ˜r' ˜9s 7or0 ie (o.es, e ˜˘

PART 3 - EXECUTION

3.01 EXAMINATION

- ˘ T(e i˜ s ' ..er, ; i ((e O; ˘ er3 l˜ , e+e˘ , e˘ l˜ s+e˜ or +rese˘ , s(' .. e=' 0 i˜ e ˜o˘ , i io˘ s o7 s*6s r' es ' ˘, o (er ˜o˘ , i io˘ s *˘, er ; (i˜ ((is se˜ io˘ ; or9 is o 6e +er7or0 e, ' ˘, ˘o i7l (e ˜o˘ r' ˜ or, i˜ ; ri i˜ 5, o7˜ ir˜ *0 s ' ˘˜es , e ri0 e˘ ' . o (e +ro+er ˜o0 +.e io˘ o7 (e ; or9˜ Do ˘o +ro˜ ee, ; i (; or9 *˘ i. *˘ s' is7 ˜ or1 ˜o˘ , i io˘ s ' re ˜orre˜ e, ' ˘, ' re ' ˜˜e+ ' 6.e 7or ˜o0 +.i' ˘˜e ; i (0 ' ˘*7˜ *rer re4*ire0 e˘ s˘ Ge˘ er' . s*6s r' e ˜o˘ , i io˘ s ' ˜˜e+ ' 6.e 7or (e 5' s v' +or 6' rrier i˜ s ' ..' io˘ ' re .is e, 6e.o; ˘@r ˜o˘ , i io˘ s ˘o ˜overe, i˜ (is Se˜ io˘ , ˜o˘ ' ˜ (e 5' s v' +or 6' rrier 0 ' ˘*7˜ *rer 7or 5*i, ' ˘˜e˘

B˘ SOIL SUBST3 - T° S:

ENSURE CRUSHED STONE USED FOR SUB BASE IS 1/4" OR LESS

ˆ˘ & ois *re ˜o˘ , i io˘ ' ˘, ˜o0 +' ˜ s* 625r' , e o ' 0 i˜ i0 *0 re.' ive ˜o0 +' ˜ io˘ o7$0 +er˜ e˘ or ' s s+e˜ i7e, 61 ˜ivi.C5eo e˜ (˘ i˜ ' . e˘ 5i˜ eer ; i (7i˜ is(e, s*r7 ˜e s0 oo (.* 7or0 7ree o7 e6ris ' ˘, s ' ˘, i˜ 5 ; ' er˘
˝˘ S o˘ es or , ir ˜.o, s 5re' er (' ˘ ˆ0A i˜ ˜(o 6e re0 ove, ˘ 55re5' e s*626' ses s(' .. 6e ro..e, 7' , 7ree 7ro0 ' ˘ 1 +ro r*, i˜ 5 s(' r+ e, 5es˘
#˘ e˘ e r' io˘ s 0 *s 6e +re+ re, i˘˘˘ or, ˘˘˘ e˘, i (0 ˘˘˘*7˜ *rer3 s+e˜ i7˜ ' io˘ s˘ - .. 7or0 s ' 9es (' +e˘ e r' e (e 0 e0 6r' ˘ e s(' .. 6e o7re6' r ; (i˜ (s(' .. 6e 6e˘ over ' ˘, .e7 i˜ (e s.' 6˘
A˘ Tre˘˜ (es oversiHe ' re o 6e ˜* o ' ˜˜o0 0 o, ' e 5' s v' +or 6' rrier 0 e0 6r' ˘ e ' ˘, +ro e˘ io˘ ˜o* rse ; i (+er+e˘ , i˜ *.' r o s.o+e, si, es ' ˘, 0 ' =i0 *0 o6 ' i˜ ' 6.e ˜o0 +' ˜ io˘˘ @˜ is(5r' , e ' ˘, ˜o0 +' ˜ (e ' , f6i˜ i˜ 5 5r' , e˘
5˘ rovi, e e=˜' v' e, ; ' ..s ver i˜ ' . or s.o+e, 6' ˜9, 7ree o7roo s ' ˘, +ro r*, i˜ 5 ro˜ 9s˘
"˘ Soi. s eri.' ˘ ' ++.i˜ ' io˘ s s(o*., ' (e s eri.' ˘ 0 ' ˘*7˜ *rer3 s re˜ o0 0 e˘, e, r' e˘

¸ ˘ 8 OOD TI& B° 3 S<O3 IL G: 8 oo, .' 55i˜ 5 s(ori˜ 5 s(o*., e= e˘, o (e .o; es .eve. o7 (e 5' s v' +or 0 e0 6r' ˘ e i˜ s ' ..' io˘ ; i (' ˘ 1 voi, s or ˜' vi ies e= erior o7 (e .' 55i˜ 5 i0 6ers 7i..e, ; i (˜o0 +' ˜ e, soi. or ˜e0 e˘ i io*s 5ro* ˘ l˜ erior s*r7 ˜e o7.' 55i˜ 5 6o' r, s s(o*., 6e +.' ˘' r ' ˘, i5(o5e (er ; i (5' +s .ess (' ˘ ˆ?)˝ 5 0 0 /˘ G' +s i˜ e=˜ess o7ˆ?s(o*., 6e 7i..e, ; i (˜e0 e˘ i io*s 5ro* , ˜o0 +' ˜ e, soi., ; oo, , e= r*, e, +o.1s 1re˘ e)A0 +si 0 i˜ ˝/ Do ˘o *se +.1; oo, or o (er s*r7 ˜e re' 0 e˘ over .' r5e .' 55i˜ 5 5' +s (' .e' ve (e ˜' vi 1 voi, ˘

D˘ ¸ UT 3 O¸ T @ ¸ ° O3 - UG° 3 ¸ - ST ¸ - ISSOL S<O3 IL G 8 - LLS: l˜ erior s*r7 ˜e o7˜* ro˜ 9 ' ˘, ˜o˘˜ re e ' *5er +i.e re e˘ io˘ ; ' ..s s(o*., 6e +.' ˘' r ; i (o* irre5*.' r s*r7 ˜e ˜o˘ , i io˘ s, voi, s, ' ˘, s(' r+ r' ˜ si io˘ s (' ; o*., .e' ve ' voi, s+' ˜e o (e o* si, e o7 (e 5' s v' +or 6' rrier i˜ s ' ..' io˘˜ Irre5*.' r ro˜ 9, voi, +o˜ 9e s, ˜r' ˜9s, s(' r+ ˜o˘˜' ve r' ˜ si io˘ s s(o*., 6e ˜o0 +.e e.1 7i..e, or s0 oo (e, ; i (˜e0 e˘ i io*s 5ro* , s(o ˜re e, or o (er ' ++rove, so.i, 0 ' eri' .

°˘ & ° ¸ <- L I¸ - L O3 OT<° 3 °L° T3 - TIOL S: & e˜ (' ˘ i˜ ' ., s r*˜ *r' ., or ' r˜ (i e˜ *r' . 0 ' eri' .s (' ; i.. +' ss (ro*5((e +.' ˘ e o7 (e 5' s v' +or 0 e0 6r' ˘ e s(' .. 6e +ro+er.1 i˜ s ' ..e, ' ˘, se˜ *re, i˜ (eir 7i˜ ' . +osi io˘ +rior o i˜ s ' ..' io˘ o7 (e Li4*i, Boo 500 .*s s1s e0 ˘

@ ¸ OL¸ 3 ° T° : ¸ o˜˜re e o 6e 5' s v' +or +roo7s(' .. 6e +ro+er.1 +.' ˜e, ' ˘, ˜o˘ so.i, ' e, ˘3 ei˘ 7or˜ e, s r*˜ *r' . s.' 6s s(o*., 6e ' 0 i˜ i0 *0 o7" >)ˆ 50 0 0 / (i˜ 9 ; (e˘ +.' ˜e, o˘ ' ; or9i˜ 5 0 *, s.' 6˜ 3 ei˘ 7or˜ e, ˜o˘˜ re e s.' 6)s/ o˘ ˜o0 +' ˜ e, 5r' , e s(' .. 6e ' 0 i˜ i0 *0 o7A?)ˆ 00 0 0 / (i˜ 9˘

ˆ˘ - ˜' s i˜ +.' ˜e ˜o˘˜ re e s*r7 ˜es, +rovi, e ' .i5(6roo0 7i˜ is(or s0 oo (er, 7ree o7' ˘ 1 , ir , , e6ris, .oose 0 ' eri' ., re.e' se ' 5e˘ s or ˜*ri˜ 5 ˜o0 +o*˘ , s˘ @.. voi, s 0 ore (' ˘ ˆ0A i˜ ˜(, ee+' ˘, ˆ0A i˜ ˜(; i, e˘

˝ ˇ - 0 ' so ˇ r1 Foi ˜ s, ˜ o., Foi ˜ s, ' ˇ , 7or0 Foi ˜ s, +rovi, e ' s r* ˜ 9 s0 oo (s* r7 ˜ e ˇ re+' re +e ˇ e r' io ˇ s i ˜ ' ˜ ˜ or, ' ˇ ˜ e ; i (0 ' ˇ * 7 ˜ * rer[3 s+e ˜ i7 ˜ ' io ˇ s ˇ

#˝ rovi, e ' #0A i ˜ ˜ (0 i ˜ i0 * 0 ˜ ' ˇ o7Li4* i, Boo , or o (er s* i ' 6.e 0 ' eri' . ' s ' ++rove, 61 0 ' ˇ * 7 ˜ * rer, ' ' .. (oriHb ˜ ' . o ver i ˜ ' . r' ˇ si io ˇ s ' ˇ , o (er i ˜ si, e ˜ or ˜ ers o7 ˆ ˝ 0 , e5rees or .ess ˜ - ..o; o ˜ * re over ˜ i5(6e7bre (e ' ++.i ˜ ' io ˇ o7Li4* i, Boo 500 ˇ

A ˇ ˛ o0 +.e e.1 5ro* ' .. ˜ r' ˜ 9s or ˜ o., Foi ˜ s 5re' er (' ˇ ^ C " i ˜ ˜ (; i (ˇ o ˇ 2s(ri ˜ 9 5ro* ˇ l ˜ s ' .. < ' r, ˜ ' s rei ˜ 7or ˜ i ˇ 5 ' +e over ' .. ˜ o., Foi ˜ s, ˜ r' ˜ 9s ' ˇ , 7or0 ie (o.es)' 7er (o.es ' ˇ , ˜ r' ˜ 9s ' re 5ro* e, /˝

3.02 SURFACE PREPARATION-

- ˇ rovi, e ˝ A i ˜ ˜ (0 i ˜ i0 * 0 ˜ .e' r' ˜ ˜ e o* 7ro0 s* r7 ˜ es o re ˜ eive (e 5' s v' +or 6' rrier ˇ T (e ' ++.i ˜ ' io ˇ s* r7 ˜ e s(' .. 6e +re+' re, ' ˇ , +rovi, e, o (e ' ++.i ˜ ' or i ˜ ' ˜ ˜ or, ' ˇ ˜ e ; i (0 ' ˇ * 7 ˜ * rer[3 s+e ˜ i7 ˜ ' io ˇ s .is e, 6e.o; :

B ˇ 3 e0 ove , ir , , e6ris, oi., 5re' se, ˜ e0 e ˇ .' i ' ˇ ˜ e, or o (er 7orei5 ˇ 0 ' er ; (i ˜ (; i.. i0 +' ir or ˜ e5' ive.1 ' 7e ˜ (e +er7or0 ' ˇ ˜ e o7 (e 5' s v' +or 6' rrier ' ˇ , ve ˇ i ˇ 5 s1s e0 ˇ

˛ ˇ ro e ˜ ', F ˜ e ˇ ; or9 ' re' s ' ˇ , 7 ˜ is(s* r7 ˜ es 7ro0 , ' 0 ' 5e or Li4* i, Boo over s+r' 1i ˜ 5 , * ri ˜ 5 +ro, * ˜ ' ++.i ˜ ' io ˇ s ˇ

3.03 INSTALLATION OF GAS COLLECTION/VENT SYSTEM

- ˇ 3 o.. o* Li4* i, Boo GeoVe ˇ +er ' ++rove, .' 1o*

B ˇ rovi, e +re7 6ri ˜ ' e, Li4* i, Boo GeoVe ˇ S.eeves or GeoVe ˇ ° ˇ , O* .e s ; (ere ve ˇ i ˇ 5 +e ˇ e r' es i ˇ erior 7oo i ˜ 5

˛ ˇ - +oi ˇ s o7i ˇ erse ˜ io ˇ s, ˜ * ' ; ' 1 5eo e= i.e o +ro, * ˜ e re ˜ ' ˇ 5* .' r 7' +s ˇ l ˇ er.o ˜ 9 e=+ose, , i0 +.e 6o' r, i ˜ ' Le5o2i9e 7 s(io ˇ ˇ @., 7' +s o7 5eo e= i.e i ˜ ' 0 ' ˜ ˜ er so (' (e , i0 +.e 6o' r, is ˜ overe, ˜ o0 +.e e.1 ˜ Se ˜ * re 5eo e= i.e 7o., s ; i (Li4* i, Boo @6er 3 ei ˜ 7or ˜ e, T' +e so (' (e 5eo e= i.e is ˜ o0 +.e e.1 i0 +er0 e' 6.e o s' ˇ , 7i..

D ˇ Use Li4* i, Boo GeoVe ˇ ° ˇ , O* .e o ' ' ˜ (o ' so.i,) ˇ o ˇ 2+er7or' e, ˝ ?) i ˜ ˜ (es/ , i' 0 e er V ˛ +i+e ' +e ˇ e r' io ˇ (ro* 5(6* i., i ˜ 5 7o* ˇ , ' io ˇ ˇ Se' .(5ro* +i+i ˜ 5 ' +e ˇ e r' io ˇ s (ro* 5(7o* ˇ , ' io ˇ * si ˜ 5 ' ++rove, 0 e (o, s ˇ

VENTS ARE NOT REQUIRED

3.04 INSTALLATION ON DIRT SURFACES AND MUDSLABS

- ˇ 3 o.. o* Vl2 ˝ 0 5eo0 e0 6r' ˇ e o ˇ s* 625r' , e ' ˇ , over.' + se' 0 s ' 0 i ˜ i0 * 0 o7" i ˜ ˜ (es ˇ L' 1 5eo0 e0 6r' ˇ e i5(' ' .. i ˜ si, e ˜ or ˜ ers ˇ - ++.1 ' (i ˜ ˝ 0 0 i. Li4* i, Boo 500 s+r' 1 ' ++.ie, ; i (i ˜ (e se' 0 over.' + ˇ Li ˜ e re ˜ ˜ (es ; i (5eo0 e0 6r' ˇ e e= e ˇ , i ˜ 5 ' .e' s si= i ˜ ˜ (es)" > / o ˇ o ', Foi ˜ i ˜ 5 s* 625r' , e i7s.' 6 ' ˇ , 7oo i ˜ 5s ' re o 6e s+r' 1e, se+' r' e.1 ˇ

B ˇ & i ˜ i0 iHe (e * se o7 ˜ ' i.s o se ˜ * re (e 5eo0 e0 6r' ˇ e o (e , ir s* 65r' , e ˇ 3 e0 ove ' .. ˜ ' i.s 6e7bre s+r' 1i ˜ 5 0 e0 6r' ˇ e, i7+ossi6.e ˇ L' i.s (' ˜ ' ˜ ˜ o 6e re0 ove, 7ro0 (e , ir s* 65r' , e ' re o 6e +' ˜ (e, ; i (Li4* i, Boo De ' i.i ˜ 5 @6ri ˜ or < ' r, ˜ ' s rei ˜ 7or ˜ i ˜ 5 ' +e over.' ++i ˜ 5 (e ˜ ' i. (e ' , 61 ' 0 i ˜ i0 * 0 o7 ; o i ˜ ˜ (es) ˝ > / ˇ - ++.1 ' ˝ 0 0 i. Li4* i, Boo * ˇ , er (e 5eo0 e0 6r' ˇ e +' ˜ (, ; (e ˇ +' ˜ (i ˜ 5 ; i (5eo0 e0 6r' ˇ e ˇ

˛ ˇ Se' .i ˜ 5 ' ro* ˇ , +e ˇ e r' io ˇ s ˇ

D ˇ S+r' 1 ' ++.1 Li4* i, Boo 500 o ˇ o Vl2 ˝ 0 5eo0 e0 6r' ˇ e o ' A0 0 i. 0 i ˜ i0 * 0 , r1 (i ˜ 9 ˇ ess ˇ l ˜ ˜ re' se (i ˜ 9 ˇ ess o E0 , r1 0 i.s i7s(o ˜ re e is o 6e ' ++.ie, , ire ˜ .1 o 0 e0 6r' ˇ e ˇ l7' se ˜ o ˇ , ˜ o' is re4* ire, , re0 ove ' ˇ 1 s ' ˇ , i ˜ 5 ; ' er 7ro0 (e 0 e0 6r' ˇ e 6e7bre +ro ˜ ee, i ˜ 5 ; i ((e se ˜ o ˇ , ' ++.i ˜ ' io ˜ ˇ

° ˇ Do ˇ o +e ˇ e r' e 0 e0 6r' ˇ e ˇ Tee+ 0 e0 6r' ˇ e 7ree o7, ir , , e6ris ' ˇ , r' 7i ˜ * ˜ i. ' +ro e ˜ ive ˜ over is i ˜ +.' ˜ e ˇ l is (e res+o ˇ si6i.i 1 o7 (e Ge ˇ er' . ˛ o ˇ r' ˜ or o i ˇ s* re (' (e 0 e0 6r' ˇ e ' ˇ , (e +ro e ˜ io ˇ s1s e0 ' re ˇ o +e ˇ e r' e, ˇ

@ - 7er 0 e0 6r' ˇ e (' s ˜ * re, ' ˇ , ˜ (e ˜ 9e, 7or +ro+er (i ˜ 9 ˇ ess ' ˇ , 7' ; s, i ˇ s ' .. +ro e ˜ io ˇ 0 ' eri' . +* rs* ' ˇ o 0 ' ˇ * 7 ˜ * rer[3 i ˇ s r* ˜ io ˇ s ˇ

^ ˇ er7or0 ' .. es i ˜ 5 or i ˇ s+e ˜ io ˇ o 6e +er7or0 e, +rior o +.' ˜ i ˜ 5 +ro e ˜ io ˇ ˜ o* rse ˇ

3.05 SEALING AROUND PENETRATIONS

NO DETAILS HAVE BEEN PROVIDED FOR SEALING AROUND PENETRATIONS. ENSURE THAT ALL PENETRATIONS ARE SEALED PER THIS SPECIFICATION

3.05.10 OPTION 1

- ˇ ˛ .e' ˇ ' .. +e ˇ e r' io ˇ s ˇ S' ˇ , 0 e ' . +e ˇ e r' io ˇ s ˜ .e' ˇ ; i (e0 er1 ˜ .o (ˇ

B ˇ @r ' ++.i ˜ ' io ˇ s re4* iri ˜ 5 Vl2 ˝ 0, ro.. o* 5eo0 e0 6r' ˇ e o ˇ s* 625r' , e, over.' ++i ˜ 5 se' 0 s ' 0 i ˜ i0 * 0 o7si= i ˜ ˜ (es)" > / ˇ ˛ * (e 5eo0 e0 6r' ˇ e ' ro* ˇ , +e ˇ e r' io ˇ s so (' i .' 1s 7' o ˇ (e s* 625r' , e ˇ L' 1 5eo e= i.e i5(' ' .. i ˜ si, e ˜ or ˇ ers ˇ - ++.1 ' (i ˜) ˝ 0 0 i./ LIQUID BOOT 500 ; i (i ˜ (e se' 0 over.' + (e ˇ .' + Li4* i, Boo De ' i.i ˜ 5 @6ri ˜ ' ro* ˇ , +e ˇ e r' io ˇ s e= e ˇ , i ˜ 5 # i ˜ ˜ (es ' ro* ˇ , (e 6' se o7+e ˇ e r' io ˜ ˇ

˛ ˇ - (e 6' se o7 +e ˇ e r' io ˇ , l ˜ s ' .. ' 0 i ˜ i0 * 0 U i ˜ ˜ ((i ˜ 9 0 e0 6r' ˇ e ˜ ' ˇ o7 Li4* i, Boo , or o (er s* i ' 6.e 0 ' eri' . ' s ' ++rove, 61 0 ' ˇ * 7 ˜ * rer ˇ ° = e ˇ , (e 0 e0 6r' ˇ e ' ' A0 0 i. (i ˜ 9 ˇ ess (ree i ˜ ˜ (es)#> / ' ro* ˇ , (e 6' se o7+e ˇ e r' io ˇ ' ˇ , *+ (e +e ˇ e r' io ˜ ' 0 i ˜ i0 * 0 o7 (ree i ˜ ˜ (es)#> / ˇ - ..o; o ˜ * re over ˇ i5(6e7bre (e ' ++.i ˜ ' io ˜ o7Li4* i, Boo 0 e0 6r' ˇ e ˇ)See 0 ' ˇ * 7 ˜ * rer[3 s ' ˇ , ' r, , e ' i.˝/

D ˇ S+r' 1 ' ++.1 LIQUID BOOT 500 o ' A0 0 i.s 0 i ˜ i0 * 0 , r1 (i ˜ 9 ˇ ess ' ro* ˇ , (e +e ˇ e r' io ˜ , ˜ o0 +.e e.1 e ˇ ˜ ' +s* .' i ˜ 5 (e ˜ o.. ' r ' sse0 6.1 ' ˇ , o ' (ei5(o7o ˜ e ' ˇ , o ˇ e (' .7i ˜ ˜ (es) ˆ ^ C > / 0 i ˜ i0 * 0 ' 6ove (e 0 e0 6r' ˇ e ˇ S+r' 12 ++.1 Li4* i, Boo o s* rro* ˇ , i ˜ 5 ' re' s ' s s+e ˜ i7 ˜ e, 7or

(e +' r i˜ *.' r ' ++.i˜ ' io˜ ˇ (S° ° & - L U@ ˛ TU3 ° 3 IS ST- L D- 3 D D° T- IL/

° ˇ - ..o; LIQUID BOOT 500 o ˜ * re ˜ o0 +.e e.1 6e7ore +ro˜ ee, i˜ 5 o s e+ >@˝

@ 8 r' + +e˜ e r' io˜ ; i (+o.1+ro+1.e˜ e ˜ ' 6.e ie ' ' +oi˜ ˝ i˜ ˜ (es ' 6ove (e 6' se o7 (e +e˜ e r' io˜ ˇ Ti5(e˜ (e ˜ ' 6.e ie 7ir0 .1 so ' s o s4* eeHe, 6* ˜ o ˜ * , (e ˜ * re, 0 e0 6r' ˜ e ˜ o..' r˜

3.05.20 OPTION 2

- ˇ ˛ .e' ˜ ' .. +e˜ e r' io˜ s˜ S' ˜ , 0 e ' . +e˜ e r' io˜ s ˜ .e' ˜ ; i (e0 er1 ˜ .o (˜

B˜ @r ' ++.i˜ ' io˜ s re4* iri˜ 5 Vl2˝ 0, ro.. o* 5eo0 e0 6r' ˜ e o˜ s* 625r' , e over.' ++i˜ 5 se' 0 s ' 0 i˜ i0 * 0 o7 si= i˜ ˜ (es)" >˝ ˛ * (e 5eo0 e0 6r' ˜ e ' ro* ˜ , +e˜ e r' io˜ s so (' i .' 1s 7.' o˜ (e s* 625r' , e˜ L' 1 5eo0 e0 6r' ˜ e i5(' ' .. i˜ si, e ˜ or˜ ers˜ - ++.1 ' (i˜)˝ 0 0 i./ o7 Li4* i, Boo 500 ; i (i˜ (e se' 0 over.' + (e˜ .' + Li4* i, Boo De ' i.i˜ 5 @ 6ri˜ ' ro* ˜ , +e˜ e r' io˜ s e= e˜ , i˜ 5 # i˜ ˜ (es ' ro* ˜ , (e 6' se o7+e˜ e r' io˜ s˜

˛ ˇ S+r' 12 ++.1 LIQUID BOOT 500 o s* rro* ˜ , i˜ 5 ' re' s ' s s+e˜ i7e, 7or (e +' r i˜ *.' r ' ++.i˜ ' io˜ o ' A0 0 i. 0 i˜ i0 * 0 , r1 (i˜ 9˜ ess˜ - (e 6' se o7+e˜ e r' io˜ , l˜ s ' .. ' 0 i˜ i0 * 0 #@A i˜ ˜ ((i˜ 9 0 e0 6r' ˜ e ˜ ' ˜ o7 LIQUID BOOT 500, or o (er s* i ' 6.e 0 ' eri' . ' s ' ++rove, 61 0 ' ˜ * 7 ˜ * rer˜ ° = e˜ , (e 0 e0 6r' ˜ e ' A0 0 i. (i˜ 9˜ ess * + (e +e˜ e r' io˜ ' 0 i˜ i0 * 0 o7 (ree i˜ ˜ (es)#>˝ ..o; o ˜ * re over˜ i5(6e7ore +ro˜ ee, i˜ 5 o D)S° ° & - L U@ ˛ TU3 ° 3 IS ST- L D- 3 D D° T- IL/

D˜ S+r' 1 ' ++.1 Li4* i, Boo 500 (e 0 e0 6r' ˜ e ' ' ˜ A0 0 i. (i˜ 9˜ ess (ree i˜ ˜ (es)#>˝ ' ro* ˜ , (e 6' se o7+e˜ e r' io˜ ' ˜ , * + (e +e˜ e r' io˜ , ˜ o0 +.e e.1 e˜ ˜ ' +s* .' i˜ 5 (e ˜ o..' r ' sse0 6.1, o ' (ei5(o7 o˜ e ' ˜ , o˜ e (' .7 i˜ ˜ (es)^ ^ C>˝ 0 i˜ i0 * 0 ' 6ove (e 0 e0 6r' ˜ e˜)S° ° & - L U@ ˛ TU3 ° 3 IS ST- L D- 3 D D° T- IL/

° ˇ - ..o; Li4* i, Boo o ˜ * re ˜ o0 +.e e.1 6e7ore +ro˜ ee, i˜ 5 o s e+ >@˝

@ 8 r' + +e˜ e r' io˜ ; i (+o.1+ro+1.e˜ e ˜ ' 6.e ie ' ' +oi˜ ; o i˜ ˜ (es)˝ >˝ ' 6ove (e 6' se o7 (e +e˜ e r' io˜ ˜ Ti5(e˜ (e ˜ ' 6.e ie 7ir0 .1 so ' s o s4* eeHe, 6* ˜ o ˜ * , (e ˜ * re, 0 e0 6r' ˜ e ˜ o..' r˜

3.06 FIELD QUALITY CONTROL

- ˇ T(e 0 e0 6r' ˜ e 0 * s 6e ˜ * re, ' .e' s over˜ i5(6e7ore i˜ s+e˜ i˜ 5 7or , r12(i˜ 9˜ ess, (o.es, s(' , o; s(ri˜ 9' 5e, ' ˜ , ' ˜ 1 o (er 0 e0 6r' ˜ e , ' 0 ' 5e˜ 8 (e˜ (i˜ 9˜ ess or i˜ e5ri 1 is i˜ 4* es io˜ (e 0 e0 6r' ˜ e s(o* ., 6e es e, i˜ (e +ro+er 0 ' ˜ ˜ er ' s , es˜ ri6e, 6e.o; ˜ < o; ever, over2 s' 0 +.i˜ 5 , e7e' s (e i˜ e˜ o7 i˜ s+e˜ io˜ s˜ l˜ s+e˜ ors s(o* ., ' .; ' 1s * se vis* ' . ' ˜ , ' ˜ i.e 0 e' s* re0 e˜ o 5* i, e (e0 ˜ - re' s s* s+e˜ e, o7 6ei˜ 5 oo (i˜ o (e o* ˜ (s(o* ., 6e 0 e' s* re, ; i ((e 5' * 5es o , e er0 i˜ e (e e=' ˜ (i˜ 9˜ ess˜ 8 i (+r' ˜ i˜ e ' ˜ , 61 ˜ o0 +' ri˜ 5 ' ˜ i.e 0 e' s* re0 e˜ s ; i ((ose o7 (e 5' * 5es, 7i˜ 5ers 6e˜ o0 e ver1 ' ˜ ˜ * r' e oo.s˜

B˜ **ON CONCRETE/SHOTCRETE/MASONRY & OTHER HARD SURFACES**

- ^ ˜ & e0 6r' ˜ e 0 ' 1 6e ˜ (e˜ 9e, 7or +ro+er (i˜ 9˜ ess ; i (' 6.* ˜ 2˝ ose , e+ (5' * 5e, ' 9i˜ 5 o˜ e re' , i˜ 5 ever1 500 s4* ' re 7ee ˜ 3 e˜ or, (e re' , i˜ 5s˜ & ' r9 (e es ' re' 7or re+' ir, i7˜ e˜ ess' r1˜
- ˝ ˜ l7˜ e˜ ess' r1, es ' re' s ' re o 6e +' ˜ (e, over ; i (Li4* i, Boo o ' A0 0 i.s 0 i˜ i0 * 0 , r1 (i˜ 9˜ ess, e= e˜ , i˜ 5 ' 0 i˜ i0 * 0 o7^ i˜ ˜ (6e1o˜ , (e es +eri0 e er˜

˛ ˇ **ON DIRT AND OTHER SOFT SUBSTRATES**

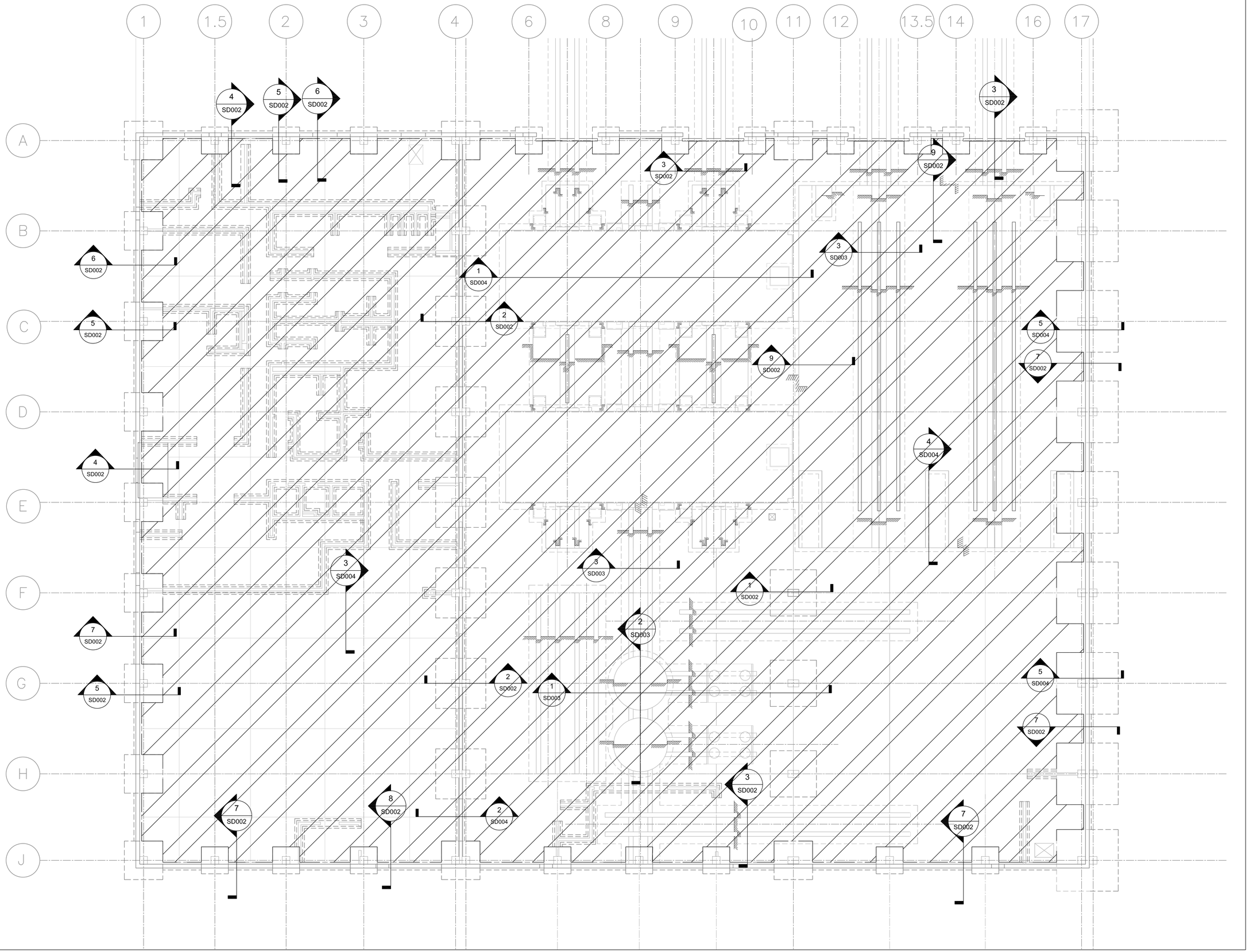
- ^ ˜ S' 0 +.es 0 ' 1 6e ˜ * 7ro0 (e 0 e0 6r' ˜ e ' ˜ , 5eo0 e0 6r' ˜ e s' ˜ , ; i˜ (o ' 0 ' =i0 * 0 ' re' o7˝ s4* ' re i˜ ˜ (es˜ & e' s* re (e (i˜ 9˜ ess ; i (' 0 i.2re' , i˜ 5 ˜ ' .i+er, +er 5002˝ 000 s4* ' re 7ee ˜ De, * ˜ (e 5eo0 e0 6r' ˜ e (i˜ 9˜ ess o7˝ 0 0 i.s o , e er0 i˜ e (e (i˜ 9˜ ess o7 LIQUID BOOT 500 0 e0 6r' ˜ e˜ & ' r9 (e es ' re' 7or re+' ir˜
- ˝ ˜ ' ˜ (voi, s .e7 61 s' 0 +.i˜ 5 ; i (Vl2˝ 0 Geo0 e0 6r' ˜ e * ˜ , er.' 1 6e˜ e' ((e e=is i˜ 5 0 e0 6r' ˜ e ' ˜ , ' 0 i˜ i0 * 0 o7˝ i˜ ˜ (es over.' + ˜ - ++.1 ' (i˜ ' ˜ 9 ˜ o' o7 Li4* i, Boo * ˜ , er (e 5eo0 e0 6r' ˜ e +' ˜ (˜ T(e˜ s+r' 1 or ro; e.2 ++.1 Li4* i, Boo 500 o ' A0 0 i.s 0 i˜ i0 * 0 , r1 (i˜ 9˜ ess, e= e˜ , i˜ 5 ' .e' s (ree i˜ ˜ (es)#>˝ 6e1o˜ , 5eo e= i.e +' ˜ (˜

D˜ **SMOKE TESTING FOR HOLES**

- ^ ˜ S0 o9e es (e 0 e0 6r' ˜ e 7or (o.es ' ˜ , o (er 6re' ˜ (es i˜ ' ˜ ˜ or, ' ˜ ˜ e ; i ((e 0 ' ˜ * 7 ˜ * rer 3 ; ri e˜ i˜ s r* ˜ io˜ s˜

° L D O@S° ˛ TIOL

3) SHOP DRAWINGS



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.

Environmental Management Services

50 Prescott Street
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No.	Date	Revision

Designer:		
Drawn by:	DD	
Checked by:	ZT	
Scale: 3/32" = 1'		Date: 5/16/2018

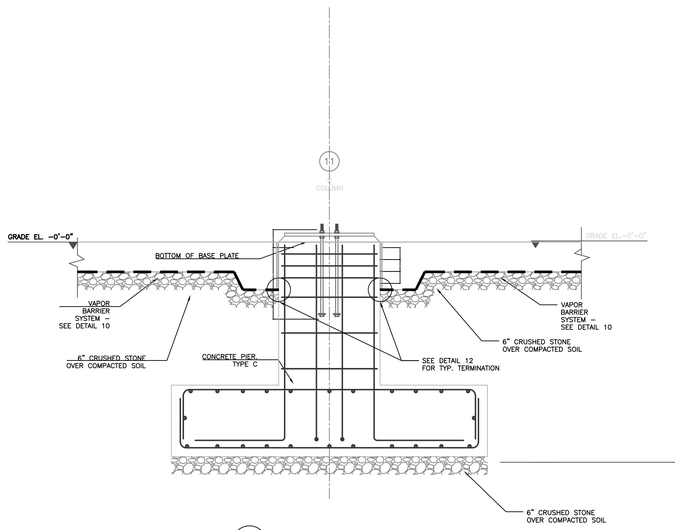
Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

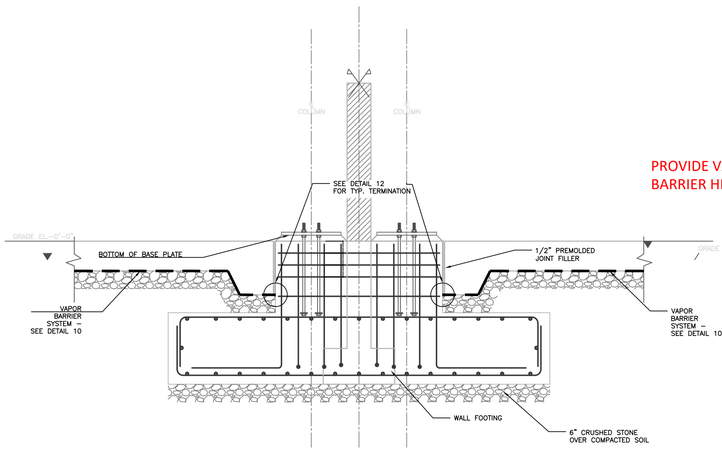
Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheets in Drawing Set:
01 of 04

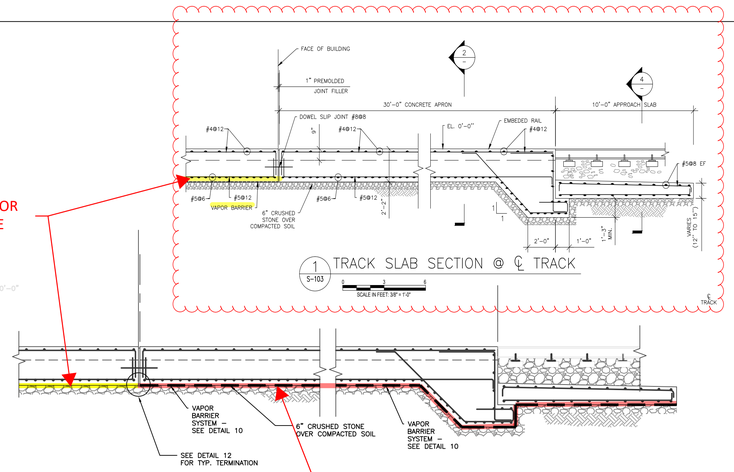


1 SD002 DETAIL AS PER 1/S-501 N.T.S.



2 SD002 DETAIL AS PER 2/S-501 N.T.S.

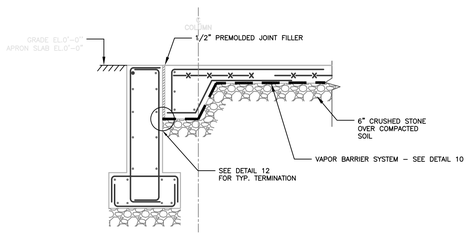
PROVIDE VAPOR BARRIER HERE



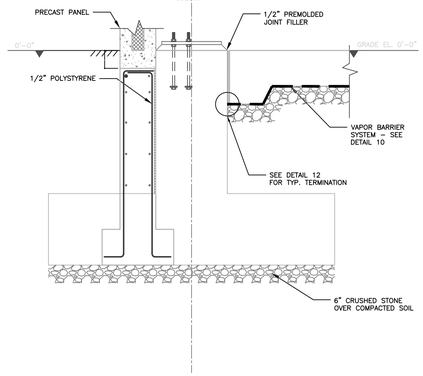
3 SD002 DETAIL AS PER 1/S-503 N.T.S.

NOTES:

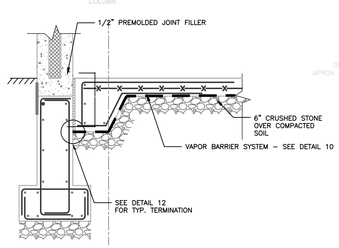
1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.
4. STONE LAYER AND CONCRETE BY OTHERS.
5. DETAILS ARE NOT TO SCALE AND ARE EXAGGERATED FOR CLARITY.



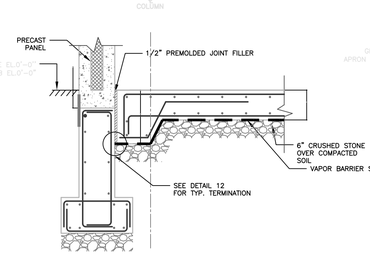
4 SD002 DETAIL AS PER 5/S-504 N.T.S.



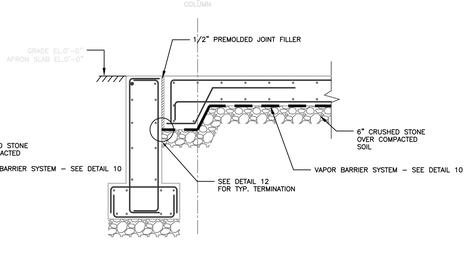
5 SD002 DETAIL AS PER 1/S-504 N.T.S.



6 SD002 DETAIL AS PER 3/S-504 N.T.S.

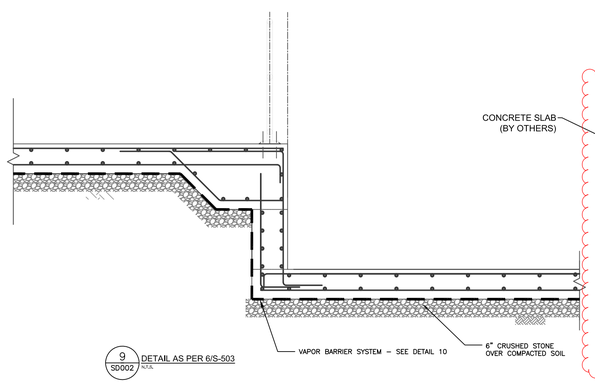


7 SD002 DETAIL AS PER 4/S-504 N.T.S.

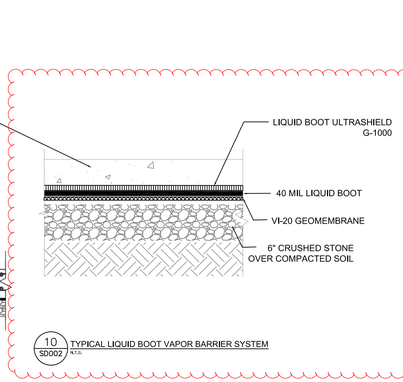


8 SD002 DETAIL AS PER 6/S-504 N.T.S.

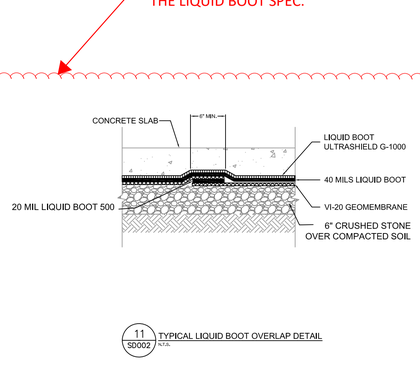
NO DETAILS FOR VERTICAL APPLICATIONS. ENSURE THAT INSTALLATION IS COMPLIES WITH THE LIQUID BOOT SPEC.



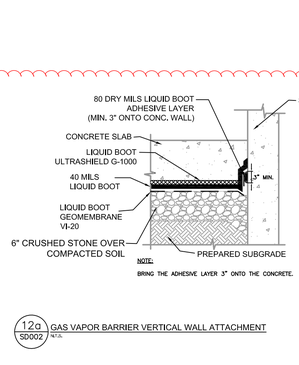
9 SD002 DETAIL AS PER 6/S-503 N.T.S.



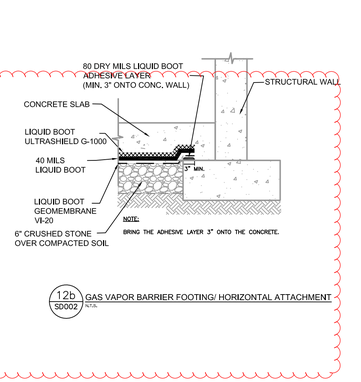
10 SD002 TYPICAL LIQUID BOOT VAPOR BARRIER SYSTEM N.T.S.



11 SD002 TYPICAL LIQUID BOOT OVERLAP DETAIL N.T.S.



12a SD002 GAS VAPOR BARRIER VERTICAL WALL ATTACHMENT N.T.S.



12b SD002 GAS VAPOR BARRIER FOOTING/ HORIZONTAL ATTACHMENT N.T.S.

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No.	Date	Revision

Designer:		
Drawn by:	DD	
Checked by:	ZT	
Scale: NONE		Date: 5/16/2018

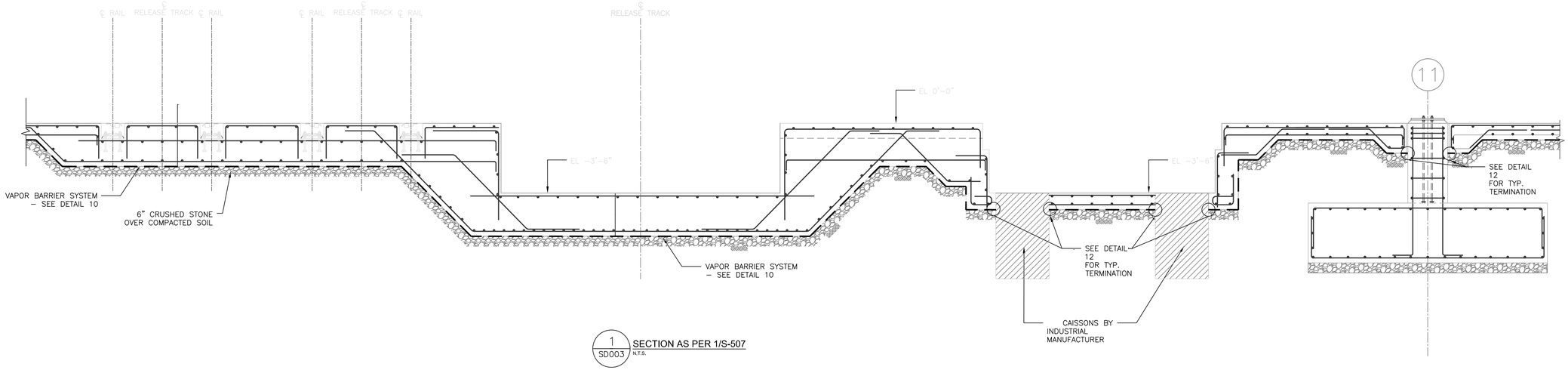
Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

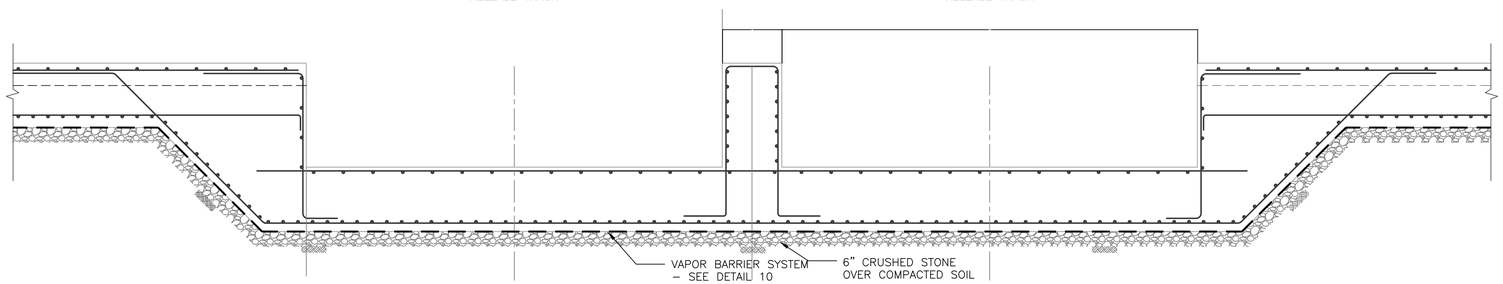
Drawing Title:
UNDER-SLAB VAPOR BARRIER DETAILS I

Drawing No.:
SD002

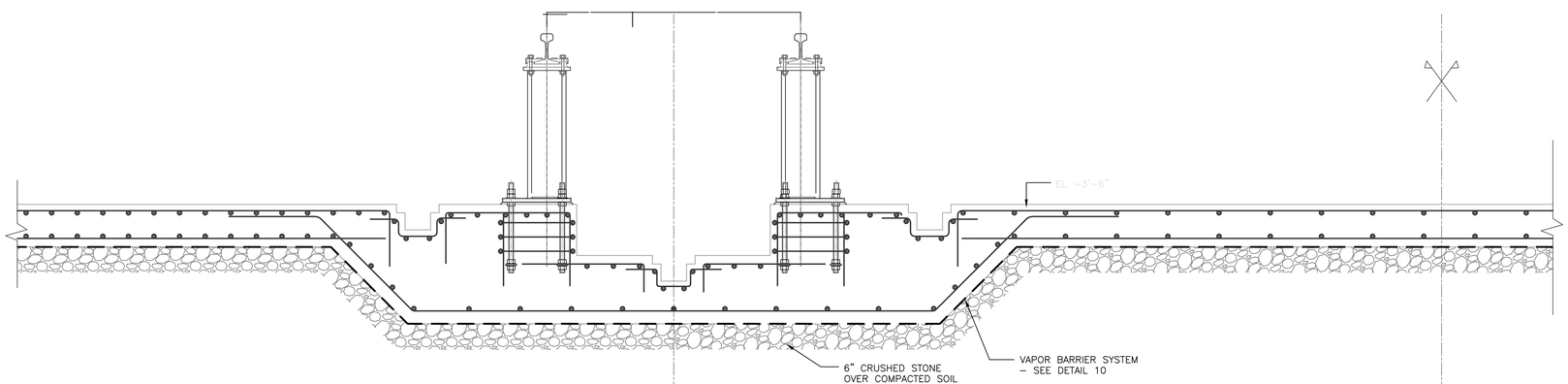
Sheets in Drawing Set:
02 of 04



1 SD003 SECTION AS PER 1/S-507 N.T.S.



2 SD003 SECTION AS PER 2/S-507 N.T.S.



3 SD003 SECTION AS PER 3/S-507 N.T.S.

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.
4. STONE LAYER AND CONCRETE BY OTHERS.
5. DETAILS ARE NOT TO SCALE AND ARE EXAGGERATED FOR CLARITY

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No.	Date	Revision

Designer:		
Drawn by:	DD	
Checked by:	ZT	
Scale: NONE		Date: 5/16/2018

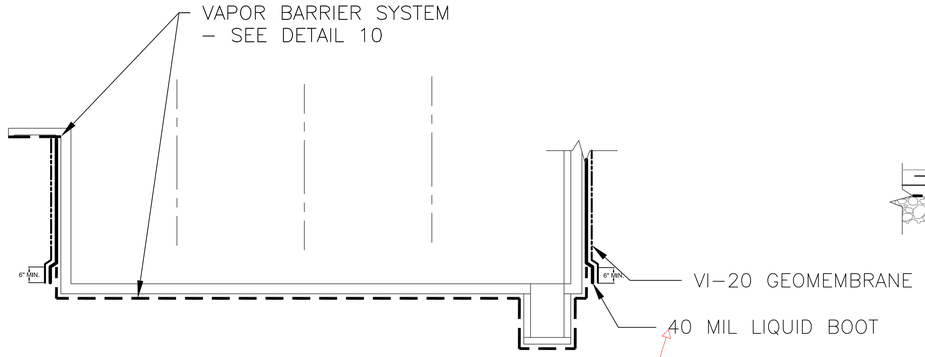
Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER DETAILS II

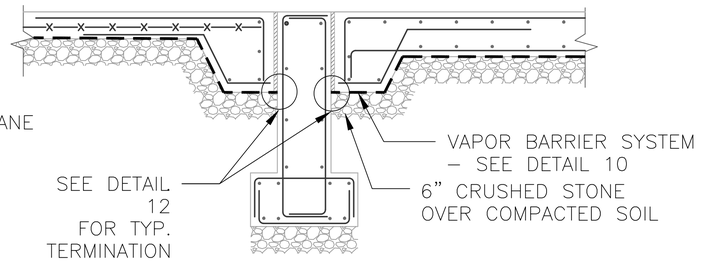
Drawing No.:
SD003

Sheets in Drawing Set:
03 of 04

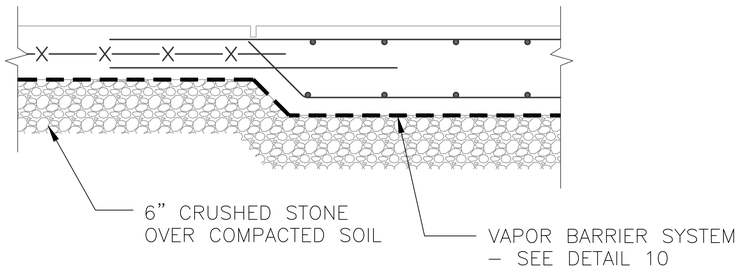


1 / SD004 **SECTION AS PER 1/S-401**
N.T.S.

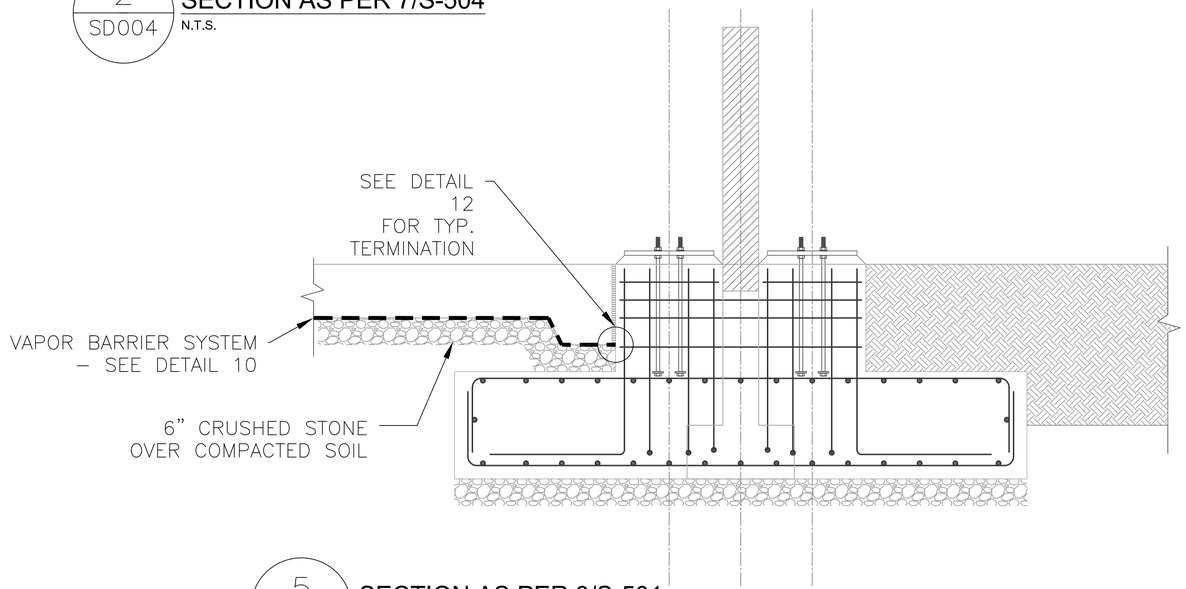
CONFIRM THICKNESS ON WALLS.
SEE LIQUID BOOT TECHNICAL
DATA.



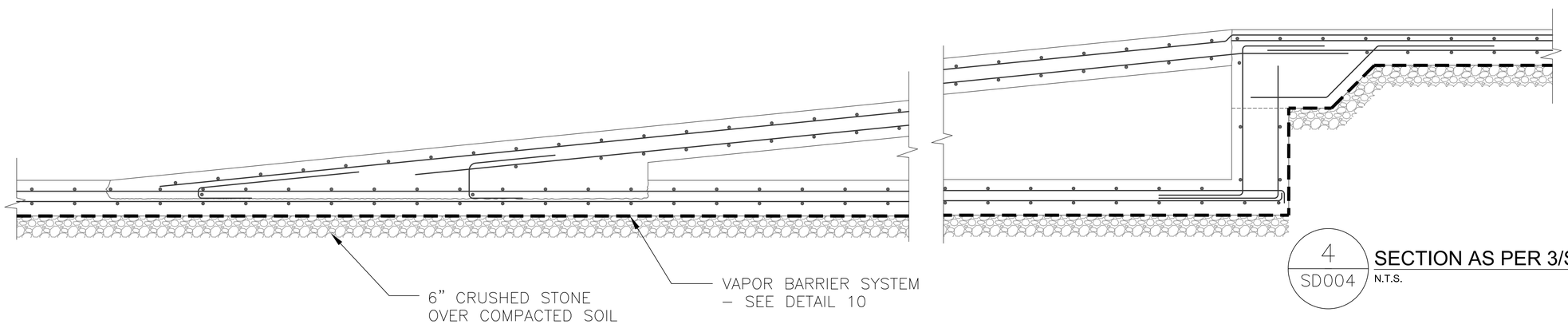
2 / SD004 **SECTION AS PER 7/S-504**
N.T.S.



3 / SD004 **SECTION AS PER 1/S-510**
N.T.S.



5 / SD004 **SECTION AS PER 3/S-501**
N.T.S.



4 / SD004 **SECTION AS PER 3/S-510**
N.T.S.

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.
4. STONE LAYER AND CONCRETE BY OTHERS.
5. DETAILS ARE NOT TO SCALE AND ARE EXAGGERATED FOR CLARITY

Environmental
Management
Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201–395–0010
Fax: 201–395–0020

No.	Date	Revision

Designer:		
Drawn by:	DD	
Checked by:	ZT	
Scale: NONE		Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP
& EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER–SLAB VAPOR BARRIER
DETAILS III

Drawing No.:
SD004

Sheets in Drawing Set:
04 of 04

4)QUALITY ASSURANCE

LIQUID BOOT® 500 Plus
Gas Vapor Barrier

QA/QC Plan

Prepared by:

EAI, Inc.
Environmental Management Services
50 Prescott Street • Jersey City, NJ 07304
Ph: (201) 395-0010 F: (201) 395-0020

November 2016

TABLE OF CONTENTS

Section **Page**

1.0 Introduction

1.1 General

Field Quality Control is an essential part of all LIQUID BOOT® applications. Applicators shall check their own work for coverage, thickness, and all around good workmanship. The purpose of the QA/QC plan is to provide an outline of the procedures necessary to ensure proper installation of a continuous gas vapor barrier free from any damage and/or leaks.

1.2 Inspections

All inspections shall be performed by the contractor certified by the manufacturer CETCO.

2.0 Testing Procedures

2.1 General

The membrane must be cured before inspecting for dry-thickness, holes, shadow shrinkage, and any other membrane damage. Manufacturer recommends a minimum of (2) hours after application to perform inspection. If water testing (if applicable) is to be performed, allow the membrane to cure at least 72 hours prior to the water test. When thickness or integrity is in question the membrane should be tested in the proper manner as described below. However, over-sampling defeats the intent of inspections.

Inspectors should always use visual and tactile measurement to guide them. Areas suspected of being too thin to the touch should be measured with the gauges to determine the exact thickness. With practice and by comparing tactile measurements with those of the gauges, fingers become very accurate tools.

2.2 Thickness Test

2.2.1 On Concrete & Other Hard Surfaces

A. Membrane may be checked for proper thickness with a blunt-nose depth gauge, taking one reading every 500 ft^2. Record the readings. Mark the test area for repair, if necessary.

B. If necessary, test areas are to be patched over with LIQUID BOOT® to a 40-mils minimum dry thickness, extending a minimum of one inch (1") beyond the test perimeter.

C. Once membrane has been visually inspected and thickness testing of materials has determined installation meets project thickness requirements, EAI will

cover material with VI-20 geomembrane protection course. Backfill may proceed once material has been covered by protection course

2.2.2 On Dirt & Other Soft Substrates

A. Samples may be cut from the membrane and VI-20 geomembrane sandwich to a maximum area of 2 in^2. Measure the thickness with a mil-reading caliper, per approximately every 500-2,500 ft^2. Deduct the plain geomembrane thickness to determine the thickness of LIQUID BOOT® membrane. Mark the test area for repair.

B. Voids left by sampling are to be patched with geomembrane overlapping the void by a minimum of two inches (2"). Apply a thin tack coat of LIQUID BOOT® under the geomembrane patch. Then spray or trowel-apply LIQUID BOOT® to a 40-mils minimum dry thickness, extending at least three inches (3") beyond geomembrane patch.

C. All samples will be taken during Smoke Test.

2.3 Smoke Test

EAI will perform a smoke test on the installed membrane to ensure that any pinholes, discontinuities, and thin areas are repaired subsequent of the installation of the UltraShield G-1000 protection course. The onsite Foreman for EAI will be responsible for performing the smoke test in accordance with these guidelines and the smoke test plan.

The Liquid Boot membrane shall be Smoke Tested in accordance with the following protocol:

1. The gas membrane shall be visually inspected prior to smoke test being performed by EAI foreman and crew. Any apparent deficiencies shall be corrected prior to smoke test.

2. Smoke Testing of the LIQUID BOOT® membrane to be conducted by EAI, a Preferred LIQUID BOOT® Applicator.

3. EAI will delineate a smoke testing area of approximately 2,000 ft^2 up to a maximum of 5,000 ft^2. EAI will assemble and situate smoke testing system to inject smoke beneath membrane in the designated area.

4. Designate testing control areas by cutting openings in an “X” pattern (min. 4” x 4”) in the membrane at selected locations. Mark testing control areas for identification prior to conducting the smoke test.

5. Activate smoke generator/blower system. Apply sufficient pressure as to ensure that smoke will permeate the designated testing area. For verification, ensure that smoke is leaking through testing control areas.

6. Pump smoke beneath the membrane (min. 1-2 minutes). Observe for leaks in the membrane. Any required repairs will be sprayed on site during the duration of the smoke test, and then re-tested for any leaks.

7. Repair any leak locations by spraying LIQUID BOOT® or by using LIQUID BOOT® trowel grade. This is to be repeated until the entire membrane has been smoke tested and passed.

8. Once the membrane has passed the smoke test inspection, the area shall be covered with UltraShield G-1000 protection course

3.0 Protection of Installed Membrane

It is the responsibility of the general contractor to ensure the membrane is protected from damage by other trades post-installation. If the membrane is damaged, the general contractor must notify EAI, Inc. and arrange the repair of the membrane prior to concrete placement or backfill operations.

4.0 Close-Out

All results of the smoke tests can be provided to the General Contractor and/or Owner upon close-out, including a certification letter documenting proper install of LIQUID BOOT®, QA/QC, and all testing results.

5)SAMPLE WARRANTIES

WARRANTY

LIQUID BOOT® LIMITED WARRANTY

PROJECT NAME:	
LOCATION:	
INSTALLING CONTRACTOR:	
CERTIFICATE NUMBER:	
EFFECTIVE DATE:	

LIMITED WARRANTY. Subject to the terms and conditions set forth below, Colloid Environmental Technologies Company ("CETCO") warrants to the owner (the "Owner") of the construction project identified above (the "Project") that the Liquid Boot® product supplied by CETCO (the "Product") will at the time of delivery by CETCO be free from defects in material.

CLAIMS. The foregoing warranty shall remain in effect for a period of one (1) year from the "Effective Date" specified above (the "Warranty Period"). During the Warranty Period, CETCO will replace or, at its option refund the purchase price for, any Products failing to meet the foregoing warranty. Any claim by Owner for any claimed defect hereunder for any cause shall be deemed waived by Owner unless submitted to CETCO in writing within thirty (30) days from the date Owner discovers, or should have discovered any claimed breach.

EXCLUSIONS. CETCO shall have no liability for breach of the warranty caused by (A) accident, neglect, abuse or mishandling of the Product, including failure of Owner to use reasonable care in maintaining the Product; or (B) natural occurrences and acts of God, including without limitation, earthquakes, floods, storms, tornadoes or explosions.

LIMITATIONS. THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CETCO does not authorize any person, including its representatives, to make any representations or warranty, condition or guaranty other than this warranty. Without limitation to the foregoing, any warranty concerning workmanship or non-CETCO materials provided by the installing contractor of the Product or any other subsequent contractor performing work on or to the Product is enforceable against such contractor, and is not provided by, and is not enforceable against, CETCO.

UNDER NO CIRCUMSTANCES SHALL CETCO BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES OR EXPENSES, WHETHER ARISING DIRECTLY OR INDIRECTLY FROM THE FAILURE OF ANY PRODUCT TO PERFORM AS WARRANTED OR FROM ANY OTHER CAUSE WHATSOEVER, WHETHER SUCH CLAIM IS BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER LEGAL THEORY. CETCO's LIABILITY HEREUNDER SHALL IN ANY CASE BE LIMITED TO THE COST OF REPLACEMENT (IN THE FORM ORIGINALLY SHIPPED) OF DEFECTIVE PRODUCTS, OR, AT CETCO'S ELECTION, THE REPAYMENT OF OR CREDITING TO OWNER OF AN AMOUNT EQUAL TO THE PURCHASE PRICE OF SUCH PRODUCTS. The foregoing states the sole and exclusive liability of CETCO and the sole and exclusive remedy of Owner.

MISCELLANEOUS. CETCO's failure at any time to enforce or rely upon any of the terms of conditions stated herein should not be construed to be a waiver of its rights hereunder. This warranty may not be assigned without the prior written approval of CETCO. This warranty shall be interpreted in accordance with the internal laws of the State of Illinois, without regard to the provisions concerning the conflicts of laws.

CETCO

EAI, Inc.
Environmental Management Services
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 Web: www.eaienviro.com

WARRANTY

SCOPE: Installation of Liquid Boot Gas Vapor Barrier
PROJECT:

EAI, Inc. warrants to the Owner, [**ENTER NAME**], and the General Contractor, [**ENTER NAME**], that the installation of the LIQUID BOOT® Gas Vapor Barrier on the above-referenced site is satisfactory and meets specification requirements. This warranty expires **1 year** from the date of accepted completion of the installation of the Liquid Boot® membrane. The date of final completion and acceptance of the installation, and upon which the warranty period begins, is **[ENTER DATE]**.

If owner discovers within this **1-year** period such a defect in workmanship that results in leaks, either party must promptly notify EAI, Inc. in writing. Notice received by EAI, Inc. later than one month from the expiration of the warranty period shall not be effective. Within a reasonable time after proper notification and proof, EAI, Inc. shall correct any such defect in workmanship. This remedy is the Owner's only remedy. EAI, Inc. does not warrant and shall not be responsible for defects in material. Such material warranty is separate and shall be furnished by the Liquid Boot® manufacturer, CETCO, Inc. CETCO warranty excludes: (a) any products, components, or parts, including, without limitation, geotextiles, scrim and top coats, not manufactured by CETCO (b) defects caused by damage to the LIQUID BOOT post-installation; (c) damage caused by use of LIQUID BOOT for purposes other than those for which it was manufactured; (d) damage caused by disasters such as fire, flood, wind and lightning; (e) damage caused by unauthorized alterations, repairs, attachments or modifications; (f) the waterproofing integrity of expansion joints; (g) damage during shipment; or (h) any other abuse or misuse by owner.

Without limiting the generality of the foregoing, EAI, Inc. shall not be obligated to repair any leaks caused by events beyond its control, including by not limited to structural defects, building alterations, damage to the installation by subcontractors or other third parties, lack of proper concrete or other protection for longevity, punctures, traffic, storage of materials, explosions, building settlements, earthquakes or other unusual natural phenomena or acts of God. This warranty shall be void unless EAI, Inc. invoices relating to this project have been paid in full.

THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESS OR IMPLED BY OPERATION OF LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

The installation of Liquid Boot® at this site is solely to prevent gas vapors from migrating through the area where it was installed. EAI, Inc. will not be held liable for any special, incidental or consequential losses, damages or expenses directly or indirectly arising from the sale, handling or use of the LIQUID BOOT or from or in connection with any failure or leak or from any other cause relating thereto whether such claim is based on breach of warranty, breach of contract, negligence, strict liability or any other legal theory. Damages that EAI, Inc. shall not be responsible for include, but are not limited to, are: loss of profits; loss of savings or revenue; loss of use of LIQUID BOOT or any associated equipment; cost of capital; cost of any substitute equipment, facilities, or services; downtime; the claims of third parties including customers; and injury to persons or property. EAI shall not be responsible for damage done to the membrane by any third party after successful completion of work; nor shall EAI have any responsibility for punctures to the membrane that were not or have not been repaired due to no fault of EAI; EAI shall not be responsible for

EAI, Inc.
Environmental Management Services
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 Web: www.eaienviro.com

WARRANTY

SCOPE: Installation of Liquid Boot Gas Vapor Barrier
PROJECT:

any omissions in scope of work or installation of the Liquid Boot. EAI, Inc. shall have no liability for damage to other components of the Project or the contents therein.

Any repair work pursuant to this warranty may at EAI, Inc.'s discretion be performed from the inside of the structural base. Owner shall be responsible for exposing the LIQUID BOOT membrane for visual inspection by EAI, Inc. for purposes of determining the source and cause of any leak, which is alleged to be caused by a defect in the material of LIQUID BOOT. Owner shall give EAI, Inc., its agents and employees responsible access to the area where LIQUID BOOT is installed during the business hours during the term of this warranty. No employee of EAI, Inc. or any other party is authorized to make any warranty in addition to those made in this warranty.

Signature: _____ Date: _____

Name: _____

Company: _____

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 8/17/2018
TRANSMITTAL #: 416

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-020:Liquid Boot 500 Plus QA/QC Field Report 08/05/18	1	Submited for Approval	

Additional Notes: PC1702-046

Alex Chung, PMP

Reviewed by: Chaudhry Ahmad

Date: 8/17/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot 500 Plus QA/QC Field Report

Project: LIRR Morris Park Date: 8/15/18 Weather: Sunny 90°F

Area: Locomotive Pit - South Inspection Performed: ☐Smoke Test ☑Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations			✓	
b. VI-20 overlap			✓	
c. Foundation contact			✓	
d. Elevator pit walls	✓			Locomotive Pit Walls
6. Smoke testing at approximately every 2,500 ft²	✓		✓	
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation			✓	
7. Protection course installation	✓			VI-20

	Test #	Mils	Test #	Mils	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	71	6	70	11		16		21		
	2	62	7	45	12		17		22		
	3	61	8	72	13		18		23		
	4	63	9	70	14		19		24		
	5	55	10		15		20		25		

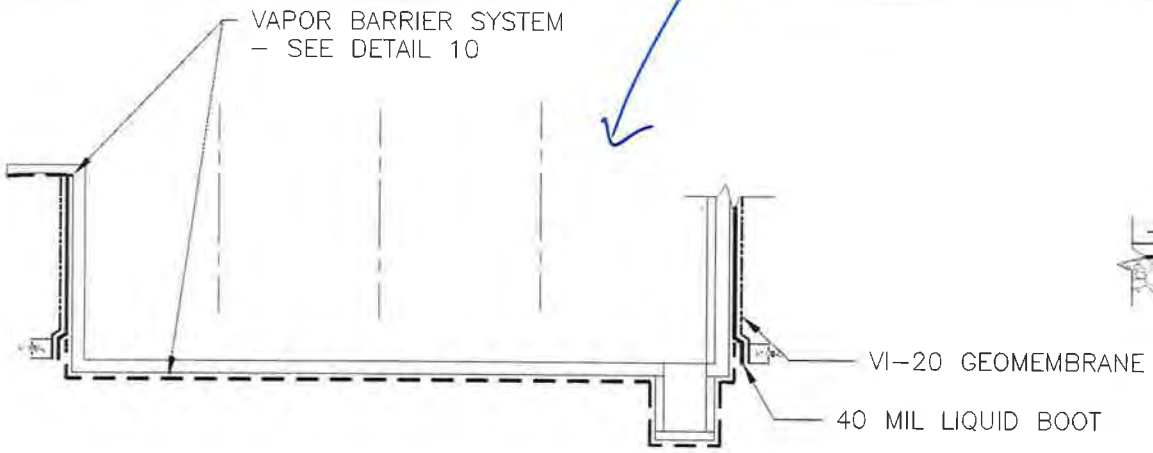
Jessica Telano — EAI Foreman /PM / Supervisor

Signature — Date: 8/15/18

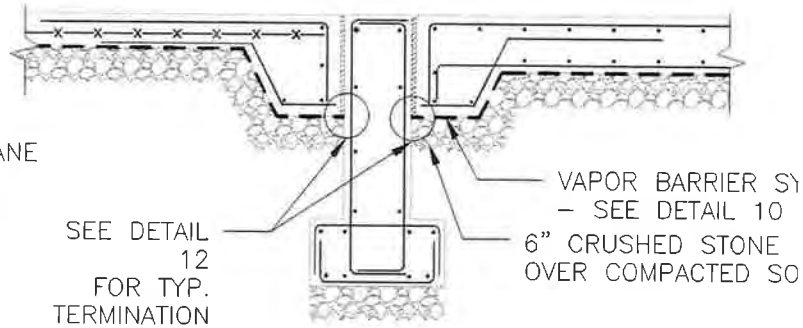
Third Party Witness Name/Title/Company (if applicable)

Signature — Date

SOUTH LOCOMOTIVE PIT DETAIL

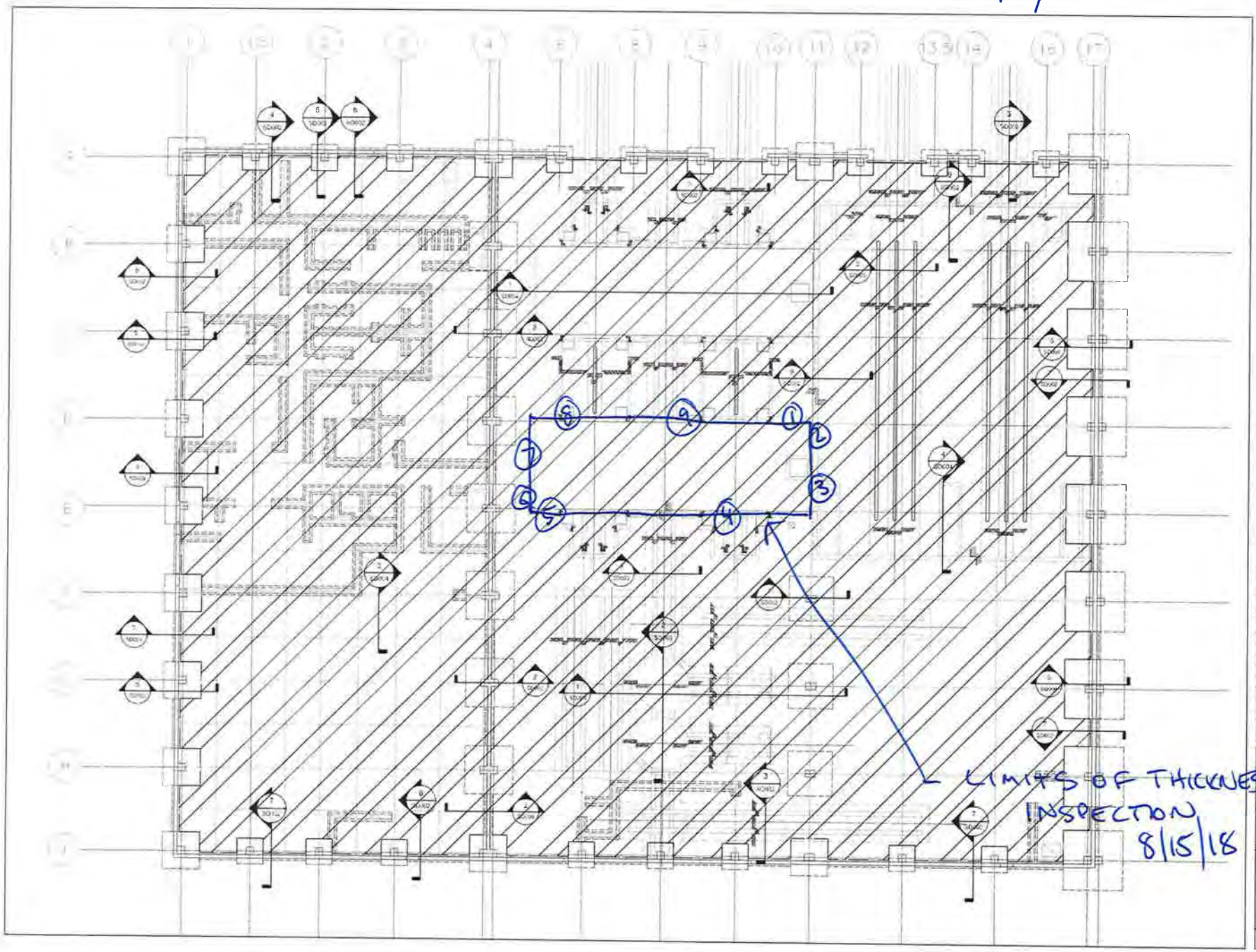


1 / SD004 SECTION AS PER 1/S-401
N.T.S.



2 / SD004 SECTION AS PER 7/S-504
N.T.S.

SOUTH LOCOMOTIVE PIT WALL THICKNESS INSPECTION 8/16/18



Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Drawn by:	BD
Checked by:	ZT
Scale: 3/32" = 1'	Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY
88 121ST STREET
RICHMOND HILL, NY 11418

Drawing title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.: SD001

Sheet in Drawing Set: 01 of 04

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 8/22/2018
TRANSMITTAL #: 428

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-021:Hold Point Inspection Report - 08/21/18	1	Submitted for Approval	

Additional Notes: Vapor Barrier - North Pit Walls
PC1702-046

Alex Chung, PMP

Railroad Construction Company, Inc.
RCC
Contractors Engineers
Est 1920

AMCC CORP
BUILDERS
ENGINEERS
CONSTRUCTION MANAGERS

RCC / AMCC - A Joint Venture

75-77 Grove Street • Paterson, NJ 07503 • Phone: 973-684-0362 • Fax: 973-684-1355

HOLD POINT INSPECTION REPORT

PROJECT No.: 6241
DESCRIPTION: MORRIS PARK LOCOMOTVIE SHOP

PREPARED BY: CHAUDHRY AHMAD
REPORT NO. 018
DATE PREPARED: 8/22/2018

CONTRACTOR: RCC/AMCC
SUB CONTRACTOR: EAI Inc.
SPECIFICATION SECTION: 072600
DRAWING/SPEC.NUMBER: SD001 & SD014

LOCATION OF WORK: NORTH Pit Walls
DATE OF WORK: 8/21/2018
INSPECTOR (Agency, Name): N/A
INSPECTOR'S TITLE: N/A
INSPECTOR'S CERTIFICATION #: N/A
CERT. EXPIRATION DATE: N/A

HOLD POINT INSPECTION ACTIVITIES:

Corey Morkovitch of EAI inc performed thickness test of the Vapor Barrier membrane (Liquid Boot 500 Plus) Sprayed on the walls of the North pit. Gary Tozzo witnessed the test.

INSPECTION STATUS (Accept/Reject/NCR #): Accept

REMARKS: Complete Thin areas respayed

SIGNED BY:
CONTRACTOR: [signature] DATE: 8/22/2018
SUB-CONTRACTOR: Signed the attached Sheet DATE:
WITNESSED BY (Owner's Rep.): [signature] DATE: 8/22/18

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIRR Date: 8/21/18 Weather: Sunny

Area: NORTH LOCOMOTIVE PIT Inspection Performed: ☐Smoke Test ☐Thickness Test ✓

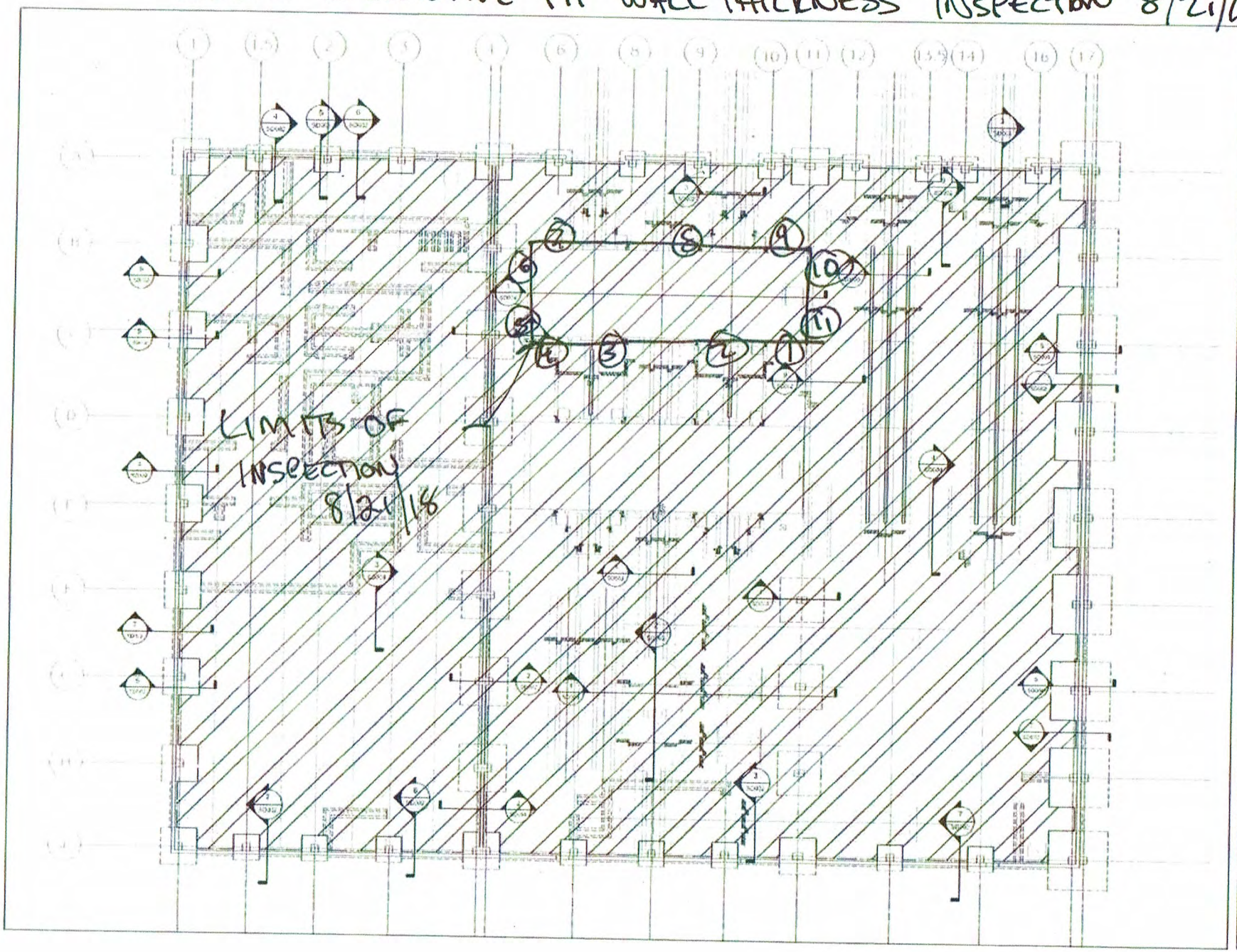
Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations				
b. VI-20 overlap			✓	
c. Foundation contact	✓			
d. Elevator pit walls	✓			
6. Smoke testing at approximately every 2,500 ft²			✓	
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation			✓	
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	42	6	50	11	70	Thin areas re sprayed to appropriate thickness
	2	55	7	35	12		
	3	72	8	42	13		
	4	61	9	50	14		
	5	41	10	72	15		

Corey Markovitch — EAI Foreman — Signature — 8/21/2018 Date

CHAUDHRY, RCC/AMEC — Third Party Witness Name/Title/Company (if applicable) — Signature — Date

NORTH LOCOMOTIVE PIT WALL THICKNESS INSPECTION 8/21/18



LEGEND:

HORIZONTAL EXTENT OF UNDERSLAB VAPOR BARRIER

NOTES:

1. DRAWINGS NOT TO BE USED FOR ARCHITECTURAL OR STRUCTURAL DETAILS OR CONSTRUCTION. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR DETAILS.
2. SURFACE PREPARATION DIRECTIONS.
3. EXCAVATION/BACKFILL REQUIREMENTS.

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer	
Drawn by	DD
Checked by	ZT
Scale	3/32" = 1'
Date	5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheets in Drawing Set:
01 of 04

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 8/24/2018
TRANSMITTAL #: 437

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-022:North Locomotive Pit Inspection Report - 08/21/18	1	Submitted for Approval	

Additional Notes: PC1702-046

Alex Chung, PMP

Reviewed by: Chaudhry Ahmad

Date: 8/24/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIRR Date: 8/21/18 Weather: Sunny

Area: NORTH LOCOMOTIVE PIT Inspection Performed: ☐Smoke Test ☐Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations				
b. VI-20 overlap			✓	
c. Foundation contact	✓			
d. Elevator pit walls	✓			
6. Smoke testing at approximately every 2,500 ft²			✓	
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation			✓	
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	42	6	50	11	70	Thin areas re sprayed to appropriate thickness
	2	55	7	35	12		
	3	72	8	42	13		
	4	61	9	70	14		
	5	41	10	72	15		

Corey Markovitch
EAI Foreman

Signature

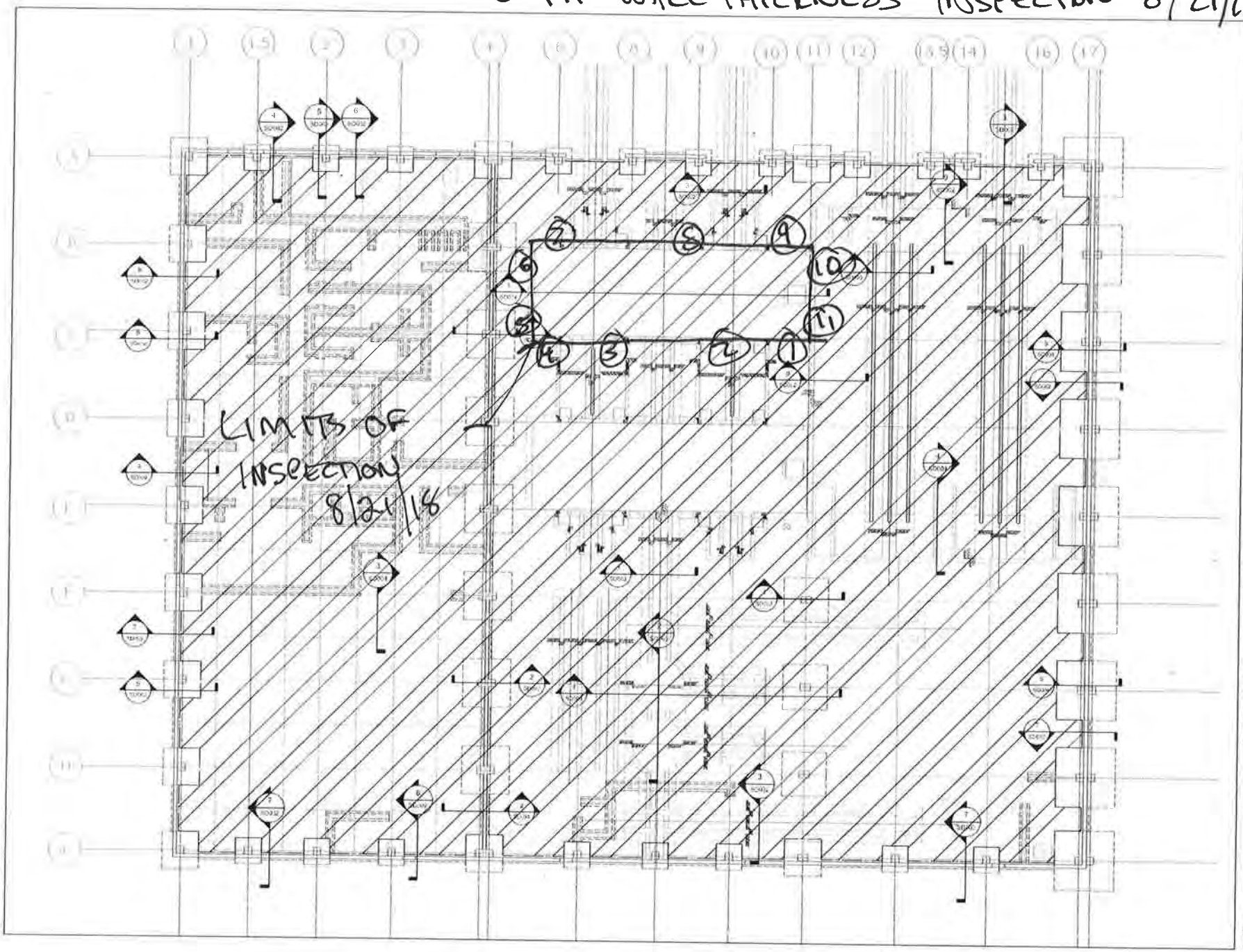
8/21/2018
Date

CHADDHARY, RCC/AMEC
Third Party Witness Name/Title/Company (if applicable)

Signature

Date

NORTH LOCOMOTIVE PIT WALL THICKNESS INSPECTION 8/21/18



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWINGS NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER SLAB VAPOR BARRIER SYSTEM. SEE DETAIL
2. SURFACE PREPARATION BY OTHERS
3. EXCAVATION/BACKFILL BY OTHERS

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer:	
Drawn by:	DD
Checked by:	ZT
Scale: 3/32" = 1'	Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheet 1 of Drawing Set
01 of 04

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 8/27/2018
TRANSMITTAL #: 443

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-023:Liquid Boot Thickness TR 08/25/18 - Loco Pits Upper Section	1	Submitted for Approval	

Additional Notes: PC1702-046

Alex Chung, PMP

Reviewed by:
Chaudhry Ahmad

Date: 8/28/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIRR Date: 8/25/18 Weather: SUNNY 80°F

Area: LOCOMOTIVE PITS Inspection Performed: ☐Smoke Test ☑Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations			✓	
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls	✓			
6. Smoke testing at approximately every 2,500 ft²			✓	
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation	✓		✓	
7. Protection course installation	✓			

Thickness Testing (if applicable):	Test #	Mils	Test #	Mils	Test #	Mils	Test #	Mils	Test #	Mils
	1	62	6	41	11	43	16	61	21	53
	2	54	7	49	12	42	17	42		
	3	42	8	51	13	46	18	46		
	4	50	9	61	14	44	19	43		
	5	60	10	48	15	46	20	62		

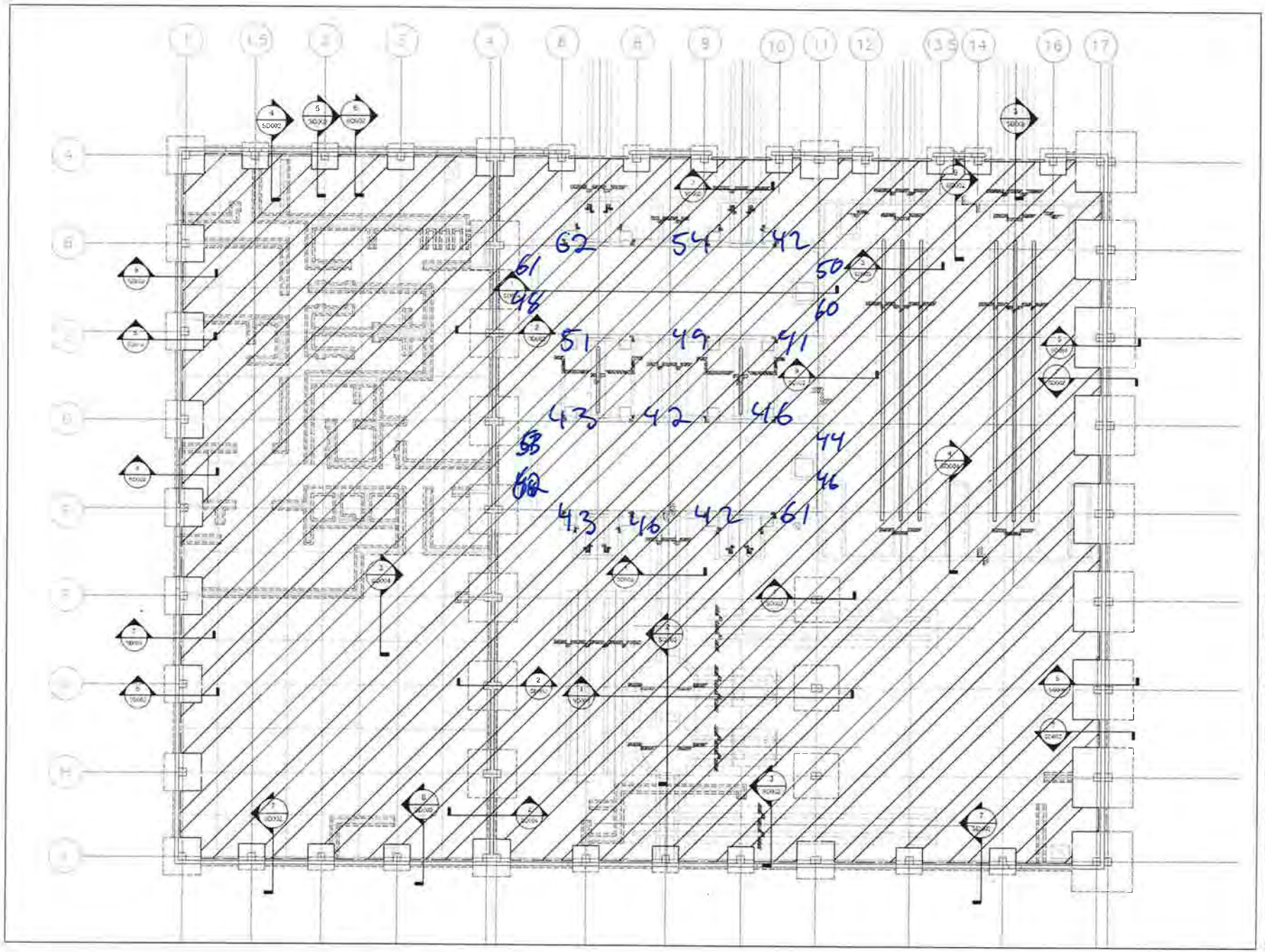
ANTHONY SICILIANO — EAI Foreman

Signature — Date: 8/25/18

Third Party Witness Name/Title/Company (if applicable)

Signature — Date

THICKNESS INSPECTIONS LOCOMOTIVE PITS (TOP 10') 8/25/18



LEGEND:

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL STRUCTURAL OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL
2. SURFACE PREPARATION BY OTHERS
3. EXCAVATION BACKFILL BY OTHERS

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designed:	
Drawn by:	SD
Checked by:	ZT
Scale: 3/32" = 1'	Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 9/07/2018
TRANSMITTAL #: 485

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-024:Liquid Boot Thickness Tr 09/05/18 - N & S Pits Upper Section	1	Submitted for Approval	

Additional Notes:

Alex Chung, PMP

Reviewed by: Chaudhry Ahmad

Date: 9/7/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot 500 Plus QA/QC Field Report

Project: LIRR Morris Park Date: 9/5/18 Weather: Sunny 90°F

Area: Locomotive Pit Inspection Performed: ☐Smoke Test ☒Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications			✓	
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations			✓	
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls	✓			
6. Smoke testing at approximately every 2,500 ft^2			✓	
7. Thickness testing at approximately every 500 ft^2	✓			
8. Installation of all subsurface components prior to protection course installation			✓	
7. Protection course installation	✓			

Thickness Testing (if applicable):	Test #	Mils	Test #	Mils	Test #	Mils	Notes
	1	78	6	44	11	42	
	2	52	7	65	12	52	
	3	40	8	65	13		
	4	65	9	55	14		
	5	54	10	50	15		

Jessica Telano — EAI Foreman/PM

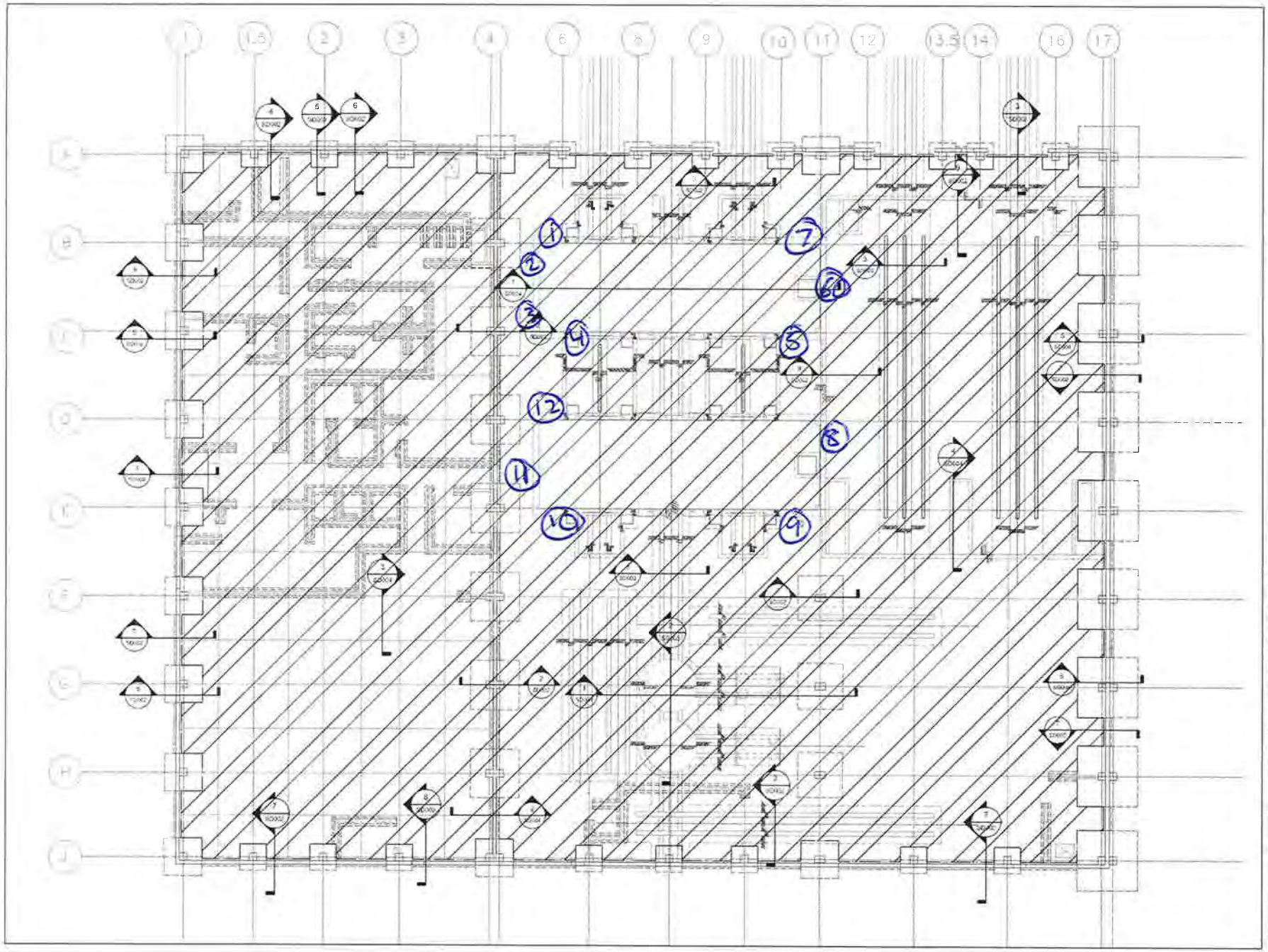
Signature — Date: 9/5/18

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

THICKNESS TEST 9/5/18



LEGEND:

HORIZONTAL EXTENT OF UNDERSLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL STRUCTURAL OR ANY PURPOSE OTHER THAN UNDERSLAB VAPOR BARRIER SYSTEM - SEE DETAIL
2. SUBBASE PREPARATION BY OTHERS
3. EXCAVATIONS AS LETTERED

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer:	
Drawn By:	DD
Checked By:	ZT
Scale: 3/32" = 1'	Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheets in Drawing Set:
01 of 04

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 9/19/2018
TRANSMITTAL #: 507

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-025:Liquid Boot Thickness TR 09/17/18 - SOG @ Loco Pits	1	Submitted for Approval	

Additional Notes: PC1702-046

Alex Chung, PMP

Reviewed by: Chaudhry Ahmad

Date: 9/19/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot 500 Plus QA/QC Field Report

Project: LIRR MORRIS PARK Date: 9/17/18 Weather: 85°F, PARTLY CLOUDY & SUNNY

Area: SLAB ON GRADE NEAR PITS Inspection Performed: ☑ Smoke Test ☑ Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations			✓	
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft²	✓			
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	74	6	67	11		
	2	73	7		12		
	3	64	8		13		
	4	75	9		14		
	5	66	10		15		

ANTHONY SICILIANO — EAI Foreman

Signature

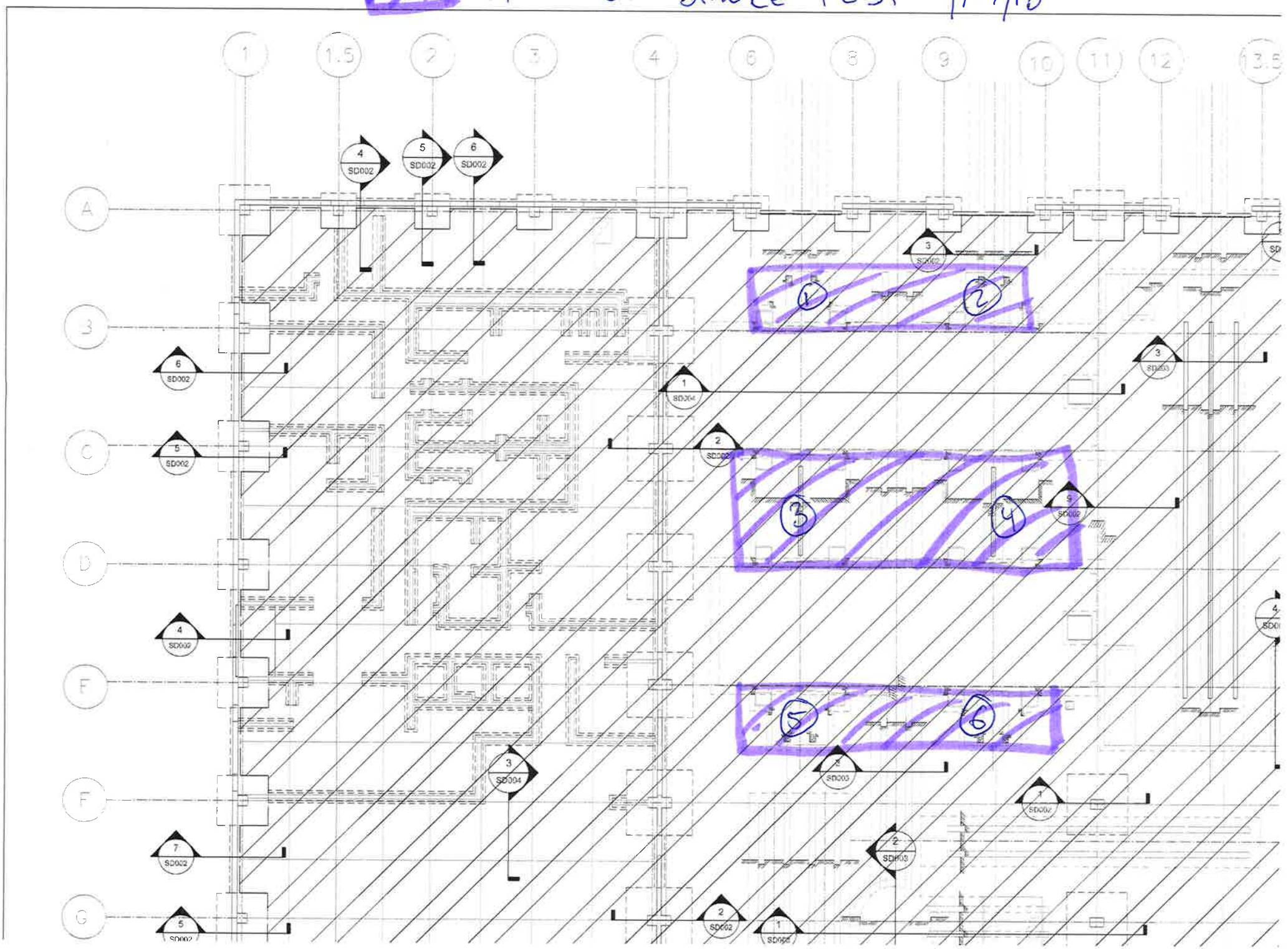
9/18/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

AREA OF SMOKE TEST 9/17/18



LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 10/08/2018
TRANSMITTAL #: 561

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-026:Liquid Boot Thickness TR 10/01/18 - SOG Zone B	1	Submitted for Approval	

Additional Notes:

Alex Chung, PMP

Reviewed by:

Chaudhry Ahmad

Date: 10/9/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot 500 Plus QA/QC Field Report

Project: LRR Date: 10/1/18 Weather: Cloudy 68°F

Area: COLUMN F-J, 1-4 Inspection Performed: ☑ Smoke Test ☑ Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft²	✓			
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	62	6		11		16		21		
	2	63	7		12		17		22		
	3	60	8		13		18		23		
	4	62	9		14		19		24		
	5	69	10		15		20		25		

ANTHONY SICILIANO — EAI Foreman

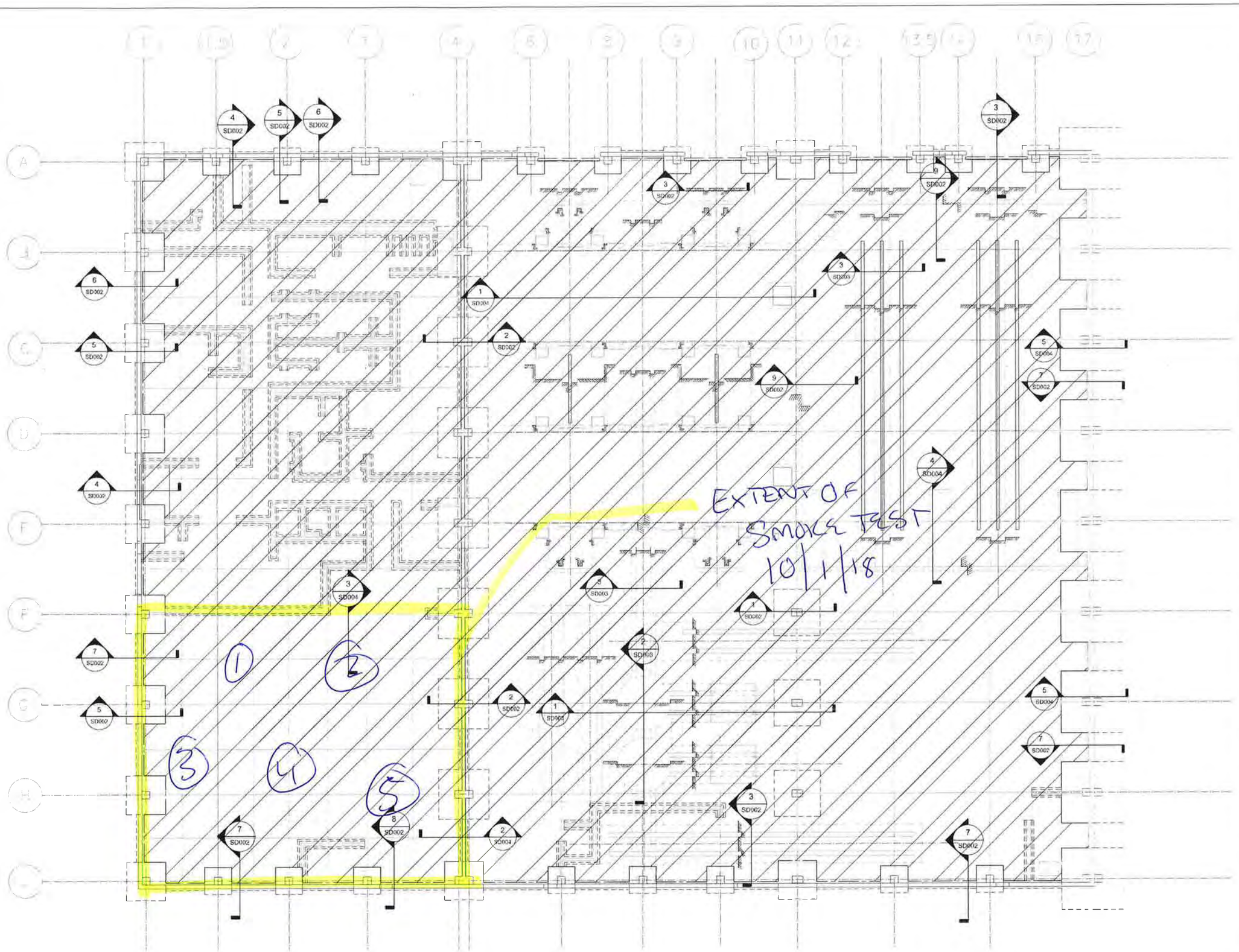
Signature

10/1/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

No	Date	Revision

Designer:		
Drawn by:	DD	
Checked by:	ZT	
Scale: 3/32" = 1'		Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 10/19/2018
TRANSMITTAL #: 612

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-027:Liquid Boot Thickness TR 10/16 - SOG Zone A South Half	1	Submitted for Approval	

Additional Notes:

Alex Chung, PMP

Reviewed by:
Chaudhry Ahmad

Date: 10/22/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot 500 Plus QA/QC Field Report

Project: LIRR Date: 10/16/18 Weather: Cloudy 63°

Area: Slab on grade C-F, 1-4 Inspection Performed: ☑ Smoke Test ☑ Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:	✓			
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft^2	✓			
7. Thickness testing at approximately every 500 ft^2	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	79	6		11		
	2	66	7		12		
	3	71	8		13		
	4	67	9		14		
	5		10		15		

Anthony Siciliano — EAI Foreman

Signature

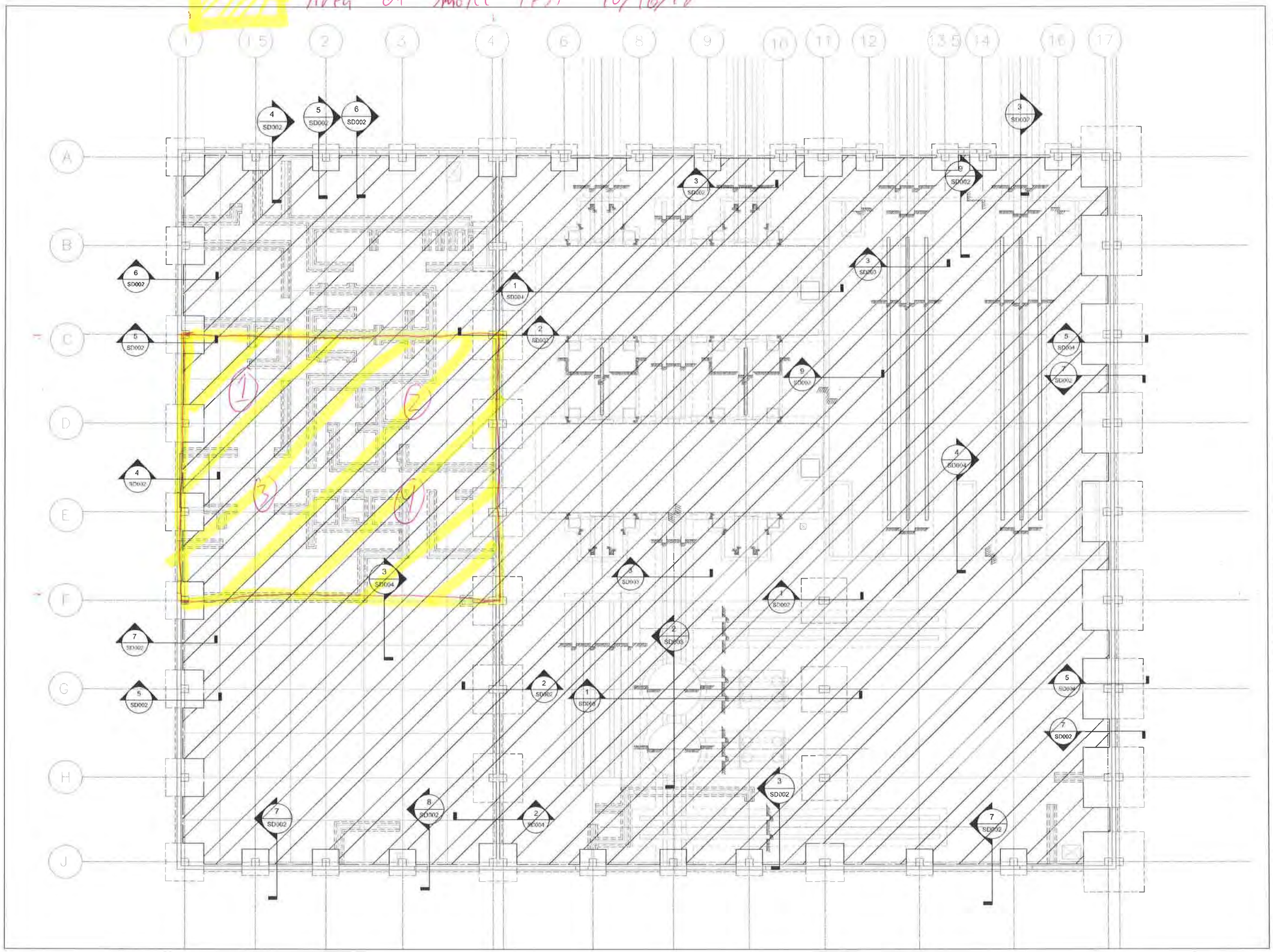
10/16/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

Area of Smoke Test 10/16/18



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS
3. EXCAVATION/BACKFILL BY OTHERS.

Environmental Management Services

50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

No.	Date	Revision

Designer:		
Drawn by:	DD	
Checked by:	ZT	
Scale: 3/32" = 1'		Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No:
SD001

Sheets in Drawing Set:
01 of 04

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 11/02/2018
TRANSMITTAL #: 648

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-028:Liquid Boot Thickness TR 10/26/18 - Top of North Loco Pit	1	Submitted for Approval	
Submittal Register	72600-029:Liquid Boot Thickness TR 10/29/18 - Top of South Loco Pit	1	Submitted for Approval	
Submittal Register	72600-030:Liquid Boot Thickness Test Report 11/01/18 - Columns A:C,1:4	1	Submitted for Approval	

Additional Notes: PC1702-046

Alex Chung, PMP

Reviewed by: Chaudhry Ahmad

Date: 11/2/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIRR MORRIS PARK Date: 10/26/18 Weather: PARTLY CLOUDY 52°F

Area: NORTH LOCOMOTIVE PIT Inspection Performed: ☐Smoke Test ☑Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations			✓	
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls	✓			
6. Smoke testing at approximately every 2,500 ft²			✓	
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation			✓	
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	78	6		11		
	2	61	7		12		
	3	61	8		13		
	4	65	9		14		
	5		10		15		

ANTHONY SICILIANO
EAI Foreman

Signature

10/26/18
Date

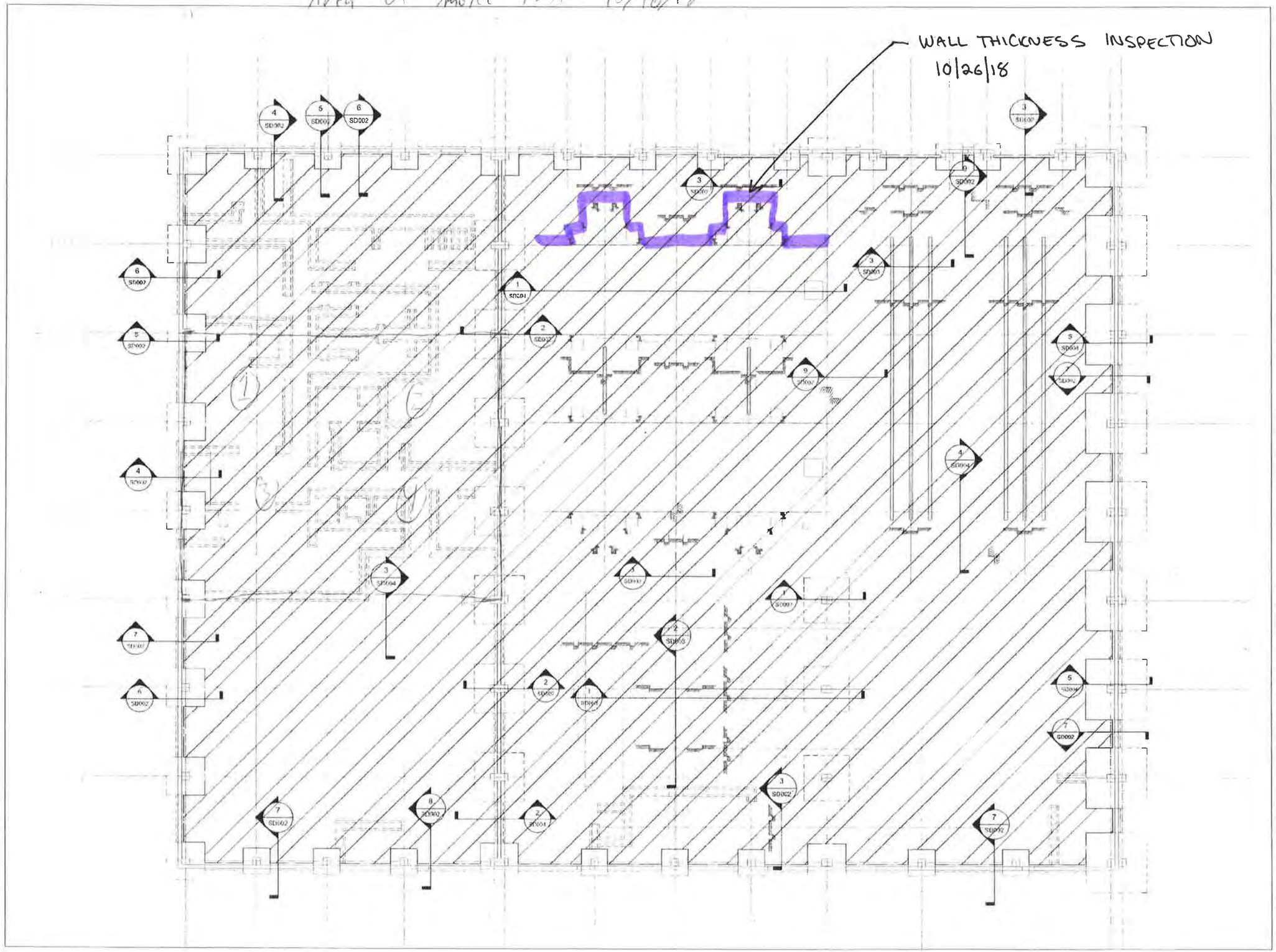
Third Party Witness Name/Title/Company (if applicable)

Signature

Date

Area of Smoke Test 10/16/18

WALL THICKNESS INSPECTION
10/26/18



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS
3. EXCAVATION/BACKFILL BY OTHERS.

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

No.	Date	Revision

Designer:		
Drawn by:	DD	
Checked by:	ZT	
Scale: 3/32" = 1'		Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No:
SD001

Sheets in Drawing Set:
01 of 04

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIBERTY MORRIS PARK Date: 10/29/18 Weather: PARTLY SUNNY 53°F

Area: SOUTH LOCOMOTIVE PIT Inspection Performed: ☐Smoke Test ☑Thickness Test

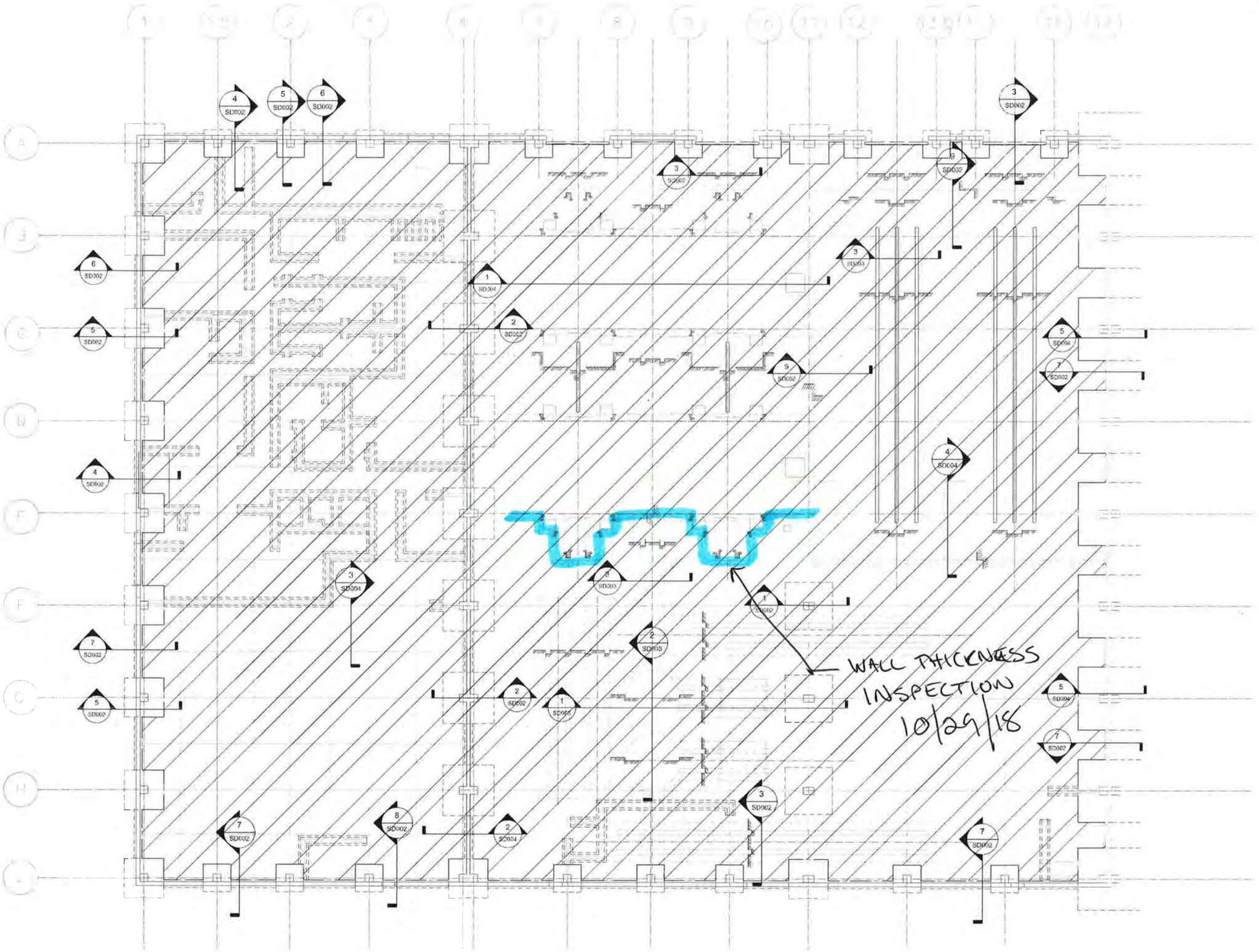
Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:			✓	
a. Penetrations			✓	
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls	✓			
6. Smoke testing at approximately every 2,500 ft^2			✓	
7. Thickness testing at approximately every 500 ft^2	✓			
8. Installation of all subsurface components prior to protection course installation			✓	
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	63	6		11		
	2	65	7		12		
	3	61	8		13		
	4	70	9		14		
	5		10		15		

ANTHONY SICILIANO — Anthony Siciliano — 10/29/18

EAI Foreman — Signature — Date

Third Party Witness Name/Title/Company (if applicable) — Signature — Date



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

No:	Date	Revision

Designer:		
Drawn by:	DD	
Checked by:	ZT	
Scale: 3/32" = 1'		Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No:
SD001

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIRR MORRIS PARK Date: 11/1/18 Weather: SUNNY 68°F

Area: COLUMN A:C, 1:4 COLUMN Inspection Performed: ☑ Smoke Test ☑ Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft^2	✓			
7. Thickness testing at approximately every 500 ft^2	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	60	6	62	11		
	2	68	7		12		
	3	65	8		13		
	4	64	9		14		
	5	69	10		15		

ANTHONY SICILIANO — EAI Foreman

Anthony Siciliano — Signature

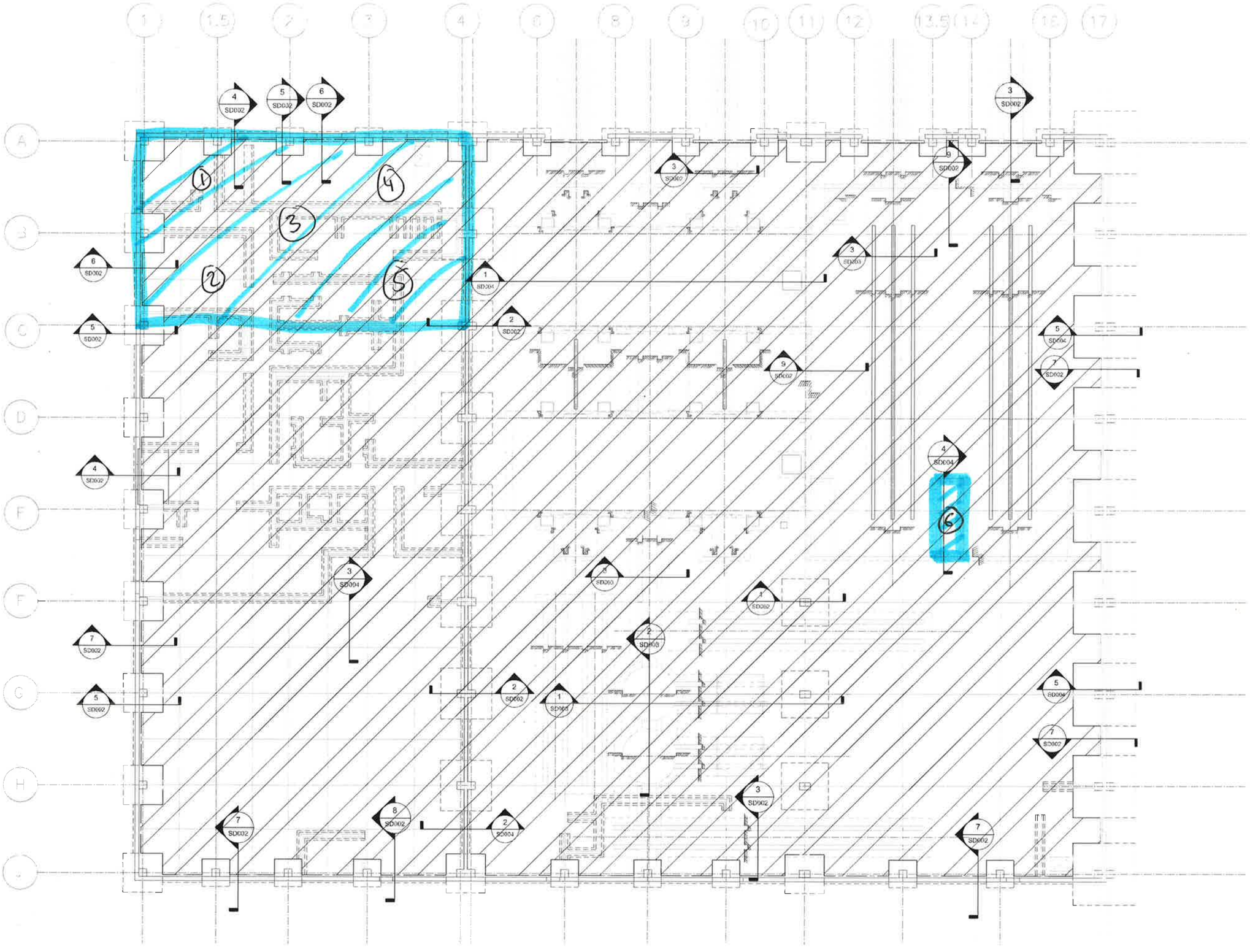
11/1/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

EXTENT OF SMOKE TEST PERFORMED 11/1/18



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

No.	Date	Revision

Designer:		
Drawn by	DD	
Checked by:	ZT	
Scale: 3/32" = 1'		Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No:
SD001

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 11/19/2018
TRANSMITTAL #: 702

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-033:Smoke Test SOG TR 11/08/18 - Areas 4:17, E:4	1	Submitted for Approval	
Submittal Register	72600-034:Thickness Deep Pit Walls TR 11/09/18 - 13.5:14, D:F	1	Submitted for Approval	
Submittal Register	72600-035:Smoke Test TR 11/17/18 - Zone C - South 1/2	1	Submitted for Approval	

Additional Notes:

Alex Chung, PMP

Reviewed by:
Chaudhry Ahmad

Date: 11/20/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIRR Morris Park Date: 11/5/18 Weather: Sunny 60-65°F

Area: 2 Areas: 4:17, E:H Inspection Performed: ☑ Smoke Test ☑ Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft²	✓			
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

Thickness Testing (if applicable):	Test #	Mils	Test #	Mils	Test #	Mils	Notes
	1	66.5	6	69	11		
	2	62	7	72	12		
	3	68	8	68.5	13		
	4	63	9	66	14		
	5	66	10		15		

Anthony Siciliano — EAI Foreman

Anthony Siciliano — Signature

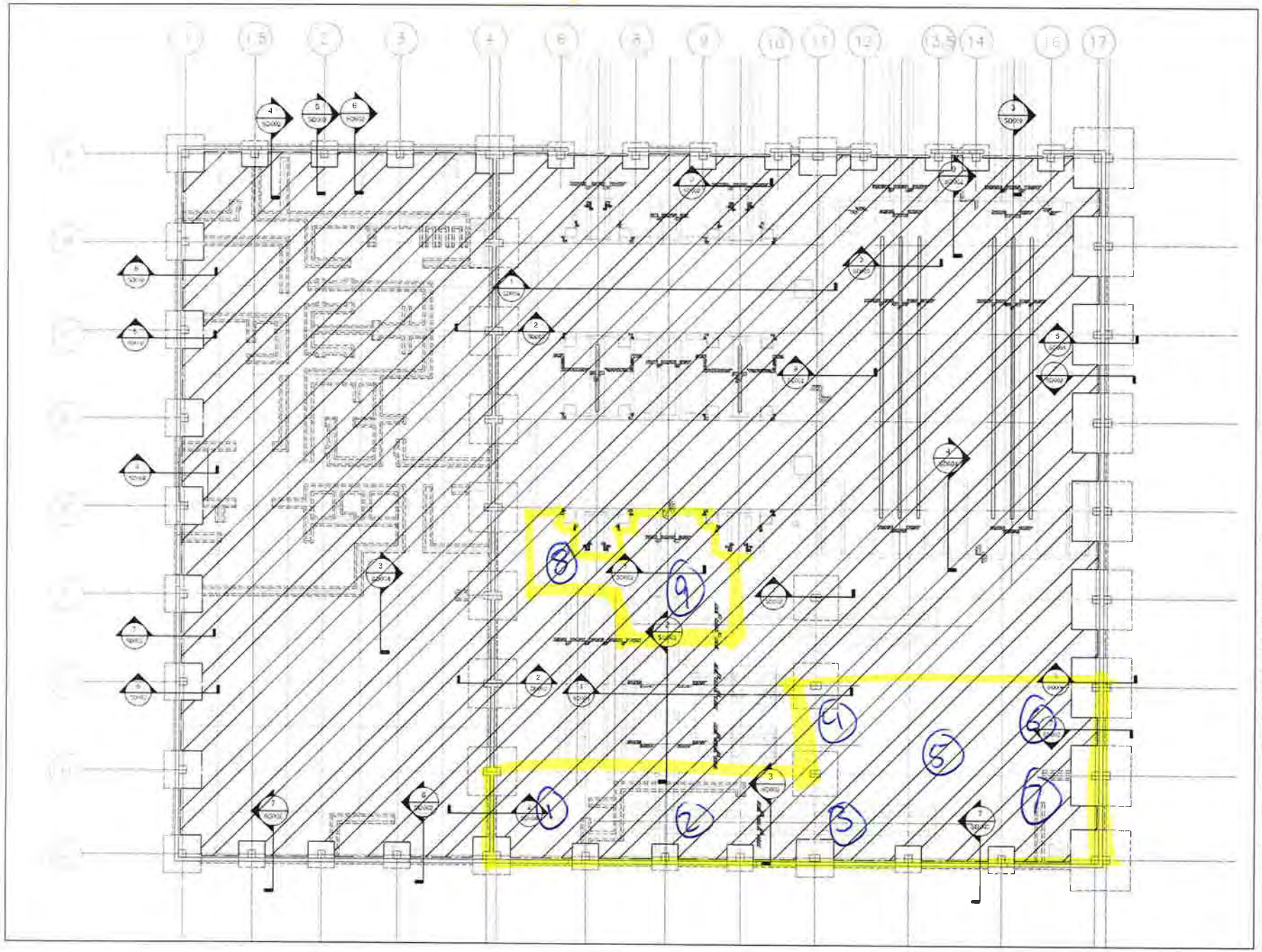
11/6/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

SMOKE TEST 11/8/18



Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer:		
Drawn by:	SD	
Checked by:	ZT	
Scale: 3/32" = 1'		Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheet 9 in Drawing Set
23 of 64

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIRR MORRIS PARK Date: 11/9/18 Weather: SUNNY 65°F

Area: PIT WALLS 13.5:14, D:F Inspection Performed: ☐Smoke Test ☑Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications			✓	
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls	✓			
6. Smoke testing at approximately every 2,500 ft²			✓	
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	60	6		11		
	2	60	7		12		
	3	68	8		13		
	4	63	9		14		
	5		10		15		

ANTHONY SICILIANO
EAI Foreman

Anthony Siciliano
Signature

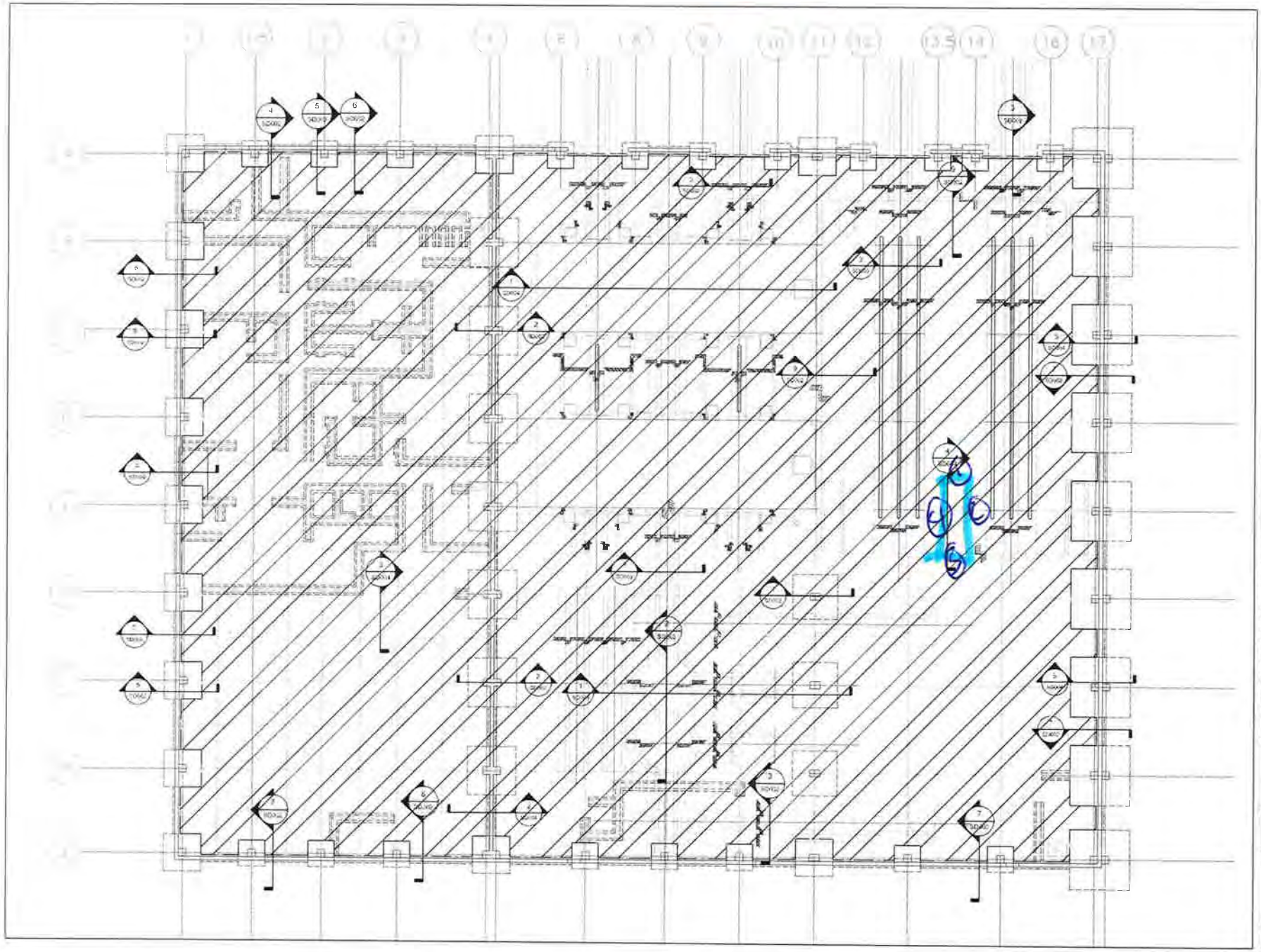
11/9/18
Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

THICKNESS TEST WALLS 11/9/18



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL
2. SUBBASE PREPARATION BY OTHERS
3. [illegible] BY OTHERS

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer:	
Drawn By:	SD
Checked by:	JT
Scale: 3/32" = 1'	Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.: SD001

Sheets in Drawing Set: 01 of 04

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: Long Island Railroad Date: 11/17/18 Weather: Cloudy 48°F

Area: Zone C - South ½ Inspection Performed: ☑Smoke Test ☑Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications				
3. VI-20 installed	✓			
4. Liquid Boot installed at all:	✓			
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft²	✓			
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	>60	6		11		
	2	>60	7		12		
	3	>60	8		13		
	4	>60	9		14		
	5	>60	10		15		

Luis Aguilar — EAI Foreman

Luis Aguilar — Signature

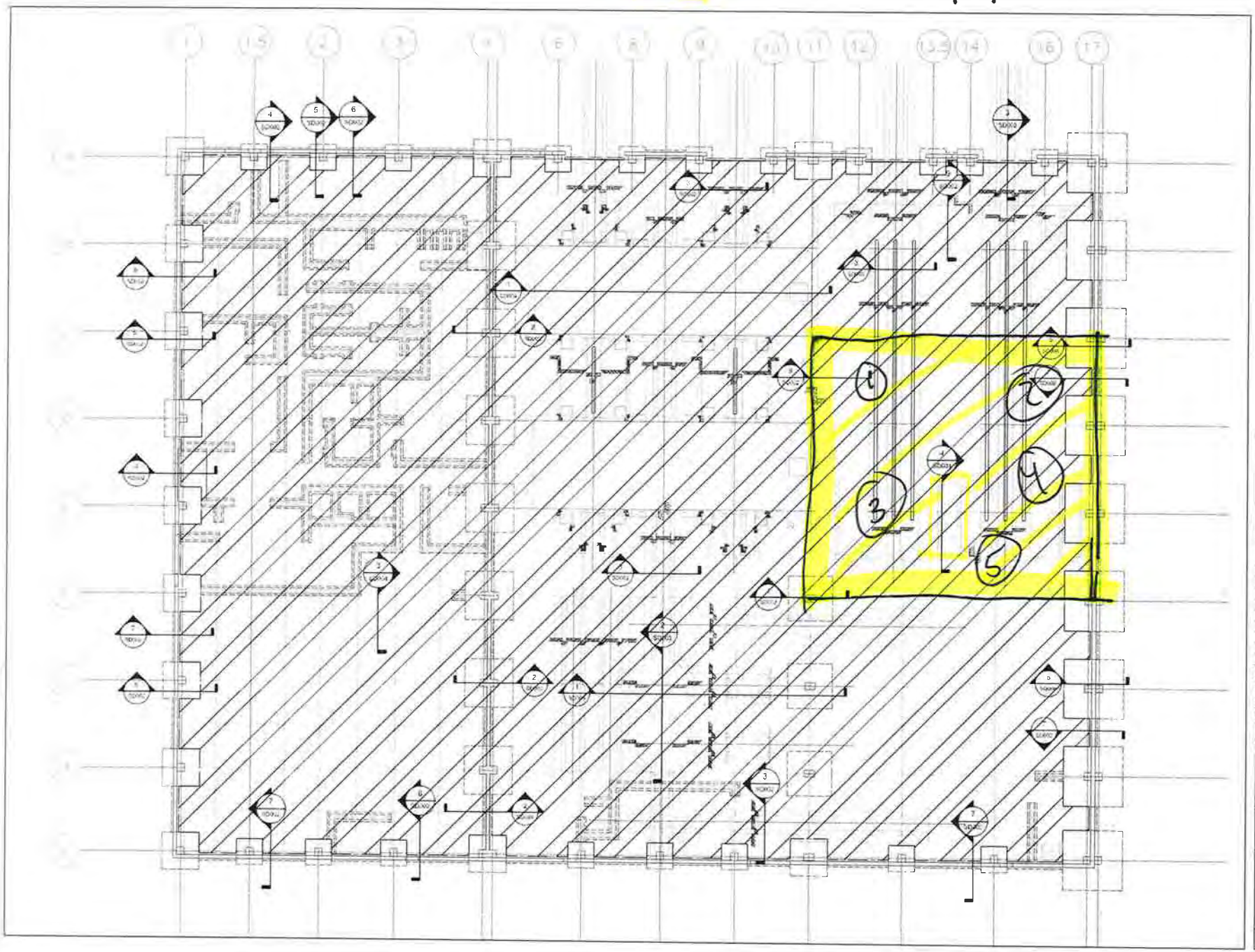
11/17/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

Smoke Test 11/17/18



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL
2. SUBFACE PREPARATION BY OTHERS
3. EXCAVATION/BACKFILL BY OTHERS

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer	
Drawn by	SD
Checked by	ZT
Scale	3/32" = 1'
Date	5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheets in Drawing Set:
01 of 04

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 12/07/2018
TRANSMITTAL #: 752

RCC / AMCC - A JOINT VENTURE

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-036:Smoke Test TR 11/28/18 - Zone C - North Side	1	Submitted for Approval	

Additional Notes:

Alex Chung, PMP

Reviewed by:
Chaudhry Ahmad

Date: 12/7/2018

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot QA/QC Field Report

Project: LIRR Date: 11/28/18 Weather: OVERCAST 45°F

Area: Columns 11:17, A.5:D Inspection Performed: ☑ Smoke Test ☑ Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft^2	✓			
7. Thickness testing at approximately every 500 ft^2	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	69	6		11		
	2	64	7		12		
	3	70	8		13		
	4	65	9		14		
	5		10		15		

ANTHONY SICILIANO — EAI Foreman

Anthony Siciliano — Signature

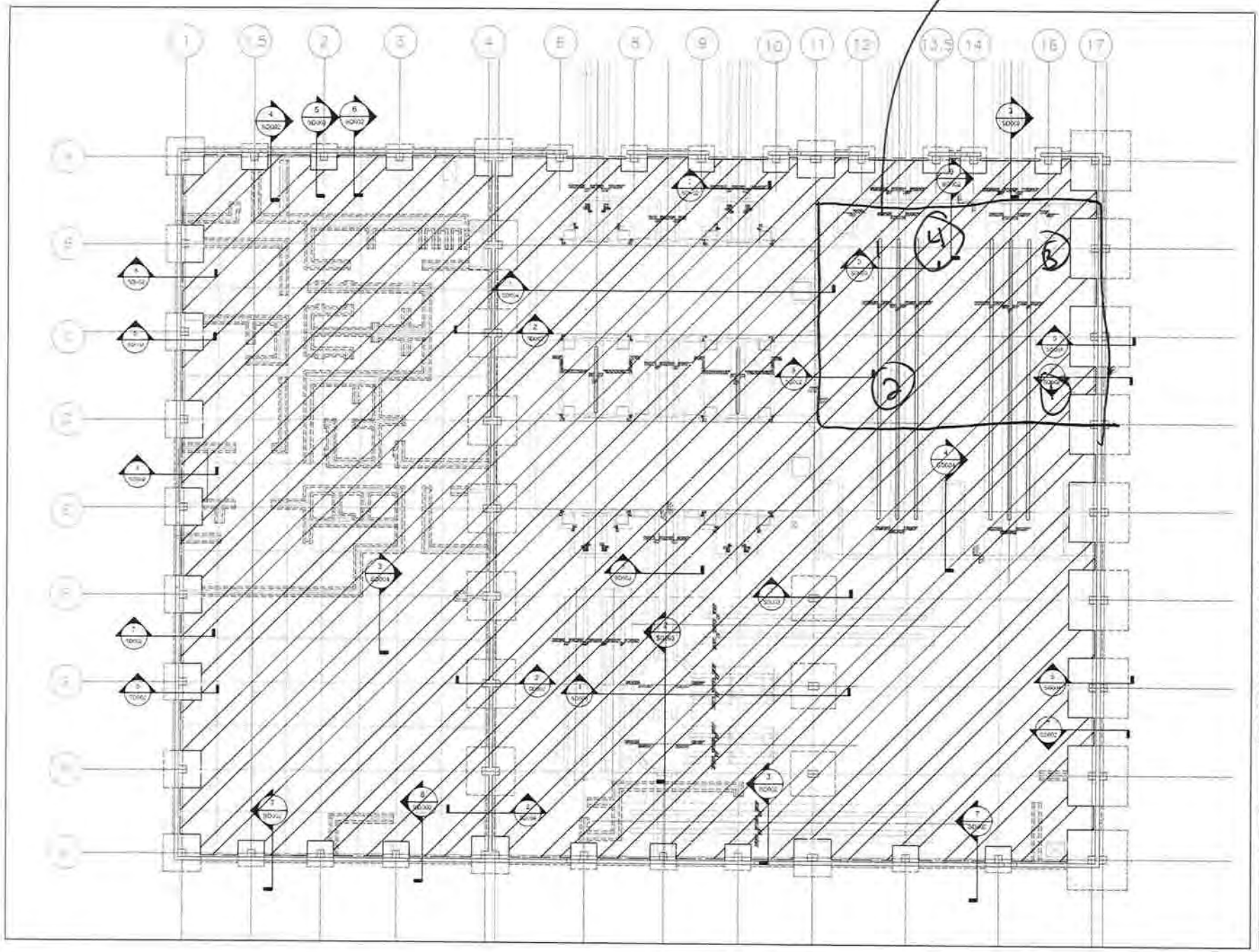
11/28/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

SMOKE TEST AREA 11/28/18



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL, OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 1/D
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer:		
Drawn by:	SD	
Checked by:	JT	
Scale: 3/32" = 1'		Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheets in Drawing Set:
01 of 04

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 1/02/2019
TRANSMITTAL #: 808

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-037:Smoke Test Hold Point Inspection Report 12/07/18	1	Submitted for Approval	
Submittal Register	72600-038:Smoke Test Hold Point Inspection Report 12/18/18	1	Submitted for Approval	

Additional Notes:

Alex Chung, PMP

Railroad Construction Company, Inc.
AMCC CORP
BUILDERS
ENGINEERS
CONSTRUCTION MANAGERS
RCC / AMCC - A Joint Venture
75-77 Grove Street • Paterson, NJ 07503 • Phone: 973-684-0362 • Fax: 973-684-1355

HOLD POINT INSPECTION REPORT

PROJECT No.: 6241
DESCRIPTION: Morris Park Locomotive Shop

PREPARED BY: Chaudhry Ahmad
REPORT NO. 72
DATE PREPARED: 12/28/2018

CONTRACTOR: RCC / AMCC
SUB CONTRACTOR: EAI, Inc.
SPECIFICATION SECTION: 072600
DRAWING/SPEC.NUMBER: SD 001

LOCATION OF WORK: Area C and Area C&D shown on the attached drgs.
DATE OF WORK: 12/7, 18/2018
INSPECTOR (Agency, Name):
INSPECTOR'S TITLE:
INSPECTOR'S CERTIFICATION #:
CERT. EXPIRATION DATE:

HOLD POINT INSPECTION ACTIVITIES:

Anthony Sicitiano of EAI performed thickness measurements of the installed vapor barrier and performed smoke test on 12/7/2018
Luis Aguilar of EAI performed thickness measurements and the smoke test for the installed vaporbarrier on 12/8/2018
Tests witnessed by Gary Tozzo. Tests passed on both days

INSPECTION STATUS (Accept/Reject/NCR #): Accept

REMARKS: N/A

SIGNED BY:
CONTRACTOR: [signature] DATE: 12/28/2018
SUB-CONTRACTOR: Signed the attached sheets DATE:
WITNESSED BY (Owner's Rep.): [signature] DATE: 12/28/18

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot 500 Plus QA/QC Field Report

Project: Long Island Railroad Date: 12/18/18 Weather: SUNNY 30-35°F

Area: (on drawing) Inspection Performed: ☑ Smoke Test ☑ Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls				
6. Smoke testing at approximately every 2,500 ft²	✓			
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	>60	6		11		
	2	>60	7		12		
	3	>60	8		13		
	4		9		14		
	5		10		15		

Luis Aguilar — EAI Foreman

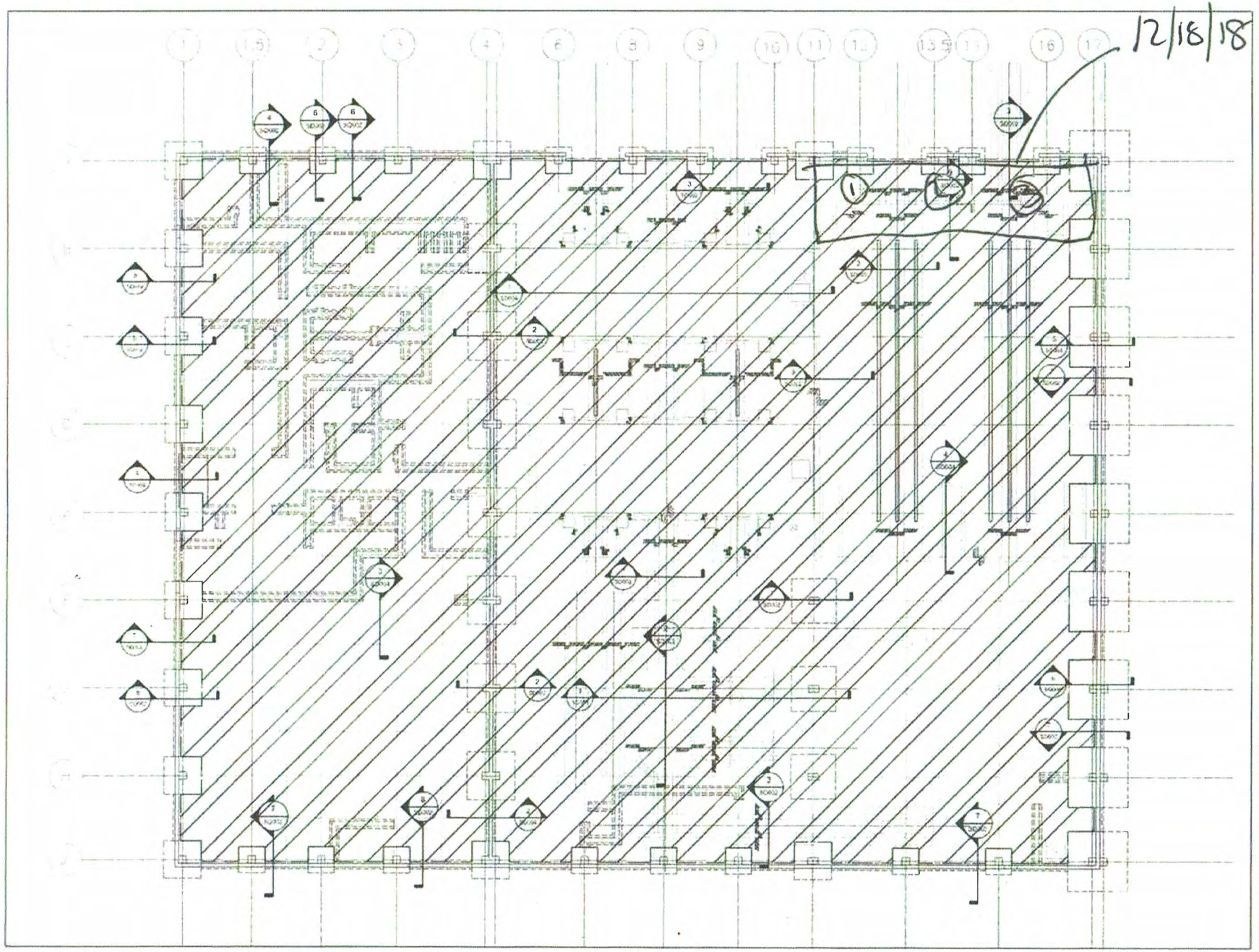
Luis Aguilar — Signature

12/18/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date



12/18/18

LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWINGS NOT TO BE USED FOR ARCHITECTURAL, STRUCTURAL OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 1/...
2. SURFACE PREPARATION BY OTHERS.
3. ELEVATION SHOWN ... BY OTHERS.

Environmental Management Services

50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

No.	Date	Issued

Designed by:	
Drawn by:	SG
Checked by:	ZT
Scale: 3/32" = 1'	Date: 5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheet in Drawing Set: 01 of 04

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot 500 Plus QA/QC Field Report

Project: LIRR Date: 12/7/18 Weather: SUNNY 35°F

Area: E:6, 11:17 Inspection Performed: ☑ Smoke Test ☑ Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations	✓			
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft²	✓			
7. Thickness testing at approximately every 500 ft²	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	67	6		11		
	2	64	7		12		
	3		8		13		
	4		9		14		
	5		10		15		

ANTHONY SICILIANO — EAI Foreman

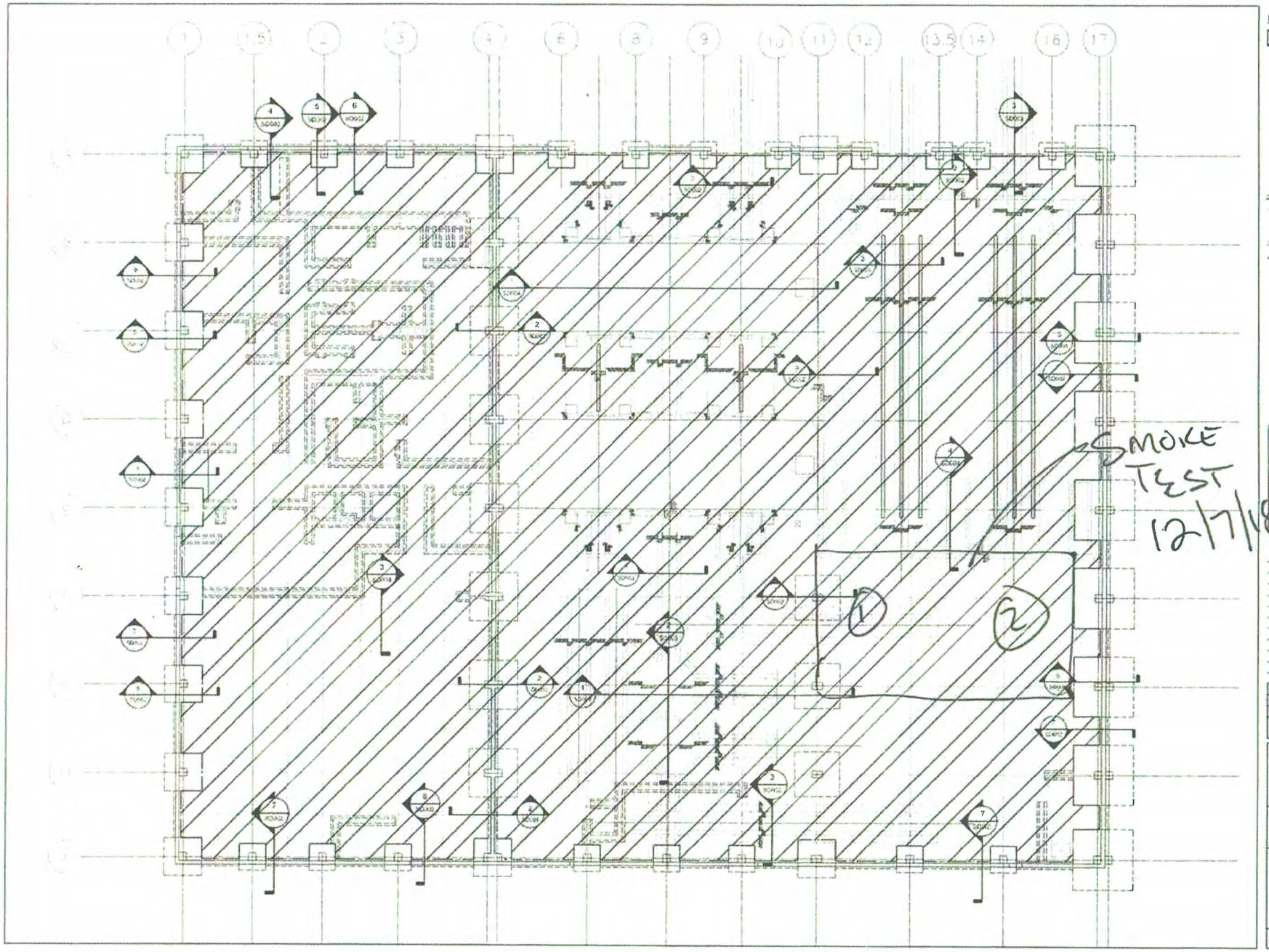
Anthony Siciliano — Signature

12/7/18 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date



LEGEND:

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL STRUCTURAL OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL #1
2. SURFACE PREPARATION BY OTHERS
3. EXCAVATION/BACKFILL BY OTHERS

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer	
Drawn by	SD
Checked by	ET
Scale	3/32" = 1'
Date	5/16/2018

Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No:
SD001

Sheets in Drawing Set:
01 of 04

LETTER OF TRANSMITTAL

Railroad Const/AMCC Corp, JV
R171153. - MTA-LIRR/ Morris Park Diesel Locomotive Shop Facility

DATE: 1/23/2019
TRANSMITTAL #: 873

To:	Teffin George MTA/LIRR P.O. BOX 1425 JAMAICA, NY 11435	From:	Alex Chung, PMP Railroad Const/AMCC Corp, JV 75-77 Grove Street Paterson, NJ 07503
Phone:		Phone:	
Fax:		Fax:	
Email:	tgeorge@lirr.org	Email:	AChung@amcccorp.com
CC:			

Attached and/or enclosed are the following documents.

DOC TYPE	DOCUMENT #	COPIES	STATUS	REMARKS
Submittal Register	72600-039:Liquid Boot Thickness Test Report 01/16/19 - West Drop Pits	1	Submitted for Approval	

Additional Notes: PC1702-245

Alex Chung, PMP

Reviewed by:

Chaudhry Ahmad

Date: 1/23/2019

EAI, Inc.
Environmental Management Services/ Specialty Contracting and Consulting
50 Prescott Street, Jersey City, NJ 07304 Tel: 201-395-0010 / Fax: 201-395-0020 www.eaienviro.com

Liquid Boot 500 Plus QA/QC Field Report

Project: Long Island Railroad Date: 1/16/19 Weather: SUNNY 33°F

Area: 4:6, B:E Inspection Performed: ☑Smoke Test ☑Thickness Test

Item	Y	N	N/A	Notes
1. Materials undamaged, unexpired, stored properly	✓			
2. Subbase/concrete prepared per specifications	✓			
3. VI-20 installed	✓			
4. Liquid Boot installed at all:				
a. Penetrations	✓		N/A	
b. VI-20 overlap	✓			
c. Foundation contact	✓			
d. Elevator pit walls			✓	
6. Smoke testing at approximately every 2,500 ft^2	✓			
7. Thickness testing at approximately every 500 ft^2	✓			
8. Installation of all subsurface components prior to protection course installation	✓			
7. Protection course installation	✓			

	Test #	Mils	Test #	Mils	Test #	Mils	Notes
Thickness Testing (if applicable):	1	>60	6		11		LIQUID BOOT LT INSTALLED
	2	>60	7		12		
	3		8		13		
	4		9		14		
	5		10		15		

William Quilty — EAI Foreman

William Quilty — Signature

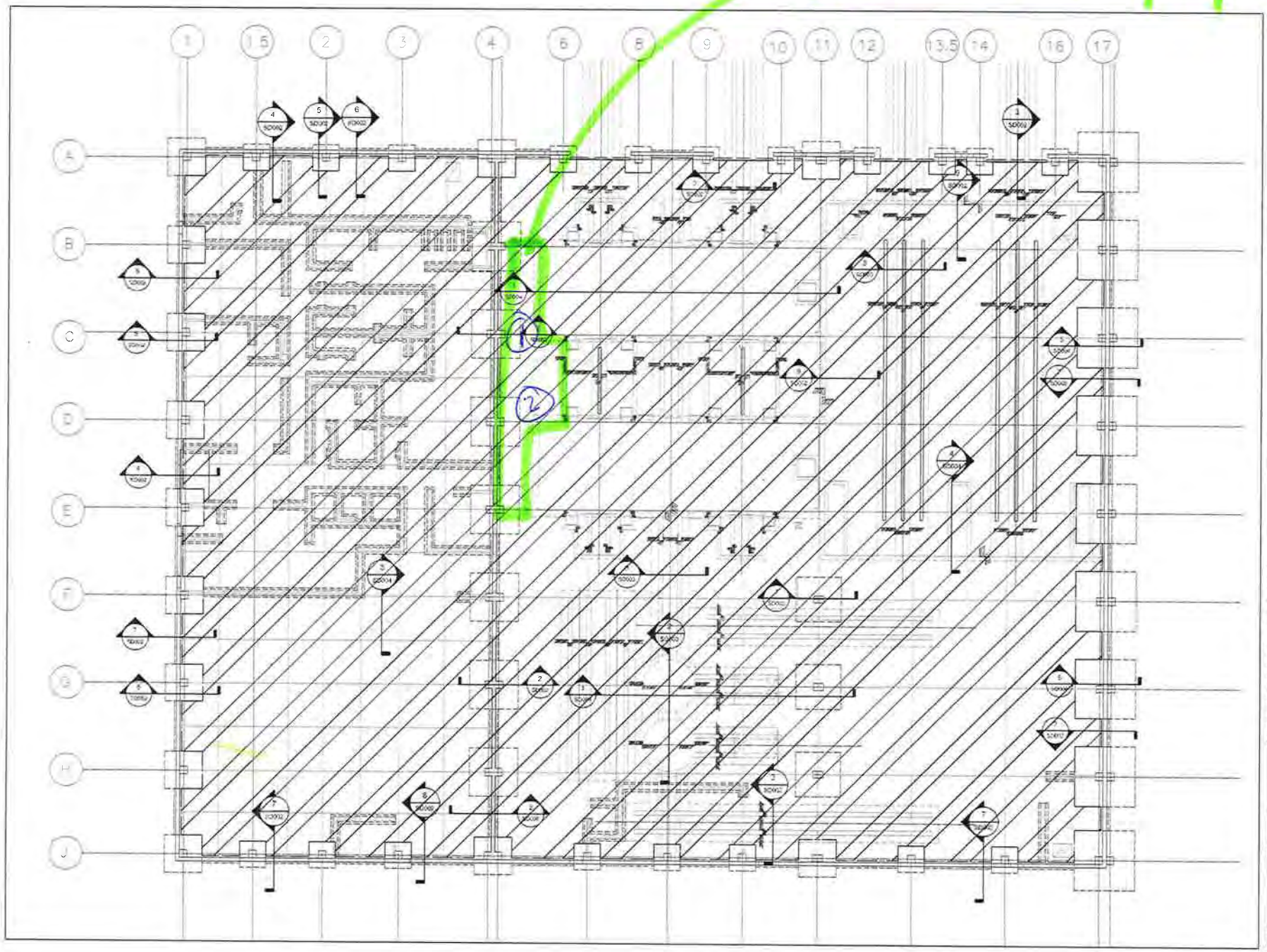
1/16/19 — Date

Third Party Witness Name/Title/Company (if applicable)

Signature

Date

SMOKE TEST 1/16/19



LEGEND:

HORIZONTAL EXTENT OF UNDER-SLAB VAPOR BARRIER

NOTES:

1. DRAWING NOT TO BE USED FOR ARCHITECTURAL STRUCTURAL OR ANY PURPOSE OTHER THAN UNDER-SLAB VAPOR BARRIER SYSTEM - SEE DETAIL 10.
2. SURFACE PREPARATION BY OTHERS.
3. EXCAVATION/BACKFILL BY OTHERS.

Environmental Management Services
50 Prescott Street
Jersey City, NJ 07304
Phone: 201-395-0010
Fax: 201-395-0020

Designer:	
Drawn by:	SD
Checked by:	ZT
Scale: 3/32" = 1'	Date: 5/16/2018

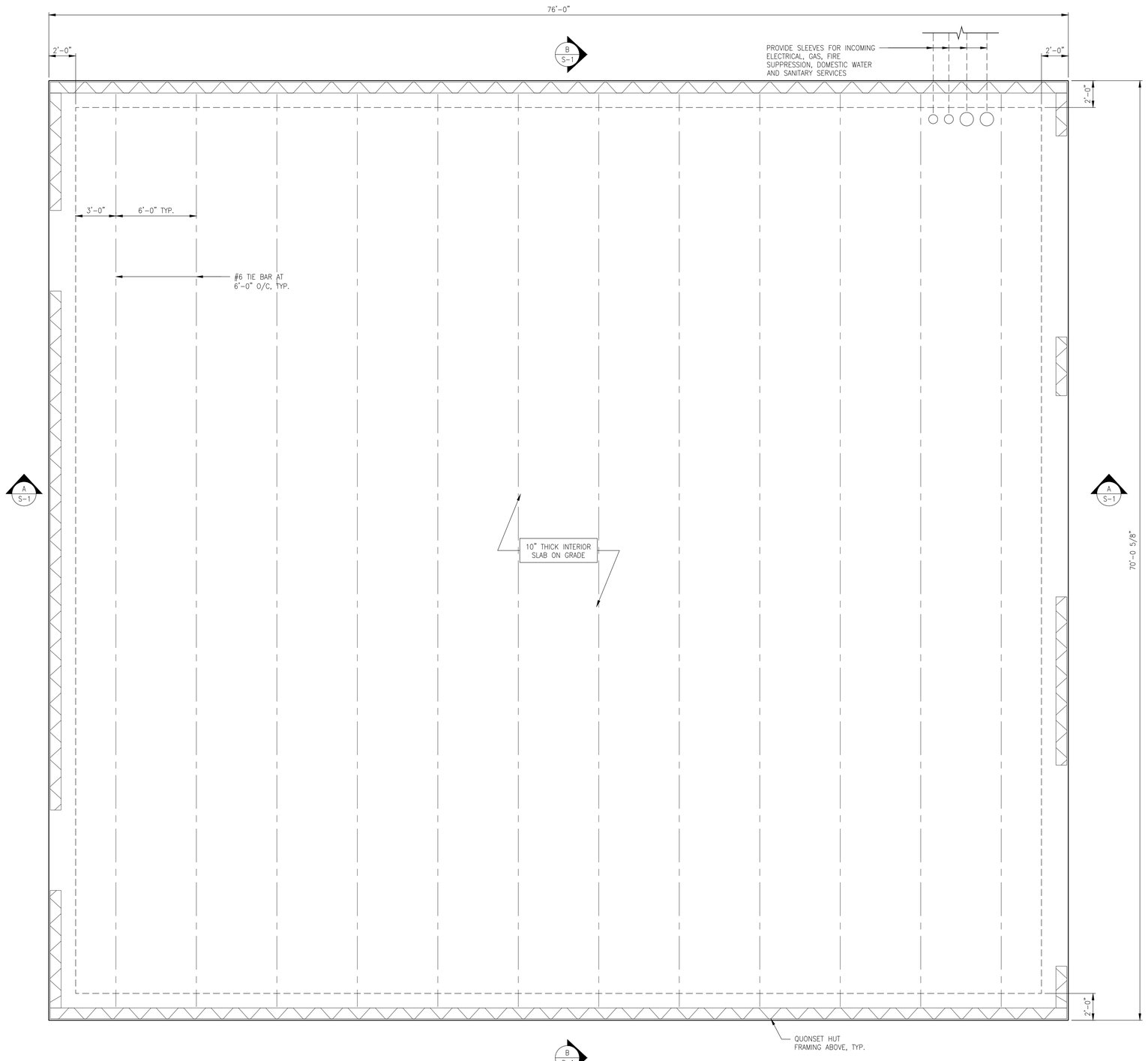
Project:
LIRR MORRIS PARK LOCOMOTIVE SHOP & EMPLOYEE FACILITY

Address:
93 121ST STREET
RICHMOND HILL, NY 11418

Drawing Title:
UNDER-SLAB VAPOR BARRIER FLOOR PLAN

Drawing No.:
SD001

Sheet 1 of 04



1 S-1 FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

INSTALL ELECTRICAL GROUNDING AS PER ET DRAWINGS

NOTES:
1. FOUNDATION DESIGN BASED ON LOADS PROVIDED IN STEEL MASTER DRAWING 81-55018 DATED JULY 8, 2019.
2. REFER TO STEEL MASTER DRAWINGS FOR ALL DIMENSIONS.

GENERAL NOTES

1. ALL STRUCTURAL WORK SHALL BE COORDINATED WITH ARCHITECTURAL, MECHANICAL, AND PREFABRICATED BUILDING DRAWINGS AND SHALL CONFORM TO THE PROJECT SPECIFICATIONS, INCLUDING THE 2015 NEW YORK STATE BUILDING CODE.

FOUNDATIONS

1. BUILDING FOUNDATIONS SHALL BEAR ON UNDISTURBED SOIL HAVING A MINIMUM BEARING CAPACITY OF 3,750 PSF. AS SPECIFIED IN THE KSE GEOTECHNICAL REPORTED DATED MARCH 8, 2018.
2. ALL EXTERIOR FOOTINGS SHALL BE PLACED A MINIMUM OF 2'-6" BELOW GRADE AND BEAR ON A 1'-0" THICK COMPACTED LAYER OF FROST RESISTANT CRUSHED STONE.
3. CONCRETE SHALL BE POURED IN DRY EXCAVATIONS. LIRR FORCE ACCOUNT SHALL NOTE SOIL AND WATER CONDITIONS AS SHOWN BY BORINGS AND DEPTHS OF FOOTINGS AS SHOWN ON FOUNDATION PLANS.

CONCRETE

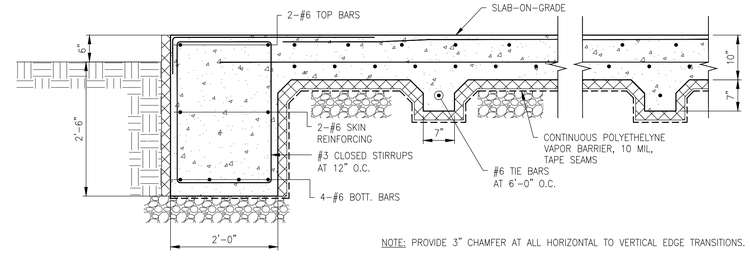
1. ALL CONCRETE WORK SHALL CONFORM TO THE ACI FOLLOWING GOVERNING STANDARDS.
   A. AMERICAN CONCRETE INSTITUTE (ACI) "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" (ACI 318), LATEST EDITION.
   A. ACI "MANUAL OF CONCRETE PRACTICE" LATEST EDITION
   B. CONCRETE REINFORCING STEEL INSTITUTE (CRSI) "MANUAL OF STANDARD PRACTICE" LATEST EDITION
2. ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT 28 DAYS, UNLESS OTHERWISE NOTED.
3. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60 REINFORCING STEEL SHALL BE DETAILED ACCORDING TO THE ACI "DETAILS AND DETAILING OF REINFORCEMENT", (ACI 315), LATEST EDITION.
4. WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A1064, WITH A MINIMUM YIELD STRENGTH OF 65,000 PSI.
5. PROVIDE CLEARANCE FROM FACE OF CONCRETE TO REINFORCEMENT AS FOLLOWS:
   SLAB-ON-GRADE: ¾" TOP, 3" BOTTOM
   GRADE BEAMS: 1 ½" TOP & SIDES, 3" BOTTOM
6. TENSION LAP SPLICE LENGTHS SHALL BE AS FOLLOWS:
   #3 – 28", #4 – 37", #5 – 47", #6 – 56"
7. SEE OTHER DRAWINGS IN THIS PROJECT FOR SIZE AND LOCATIONS OF EQUIPMENT PADS, INSERT AND EMBED ITEMS.
8. COORDINATE SIZE AND LOCATION OF ALL OPENINGS AND PIPE SLEEVES WITH VARIOUS LIRR F/A DEPARTMENTS (IE. EL&P, PLUMBING, FACILITIES, ETC.). MINIMUM CONCRETE BETWEEN SLEEVES SHALL BE 6". CORE DRILLING OF GRADE BEAMS AND SLABS IS NOT PERMITTED.

SLAB ON GRADE

1. SLAB ON GRADE TO BE REINFORCED WITH #5 AT 12" O.C. TOP BARS & #5 @ 9" O.C. BOTTOM BARS, EACH WAY.
2. SLAB ON GRADE SHALL BEAR ON 6" THICK LAY OF CRUSHED STONE OVER COMPACTED SUBGRADE.

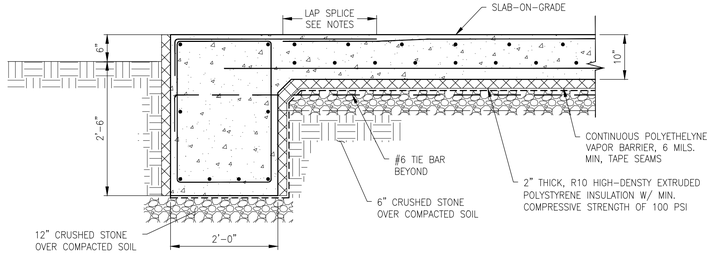
UTILITIES

1. PROVIDE SLAB OPENINGS AND SLEEVES THROUGH THE FOUNDATION TO ALLOW FOR UTILITY CONNECTIONS. THIS SHALL INCLUDE, AND IS NOT LIMITED TO: POWER, GAS, DOMESTIC WATER, FIRE SUPPRESSION, FIRE ALARM, ETC.
2. BUILDING SHALL NOT BE LOCATED DIRECTLY OVER ANY EXISTING UTILITY.



NOTE: PROVIDE 3" CHAMFER AT ALL HORIZONTAL TO VERTICAL EDGE TRANSITIONS.

A S-1 SECTION
SCALE: 3/4" = 1'-0"



NOTE: REFER TO A/S-1 FOR INFORMATION NOT SHOWN, TYP.

B S-1 SECTION
SCALE: 3/4" = 1'-0"

Rev. No.	Drawn by	Chk by	Description	Date
	M.T.S.	U.A.	For Construction	7.29.2019
	M.T.S.	U.A.	Preliminary Set For Q/C Review & Comments	7.26.2019

project:
MORRIS PARK QUONSET HUT FOUNDATION

Metropolitan Transportation Authority

THE LONG ISLAND RAIL ROAD

Office of the Chief Engineer

drawing title:
GENERAL NOTES, SECTIONS & FOUNDATION PLAN

REFERENCE FILES:

designed by: M.T.S.	drawn by: M.T.S.	project no: WO 101200	
checked by: U.A.	scale: AS SHOWN	sheet no: S-1	
in charge: U.A.	date: 07.26.2019		
branch: ATLANTIC		1 of: 1	

ePaul Dynamics

16 Sintsink Drive East
Port Washington, NY 11050-2014
Phone: 516-753-9350
orders@epauldynamics.com

Invoice

Date 10/7/2019
Invoice # GPP3212
Terms Net 30
Due Date 11/6/2019
PO # 4000138968

Supplier ID
0000232559

Bill To
MTA Business Service Center 333 W. 34th St New York NY 10001 United States

Ship To
Don Mailings MTA Long Island Rail Road Morris Park Shops 121st Street & Atlantic Ave Richmond Hill NY 11418 United States

Item #	Description	Quantity	Rate	Amount
8200100	Stego Wrap 15 Mill - 14 Foot x 140 Foot (1 Roll)	4	316.86	1,267.44
Freight	Freight Cost	1	288.00	288.00
8200410	Stego Tape 4" x 190 Foot (1 Roll)	3	47.04	141.12

Total $1,696.56

From: Invoices <invoices@epauldynamics.com>
To: "Invoice@mtabsc.org" <Invoice@mtabsc.org>
Subject: Invoice_GPP3212
Sent: Mon, 7 Oct 2019 18:56:56 +0000

Dear Customer,

Please see attached invoice for processing.

Thank you,

Accounting Department
ePaul Dynamics
A Certified MWBE Company

16 Sintsink Drive East
Port Washington, NY 11050
(516) 753-9350