D&B ENGINEERS AND ARCHITECTS, P.C.

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October 21, 2020

Jessica LaClair, Environmental Engineer
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7013

Re: GLOBALFOUNDRIES U.S. 2 LLC – Fab 10
East Fishkill Facility
Closure of Building 320B
Solid Waste Management Units
D&B No. 5495

Dear Ms. LaClair:

In May of 2020, GLOBALFOUNDRIES U.S. 2 LLC – Fab 10 (GLOBALFOUNDRIES) submitted a Work Plan to the New York State Department of Environmental Conservation (NYSDEC) for the Decontamination/Closure of Building 320B Solid Waste Management Units (SWMUs). The SWMUs identified in the Work Plan consisted of fluoride/heavy metals wastewater transfer piping, industrial wastewater transfer piping and solvent waste transfer piping located in Building 320B at the GLOBALFOUNDRIES Fab 10 facility (formerly the International Business Machines Corporation East Fishkill Facility) in Hopewell Junction, New York as follows:

UNIT ID	DESCRIPTION	*Unit Type	LOC.	STATUS	GW REMED. AREA?	RCRA STATUS
B320-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	Other	B/320	Inactive	No	Inaccessible SWMU
B320-IW	Industrial Wastewater Transfer Piping	Other	B/320	Inactive	No	Inaccessible SWMU
B320-SO	Solvent Waste Transfer Piping	Other	B/320	Inactive, Abandoned	No	Inaccessible SWMU

Project Background

The SWMUs were identified in the Corrective Action Module of the 6 NYCRR Part 373 Permit previously issued to IBM when it was the owner/operator of the facility. The SWMUs were classified as "inaccessible" because the piping was reportedly installed in trenches that were covered by a concrete slab floor. Since a new renovation project was planned by GLOBALFOUNDRIES for

Building 320B that called for the removal of the concrete floor, it was determined that this would be an appropriate time to decontaminate and close the portions of the SWMUs that would be exposed as part of the construction activities. A site plan denoting the area within Building 320B planned for slab demolition is provided as **Attachment 1.**

It was originally believed that the trenches had a solid bottom and that the transfer piping was placed within the trenches within a bed of sand for support. Upon removal of the concrete floor covering the piping, it was discovered that in some areas the trenches had walls, but no bottom and the sand supporting the transfer piping was placed directly upon the underlying soil. When sections of the transfer piping were exposed by the removal of the slab, the piping was removed and containerized prior to undergoing characterization for proper off-site disposal. The sand was also removed, containerized and characterized for proper off-site disposal.

It was noted during the removal of transfer piping located at the north end of the work area, that some sections of piping had leaked and contaminated the underlying sand and soil. Soil samples collected for on-site headspace screening with a photoionization detector (PID) revealed VOC concentrations ranging from 0.0 to 250 ppm in these areas.

In August of 2020, GLOBALFOUNDRIES notified the NYSDEC of the presence of contaminated soil and that further delineation and soil removal would take place. As an initial effort to delineate the contamination, three test pits were excavated surrounding the areas of impacted soil to a depth of three feet below ground surface (bgs). It should be noted that for the purposes of discussion, "ground surface" was established as the surface of the soil within the building, immediately below the demolished slab. This may differ from the elevation of the ground surface outside the building. Based on PID headspace readings, it was determined that additional impacted soil remained in the area with some contamination present at a depth greater than 3 feet bgs. The depth of 3 feet bgs is significant because that is the maximum depth that can be safely excavated within the building footprint before the structural foundation is compromised. As a result, GLOBALFOUNDRIES continued to excavate and screen the soil within the impacted area which effectively merged the three test pits into a single area of excavation covering approximately 24 x 28 feet which was excavated to a depth of approximately 3 feet. This area of excavation is presented on **Attachment 2** as the "Approximate Extent of Pre-Delineation Excavation."

Delineation Program

On October 3, 2020, GLOBALFOUNDRIES conducted a series of 12 borings utilizing a track-mounted Geoprobe unit to more accurately delineate the horizontal and vertical extent of potential contamination. A site plan depicting the locations of the 12 borings is provided as **Attachment 2.**

To provide some background as to the subsurface soil characteristics located beneath Building 320B, we refer to the RCRA Facility Investigation Report for Solid Waste Management Units at B/330, B/322, B301/210 and B/309/310 and RCRA Facility Assessment Report for the Southeast Quadrant Area of Concern which was submitted to the NYSDEC in May of 1997. This report detailed the

extensive soil and groundwater sampling program conducted in October of 1996 at the East Fishkill Facility.

While Building 320B was not the focus of the 1996 site investigation, numerous soil borings were made in the area between Buildings320B and 322. An excerpt from this report that describes the soil conditions encountered surrounding Building 322 also depicts portions of Building 320B and is presented as **Attachment 3**. Of particular note is **Figure 3-9** which depicts Geologic Cross Section B322-B – B22-B' which shows a layer of clay existing between 15 and 25 feet below ground surface at borings 322-L, 322-M, 322-N and 322-O. The borings and related cross-sections provide in-depth knowledge of the characteristics of the subsurface soils, specifically the depth and extent of a confining unit of gray silty clay of variable consistency.

Consistent with what is depicted in these historical cross-sections, clay was recovered from the majority of the Geoprobe borings advanced on October 3, 2020 at depths ranging from 10 to 12 feet. Once the clay layer was reached at a particular boring location, boring ceased to prevent penetrating the clay layer and creating a potential conduit for contamination to migrate further. Although some of the soil recovered from the borings was moist, the soil samples recovered down to the clay layer indicated that soil beneath this portion of Building 320B is not saturated with groundwater. Boring logs for the October 3, 2020 Geoprobe borings are presented as **Attachment 4**.

The initial boring (B-1) was centered upon the area that was initially excavated to a depth of 3 feet bgs and was advanced starting at 3 feet bgs to a depth of 12 feet bgs. Recovered soil was screened every 3 feet using headspace screening with a PID and revealed only trace concentrations of VOCs between 9 and 12 feet (0.4 ppm). Attachment 2 also presents 3 cross-sectional lines (A-A', B-B' and C-C'). Soil borings that were advanced in close proximity to each these cross-sections are provided as **Attachment 5** and depict the horizontal and vertical extent of contamination that was encountered during delineation. A summary of the PID readings are presented as **Attachment 6**.

After boring B-1 was completed, borings B-2, B-3, B-4 and B-5 were advanced approximately 10 feet to the north, west, east and south of boring B-1.

Headspace screening revealed only trace concentrations of VOCs between 3 and 6 feet (0.2 ppm) at boring B-2 and no detections at boring B-4, indicating that further delineation to the north and east, respectively would not be required. VOC concentrations from boring B-3 ranged from 250.8 ppm at 3-6 feet to 120.4 ppm at 9-12 feet, indicating that further delineation was needed toward the west. VOC concentrations from boring B-5 ranged from 517.8 ppm at 3-6 feet and 158.7 at 6-9 feet and 383.4 ppm at 9-12 feet, indicating that further delineation was needed toward the south.

Soil borings B-6, B-7 and B-8 were advanced in a line extending south, starting approximately 25 feet to the south of boring B-5 to approximately 35 feet to the south of B-5. Headspace PID readings in boring B-6 ranged from 188.1 ppm at 0-3 feet, 298.6 ppm at 3-6 feet, 213.4 ppm at 6-9 feet and 111.3 at 120.4 feet. While there were initial PID readings from B-7 at 0-3 feet (28.7 ppm) and 3-6 feet (13.8 ppm), there were no detections at the 6-10.5 foot depth. There were no VOC detections in boring B-8, indicating that further delineation to the south would not be required.

Soil borings B-9, B-10 and B-12 were advanced in a line extending southwest, starting approximately 10 feet to the southwest of boring B-5 to approximately 25 feet to the southwest of B-5. Headspace PID readings in boring B-9 ranged from 138.4 ppm at 0-3 feet to 163.8 ppm at 3-6 feet. While there were PID readings from B-10 above zero at 0-3 feet (2.1 ppm) 3-6 feet (0.9 ppm) and 6-10.5 feet (0.1), the results for the deeper samples from these borings were not significantly above background. There were no VOC detections in boring B-12 at 0-3 feet or 3-6 feet, and 6-10.5 feet only registered 0.4 ppm, again not significantly above background readings within the confines of Building 320B, indicating that further delineation to the southeast would not be required.

Boring B-11 was advanced approximately 20 feet to the west of B-3 to a depth of 10.5 feet. PID readings were similar to background with the highest reading detected at 0-3 feet (0.3 ppm), indicating that further delineation to the west would not be required.

Soil Sampling Analytical Results

A confirmatory soil sample was collected from boring B-5 from the 6 to 9 foot bgs interval which had exhibited a headspace VOC concentration of 158.7 ppm. The sample was submitted to ALS Environmental Laboratory under Chain of Custody to be analyzed for Volatile Organic Compounds, Isopropyl Alcohol, n-Butyl Acetate, N-Methyl-2-Pyrrolidinone, Total Phenols, RCRA Metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver), Nickel, Fluoride and pH,. Endpoint soil samples were collected from borings B-2, B-4, B-8 and B-11 from the soil interval that had exhibited headspace VOC concentrations of 0.0 ppm, and in soil recovered from B-12 that had exhibited a headspace VOC concentration of 0.4 ppm. Results of these analyses are presented as **Attachment 7**.

We have reviewed the lab data in comparison to 6 NYCRR Part 375-6.8 Soil Cleanup Objectives (SCOs) and found that one sample, SB-5 (3-6), contained volatile organic compounds above Part 365 SCOs as follows:

- 2-Butanone (Methyl Ethyl Ketone) was detected at 400 micrograms per kilogram (ug/kg) which exceeds the Unrestricted Use SCO of 120 ug/kg, but is below the Residential Use SCO of 100,000 ug/kg, Restricted Residential Use SCO of 100,000 ug/kg, Commercial Use SCO of 500,000 ug/kg and Industrial Use SCO of 1,000,000 ug/kg.

- Acetone was detected at 110,000 ug/kg which exceeded the Unrestricted Use SCO of 50 ug/kg, Residential Use SCO of 100,000 ug/kg and Restricted Residential Use SCO of 100,000 ug/kg but is below the Commercial Use SCO of 500,000 ug/kg and Industrial Use SCO of 1,000,000 ug/kg.

In addition, three solvents, 1-Butanol, N-methyl-2-pyrrolidinone (NMP) and Isopropyl alcohol, were detected in B-5 (3-6) at concentrations of 1,800 milligrams per kilogram (mg/kg), 870 mg/kg and 2,100 mg/kg, respectively, however SCOs are not available for these compounds. Since B-5 is located within

the area that exhibited elevated headspace PID readings, the analytes that were detected in the sample from this location are consistent with what was expected.

None of the parameters for the remaining samples collected from borings B-2, B-4, B-8, B-11 and B-12 exceeded Unrestricted SCOs.

Soil Remediation

On October 10, 2020, GLOBALFOUNDRIES initiated soil excavation and removal activities within the southern area delineated by soil borings B-6 through B-10 as a resulted of the elevated headspace PID readings obtained during the Geoprobe delineation program. The excavation was completed to a depth of approximately 3 feet bgs. Endpoint soil samples were not collected at this time. This secondary area of excavation is also presented on **Attachment 2** as the "Approximate Extent of Post-Delineation Excavation."

At this time, excavation of soil within the impacted area cannot proceed deeper due to structural concerns associated with the building foundation. Following discussions with structural engineers involved in the renovation project, it was determined that further excavation below the 3-foot bgs level, particularly in close proximity to the building column foundations, would significantly impact the structural stability of the foundations supporting the columns.

It is GLOBALFOUNDRIES' intent to cap the contaminated soil that remains as follows:

- Backfill over excavated areas with ¾-inch stone to bottom of "rat slab" elevation.
- Lay down a 10-mil vapor barrier. Taped at seams and taped to the face of the saw cut edges of the existing slab. The product used will be a "Stego Wrap Class A Vapor Retarder" or approved equal.
- Place a 3-inch rat slab.
- Place a 21-inch structural mat slab.
- Finish work in this area will include a Chemical Resistant floor coating.
- Air quality within the renovated area will be maintained with a positive pressure HVAC system.

Summary and Conclusions

The location of the contamination within the interior of Building 320B and in close proximity to building column foundations provides a significant obstacle preventing the complete removal of all impacted soil from this location. That being said, geology of the site, specifically the layer of clay located immediately beneath the impacted soil provides a natural barrier that prevents the migration of

contaminants from the specific location of the spill. In addition, the lack of perched groundwater on top of the clay layer also eliminates another potential pathway for migration. Furthermore, the analytical results for the sample collected from the spill location are in compliance with the Industrial Use Soil Use Soil Cleanup Objectives. The samples collected at the perimeter of the area being delineated are in compliance with the Unrestricted Use Soil Cleanup Objectives.

GLOBALFOUNDRIES believes that they have remediated the impacted soil to the maximum extent practicable without jeopardizing the structural stability of the building. The likelihood of migration of contaminants from their present location is extremely low and the analytical results indicate that the soil meets the Industrial Use SCOs. Accordingly, GLOBALFOUNDRIES is requesting concurrence from the NYSDEC that the impacted soils beneath this portion of Building 320B have been remediated to the maximum extent practicable and to approve proposed capping of the remaining soil and the closure of the SWMUs at this location.

Please do not hesitate to contact me with any questions and/or comments at (516) 364-9890, Ext. 3009.

Very truly yours

Brian Veith

Brian, M. Veith, P.E.
Senior Vice President

BMV/KRBt/kb
Attachments
♦5495\BMV102120JL-Ltr(R01)

ATTACHMENT 1

AREA OF PLANNED CONCRETE SLAB DEMOLITION

V T S R Q P N M L K J

24'-0" 24'-0" 24'-0" 24'-0" 24'-0" 24'-0" 24'-0" 24'-0" 24'-0" 24'-0" 24'-0"

29 30 31 32 33 34

32'-0" 32'-0" 32'-0" 32'-0" 32'-0"

5 B320S-7607

EXISTING WALL

2 B320S-7607

DO NOT REMOVE EXISTING SLAB IN THIS AREA UNTIL BRACING AT GRID 30 IS COMPLETE

16' - 0"

16' - 0"

INSTALL BRACING PRIOR TO SLAB REMOVAL IN THESE BAYS

1

3A B320S-7607

1 B320S-7613

EXISTING WALL

4 B320S-7607

5 B320S-7607

EXISTING WALL

3 B320S-7607

1 B320S-7607

UNDER-PINNING - TYP. SEE FOUNDATION PLAN

REMOVE TRENCH WALL AFTER INSTALLATION OF W8 BEAM -(SEE S-1BE AND 1/S-7617)

1

REMOVE EXISTING 5" CONCRETE SLAB-ON-GRADE W/ 6x6-W2.9xW2.9 WWR

OPP 4 B320S-7607

EXISTING WALL

6 B320S-7607

2 B320S-7607

1

7 B320S-7607

14' - 0"

3 B320S-7607

OPP 6 B320S-7607

9' - 10"

EXISTING WALL

EXISTING WALL

EXISTING WALL

8 B320S-7607

4' - 0"

EXISTING WALL

V.1

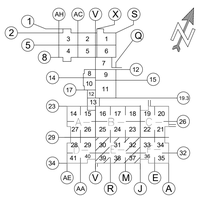
SHEET NOTES:

A. TOP OF EXISTING SLAB ELEVATION = 264'-0" ±, UNLESS NOTED OTHERWISE AS [± X'-X"] FROM 264'-0".

B. FOR GENERAL NOTES, DESIGN CRITERIA AND ABBREVIATIONS, SEE DRAWINGS B320S-0000 AND B320S-0001.

C. COORDINATE SLAB REMOVAL WITH OTHER DEMOLITION.

AREA OF WORK
AREA OF WORK ON THIS DRAWING IS IN BB-PH2-B13 UNLESS OTHERWISE IDENTIFIED.



KEY PLAN B320

8 0 8 16
Scale: 1/8 INCH = 1 FOOT

GLOBALFOUNDRIES
2070 Route 52
Hopewell Junction, NY 12533

Consultant
Jacobs
Corporate Offices
777 Main Street
Fort Worth, Texas, 76102

Project Title

GLOBALFOUNDRIES FAB 10 B/320B POST-FAB RAMP ENABLING WORKS PROJECT

No	Date	Revision	By
1	07/04/25	DR807	REP
0	04/27/20	BULLETIN 13 - DR801	REP

Date:	
Proj.#	D3328700
Checked By:	REP
Drawn By:	JEG

Sheet Title

B320 - STRUCTURAL LEVEL 1B SLAB DEMOLITION PLAN SECTOR E

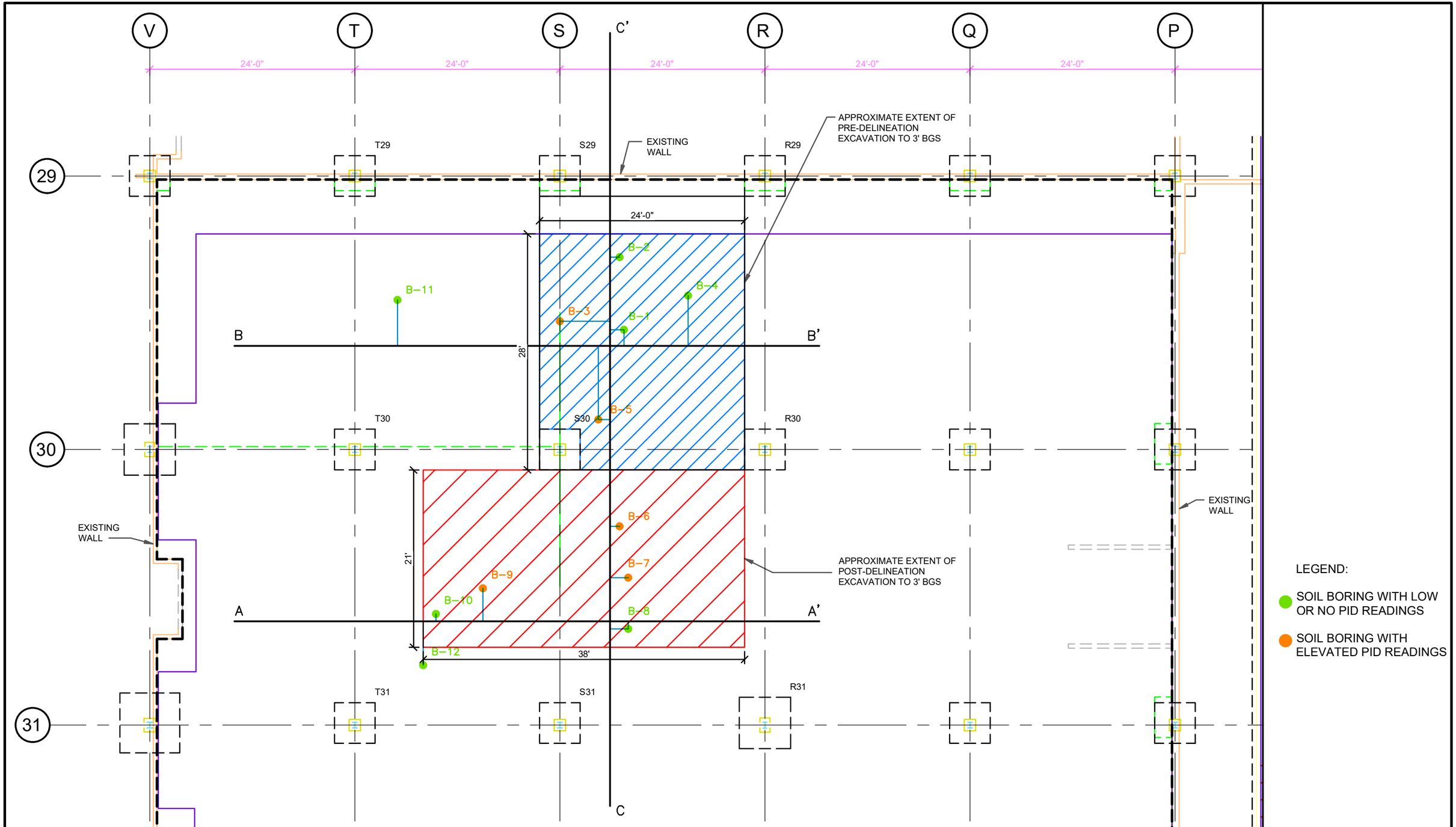
Sheet No.

B320

SD1BE-

ATTACHMENT 2

GEOPROBE SOIL BORING LOCATION MAP



D&B ENGINEERS AND ARCHITECTS, P.C.

GLOBALFOUNDRIES U.S. 2 LLC - FAB 10
HOPEWELL JUNCTION, NEW YORK

GEOPROBE SOIL BORING LOCATION MAP

FIGURE 1

F:\5495-06\dwg\5495-06-A-PL01_REVdr.dwg, Layout1, 10/15/2020 8:52:19 AM, droot

ATTACHMENT 3

EXCERPTS FROM MAY 1997
RCRA FACILITY INVESTIGATION REPORT

The presence of locally occurring lenses of other sedimentary deposits is a characteristic feature in the area of B/330. Isolated lenses of other stratigraphic units include: glaciolacusterine silty clay, silt with gravel and/or rock fragments, sand and gravel, silty sand, and a glacial outwash/ablation till unit. These deposits are typically located within depressions in the lodgment till surface overlying the bedrock surface.

3.1.3 Solid Waste Management Units at B/322

Three geologic cross sections traversing the B/322 area of investigation have been constructed utilizing data obtained during the field investigation and documented on the boring logs provided in Appendix A. This information been supplemented with existing geologic cross sections as well as historical boring and well logs. The locations of the geologic cross sections in the B/322 area are provided on Figure 3-7. The three geologic cross sections, 322-A - 322-A′, 322-B - 322-B′ and 322-C - 322-C′, provided in Figures 3-8, 3-9 and 3-10, respectively, illustrate the subsurface stratigraphy in the B/322 area. In general, the shallow unsaturated soil consisted of silty brown fill with varying quantities of sand and gravel. The sediment in the vadose zone beneath the fill generally consisted of silty sand and layers of sand and gravel. The confining unit at all soil borings in the B/322 area was a gray silty clay of variable consistency, with the exception of boring 322-S which terminated at a depth of six feet in bedrock.

The geology of the B/322 area is complex. The subsurface soil of this area differ from the majority of the site in that the glacial lodgment till is absent from the stratigraphic column. The major stratigraphic units observed in the B/322 vicinity include post-glacial fill, sand, silty sand, sand and gravel and the confining unit of glaciolacusterine silty clay across the majority of the area. Typically, the sandy silt layer is widespread with occasional lenses of sand and gravel overlying the gray silty clay.

Minor geologic units include glacial outwash/ablation till, which has been mapped where the silty clay unit pinches out, and bedrock located approximately 6 feet below ground surface at boring B-322-S.

B. 321

B. 320B

B. 322

B. 323

322-A

322-A'

322-B

322-B'

322-C

322-C'

322 A

322B

322 C

322 D

322 E

322 F

322 G

322 H

322 I

322 J

322 K

322 L

322 M

322 N

322 O

322 P

322 Q

322 R

322 S

769

771

770

768

767

766

741

742

740

736

735

737

781

203

202

204

951

793

947

946

948

945

949

794

950

798

329

B328

128

127

039

SHENANDOAH DRIVE

LEGEND:

- 781 MONITORING WELL LOCATION
- 322R SOIL BORING LOCATION
- FENCE
- BUILDING/STRUCTURE
- ROAD/CURB
- LOCATION AND DESIGNATION OF CROSS SECTION CREATED 11/96

0 100 200

SCALE IN FEET

DIR: 1436 FILE: 1436-12BRH-2/28/97

INTERNATIONAL BUSINESS MACHINES CORPORATION

EAST FISHKILL FACILITY

SOLID WASTE MANAGEMENT UNITS AT B/322
GEOLOGIC CROSS SECTION LOCATIONS

William F. Cosulich Associates, P.C.
Environmental Engineers, Scientists and Planners

FIGURE 3-7

322–A
NORTH

322–A'
SOUTH

322–A
256.2

322–C
254.9

322–E
254.0

322–G
253.5

322–H
254.4

322–I
245.2

236.2 B

232.9 B

232.0 B

231.5 B

230.4 B

229.2 B

ELEVATION (FEET ABOVE NGVD 1929)

256
252
248
244
240
236
232
228

0 40 80 120 160 200 240 280 320 360 400 440 480 520

322–A ← BORING DESIGNATION

256.2 ← GROUND SURFACE ELEVATION (FEET ABOVE NGVD 1929)

← SOIL SAMPLE SATURATED

B ← BOTTOM OF BORING

R ← AUGER REFUSAL

FILL – PRIMARILY SILTY POORLY SORTED FINE TO COARSE SAND WITH ANGULAR TO SUBROUNDED FINE TO COARSE GRAVEL. ALSO INCLUDES REWORKED EARTH UNITS.

SILTY SAND – TYPICALLY BROWN SILTY FINE TO MEDIUM SAND SMALL QUANTITIES OF GRAVEL PRESENT IN SOME AREAS.

SAND/SAND AND GRAVEL – TYPICALLY BROWN FINE TO COARSE GRAINED SAND, SORTING RANGES FROM WELL SORTED TO POORLY SORTED. TYPICALLY INCLUDES SOME FINE TO COARSE SUBROUNDED TO SUBANGULAR GRAVEL, LITTLE OR NO FINES.

SILTY CLAY/CLAYEY SILT/CLAY – RANGES FROM GRAY TO BROWN IN COLOR VARIABLE PLASTICITY

– – – – DASHED WHERE INFERRED OR BASED UPON PREVIOUS BORING LOGS, CROSS SECTIONS OR ELEVATION MAPS

NOTE:
SUPPLEMENTAL INFORMATION INTERPRETED FROM GEOLOGIC CROSS SECTIONS PREPARED FOR IBM CORP. BY SANBORN, HEAD & ASSOCIATES, JANUARY 1996, REPORT ENTITLED SUPPLEMENTAL GEOLOGIC MAPPING.

VERTICAL SCALE: 1"=4'
HORIZONTAL SCALE: 1"=40'
VERTICAL EXAGGERATION = 10X

DIR: 1436 FILE: 1436-07 RDS-05/22/97

INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL, NEW YORK

GEOLOGIC CROSS SECTION
322–A – 322–A'

William F. Cosulich Associates, P.C.
Environmental Engineers, Scientists and Planners

FIGURE 3–8

322–B
WEST

322–B'
EAST

322–B
254.8

322–A
256.2

322–J
257.5

322–K
255.4

322–L
261.8

322–M
259.9

322–O
259.5

322–N
259.6

B 230.8

B 236.2

B 237.5

B 237.8

B 239.8

B 243.9

B 243.3

B 243.6

ELEVATION (FEET ABOVE NGVD 1929)

265
260
255
250
245
240
235
230

0 50 100 150 200 250 300 350 400 450 500 550 600 650

322–B ← BORING DESIGNATION
254.8 ← GROUND SURFACE ELEVATION (FEET ABOVE NGVD 1929)
← SOIL SAMPLE SATURATED
B ← BOTTOM OF BORING
R ← AUGER REFUSAL

FILL – PRIMARILY SILTY POORLY SORTED FINE TO COARSE SAND WITH ANGULAR TO SUBROUNDED FINE TO COARSE GRAVEL. ALSO INCLUDES REWORKED EARTH UNITS.

SILTY SAND – TYPICALLY BROWN SILTY FINE TO MEDIUM SAND SMALL QUANTITIES OF GRAVEL PRESENT IN SOME AREAS.

SAND/SAND AND GRAVEL – TYPICALLY BROWN FINE TO COARSE GRAINED SAND, SORTING RANGES FROM WELL SORTED TO POORLY SORTED. TYPICALLY INCLUDES SOME FINE TO COARSE SUBROUNDED TO SUBANGULAR GRAVEL, LITTLE OR NO FINES.

SILTY CLAY/CLAYEY SILT/CLAY – RANGES FROM GRAY TO BROWN IN COLOR VARIABLE PLASTICITY

NOTE:
SUPPLEMENTAL INFORMATION INTERPRETED FROM GEOLOGIC CROSS SECTIONS PREPARED FOR IBM CORP. BY SANBORN, HEAD & ASSOCIATES, JANUARY 1996, REPORT ENTITLED SUPPLEMENTAL GEOLOGIC MAPPING.

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=50'
VERTICAL EXAGGERATION = 10X

DIR: 1436 FILE: 1436-08 RDS-05/22/97

INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL, NEW YORK

GEOLOGIC CROSS SECTION
322–B – 322–B'

William F. Cosulich Associates, P.C.
Environmental Engineers, Scientists and Planners

FIGURE 3–9

322–C
NORTH

322–C'
SOUTH

322–P
261.4

322–N
259.6

322–Q
255.1

322–R
252.3

703 *
255.0

322–S
257.6

249.4
B

243.6
B

237.1
B

240.3
B

249.6
R

231'

ELEVATION (FEET ABOVE NGVD 1929)

265
260
255
250
245
240
235
230

0 50 100 150 200 250 300 350 400 450 500 550 600 650

322–P ← BORING DESIGNATION
261.4 ← GROUND SURFACE ELEVATION (FEET ABOVE NGVD 1929)
← SOIL SAMPLE SATURATED
B ← BOTTOM OF BORING
R ← AUGER REFUSAL

FILL – PRIMARILY SILTY POORLY SORTED FINE TO COARSE SAND WITH ANGULAR TO SUBROUNDED FINE TO COARSE GRAVEL. ALSO INCLUDES REWORKED EARTH UNITS.

SAND/SAND AND GRAVEL – TYPICALLY BROWN FINE TO COARSE GRAINED SAND, SORTING RANGES FROM WELL SORTED TO POORLY SORTED. TYPICALLY INCLUDES SOME FINE TO COARSE SUBROUNDED TO SUBANGULAR GRAVEL, LITTLE OR NO FINES.

SILTY SAND – TYPICALLY BROWN SILTY FINE TO MEDIUM SAND SMALL QUANTITIES OF GRAVEL PRESENT IN SOME AREAS.

SILTY CLAY/CLAYEY SILT/CLAY – RANGES FROM GRAY TO BROWN IN COLOR VARIABLE PLASTICITY

ABLATION TILL/OUTWASH/WEATHERED TILL

BEDROCK – TYPICALLY DOLOSTONE, INCLUDES UNITS OF WEATHERED BEDROCK

— — DASHED WHERE INFERRED OR BASED UPON PREVIOUS BORING LOGS, CROSS SECTIONS OR ELEVATION MAPS

* BORING CONSTRUCTED PRIOR TO THIS INVESTIGATION

NOTE:
SUPPLEMENTAL INFORMATION INTERPRETED FROM GEOLOGIC CROSS SECTIONS PREPARED FOR IBM CORP. BY SANBORN, HEAD & ASSOCIATES, JANUARY 1996, REPORT ENTITLED SUPPLEMENTAL GEOLOGIC MAPPING.

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=50'
VERTICAL EXAGGERATION = 10X

DIR: 1436 FILE: 1436-06 RDS-05/22/97

INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL, NEW YORK

GEOLOGIC CROSS SECTION
322–C – 322–C'

William F. Cosulich Associates, P.C.
Environmental Engineers, Scientists and Planners

FIGURE 3–10

ATTACHMENT 4

SOIL BORING LOGS

D&B ENGINEERS AND ARCHITECTS, P.C.

	Project No.: 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-1** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 12ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample				PID (ppm)	Sample Description	USCS
		Type	Blows Per 6"	Rec. (inches)			
3-6ft				15	0.0	Light brown/gray, Poorly Sorted, sand and silt with small gravel/pebbles	
6-9ft				16	0.0	Light brown/gray , Poorly Sorted, sand and silt with small gravel/pebbles	
9-12ft				33	0.4		
9-10.5						Light brown poorly sorted, fine to coarse sand/silt with small gravel	
10.5-12ft						Light brown to dark grey, Well sorted, fine silt/clay	
-							

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.	**Project No.:** 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-2** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 12ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
3-6ft				16	0.2	Light brown, dry, partially Sorted, coarse sand and silt with small stones, no odor no staining.	
6-9ft				16	0.0	Light brown/gray, dry, Poorly Sorted, coarse sand and silt with small gravel/pebbles, no odor no staining	
9-12ft 9-10.5				28	0.0	Light brown poorly sorted dry, fine to coarse sand/silt with small gravel no odor, no staining	
10.5-12						Light brown to dark grey damp/wet, Well sorted, fine silt/clay, Organic odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.	**Project No.:** 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-3** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 12ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
3-6ft				13	250.8	Light brown, poorly sorted, sand and silt with small stones, dry, no odor, no staining	
6-9ft				16	210.6	Light gray/brown , poorly sorted, sand and silt with small stones, dry, no odor, no staining	
9-12ft 9-10.5				29	120.4	Light gray poorly sorted, fine to coarse sand/silt with small stones, dry, no odor, no staining	
10.5-12						Light dark grey, Well sorted, coarse silt/clay, moist, no odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.	**Project No.:** 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-4** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 12ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
3-6ft				16	0.0	Dark brown, very poorly sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	
6-9ft				12	0.0	Light brown, poorly sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	
9-12ft 9-10.5ft				30	0.0	Light brown poorly sorted, sand/silt with small gravel/pebbles, dry, no odor, no staining	
10.5-12ft						Dark grey, well sorted, moist fine silt/clay, no odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.

Project No.: 5495
Project Name: GLOBALFOUNDRIES 320B Demo

Boring No.: B-5
Sheet __ of __.
By: A. Pugliese

Drilling Contractor: Eastern Environmental
Driller: Pat & Ernesto
Drill Rig: Geoprobe 420
Date Started: 10/3/20

Geologist:
Drilling Method: Direct Push
Drive Hammer Weight:
Date Completed: 10/3/20

Boring Completion Depth: 12ft
Ground Surface Elevation: ---
Boring Diameter:2in

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
3-6ft				25	517.8	Light brown, poorly sorted, dry, sand and silt with small gravel/pebbles, dry, heavy volatile odor, no staining	
6-9ft				2	158.7	Light brown, poorly sorted, sand and silt with small gravel/pebbles, dry, heavy volatile odor, no staining	
9-12ft 9-10.5				16	383.4	Light brown poorly sorted, fine to coarse sand/silt with small gravel/pebbles, dry, heavy volatile odor, no staining	
10.5-12						Dark grey, Well sorted, fine silt/clay moist, organic odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.

Project No.: 5495
Project Name: GLOBALFOUNDRIES 320B Demo

Boring No.: B-6
Sheet __ of __.
By: A. Pugliese

Drilling Contractor: Eastern Environmental
Driller: Pat & Ernesto
Drill Rig: Geoprobe 420
Date Started: 10/3/20

Geologist:
Drilling Method: Direct Push
Drive Hammer Weight:
Date Completed: 10/3/20

Boring Completion Depth: 12ft
Ground Surface Elevation: ---
Boring Diameter:2in

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
0-3ft				6	188.1	Light brown, poorly sorted, sand and silt with small gravel/pebbles, dry, volatile odor, no staining	
3-6ft				7	298.6	Brown, poorly sorted, sand and silt with small gravel/pebbles, dry, volatile odor, no staining	
6-9ft				16	213.4	Light brown/gray poorly sorted, fine to coarse sand/silt with small gravel, dry, volatile odor, no staining	
9-12ft 9-9.5ft				32	111.3	Light brown poorly sorted, fine to coarse sand/silt with small gravel, dry, volatile odor, no staining	
9.5-12ft						Gray silt well sorted, moist, organic odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.	**Project No.:** 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-7** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 10.5ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
0-3ft				26	28.7	Gray, Poorly Sorted, sand and silt with small gravel/pebbles, dry, slight volatile odor, no staining	
3-6ft				20	13.8	Dark brown/gray , poorly sorted, sand and silt with small gravel/pebbles, dry, slight volatile odor, no staining	
6-10.5ft 6-9ft				28	0.0	Brown/gray poorly sorted, fine to coarse sand/silt with small gravel, dry, no odor, no staining	
9-10.5ft						Dark grey, Well sorted, fine silt/clay moist, organic odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.	**Project No.:** 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-8** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 6ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
0-3ft				32	0.0	Light brown/gray, poorly sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	
3-6ft				25	0.0	Light brown, poorly sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.	**Project No.:** 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-9** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 6ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
0-3ft				27	138.4	Light gray/brown, poorly sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	
3-6ft				20	163.8	Dark brown, poorly sorted, sand and silt with small gravel/pebbles, dry, volatile odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.	**Project No.:** 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-10** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 10.5ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
0-3ft				25	2.1	Light brown/ gray, Poorly Sorted, sand and silt with small gravel/pebbles, dry, no noticeable odor, no staining	
3-6ft				18	0.9	Light brown/gray, poorly sorted, sand and silt with small gravel/pebbles, dry, no noticeable odor, no staining	
6-10.5ft 6-9ft				19	0.1	Gray poorly sorted, sand/silt with small gravel/pebbles, dry, no odor, no staining	
9-10.5ft						Dark grey, poorly sorted, fine silt/clay slightly moist, slight organic odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.

	Project No.: 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-11** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 10.5ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
0-3ft				33	0.3	Light gray/brown, Poorly Sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	
3-6ft				33	0.3	Light brown/gray , poorly sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	
6-10.5ft 6-9ft				25	0.0	Light Brown/gray poorly sorted, fine to coarse sand/silt with small gravel, dry, no odor, no staining	
9-10.5ft						Light grey, poorly sorted, fine silt/clay compacted, slight organic odor, no staining	

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.

	Project No.: 5495 **Project Name:** GLOBALFOUNDRIES 320B Demo	**Boring No.: B-12** **Sheet __ of __.** **By:** A. Pugliese
Drilling Contractor: Eastern Environmental **Driller: Pat & Ernesto** **Drill Rig:** Geoprobe 420 **Date Started:** 10/3/20	**Geologist:** **Drilling Method:** Direct Push **Drive Hammer Weight:** **Date Completed:** 10/3/20	**Boring Completion Depth: 10.5ft** **Ground Surface Elevation: ---** **Boring Diameter:2in**

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec. (inches)	PID (ppm)	Sample Description	USCS
0-3ft				28	0.0	Light brown, Poorly Sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	
3-6ft				16	0.0	Light brown, poorly sorted, sand and silt with small gravel/pebbles, dry, no odor, no staining	
6-10.5ft				20	0.0	Dark Brown poorly sorted, fine to coarse sand/silt with small gravel, dry, no odor, no staining	

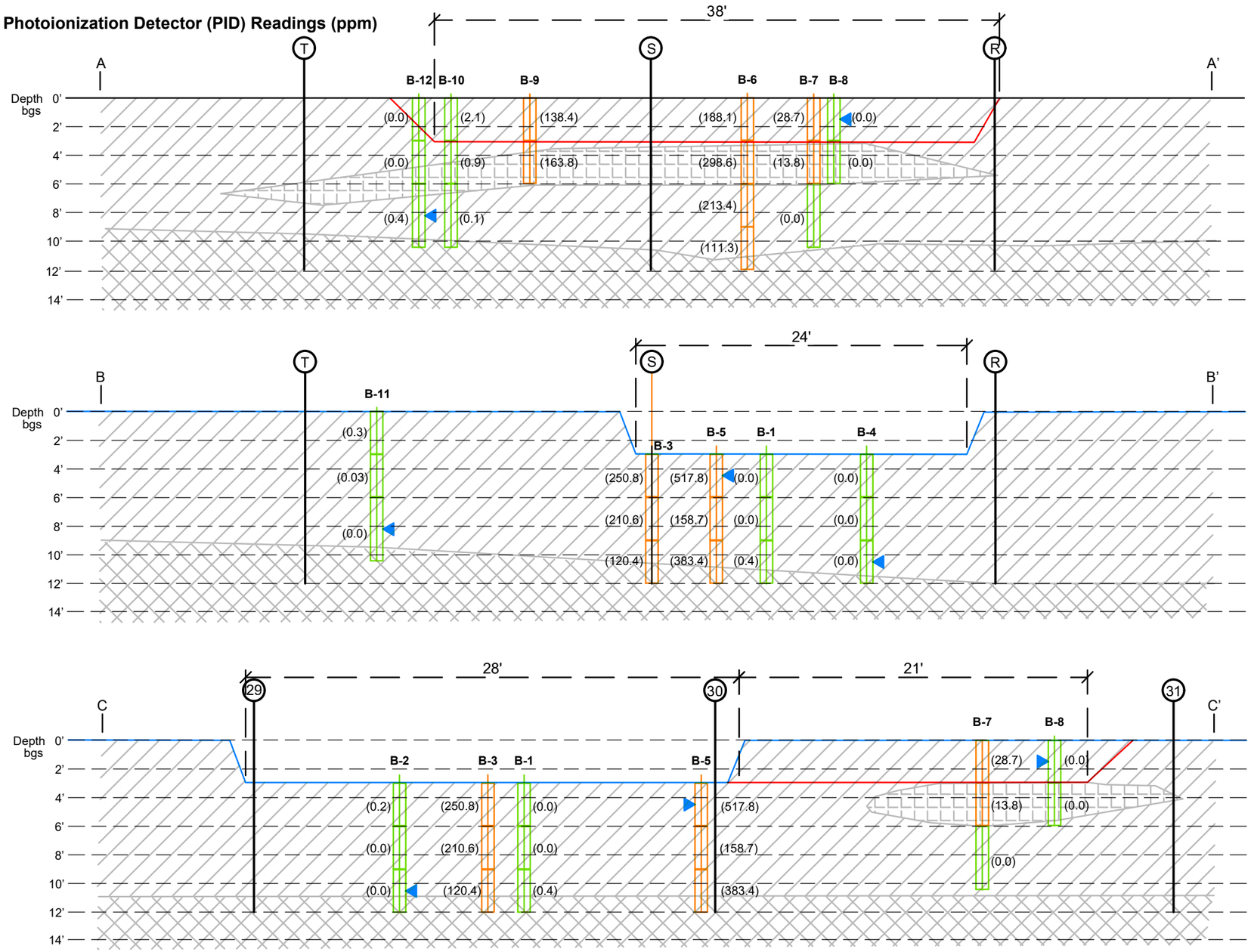
Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler

NOTES:

ATTACHMENT 5

CROSS SECTIONS OF SOIL BORINGS

Photoionization Detector (PID) Readings (ppm)



LEGEND:

- PRE–DELINEATION EXCAVATION
- POST–DELINEATION EXCAVATION
- LIGHT BROWN/GRAY POORLY SORTED, FINE TO COARSE SAND/ GRAVEL
- DARK BROWN, VERY POORLY SORTED SAND AND SILT WITH SMALL GRAVEL
- LIGHT BROWN TO DARK GRAY FINE SILT/CLAY
- SOIL SAMPLE COLLECTED FOR ANALYSIS

D&B ENGINEERS AND ARCHITECTS, P.C.

GLOBALFOUNDRIES U.S. 2 LLC - FAB 10
HOPEWELL JUNCTION, NEW YORK

CROSS SECTIONS OF PHOTOIONIZATION DETECTOR READINGS

FIGURE 2

ATTACHMENT 6

SUMMARY OF PHOTOIONIZATION DETECTOR READINGS

Attachment 6
GLOBALFOUNDRIES U.S. 2 LLC - FAB 10
B/320B RENOVATION PROJECT

Summary of Soil Screening Headspace Readings using Photoionization Detector
(VOC concentrations in ppm)

Depth	Boring ID					
	B-1	B-2	B-3	B-4	B-5	B-6
0-3 ft						188.1
3-6 ft	0	0.2	250.8	0	517.8	298.6
6-9 ft	0	0	210.6	0	158.7	213.4
9-12 ft	0.4	0	120.4	0	383.4	111.3

Depth	Boring ID					
	B-7	B-8	B-9	B-10	B-11	B-12
0-3 ft	28.7	0	138.4	2.1	0.3	0
3-6 ft	13.8	0	163.8	0.9	0.03	0
6-10.5 ft	0			0.1	0	0

ATTACHMENT 7

ANALYTICAL LABORATORY RESULTS

TABLE 1
WHITING-TURNER
GLOBAL FOUNDARIES U.S. 2 LLC - Fab 10
END POINT SOIL SAMPLE RESULTS
VOLATILE ORGANICS

Sample ID	B-2	B-2 (DUP)	B-4	B-5	B-8	NYCRR 6 Part 375 Unrestricted Use Soil Cleanup Objectives (SCO)	NYCRR 6 Part 375 Industrial Use Soil Cleanup Objectives (SCO)
Sampling Date	10/3/2020	10/3/2020	10/3/2020	10/3/2020	10/3/2020		
Start Depth (in Feet)	9.5	9.5	9	3	0		
End Depth (in Feet)	10	10	10.5	6	3		
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
VOLATILE COMPOUNDS							
1,1,1-Trichloroethane	U	U	U	U	U	680	1,000,000
1,1,2,2-Tetrachloroethane	U	U	U	U	U	--	--
1,1,2-Trichloro-1,2,2-trifluoroethane	U	U	U	U	U	--	--
1,1-Dichloroethane	U	U	U	U	U	270	480,000
1,1-Dichloroethene	U	U	U	U	U	330	1,000,000
1,2,3-Trichlorobenzene	U	U	U	U	U	--	--
1,2,4-Trichlorobenzene	U	U	U	U	U	--	--
1,2,4-Trimethylbenzene	U	U	U	U	U	3,600	
1,2-Dibromo-3-chloropropane	U	U	U	U	U	--	--
1,2-Dibromoethane	U	U	U	U	U	--	--
1,2-Dichlorobenzene	U	U	U	950 DJ	6	1,100	1,000,000
1,2-Dichloroethane	U	U	U	U	U	20	60,000
1,2-Dichloropropane	U	U	U	U	U	--	--
1,3,5-Trimethylbenzene	U	U	U	U	U	8,400	--
1,3-Dichlorobenzene	U	U	U	U	U	2,400	560,000
1,4-Dichlorobenzene	U	U	U	U	U	1,800	250,000
1,4-Dioxane	U	U	U	U	U	100	--
2-Butanone	U	U	U	**400 J**	U	120	1,000,000
4-Isopropyltoluene	U	U	U	U	U	--	--
4-Methyl-2-pentanone	U	U	U	U	U	--	--
Acetone	35	35	50	**110,000 D**	U	50	1,000,000
Benzene	U	U	U	U	U	60	89,000
Bromochloromethane	U	U	U	U	U	--	--
Bromodichloromethane	U	U	U	U	U	--	--
Bromoform	U	U	U	U	U	--	--
Bromomethane	U	U	U	U	U	--	--
Carbon disulfide	U	U	U	U	U	--	--
Carbon tetrachloride	U	U	U	U	U	760	44,000
Chlorobenzene	U	U	U	U	U	1,100	1,000,000
Chloroethane	U	U	U	U	U	--	--
Chloroform	U	U	U	U	U	370	700,000
Chloromethane	U	U	U	U	U	--	--
cis-1,2-Dichloroethene	U	U	U	U	U	250	1,000,000
cis-1,3-Dichloropropene	U	U	U	U	U	--	--

See next page for Footnotes/Qualifiers

TABLE 1
WHITING-TURNER
GLOBAL FOUNDARIES U.S. 2 LLC - Fab 10
END POINT SOIL SAMPLE RESULTS
VOLATILE ORGANICS

Sample ID	B-2	B-2 (DUP)	B-4	B-5	B-8	NYCRR 6 Part 375 Unrestricted Use Soil Cleanup Objectives (SCO)	NYCRR 6 Part 375 Industrial Use Soil Cleanup Objectives (SCO)
Sampling Date	**10/3/2020**	**10/3/2020**	**10/3/2020**	**10/3/2020**	**10/3/2020**		
Start Depth (in Feet)	**9.5**	**9.5**	**9**	**3**	**0**		
End Depth (in Feet)	**10**	**10**	**10.5**	**6**	**3**		
Units	**ug/Kg**	**ug/Kg**	**ug/Kg**	**ug/Kg**	**ug/Kg**	**ug/Kg**	**ug/Kg**
COMPOUNDS CONTINUED							
Cyclohexane	U	U	U	U	U	--	--
Dibromochloromethane	U	U	U	U	U	--	--
Dichlorodifluoromethane	U	U	U	U	U	--	--
Ethylbenzene	U	U	U	U	U	1,000	780,000
Isopropylbenzene	U	U	U	U	U	--	--
m,p-Xylene	U	U	U	U	U	260	1,000,000
Methyl Acetate	U	U	U	U	U	--	--
Methyl tert-butyl ether	U	U	U	U	U	930	--
Methylcyclohexane	U	U	U	U	U	--	--
n-Butylbenzene	U	U	U	U	U	12,000	--
n-Propylbenzene	U	U	U	U	U	3,900	--
o-Xylene	U	U	U	U	U	260	1,000,000
sec-Butylbenzene	U	U	U	U	U	11,000	--
Styrene	U	U	U	U	U	--	--
Tetrachloroethene	U	U	U	U	U	1,300	300,000
Toluene	0.41 J	0.41 J	0.25 J	U	0.86 J	700	1,000,000
trans-1,2-Dichloroethene	U	U	U	U	U	190	1,000,000
trans-1,3-Dichloropropene	U	U	U	U	U	--	--
Trichloroethene	0.44 J	0.44 J	0.25 J	U	U	470	400,000
Trichlorofluoromethane	U	U	U	U	U	--	--
Vinyl chloride	U	U	U	U	U	20	27,000
Xylenes, Total	U	U	U	U	U	260	--

Footnotes/Qualifiers:

ug/kg: Micrograms per kilogram
U: Analyzed for but not detected
J: Compound detected below CRDL, value estimated
--: No standard
BOLD: Result exceeds NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (SCO)

TABLE 1
WHITING-TURNER
GLOBAL FOUNDARIES U.S. 2 LLC - Fab 10
END POINT SOIL SAMPLE RESULTS
VOLATILE ORGANICS

Sample ID	B-11	B-12	NYCRR 6 Part 375	NYCRR 6 Part 375
Sampling Date	10/3/2020	10/3/2020	Unrestricted	Industrial
Start Depth (in Feet)	6	6	Use Soil	Use Soil
End Depth (in Feet)	10.5	10.5	Cleanup	Cleanup
			Objectives (SCO)	Objectives (SCO)
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg
VOLATILE COMPOUNDS				
1,1,1-Trichloroethane	U	U	680	1,000,000
1,1,2,2-Tetrachloroethane	U	U	--	--
1,1,2-Trichloro-1,2,2-trifluoroethane	U	U	--	--
1,1-Dichloroethane	U	U	270	480,000
1,1-Dichloroethene	U	U	330	1,000,000
1,2,3-Trichlorobenzene	U	U	--	--
1,2,4-Trichlorobenzene	U	U	--	--
1,2,4-Trimethylbenzene	U	U	3,600	
1,2-Dibromo-3-chloropropane	U	U	--	--
1,2-Dibromoethane	U	U	--	--
1,2-Dichlorobenzene	1.4 J	0.55 J	1,100	1,000,000
1,2-Dichloroethane	U	U	20	60,000
1,2-Dichloropropane	U	U	--	--
1,3,5-Trimethylbenzene	U	U	8,400	--
1,3-Dichlorobenzene	U	U	2,400	560,000
1,4-Dichlorobenzene	U	U	1,800	250,000
1,4-Dioxane	U	U	100	--
2-Butanone	U	U	120	1,000,000
4-Isopropyltoluene	U	U	--	--
4-Methyl-2-pentanone	U	U	--	--
Acetone	49	5.6	50	1,000,000
Benzene	U	U	60	89,000
Bromochloromethane	U	U	--	--
Bromodichloromethane	U	U	--	--
Bromoform	U	U	--	--
Bromomethane	U	U	--	--
Carbon disulfide	U	U	--	--
Carbon tetrachloride	U	U	760	44,000
Chlorobenzene	U	U	1,100	1,000,000
Chloroethane	U	U	--	--
Chloroform	U	U	370	700,000
Chloromethane	U	U	--	--
cis-1,2-Dichloroethene	U	U	250	1,000,000
cis-1,3-Dichloropropene	U	U	--	--

See next page for Footnotes/Qualifiers

TABLE 1
WHITING-TURNER
GLOBAL FOUNDARIES U.S. 2 LLC - Fab 10
END POINT SOIL SAMPLE RESULTS
VOLATILE ORGANICS

Sample ID	B-11	B-12	NYCRR 6 Part 375 Unrestricted Use Soil Cleanup Objectives (SCO)	NYCRR 6 Part 375 Industrial Use Soil Cleanup Objectives (SCO)
Sampling Date	10/3/2020	10/3/2020		
Start Depth (in Feet)	6	6		
End Depth (in Feet)	10.5	10.5		
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUNDS CONTINUED				
Cyclohexane	U	U	--	--
Dibromochloromethane	U	U	--	--
Dichlorodifluoromethane	U	U	--	--
Ethylbenzene	U	U	1,000	780,000
Isopropylbenzene	U	U	--	--
m,p-Xylene	U	U	260	1,000,000
Methyl Acetate	U	U	--	--
Methyl tert-butyl ether	U	U	930	--
Methylcyclohexane	U	U	--	--
n-Butylbenzene	U	U	12000	--
n-Propylbenzene	U	U	3900	--
o-Xylene	U	U	260	1,000,000
sec-Butylbenzene	U	U	11,000	--
Styrene	U	U	--	--
Tetrachloroethene	U	U	1,300	300,000
Toluene	0.6 J	0.37 J	700	1,000,000
trans-1,2-Dichloroethene	U	U	190	1,000,000
trans-1,3-Dichloropropene	U	U	--	--
Trichloroethene	0.89 J	U	470	400,000
Trichlorofluoromethane	U	U	--	--
Vinyl chloride	U	U	20	27,000
Xylenes, Total	U	U	260	--

Footnotes/Qualifiers:

ug/kg: Micrograms per kilogram
U: Analyzed for but not detected
J: Compound detected below CRDL, value estimated
--: No standard
BOLD: Result exceeds NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (SCO)

TABLE 2
WHITING-TURNER
GLOBAL FOUNDARIES U.S. 2 LLC - Fab 10
END POINT SOIL SAMPLE RESULTS
FLUORIDE, pH, Phenols, TOTAL SOLIDS AND SOLVENT RESULTS

Sample ID	B-2	B-2 (DUP)	B-4	B-5	B-8	B-11	B-12
Sampling Date	10/3/2020	10/3/2020	10/3/2020	10/3/2020	10/3/2020	10/3/2020	10/3/2020
	9	9	9	3	0	6	6
	10.5	10.5	10.5	6	3	10.5	10.5
Total Solids*	91.8	91.6	89.3	91	90.4	94.5	94.4
Fluoride**	U	U	U	U	4 J	5 J	U
pH***	6.5	6.49	6.73	4.98	6.87	5.22	6.76
Total Recoverable Phenols	U	U	U	U	U	U	U
Solvents, ug/kg							
1-Butanol	U	U	U	1,800,000	U	U	U
1-Methoxy-2-propanol	U	U	U	U	U	U	U
1-Methyl-2-pyrrolidinone (NMP)	U	U	U	870,000	U	U	U
2-Ethoxyethyl Acetate	U	U	U	U	U	U	U
Isopropyl Alcohol	U	U	U	2,100,000	U	U	U
Methanol	U	U	U	U	U	U	U
PGMEA	U	U	U	U	U	U	U
gamma-Butyrolactone (GML)	U	U	U	U	U	U	U
n-Butyl Acetate	U	U	U	U	U	U	U

Notes:

*percentage

**ug/kg: Micrograms per kilogram

***pH units ranging between <2 and >12

U: Non-detect

J: Compound detected below CRDL, value estimated

TABLE 3
WHITING-TURNER
GLOBAL FOUNDARIES U.S. 2 LLC - Fab 10
END POINT SOIL SAMPLE RESULTS
TAL METALS

Sample ID	B-2 (9-10.5)	B-2 (9-10.5) DUP	B-4 (9-10.5)	B-5 (3-6)	B-8 (0-3)	B-11	B-12	NYCRR 6 Part375	NYCRR 6 Part375
Sampling Date	10/3/2020	10/3/2020	10/3/2020	10/3/2020	10/3/2020	10/3/2020	10/3/2020	Unrestricted	Industrial
Start Depth (in Feet)	9	9	9	3	0	6	6	Use Soil	Use Soil
End Depth (in Feet)	10.5	10.5	10.5	6	3	10.5	10.5	Cleanup	Cleanup
Dilution Factor	1	1	1	1	1	1	1	Objectives (SCO)	Objectives (SCO)
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
METALS									
Arsenic	5.5	5.99	4.7	7.6	5.8	4.8	6.2	13	16
Barium	38.6	45.1	33.2	75.1	73.9	39.4	42.4	350	10,000
Cadmium	U	U	U	U	U	U	0.26 J	2.5	60
Chromium	12	10.9	12.2	15.2	15.4	17.5	14	30	6,800
Lead	15.2	15.3	12.6	20.3	16.6	16.1	22.6	63	3,900
Mercury	0.018 J	0.038	0.029 J	0.085	0.038	0.03 J	0.032 J	0.18	5.7
Nickel	19.6	21.3	19.6	20.8	23.4	17.5	22.7	30	10,000
Selenium	0.9 J	0.58 J	U	U	U	U	U	3.9	6,800
Silver	U	U	U	U	U	U	U	2	6,800

Footnotes/Qualifiers:

mg/kg: Milligrams per kilogram
U: Analyzed for but not detected
J: Estimated value or limit
D: Result reported from a secondary dilution
--: Not analyzed or no standard