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October 6, 2023

Ms. Katherine Todoroff
Office of Dredging and Sediment Technology
New Jersey Department of Environmental Protection
Mail Code #501-02A, P.O. Box 420
Trenton, New Jersey 08625-0425

Re: Marcus Hook Industrial Complex Water Quality Certificate
Berths 1A, 2A, 3A, 3B, 3C, Basin 2B/Intake RW5 and Intake RW7
August 2023 Sediment Sampling Results

Dear Ms. Todoroff,

As you are aware, Energy Transfer is proposing to dredge the berthing areas at their Marcus Hook Terminal (MHT) (Figure 1) starting as early as November 2023. Specifically, Energy Transfer plans on maintenance dredging berths 1A, 2A, 3A, 3B, 3C, 2B Basin/Intake RW5 and Intake RW7. Energy Transfer would like to dredge the MHT site according to the following permitted depths, plus 2 feet of overdredge:

- Berth 1A to 42' Mean Low Water (MLW) (Previously Submitted)
- Berth 2A to 36' Mean Low Water (MLW)
- Berth 3A to 40' Mean Low Water (MLW)
- Berth 3B to 13' Mean Low Water (MLW)
- Berth 3C to 40' Mean Low Water (MLW)
- Berth 2B/Intake RW5 to 15' Mean Low Water (MLW)
- Intake RW7 to 20' Mean Low Water (MLW)

Energy Transfer and Weston Solutions, Inc. (Weston), Energy Transfer's environmental consultant, are requesting that the upcoming dredging be performed under New Jersey Department of Environmental Protection (NJDEP) 401 Water Quality Certificate (WQC) and Acceptable Use Determination (AUD) (Permit No. 0809-01 1001.14, CDT220001).

Weston chose the core locations using recent hydrographic surveys of the dock areas performed by S.T. Hudson Engineers, Inc. (Camden, NJ) on July 10, 2023.

These surveys show that approximately 64,231 cubic yards (cy) needs to be removed from the MHT Berths 2A, 3A, 3B, 3C, 2B Basin/Intake RW5 and Intake RW7 in order to achieve the proposed dredge depths (see Attachment 1 for volume calculations). The Sediment Sampling and Analysis Plan (SSAP) submitted on July 19, 2023, presented the number of cores to be collected and the appropriate analyses to be conducted, and was approved by the NJDEP on August 15, 2023. A description of this sampling event and a summary of the sediment sample results are presented in this correspondence.

Material dredged from MHT will be disposed of at White's Rehandling Basin, which is owned and operated by Weeks Marine, Inc./American Atlantic. Open clamshell dredging will be conducted to remove the sediment from the berthing areas. Sediment will be transported by scow, bottom-dumped into a subaqueous disposal pit, and then hydraulically moved to an upland disposal basin. White's Rehandling Basin, located in Logan Township, Gloucester County, NJ is an approved disposal basin that has the capacity for the estimated maximum 64,231 cy to be dredged.

August 2023 Sediment Sampling Event

Thirteen (13) sediment cores were collected to characterize the approximately 64,231 cy of sediments currently within the dredge templates. The thirteen cores collected from MHT on August 15 and 16, 2023 were collected by Weston from a motorized sampling platform operated by Aqua Survey Inc. using a modified sediment coring device (Vibracore).

All thirteen initial cores collected were processed into 3 samples and 5 composite samples according to the approved SSAP. This sampling strategy resulted in a total of 8 analytical samples plus a duplicate, matrix spike (MS), and matrix spike duplicate (MSD) samples. Refer to Figure 2 for the core locations. Each core was collected to the design depth of the area to be dredged plus 2 feet of allowable over dredge depth (see Table 1).

Core logs were prepared by Weston of each sediment core collected, and they are provided as Attachment 2. The core logs list the precise collection coordinates as recorded by global positioning system (GPS), the depth of each core, and a physical description of the core. The physical description of each core is provided in Table 2. No distinct strata were observed in any cores and hence none were sub-sampled. Photographs of the individual cores can be found in Attachment 3.

After core collection and logging, each core was homogenized and composited, as applicable, into samples per the sampling plan (see Table 1) and stored in sealed glass jars by Weston field personnel. Samples were stored at 4°C and transported to Test America/Eurofins Laboratories for analysis. Samples were analyzed for the NJDEP required physical and chemical parameters. A field duplicate, matrix spike and matrix spike duplicate were also prepared and analyzed.

Table 1. Sediment Sampling Summary at MHT

Core #	Core Location	Sample Type	Sample to Depth*	Existing Depth	Target Core Length	Collected Core Length	Analytes**
1	Intake RW7	Sample A	20' + 2'	19.2'	2.8'	2.8'	Reduced List
2	Berth 3C	Composite B	40' + 2'	39.4'	2.6'	2.6'	Reduced List
3	Berth 3C	Composite B	40' + 2'	39.1'	2.9'	2.9'	Reduced List
4	Berth 3A	Composite C	40' + 2'	39.2'	2.8'	2.8'	Reduced List
5	Berth 3A	Composite C	40' + 2'	39.2'	2.8'	2.8'	Reduced List
6	Berth 3B	Sample D	13' + 2'	11.3'	3.7'	3.7'	Reduced List
7	Berth 2A	Composite E	36' + 2'	35.0'	3.0'	3.0'	Reduced List
8	Berth 2A	Composite E	36' + 2'	34.7'	3.3'	3.3'	Reduced List
9	Berth 2B	Sample F	15' + 2'	13.5'	3.5'	3.5'	Reduced List
10	Berth 1A	Composite G	42' + 2'	39.0'	3.0'	3.0'	Reduced List
11	Berth 1A	Composite G	42' + 2'	39.3'	2.7'	2.7	Reduced List
12	Berth 1A	Composite H	42' + 2'	39.4'	2.6'	2.6'	Reduced List
13	Berth 1A	Composite H	42' + 2'	38.4'	3.6'	3.6'	Reduced List

*Includes 2' overdredge, as requested by NJDEP.
** Samples analyzed for SVOCs, metals, hexavalent chromium, cyanide, percent moisture, sulfide, grain size, TOC and % moisture.

The sediment sampling procedures were conducted in accordance with *The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters* (NJDEP, 1997), the *Field Sampling Procedures Manual* (NJDEP, 2005), and the approved *Sediment Sampling and Analysis Plan (SSAP) Template (Version 4.0)* as updated by the NJDEP Office of Dredging and Sediment Technology in September 2020.

Analytical Results and Screening of Sediment Samples

Test America analyzed the samples submitted for the applicable NJDEP chemical and physical parameters. All four samples and two composite samples plus the duplicate sample were analyzed for the approved list of parameters (semi volatile organic compounds [SVOCs], target analyte [TAL] metals, trivalent and hexavalent chromium, cyanide, and percent solids and grain size). All four samples and two composite samples were also analyzed for grain size, total organic compounds (TOC) and percent moisture. The method for each parameter is outlined in Table 3.

Table 2. Physical Descriptions of Sediment Cores

Core ID	Physical Description
1	Very loose, dark greyish-brown silt, trace fine sand, trace organics, firmer w/ depth.
2	Very loose, dark greyish-brown silt, trace clay, firmer w/ depth.
3	Very loose, dark greyish silt, fine sand, firmer w/ depth.
4	Very loose, dark greyish-brown silt, trace clay, firmer w/ depth.
5	Dark greyish-brown silt, trace fine sand, firmer w/ depth.
6	Greyish-brown silt, trace fine sand, trace organics, firmer w/ depth.
7	Loose, dark grey silt, trace clay, firmer w/ depth.
8	Dark greyish-brown silt, little fine sand, trace organics, firmer w/ depth.
9	Loose, dark grey silt, some clay, firmer w/ depth.
10	Very loose, dark greyish-brown silt, firmer w/ depth.
11	Very loose, dark greyish-brown silt, some clay, trace gravel, firmer w/ depth.
12	Loose dark greyish-brown silt, some clay, firmer w/ depth.
13	Very loose, dark greyish-brown silt, trace organics, firmer w/ depth.

Table 3. Analytical Parameters and Methods

Test Parameter	Analytical Method
Grain Size	ASTM D422
TCL SVOCs	8270E
TAL Metals/Mercury	6020B/7471B
Hexavalent/Trivalent Chromium	7196A
Cyanide, total	9014
TOC	Lloyd Kahn
Percent Moisture	ASTM D2216
Sulfide	9034

TCL = Target Compound List
TAL = Target Analyte List
TOC = Total Organic Compound
ASTM = American Society for Testing and Materials
EPA = U.S. Environmental Protection Agency
SVOCs = Semivolatile Organic Compounds

PHYSICAL CHARACTERIZATION OF SEDIMENTS

Grain Size: Grain size was classified using the ASTM Method D422. MHT sediments were primarily comprised of gravel, sand and silt/clay. The grain size analysis indicated that only sample MHT-1A-Comp G contained gravel (8.6%). Samples ranged from 5.0% sand at location MHT-RW7-Sample A to 12.6% at location MHT-1A-Comp G. Samples ranged from 44.7% silt at location MHT-1A-Comp G to 61.1% silt at location MHT-3B-Sample D. Samples ranged

from 33.6% clay at location MHT-3B-Sample D to 43.1% clay at location MHT-3A-Comp C. The results for the grain size analysis in sediments collected from MHT are provided in Table 4.

Total Organic Carbon (TOC): Sediments at MHT contained TOC concentrations ranging from 30,000 milligrams/kilogram (mg/kg) at location MHT-2A-Comp E to 43,000 mg/kg at location MHT-3B-Sample D. The results for the TOC analysis in sediments are summarized in Table 4.

CHEMICAL CHARACTERIZATION OF BULK SEDIMENTS

Results from the bulk sediment analysis were compared to the most current New Jersey Soil Remediation Standards (SRS) for Non-Residential Ingestion-Dermal and Non-Residential Inhalation standards (May 2021). Table 5 provides a summary of detected concentrations for the bulk sediments collected from MHT. The analytical lab report is provided in Attachment 4 (electronically on the attached thumb drive).

Semivolatile Organic Compounds (SVOCs): Twenty SVOCs were detected in one or more of the sediment samples collected at MHT, as summarized in Table 5. No detected SVOCs concentrations exceeded NJ Non-Residential Ingestion-Dermal and Non-Residential Inhalation standards.

Inorganic Chemicals (Metals and Cyanide): Twenty-three metals plus cyanide were detected in one or more of the sediment samples collected at MHT, as summarized in Table 5. No detected inorganic chemical concentrations exceeded NJ Non-Residential Ingestion-Dermal and Non-Residential Inhalation standards.

Note that no NJ SRSs have been developed for calcium, total chromium, iron, magnesium, potassium, sodium or thallium, so detected concentrations of these substances could not be compared to screening criteria. Calcium concentrations ranged from 4,200 mg/kg to 5,600 mg/kg. Total chromium concentrations ranged from 45 mg/kg to 53 mg/kg. Iron concentrations ranged from 30,00 mg/kg to 38,000 mg/kg. Magnesium concentrations ranged from 5,300 mg/kg to 6,800 mg/kg. Potassium concentrations ranged from 2,000 mg/kg to 2,700 mg/kg. Sodium concentrations ranged from 350 mg/kg to 650 mg/kg. Thallium concentrations ranged from 0.12 mg/kg to 0.24 mg/kg.

QUALITY ASSURANCE & QUALITY CONTROL

This section documents the data validation for the nine sediment samples including one field duplicate collected for the project.

The data validation was conducted in general accordance with the USEPA National Functional Guidelines for Organic and Inorganic Superfund Methods Data Review (November 2020) and the applicable methods listed above. The results of quality control (QC) data analyzed with site samples were used to assess the overall data reliability. The method and/or laboratory-established control limits were used for assessment.

Samples were analyzed for the parameters below following the stated methods:

- Semivolatile Organic Compounds (SVOC) – SW 846 Method 8270E LL
- Metals – SW 846 Method 6020B
- Mercury (Hg) – SW 846 Method 7471B
- Cyanide, Total & Amenable – SW 846 Method 9014
- Trivalent Chromium – SW846 Method 7196A
- Hexavalent Chromium – SW846 Method 7196A
- Total Organic Carbon (TOC) – Lloyd Kahn Method
- Sulfide, Acid soluble and insoluble –EPA 9034
- Percent Moisture – SM 2540G

General Comment

Nine sediment samples collected on 8/15/2023 and 8/16/2023 by Weston Solutions, Inc. and their requested analyses are summarized in the table below.

SDG No.	Field Sample ID	Lab Sample ID	Analysis
180-160903-1	MHT-3A-COMP C	180-160903-1	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture
	MHT-3A-COMP C-DUP	180-160903-2	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture
	MHT-3C-COMP B	180-160903-3	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture
	MHT-2B-SAMPLE F*	180-160903-4	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture
	MHT-2A-COMP E	180-160903-5	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture
180-161013-1	MHT-3B-SAMPLE D	180-161013-1	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture

SDG No.	Field Sample ID	Lab Sample ID	Analysis
	MHT-RW7-SAMPLE A	180-161013-2	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture
	MHT-1A-COMP H	180-161013-3	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture
	MHT-1A-COMP G	180-161013-4	SVOC, Metals, Mercury, Cyanide, Trivalent Chromium, Hexavalent Chromium, TOC, Sulfide, Percent Moisture

*The laboratory inadvertently logged this sample ID as MHT-2B-COMP-F so the incorrect name is reflected in the data package.

The samples were received by the laboratory on 8/16/2023 and 8/17/23 in good condition, properly preserved, and on ice. The shipment cooler temperatures were 3.4 and 3.3 degree Celsius (º C).

All samples were prepared and analyzed within the method required holding times.

The solid contents were greater than (>) 30% for all sediment samples but less than (<) 50%. Therefore, organic data did not require data qualification. Positive and non-detect inorganic results (metals, mercury, cyanide, sulfide, hexavalent chromium, and trivalent chromium) were estimated (J and UJ, respectively) for all samples based on USEPA Region 2 data validation standard operating procedures (SOPs) QA-HWSS-A-009 (ICP-MS metals), -011 (mercury), and -012 (cyanide), Revisions 0, March 2022.

SVOC Analysis

The continuing calibration verification (CCV) 180- 444651/3 failed percent difference (%D) requirements for bis(2-chloroethoxy)methane and 4-nitrophenol. The non-detected bis(2-chloroethoxy)methane and 4-nitrophenol results were estimated (UJ) for all samples.

The associated method blank was free of contamination.

In the associated laboratory control sample (LCS) analysis, the recoveries of twenty-nine (29) of the sixty-four (64) target analytes were below the acceptance limits. The positive and non-detect results of these analytes were estimated (J/UJ) for all samples.

The recoveries of all surrogate compounds were within laboratory control limits.

The matrix spike (MS) and matrix spike duplicate (MSD) analyses were performed on sample MHT-1A-COMP G. The recoveries of benzo[k]fluoranthene, 4-chloroaniline, isophorone, hexachlorocyclopentadiene, atrazine and benzaldehyde failed below laboratory control limits;

therefore, these failed analytes were flagged with "F1" qualifiers by the laboratory for sample MHT-1A-COMP G. The F1 qualifiers were removed and replaced with a J-flag for positive results and an UJ-flag for non-detected results for potential low bias for analytes, benzo[k]fluoranthene, 4-chloroaniline, isophorone, hexachlorocyclopentadiene, atrazine and benzaldehyde The MS/MSD analyses yielded acceptable relative percent difference (RPD) for all analytes, demonstrating acceptable laboratory precision.

All samples were analyzed undiluted, and all results were reported on a dry-weight basis.

Sample MHT-3A-COMP C-DUP is a field duplicate of MHT-3A-COMP C. Their analyses are considered within control in one of the following conditions.

- When analyte concentrations from both analyses were five times (5x) or more of the corresponding reporting limits (RLs), the RPD is <50%, or
- When either of the analyte concentration from both analyses was non-detect or <5xRL, the absolute difference (Δ) between the two values (RL or concentration) is less than two times (<2x) RL.

The positive results of field duplicate pair are summarized below.

Analyte Concentration (mg/kg)	MHT-3A-COMP C (RL=0.0094)	MHT-3A-COMP C-DUP (RL=0.010)	RPD (%)	Action
Phenanthrene	0.0030 J	0.0084 J	Δ=0.0054	none
Fluoranthene	0.0068 J	0.019	Δ=0.012	none
Pyrene	0.0058 J	0.017	Δ=0.011	none
Benzo[a]anthracene	0.0069 J	0.013	Δ=0.006	none
Chrysene	0.0094 U	0.017	Δ=0.008	none
Benzo[b]fluoranthene	0.0094 U	0.014	Δ=0.005	none
Benzo[k]fluoranthene	0.0094 U	0.0064 J	Δ=0.0030	none
Benzo[a]pyrene	0.0094 U	0.013	Δ=0.004	none
Indeno[1,2,3-cd]pyrene	0.0094 U	0.0079 J	Δ=0.0015	none
Benzo[g,h,i]perylene	0.0094 U	0.012	Δ=0.003	none

mg/kg – milligram per kilogram RL – reporting limit RPD – relative percent difference
ND – not detected Δ - absolute difference

Since the absolute difference was <2xRL for analytes summarized in table above, data qualification action was not required for sample MHT-3A-COMP C and its field duplicate MHT-3A-COMP C-DUP.

Metal and Mercury Analyses

Metal and mercury results had been estimated (J/UJ) due to solid contents <50% for all sediment samples.

The instrument and method blanks were free of metals and mercury contamination with the exception of the continuing calibration blank (CCB), 180-445749/85. Aluminum was detected in this blank at 28.1 mg/L; however, field samples associated with this CCB contained levels of

aluminum above the detection limit and greater than 10x the amount in the blank. Data qualification action was not required.

The analyses of the LCSs yielded acceptable recoveries.

Unless otherwise discussed, further data qualification action was not taken for the following QC results that failed technical requirements.

- Although not spiked, chromium and lead were detected with concentrations greater than (>) the method detection limits (MDL) in the ICSA analysis 180-445749/16, indicating interferant metal elements such as aluminum, calcium, iron, and/or magnesium at high enough concentrations may cause biased high chromium and lead results. Iron and aluminum, two of the major interferent analytes, were detected in all sediment samples at concentrations 1-2 times the ICSA. These not spiked but detected analyte concentrations in sediment samples were > ten time (10x) those of ICSA, suggesting insignificant impact of high iron and aluminum concentrations on chromium and lead, data qualification action was not required.
- The MS and/or MSD analyses on sample MHT-3A-COMP C yielded recoveries outside control limits of 75-125% for antimony, zinc, and mercury. The post digestive spike analysis yielded acceptable recoveries for all analytes. The positive results of these analytes for sample MHT-3A-COMP C were estimated (J) due to low percent solids, therefore no further qualifier was applied. The RPDs of all analytes met the technical requirement of ≤35%. Recoveries of aluminum, iron, and manganese were also outside control limits; however, their concentrations in sample MHT-3A-COMP C were more than four times (4x) the spike concentrations; therefore, data qualification action was not required.
- The MS and/or MSD analyses on sample MHT-1A-COMP G yielded recoveries below control limits of 75-125% for antimony. The post digestive spike analysis yielded acceptable recoveries for all analytes. The positive antimony result for sample MHT-1A-COMP was estimated (J) due to low percent solids, therefore, no further qualifier was applied. The RPDs of all analytes met the technical requirement of ≤35%. Recoveries of aluminum, iron, manganese, and zinc were also outside control limits; however, their concentrations in sample MHT-1A-COMP were more than four times (4x) the spike concentrations; therefore, data qualification action was not required.

Field Duplicate

Sample MHT-3A-COMP C-DUP is a field duplicate of MHT-3A-COMP C. Their analyses are considered within control in one of the following conditions.

- When analyte concentrations from both analyses were five times (5x) or more of the corresponding reporting limits (RLs), the RPD is <50%, or
- When either of the analyte concentration from both analyses was non-detect or <5xRL, the absolute difference (Δ) between the two values (RL or concentration) is less than two times (<2x) RL.

The positive metal and mercury results of field duplicate pair are summarized below.

Analyte Concentration (mg/kg)	MHT-3A-COMP C	MHT-3A-COMP C-DUP	RPD (%)	Action
Silver	0.30 (RL= 0.23)	0.32 (RL= 0.18)	Δ=0.02	none
Aluminum	16000 (RL= 14)	16000 (RL= 11)	0	none
Arsenic	14 (RL= 0.23)	14 (RL= 0.18)	0	none
Barium	140 (RL= 2.3)	140 (RL= 1.8)	0	none
Beryllium	0.95 (RL= 0.23)	1.1 (RL= 0.18)	Δ=0.06	none
Calcium	4700 (RL= 120)	4600 (RL= 89)	2.2	none
Cadmium	0.63 (RL= 0.23)	0.79 (RL= 0.18)	Δ=0.16	none
Cobalt	15 (RL= 0.12)	16 (RL= 0.089)	6.5	none
Chromium	48 (RL= 0.47)	49 (RL= 0.36)	2.1	none
Copper	34 (RL= 0.70)	39 (RL= 0.53)	13.7	none
Iron	32000 (RL= 12)	33000 (RL= 8.9)	3.1	none
Potassium	2500 (RL= 120)	2400 (RL= 89)	4.1	none
Magnesium	6000 (RL= 120)	6100 (RL= 89)	1.7	none
Manganese	1900 (RL= 1.2)	1600 (RL= 0.89)	17.1	none
Sodium	490 (RL= 120)	490 (RL= 89)	0	none
Nickel	29 (RL= 0.23)	30 (RL= 0.18)	3.4	none
Lead	49 (RL= 0.23)	54 (RL= 0.18)	9.7	none
Antimony	0.38 (RL= 0.47)	0.30 J (RL= 0.36)	Δ=0.08	none
Selenium	0.71 J (RL= 1.2)	0.68 J (RL= 0.89)	Δ=0.03	none
Thallium	0.22 J (RL= 0.23)	0.24 (RL= 0.18)	Δ=0.02	none
Vanadium	41 (RL= 0.23)	42 (RL= 0.18)	2.4	none
Zinc	210 (RL= 3.5)	230 (RL= 2.7)	9.1	none
Mercury	0.16 (RL= 0.046)	0.18 (RL= 0.049)	Δ=0.02	none

mg/kg – milligram per kilogram RL – reporting limit RPD – relative percent difference
Δ - absolute difference

Since the RPD was <50% and absolute difference was <2x RL for analytes summarized in the table above, data qualification action was not required for sample MHT-3A-COMP C and its field duplicate MHT-3A-COMP C-DUP.

Cyanide (Total and Amenable) Analyses

Cyanide results had been estimated (J) due to solid contents <50% for all sediment samples.

Initial and continuing calibration verification analyses met technical requirements. The instrument and method blanks were free of cyanide contamination. The recoveries of LCS analyses were within laboratory control limits.

A matrix spike and matrix spike duplicate were performed on sample MHT-1A-COMP G. All recoveries and the RPD were within acceptance limits.

All sediment samples were analyzed undiluted, and their results were on a dry-weight basis.

Field Duplicate

Sample MHT-3A-COMP C-DUP is a field duplicate of MHT-3A-COMP C. Their analyses are considered within control in one of the following conditions.

- When analyte concentrations from both analyses were five times (5x) or more of the corresponding reporting limits (RLs), the RPD is <50%, or
- When either of the analyte concentration from both analyses was non-detect or <5xRL, the absolute difference (Δ) between the two values (RL or concentration) is less than two times (<2x) RL.

The positive cyanide results of the field duplicate pair are summarized below.

Analyte Concentration (mg/kg)	MHT-3A-COMP C	MHT-3A-COMP C-DUP	RPD (%)	Action
Cyanide	0.76 (RL= 0.54)	0.82 (RL= 0.51)	Δ=0.06	none

mg/kg – milligram per kilogram RL – reporting limit RPD – relative percent difference
Δ - absolute difference

Since the absolute difference was <2xRL for cyanide, data qualification action was not required for sample MHT-3A-COMP C and its field duplicate MHT-3A-COMP C-DUP.

Hexavalent and Trivalent Chromium Analyses

Hexavalent chromium non-detected results had been estimated (UJ) due to solid contents <50% for all sediment samples.

Initial and continuing calibration verification analyses met laboratory control limits. The instrument and method blanks were free of hexavalent chromium contamination with the exception of the continuing calibration blank (CCB), 180-444641/4. Hexavalent chromium was detected in this blank at 0.004 mg/L; however, no field samples were associated with this CCB and no data qualification was required.

Hexavalent chromium analysis was performed without dilution for all samples. All results were reported on a dry-weight basis.

Hexavalent chromium was not detected in field duplicate pair MHT-3A-COMP C and MHT-3A-COMP C-DUP. The field precision was deemed acceptable.

Trivalent chromium result was calculated by subtracting hexavalent chromium result from the total chromium result. Since hexavalent chromium was not detected in any sediment samples submitted in this SDG, the trivalent chromium results are those of the total chromium results and were estimated (J) as such due to low solid contents.

Sulfide Analysis

Sulfide results had been estimated (J) due to solid contents <50% for all sediment samples.

Sulfide was detected in the continuing calibration blank (CCB), 180-444190/14 at 1.92 mg/L; however, sulfide was not detected in the sample MHT-2A-COMP E associated with this CCB. No data qualification was required.

Sulfide was detected in the calibration blanks and method blank associated with samples MHT-3B-SAMPLE D, MHT-RW7-SAMPLE A, MHT-1A-COMP H and MHT-1A-COMP G at concentrations >MDL but <RL. Based on professional judgement, positive sulfide results would be estimated (J) for potential high bias for all associated sediment samples because their concentrations, though >RLs, were <10x that of the method blank. However, since the results were previously qualified due to low percent solids, no further qualifier was needed. The B-flag applied by the laboratory was removed during the data review process.

The MS/MSD analyses on sample MHT-1A-COMP G failed sulfide recoveries low, less than laboratory control limits, but with an acceptable RPD. The positive sulfide result was previously estimated (J) for low percent solids, no further qualifier was applied to the sulfide result in sample MHT-1A-COMP G.

Other instrument and batch QC results were within laboratory control limits.

Field Duplicate

Sample MHT-3A-COMP C-DUP is a field duplicate of MHT-3A-COMP C. Their analyses are considered within control in one of the following conditions.

- When analyte concentrations from both analyses were five times (5x) or more of the corresponding reporting limits (RLs), the RPD is <50%, or
- When either of the analyte concentration from both analyses was non-detect or <5xRL, the absolute difference (Δ) between the two values (RL or concentration) is less than two times (<2x) RL.

The positive sulfide results of the field duplicate pair are summarized below.

Analyte Concentration (mg/kg)	MHT-3A-COMP C	MHT-3A-COMP C-DUP	RPD (%)	Action
Sulfide	36 J (RL= 84)	49 J (RL= 92)	Δ=13	none

mg/kg – milligram per kilogram RL – reporting limit RPD – relative percent difference
Δ - absolute difference

Since the absolute difference was <2xRL for sulfide, data qualification action was not required for sample MHT-3A-COMP C and its field duplicate MHT-3A-COMP C-DUP.

Total Organic Carbon (TOC) Analysis

TOC results had been estimated (J) due to solid contents <50% for all sediment samples.

The instrument and method blanks were free of TOC. The analyses of LCSs yielded acceptable recoveries.

Each sample was analyzed in duplicate without dilution, and the RPD of the duplicate measurements was <20% except for sample MHT-3A-COMP C-DUP which yielded an RPD of 23.65%. The positive TOC result was previously estimated (J) due to low solids and no additional qualifier for non-compliant precision was needed.

The matrix spike and matrix spike duplicate performed on sample MHT-1A-COMP G yielded TOC recoveries below the lower control limit. The RPD was within the acceptance limit. The positive detects for TOC results were estimated (J) for sample, MHT-1A-COMP G due to low percent solids, therefore no further data qualification was needed.

Note that the laboratory report narrative stated, "The reporting limit for Lloyd Kahn TOC analysis is a nominal value and does not reflect adjustments in sample mass processed on an individual basis." After a requested made for explanation, the laboratory explained that sample mass and associated solid content were used to calculate the TOC result but not the RL due to "a limitation in the either the software or the LIMS." Since the TOC results in all sediment samples were >10x RLs, the RLs are not critical to end data user.

Field Duplicate

Sample MHT-3A-COMP C-DUP is a field duplicate of MHT-3A-COMP C. Their analyses are considered within control in one of the following conditions.

- When analyte concentrations from both analyses were five times (5x) or more of the corresponding reporting limits (RLs), the RPD is <50%, or
- When either of the analyte concentration from both analyses was non-detect or <5xRL, the absolute difference (Δ) between the two values (RL or concentration) is less than two times (<2x) RL.

The positive TOC results of field duplicate pair are summarized below.

Analyte Concentration (mg/kg)	MHT-3A-COMP C	MHT-3A-COMP C-DUP	RPD (%)	Action
TOC	34000 (RL= 2800)	37000 (RL= 3100)	8.5	none

mg/kg – milligram per kilogram RL – reporting limit RPD – relative percent difference
Δ - absolute difference

Since the RPD was <50%, data qualification action was not required for TOC for sample MHT-3A-COMP C and its field duplicate MHT-3A-COMP C-DUP.

Overall Assessment

Based on the quality control data presented, this validation review, and the required qualifiers, all the results are acceptable for use with the applied qualifiers.

SUMMARY

Based on the sampling results described above, these sediments do not present a disposal concern. Concentrations of SVOCs, pesticides, PCBs, metals, hexavalent and trivalent chromium, and cyanide in bulk sediments from all locations collected at the MHT on August 15 and 16, 2023 were below the lower of Non-Residential Ingestion-Dermal and Non-Residential Inhalation standards (May 2021) and can be disposed of at White's Rehandling Basin.

The major findings of this sediment characterization are as follows:

- Sediment can be dredged from 1A, 2A, 3A, 3B, 3C, 2B Basin/Intake RW5 and Intake RW7, and can be disposed of at White's Rehandling Basin based on analytical data from sediment sampling in August 2023 as described herein.
- The maintenance dredged sediments to be removed from the Delaware River at MHT are mainly comprised of sand and silt/clay.
- Low levels of SVOCs, inorganics, trivalent chromium and cyanide were detected in bulk sediments collected at Marcus Hook Terminal. However, no compounds were detected in bulk sediments in concentrations that exceeded NJ SRS for Non-residential settings.
- All samples were processed within holding times and according to method specifications.

Energy Transfer and Weston are available at any time to clarify or address issues the Department may have regarding this request. Please call me at (908) 565-0888 with any questions. We appreciate the Departments' review and look forward to approval of the enclosed sediment data and the related Water Quality Certificate approval.

Sincerely,

WESTON SOLUTIONS, INC.

Ryan Brown
Project Manager

cc: D. Monk (Energy Transfer)
D. Caplan (USACE)
R. Montgomerie (USEPA)

USFWS
NMFS

TABLES

Table 4 - Sediment Physical Data - Berths 1A, 2A, 2B Basin, 3A, 3B, 3C, and Intake RW7
Energy Transfer - Marcus Hook Terminal
August 2023

Client ID		MHT-RW7-SAMPLE A	MHT-3C-COMP B	MHT-3A-COMP C	MHT-3B-SAMPLE D	MHT-2A-COMP E	MHT-2B-COMP F	MHT-1A-COMP G	MHT-1A-COMP H
Lab Sample ID		180-161013-2	180-160903-3	180-160903-1	180-161013-1	180-160903-5	180-160903-4	180-161013-4	180-161013-3
Sampling Date		8/16/2023	8/15/2023	8/15/2023	8/16/2023	8/15/2023	8/15/2023	8/16/2023	8/16/2023
GRAIN SIZE AND TOTAL ORGANIC CARBON									
Gravel	%	0	0	0	0	0	0	8.6	0
Coarse Sand	%	0	0	0	0	0	0	2.3	0
Medium Sand	%	0.7	0.9	1	0.7	0.9	0.6	3.7	1.3
Fine Sand	%	4.3	5.2	6.2	4.6	5.3	4.7	6.6	5.1
Silt	%	56.9	51.9	49.7	61.1	53	52.9	44.7	52.3
Clay	%	38.1	42	43.1	33.6	40.8	41.8	34.1	41.3
Total Organic Carbon	PPM	32,000	35,000	34,000	43,000	30,000	38,000	34,000	33,000

Table 5 - Sediment Analytical Data - Berths 1A, 2A, 2B Basin, 3A, 3B, 3C and Intake RW7 - SVOCs, Metals and Wet Chemistry
Energy Transfer - Marcus Hook Terminal
August 2023

Client ID	NJ SRS 7:26D	NJ SRS 7:26D	MHT-RW7-SAMPLE A			MHT-3C-COMP B			MHT-3A-COMP C			MHT-3A-COMP C-DUP			MHT-3B-SAMPLE D		
Lab Sample ID	Ingestion-Dermal	Inhalation	180-161013-2			180-160903-3			180-160903-1			180-160903-2			180-161013-1		
Sampling Date	Table 2	Table 4	08/16/2023 12:45:00			08/15/2023 13:35:00			08/15/2023 12:45:00			08/15/2023 12:50:00			08/16/2023 12:20:00		
	Nonresidential	Nonresidential															
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)			Result	Q	MDL	Result	Q	MDL	Result	Q	MDL	Result	Q	MDL	Result	Q	MDL
1,1'-Biphenyl	450	NA	ND	UJ	0.016	ND	UJ	0.017	ND	UJ	0.017	ND	UJ	0.019	ND	UJ	0.016
2,2'-oxybis[1-chloropropane]	52000	NA	ND	U	0.0033	ND	U	0.0034	ND	U	0.0035	ND	U	0.0038	ND	U	0.0033
2,4,5-Trichlorophenol	91000	NA	ND	U	0.016	ND	UJ	0.016	ND	UJ	0.016	ND	UJ	0.018	ND	UJ	0.015
2,4,6-Trichlorophenol	230	NA	ND	U	0.015	ND	UJ	0.015	ND	UJ	0.015	ND	UJ	0.017	ND	UJ	0.014
2,4-Dichlorophenol	2700	NA	ND	U	0.0035	ND	U	0.0035	ND	U	0.0036	ND	U	0.0039	ND	U	0.0034
2,4-Dimethylphenol	18000	NA	ND	U	0.015	ND	U	0.015	ND	U	0.016	ND	U	0.017	ND	U	0.015
2,4-Dinitrophenol	1800	NA	ND	U	0.28	ND	U	0.28	ND	U	0.29	ND	U	0.32	ND	U	0.27
2,4-Dinitrotoluene	NA	NA	ND	U	0.027	ND	U	0.027	ND	U	0.028	ND	U	0.03	ND	U	0.026
2-Chloronaphthalene	67000	NA	ND	UJ	0.0021	ND	UJ	0.0021	ND	UJ	0.0021	ND	UJ	0.0023	ND	UJ	0.002
2-Chlorophenol	6500	NA	ND	U	0.016	ND	U	0.017	ND	U	0.017	ND	U	0.019	ND	U	0.016
2-Methylnaphthalene	3300	NA	0.0063	J	0.0022	ND	UJ	0.0022	ND	UJ	0.0022	ND	UJ	0.0024	ND	UJ	0.0021
2-Methylphenol	4600	NA	ND	U	0.013	ND	U	0.013	ND	U	0.013	ND	U	0.015	ND	U	0.013
2-Nitroaniline	NA	NA	ND	U	0.02	ND	U	0.021	ND	U	0.021	ND	U	0.023	ND	U	0.02
2-Nitrophenol	NA	NA	ND	U	0.017	ND	U	0.017	ND	U	0.017	ND	U	0.019	ND	U	0.016
3,3'-Dichlorobenzidine	5.7	NA	ND	U	0.042	ND	U	0.043	ND	U	0.044	ND	U	0.048	ND	U	0.041
3-Nitroaniline	NA	NA	ND	U	0.011	ND	U	0.012	ND	U	0.012	ND	U	0.013	ND	U	0.011
4,6-Dinitro-2-methylphenol	NA	NA	ND	U	0.078	ND	U	0.079	ND	U	0.081	ND	U	0.088	ND	U	0.076
4-Bromophenyl phenyl ether	NA	NA	ND	UJ	0.019	ND	UJ	0.019	ND	UJ	0.02	ND	UJ	0.022	ND	UJ	0.019
4-Chloro-3-methylphenol	NA	NA	ND	U	0.016	ND	U	0.016	ND	U	0.016	ND	U	0.018	ND	U	0.015
4-Chloroaniline	13	NA	ND	UJ	0.012	ND	UJ	0.012	ND	UJ	0.012	ND	UJ	0.013	ND	UJ	0.011
4-Chlorophenyl phenyl ether	NA	NA	ND	UJ	0.015	ND	UJ	0.015	ND	UJ	0.016	ND	UJ	0.017	ND	UJ	0.015
4-Methylphenol	9100	NA	0.024	J	0.013	ND	U	0.013	ND	U	0.014	ND	U	0.015	0.037	J	0.013
4-Nitroaniline	130	NA	ND	U	0.017	ND	U	0.017	ND	U	0.017	ND	U	0.019	ND	U	0.016
4-Nitrophenol	NA	NA	ND	UJ	0.032	ND	UJ	0.032	ND	UJ	0.033	ND	UJ	0.036	ND	UJ	0.031
Acenaphthene	50000	NA	0.033	J	0.0026	ND	UJ	0.0026	ND	UJ	0.0027	ND	UJ	0.0029	ND	UJ	0.0025
Acenaphthylene	NA	NA	0.012	J	0.002	ND	UJ	0.002	ND	UJ	0.002	ND	UJ	0.0022	0.0042	J	0.0019
Acetophenone	130000	NA	ND	U	0.016	ND	U	0.016	ND	U	0.017	ND	U	0.018	ND	U	0.015
Anthracene	250000	NA	0.041	J	0.0023	ND	UJ	0.0024	ND	UJ	0.0024	ND	UJ	0.0026	0.0062	J	0.0023
Atrazine	3200	NA	ND	U	0.02	ND	U	0.02	ND	U	0.02	ND	U	0.022	ND	U	0.019
Benzaldehyde	910	NA	ND	U	0.0056	ND	U	0.0057	ND	U	0.0058	ND	U	0.0063	ND	U	0.0054
Benzo[a]anthracene	23	370000	0.12		0.0041	0.0074		0.0041	ND	U	0.0042	0.013		0.0046	0.019		0.0039
Benzo[a]pyrene	2.3	16000	0.05	J	0.0039	0.0068	J	0.004	ND	UJ	0.0041	0.013	J	0.0044	0.018	J	0.0038
Benzo[b]fluoranthene	23	370000	0.094	J	0.0022	0.0078	J	0.0022	ND	UJ	0.0023	0.014	J	0.0025	0.022	J	0.0021
Benzo[g,h,i]perylene	NA	NA	0.034	J	0.0019	0.0051	J	0.002	ND	UJ	0.002	0.012	J	0.0022	0.017	J	0.0019
Benzo[k]fluoranthene	230	NA	0.035	J	0.0027	ND	UJ	0.0027	ND	UJ	0.0028	0.0064	J	0.0031	0.009	J	0.0026
Bis(2-chloroethoxy)methane	2700	NA	ND	UJ	0.016	ND	UJ	0.017	ND	UJ	0.017	ND	UJ	0.019	ND	UJ	0.016
Bis(2-chloroethyl)ether	3.3	NA	ND	U	0.0016	ND	U	0.0017	ND	U	0.0017	ND	U	0.0018	ND	U	0.0016
Bis(2-ethylhexyl) phthalate	180	NA	ND	U	0.048	ND	U	0.049	ND	U	0.05	ND	U	0.054	ND	U	0.047
Butyl benzyl phthalate	1300	NA	ND	U	0.031	ND	U	0.032	ND	U	0.032	ND	U	0.035	ND	U	0.03
Caprolactam	460000	1300	ND	U	0.029	ND	U	0.03	ND	U	0.031	ND	U	0.033	ND	U	0.029
Carbazole	NA	NA	0.045	J	0.0021	ND	UJ	0.0021	ND	UJ	0.0022	ND	UJ	0.0024	ND	UJ	0.002
Chrysene	2300	NA	0.55	J	0.005	0.0063	J	0.0051	ND	UJ	0.0052	0.017	J	0.0057	0.023	J	0.0048
Dibenz(a,h)anthracene	2.3	37000	0.0097	J	0.0058	ND	UJ	0.0059	ND	UJ	0.006	ND	UJ	0.0065	ND	UJ	0.0056

Table 5 - Sediment Analytical Data - Berths 1A, 2A, 2B Basin, 3A, 3B, 3C and Intake RW7 - SVOCs, Metals and Wet Chemistry
Energy Transfer - Marcus Hook Terminal
August 2023

Client ID	NJ SRS 7:26D	NJ SRS 7:26D	MHT-RW7-SAMPLE A			MHT-3C-COMP B			MHT-3A-COMP C			MHT-3A-COMP C-DUP			MHT-3B-SAMPLE D		
Lab Sample ID	Ingestion-Dermal	Inhalation	180-161013-2			180-160903-3			180-160903-1			180-160903-2			180-161013-1		
Sampling Date	Table 2	Table 4	08/16/2023 12:45:00			08/15/2023 13:35:00			08/15/2023 12:45:00			08/15/2023 12:50:00			08/16/2023 12:20:00		
	Nonresidential	Nonresidential															
Dibenzofuran	NA	NA	0.026	J	0.016	ND	UJ	0.017	ND	UJ	0.017	ND	UJ	0.019	ND	J	0.016
Diethyl phthalate	730000	NA	ND	UJ	0.016	ND	UJ	0.016	ND	UJ	0.016	ND	UJ	0.018	ND	UJ	0.015
Dimethyl phthalate	NA	NA	ND	UJ	0.018	ND	UJ	0.018	ND	UJ	0.018	ND	UJ	0.02	ND	UJ	0.017
Di-n-butyl phthalate	91000	NA	ND	UJ	0.02	ND	UJ	0.02	ND	UJ	0.02	ND	UJ	0.022	ND	UJ	0.019
Di-n-octyl phthalate	9100	NA	ND	U	0.026	ND	U	0.027	ND	U	0.027	ND	U	0.03	ND	U	0.025
Fluoranthene	33000	NA	0.58	J	0.0024	0.011	J	0.0024	0.0068	J	0.0025	0.019	J	0.0027	0.03	J	0.0023
Fluorene	33000	NA	0.032	J	0.0018	ND	UJ	0.0018	ND	UJ	0.0018	ND	UJ	0.002	ND	UJ	0.0017
Hexachlorobenzene	2.3	NA	ND	UJ	0.0032	ND	UJ	0.0033	ND	UJ	0.0034	ND	UJ	0.0037	ND	UJ	0.0031
Hexachlorobutadiene	47	NA	ND	UJ	0.0026	ND	UJ	0.0027	ND	UJ	0.0027	ND	UJ	0.003	ND	UJ	0.0026
Hexachlorocyclopentadiene	7800	NA	ND	U	0.0046	ND	U	0.0047	ND	U	0.0048	ND	U	0.0052	ND	U	0.0045
Hexachloroethane	91	NA	ND	U	0.016	ND	U	0.016	ND	U	0.016	ND	U	0.018	ND	U	0.015
Indeno[1,2,3-cd]pyrene	23	370000	0.028	J	0.0045	0.0046	J	0.0046	ND	J	0.0047	0.0079	J	0.0051	0.014	J	0.0044
Isophorone	2700	NA	ND	U	0.017	ND	U	0.017	ND	U	0.018	ND	U	0.019	ND	U	0.016
Naphthalene	34000	27	0.0091	J	0.0018	ND	UJ	0.0018	ND	UJ	0.0018	ND	UJ	0.002	0.0036	J	0.0017
Nitrobenzene	2600	36	ND	U	0.016	ND	U	0.017	ND	U	0.017	ND	U	0.019	ND	U	0.016
N-Nitrosodi-n-propylamine	0.36	NA	ND	U	0.003	ND	U	0.0031	ND	U	0.0032	ND	U	0.0035	ND	U	0.003
N-Nitrosodiphenylamine	520	NA	ND	U	0.015	ND	U	0.015	ND	U	0.016	ND	U	0.017	ND	U	0.015
Pentachlorophenol	4.4	NA	ND	U	0.072	ND	U	0.074	ND	U	0.075	ND	U	0.082	ND	U	0.07
Phenanthrene	NA	NA	0.51	J	0.0024	0.0047	J	0.0025	0.003	J	0.0025	0.0084	J	0.0027	0.011	J	0.0023
Phenol	270000	NA	ND	U	0.014	ND	U	0.014	ND	U	0.014	ND	U	0.015	ND	U	0.013
Pyrene	25000	NA	0.36	J	0.0021	0.0093	J	0.0022	0.0058	J	0.0022	0.017	J	0.0024	0.028	J	0.0021
Total Conc	NA	NA	2.5991			0.063			0.0156			0.1277			0.242		
METALS (mg/kg)																	
Aluminum	NA	NA	14000	J	6.1	18000	J	10	16000	J	9.9	16000	J	7.5	14000	J	6.1
Antimony	520	NA	0.32	J	0.15	0.34	J	0.26	0.38	J	0.25	0.3	J	0.19	0.43	J	0.15
Arsenic	19	5200	14	J	0.084	15	J	0.14	14	J	0.14	14	J	0.1	13	J	0.083
Barium	260000	NA	140	J	0.89	150	J	1.5	140	J	1.4	140	J	1.1	160	J	0.88
Beryllium	2600	9300	0.93	J	0.1	1.2	J	0.17	0.95	J	0.17	1.1	J	0.13	1.1	J	0.1
Cadmium	1100	12000	0.64	J	0.081	0.75	J	0.13	0.63	J	0.13	0.79	J	0.1	0.92	J	0.08
Calcium	NA	NA	4600	J	30	5200	J	49	4700	J	48	4600	J	36	4700	J	29
Chromium	NA	NA	46	J	0.26	53	J	0.43	48	J	0.42	49	J	0.32	47	J	0.26
Cobalt	390	2500	15	J	0.052	17	J	0.087	15	J	0.084	16	J	0.064	17	J	0.052
Copper	52000	NA	36	J	0.3	46	J	0.5	34	J	0.48	39	J	0.37	45	J	0.3
Iron	NA	NA	31000	J	6.9	36000	J	12	32000	J	11	33000	J	8.5	33000	J	6.9
Lead	800	NA	49	J	0.096	54	J	0.16	49	J	0.15	54	J	0.12	60	J	0.095
Magnesium	NA	NA	5700	J	6.6	6800	J	11	6000	J	11	6100	J	8.1	5600	J	6.5
Manganese	31000	400000	1500	J	0.62	1800	J	1	1900	J	1	1600	J	0.76	1500	J	0.62
Mercury	390	NA	0.2	J	0.028	0.17	J	0.029	0.16	J	0.03	0.18	J	0.032	0.24	J	0.026
Nickel	26000	93000	28	J	0.14	33	J	0.23	29	J	0.22	30	J	0.17	31	J	0.13
Potassium	NA	NA	2200	J	21	2600	J	35	2500	J	34	2400	J	26	2100	J	21
Selenium	6500	NA	0.63	J	0.18	0.86	J	0.29	0.71	J	0.29	0.68	J	0.22	0.78	J	0.17
Silver	6500	NA	0.29	J	0.041	0.31	J	0.067	0.3	J	0.066	0.32	J	0.05	0.37	J	0.04
Sodium	NA	NA	430	J	37	650	J	62	490	J	60	490	J	46	350	J	37
Thallium	NA	NA	0.2	J	0.1	0.22	J	0.17	0.22	J	0.16	0.24	J	0.12	0.22	J	0.1
Vanadium	6500	800000	39	J	0.14	45	J	0.23	41	J	0.22	42	J	0.17	39	J	0.13
Zinc	390000	NA	210	J	0.7	240	J	1.2	210	J	1.1	230	J	0.86	260	J	0.69

Table 5 - Sediment Analytical Data - Berths 1A, 2A, 2B Basin, 3A, 3B, 3C and Intake RW7 - SVOCs, Metals and Wet Chemistry
Energy Transfer - Marcus Hook Terminal
August 2023

Client ID	NJ SRS 7:26D	NJ SRS 7:26D	MHT-RW7-SAMPLE A			MHT-3C-COMP B			MHT-3A-COMP C			MHT-3A-COMP C-DUP			MHT-3B-SAMPLE D		
Lab Sample ID	Ingestion-Dermal	Inhalation	180-161013-2			180-160903-3			180-160903-1			180-160903-2			180-161013-1		
Sampling Date	Table 2	Table 4	08/16/2023 12:45:00			08/15/2023 13:35:00			08/15/2023 12:45:00			08/15/2023 12:50:00			08/16/2023 12:20:00		
	Nonresidential	Nonresidential															
WET CHEMISTRY (mg/kg)																	
Cr (III) (mg/kg)	120,000	NA	46	J	0.21	53	J	0.21	48	J	0.21	49	J	0.21	47	J	0.21
Cr (VI) (mg/kg)	240	20	ND	UJ	0.57	ND	UJ	0.58	ND	UJ	0.60	ND	UJ	0.64	ND	UJ	0.56
Cyanide, Total (mg/kg)	780	NA	0.66	J	0.50	0.58	J	0.44	0.76	J	0.54	0.82	J	0.51	0.86	J	0.43
Sulfide (mg/kg)	NA	NA	110	J	27	57	J	27	36	J	28	49	J	31	44	J	26
Total Organic Carbon (mg/kg)	NA	NA	32000	J	2600	35000	J	2700	34000	J	2700	37000	J	3000	43000	J	2600

Notes:
% = Percent
Comp = Composite Sample
mg/kg = milligrams/kilogram
NA = No Criteria specified in current NJ SRS
Q = Qualifier
MDL = Method Detection Limit

Qualifier Definition:
J - The analyte was detected below the limit of quantitation but greater than the established Limit of Detection (LOD). These results should be considered estim
U - The compound was analyzed for but not detected.
N - Presumtively detected
Shading indicates the detected concentration exceeds Current NJDEP Non Residential Ingestion-Dermal (Table 2)
Shading indicates the detected concentration exceeds Current NJDEP Non-Residential Inhalation (Table 4).

Criteria Source:
N.J.A.C. 7:26D Remediation Standards, N.J.S.A. 13:1D-1 et seq., 58:10-23.11a et seq.,
58:10A-1 et seq. and 58:10B-1 et seq., amended May 17, 2021.

Table 5 - Sediment Analytical Data - Berths 1A, 2A, 2B Basin, 3A, 3B, 3C and Intake RW7 - SVOCs, Metals and Wet Chemistry
Energy Transfer - Marcus Hook Terminal
August 2023

Client ID	NJ SRS 7:26D	NJ SRS 7:26D	MHT-2A-COMP E			MHT-2B-SAMPLE F			MHT-1A-COMP G			MHT-1A-COMP H		
Lab Sample ID	Ingestion-Dermal	Inhalation	180-160903-5			180-160903-4			180-161013-4			180-161013-3		
Sampling Date	Table 2	Table 4	08/15/2023 11:20:00			08/15/2023 11:45:00			08/16/2023 11:00:00			08/16/2023 11:55:00		
	Nonresidential	Nonresidential												
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)			Result	Q	MDL	Result	Q	MDL	Result	Q	MDL	Result	Q	MDL
1,1'-Biphenyl	450	NA	ND	UJ	0.017	ND	UJ	0.016	ND	UJ	0.017	ND	UJ	0.017
2,2'-oxybis[1-chloropropane]	52000	NA	ND	U	0.0035	ND	U	0.0033	ND	U	0.0035	ND	U	0.0034
2,4,5-Trichlorophenol	91000	NA	ND	UJ	0.016	ND	UJ	0.015	ND	UJ	0.016	ND	UJ	0.016
2,4,6-Trichlorophenol	230	NA	ND	UJ	0.016	ND	UJ	0.015	ND	UJ	0.015	ND	UJ	0.015
2,4-Dichlorophenol	2700	NA	ND	U	0.0037	ND	U	0.0034	ND	U	0.0036	ND	U	0.0035
2,4-Dimethylphenol	18000	NA	ND	U	0.016	ND	U	0.015	ND	U	0.016	ND	U	0.015
2,4-Dinitrophenol	1800	NA	ND	U	0.29	ND	U	0.28	ND	U	0.29	ND	U	0.28
2,4-Dinitrotoluene	NA	NA	ND	U	0.028	ND	U	0.027	ND	U	0.028	ND	U	0.027
2-Chloronaphthalene	67000	NA	ND	UJ	0.0022	ND	UJ	0.002	ND	UJ	0.0021	ND	UJ	0.0021
2-Chlorophenol	6500	NA	ND	U	0.017	ND	U	0.016	ND	U	0.017	ND	U	0.017
2-Methylnaphthalene	3300	NA	ND	UJ	0.0023	ND	UJ	0.0021	0.0031	J	0.0022	ND	UJ	0.0022
2-Methylphenol	4600	NA	ND	U	0.014	ND	U	0.013	ND	U	0.013	ND	U	0.013
2-Nitroaniline	NA	NA	ND	U	0.022	ND	U	0.02	ND	U	0.021	ND	U	0.021
2-Nitrophenol	NA	NA	ND	U	0.017	ND	U	0.016	ND	U	0.017	ND	U	0.017
3,3'-Dichlorobenzidine	5.7	NA	ND	U	0.044	ND	U	0.042	ND	U	0.043	ND	U	0.042
3-Nitroaniline	NA	NA	ND	U	0.012	ND	U	0.011	ND	U	0.012	ND	U	0.012
4,6-Dinitro-2-methylphenol	NA	NA	ND	U	0.082	ND	U	0.077	ND	U	0.08	ND	U	0.078
4-Bromophenyl phenyl ether	NA	NA	ND	UJ	0.02	ND	UJ	0.019	ND	UJ	0.02	ND	UJ	0.019
4-Chloro-3-methylphenol	NA	NA	ND	U	0.017	ND	U	0.016	ND	U	0.016	ND	U	0.016
4-Chloroaniline	13	NA	ND	UJ	0.012	ND	UJ	0.012	ND	UJ	0.012	ND	UJ	0.012
4-Chlorophenyl phenyl ether	NA	NA	ND	UJ	0.016	ND	UJ	0.015	ND	UJ	0.015	ND	UJ	0.015
4-Methylphenol	9100	NA	ND	U	0.014	ND	U	0.013	0.02	J	0.014	ND	U	0.013
4-Nitroaniline	130	NA	ND	U	0.018	ND	U	0.016	ND	U	0.017	ND	U	0.017
4-Nitrophenol	NA	NA	ND	UJ	0.033	ND	UJ	0.031	ND	UJ	0.033	ND	UJ	0.032
Acenaphthene	50000	NA	ND	UJ	0.0027	ND	UJ	0.0026	ND	UJ	0.0027	ND	UJ	0.0026
Acenaphthylene	NA	NA	ND	J	0.0021	ND	J	0.002	0.0045	J	0.002	0.0041	J	0.002
Acetophenone	130000	NA	ND	U	0.017	ND	U	0.016	ND	U	0.016	ND	U	0.016
Anthracene	250000	NA	0.0034	J	0.0025	0.003	J	0.0023	0.0074	J	0.0024	0.005	J	0.0024
Atrazine	3200	NA	ND	U	0.021	ND	U	0.02	ND	UJ	0.02	ND	U	0.02
Benzaldehyde	910	NA	ND	U	0.0059	ND	U	0.0055	ND	UJ	0.0058	ND	U	0.0056
Benzo[a]anthracene	23	370000	0.016		0.0043	0.0094		0.004	0.022		0.0042	0.017		0.0041
Benzo[a]pyrene	2.3	16000	0.015	J	0.0041	0.01	J	0.0039	0.022	J	0.004	0.014	J	0.0039
Benzo[b]fluoranthene	23	370000	0.017	J	0.0023	0.011	J	0.0022	0.026	J	0.0023	0.018	J	0.0022
Benzo[g,h,i]perylene	NA	NA	0.015	J	0.0021	0.0091	J	0.0019	0.022	J	0.002	0.013	J	0.002
Benzo[k]fluoranthene	230	NA	0.0066	J	0.0028	0.0034	J	0.0027	0.014	J	0.0028	0.0051	J	0.0027
Bis(2-chloroethoxy)methane	2700	NA	ND	UJ	0.017	ND	UJ	0.016	ND	UJ	0.017	ND	UJ	0.017
Bis(2-chloroethyl)ether	3.3	NA	ND	U	0.0017	ND	U	0.0016	ND	U	0.0017	ND	U	0.0016
Bis(2-ethylhexyl) phthalate	180	NA	ND	U	0.051	ND	U	0.048	ND	U	0.05	ND	U	0.048
Butyl benzyl phthalate	1300	NA	ND	U	0.033	ND	U	0.031	ND	U	0.032	ND	U	0.031
Caprolactam	460000	1300	ND	U	0.031	ND	U	0.029	ND	U	0.03	ND	U	0.03
Carbazole	NA	NA	ND	UJ	0.0022	ND	UJ	0.0021	ND	UJ	0.0022	ND	UJ	0.0021
Chrysene	2300	NA	0.018	J	0.0053	0.013	J	0.0049	0.028	J	0.0052	0.02	J	0.005
Dibenz(a,h)anthracene	2.3	37000	ND	UJ	0.0061	ND	UJ	0.0057	ND	UJ	0.006	ND	UJ	0.0058

Table 5 - Sediment Analytical Data - Berths 1A, 2A, 2B Basin, 3A, 3B, 3C and Intake RW7 - SVOCs, Metals and Wet Chemistry
Energy Transfer - Marcus Hook Terminal
August 2023

Client ID	NJ SRS 7:26D	NJ SRS 7:26D	MHT-2A-COMP E			MHT-2B-SAMPLE F			MHT-1A-COMP G			MHT-1A-COMP H		
Lab Sample ID	Ingestion-Dermal	Inhalation	180-160903-5			180-160903-4			180-161013-4			180-161013-3		
Sampling Date	Table 2	Table 4	08/15/2023 11:20:00			08/15/2023 11:45:00			08/16/2023 11:00:00			08/16/2023 11:55:00		
	Nonresidential	Nonresidential												
Dibenzofuran	NA	NA	ND	UJ	0.017	ND	UJ	0.016	ND	UJ	0.017	ND	UJ	0.017
Diethyl phthalate	730000	NA	ND	UJ	0.017	ND	UJ	0.016	ND	UJ	0.016	ND	UJ	0.016
Dimethyl phthalate	NA	NA	ND	UJ	0.019	ND	UJ	0.018	ND	UJ	0.018	ND	UJ	0.018
Di-n-butyl phthalate	91000	NA	ND	UJ	0.021	ND	UJ	0.02	ND	UJ	0.02	ND	UJ	0.02
Di-n-octyl phthalate	9100	NA	ND	U	0.028	ND	U	0.026	ND	U	0.027	ND	U	0.026
Fluoranthene	33000	NA	0.026	J	0.0025	0.016	J	0.0024	0.04	J	0.0025	0.029	J	0.0024
Fluorene	33000	NA	ND	UJ	0.0019	ND	UJ	0.0017	0.0027	J	0.0018	0.0023	J	0.0018
Hexachlorobenzene	2.3	NA	ND	UJ	0.0034	ND	UJ	0.0032	ND	UJ	0.0033	ND	UJ	0.0033
Hexachlorobutadiene	47	NA	ND	UJ	0.0028	ND	UJ	0.0026	ND	UJ	0.0027	ND	UJ	0.0027
Hexachlorocyclopentadiene	7800	NA	ND	U	0.0049	ND	U	0.0046	ND	UJ	0.0048	ND	U	0.0046
Hexachloroethane	91	NA	ND	U	0.017	ND	U	0.016	ND	U	0.016	ND	U	0.016
Indeno[1,2,3-cd]pyrene	23	370000	0.012	J	0.0047	0.007	J	0.0044	0.017	J	0.0046	0.013	J	0.0045
Isophorone	2700	NA	ND	U	0.018	ND	U	0.017	ND	UJ	0.017	ND	U	0.017
Naphthalene	34000	27	ND	UJ	0.0019	ND	UJ	0.0017	0.0056	J	0.0018	0.0041	J	0.0018
Nitrobenzene	2600	36	ND	U	0.017	ND	U	0.016	ND	U	0.017	ND	U	0.017
N-Nitrosodi-n-propylamine	0.36	NA	ND	U	0.0032	ND	U	0.003	ND	U	0.0032	ND	U	0.0031
N-Nitrosodiphenylamine	520	NA	ND	U	0.016	ND	U	0.015	ND	U	0.015	ND	U	0.015
Pentachlorophenol	4.4	NA	ND	U	0.076	ND	U	0.072	ND	U	0.075	ND	U	0.073
Phenanthrene	NA	NA	0.013	J	0.0025	0.007	J	0.0024	0.018	J	0.0025	0.013	J	0.0024
Phenol	270000	NA	ND	U	0.014	ND	U	0.013	ND	U	0.014	ND	U	0.014
Pyrene	25000	NA	0.024	J	0.0023	0.015	J	0.0021	0.036	J	0.0022	0.025	J	0.0021
Total Conc	NA	NA	0.166			0.1039			0.2883			0.1826		
METALS (mg/kg)														
Aluminum	NA	NA	18000	J	11	15000	J	11	14000	J	6	15000	J	6.3
Antimony	520	NA	0.47	J	0.28	0.39	J	0.28	0.42	J	0.15	0.37	J	0.16
Arsenic	19	5200	14	J	0.16	12	J	0.15	12	J	0.082	12	J	0.087
Barium	260000	NA	180	J	1.6	150	J	1.6	140	J	0.87	140	J	0.91
Beryllium	2600	9300	1.2	J	0.19	1.1	J	0.19	0.97	J	0.1	0.98	J	0.11
Cadmium	1100	12000	0.96	J	0.15	0.94	J	0.15	0.73	J	0.08	0.71	J	0.084
Calcium	NA	NA	5600	J	55	4700	J	53	4200	J	29	4300	J	30
Chromium	NA	NA	55	J	0.48	48	J	0.47	45	J	0.25	48	J	0.27
Cobalt	390	2500	18	J	0.097	15	J	0.094	15	J	0.051	16	J	0.054
Copper	52000	NA	46	J	0.55	43	J	0.54	36	J	0.29	38	J	0.31
Iron	NA	NA	38000	J	13	34000	J	13	30000	J	6.8	31000	J	7.1
Lead	800	NA	60	J	0.18	55	J	0.17	54	J	0.094	55	J	0.099
Magnesium	NA	NA	6600	J	12	5700	J	12	5300	J	6.5	5800	J	6.8
Manganese	31000	400000	1800	J	1.2	1100	J	1.1	1600	J	0.61	1800	J	0.64
Mercury	390	NA	0.18	J	0.029	0.21	J	0.028	0.17	J	0.029	0.19	J	0.027
Nickel	26000	93000	34	J	0.25	29	J	0.25	28	J	0.13	31	J	0.14
Potassium	NA	NA	2700	J	39	2300	J	38	2000	J	21	2200	J	22
Selenium	6500	NA	0.85	J	0.33	0.79	J	0.32	0.64	J	0.17	0.72	J	0.18
Silver	6500	NA	0.35	J	0.075	0.33	J	0.073	0.34	J	0.04	0.32	J	0.042
Sodium	NA	NA	490	J	69	460	J	67	400	J	36	390	J	38
Thallium	NA	NA	0.23	J	0.19	0.21	J	0.18	0.18	J	0.1	0.2	J	0.1
Vanadium	6500	800000	46	J	0.25	39	J	0.25	37	J	0.13	41	J	0.14
Zinc	390000	NA	270	J	1.3	250	J	1.3	220	J	0.69	220	J	0.72

Table 5 - Sediment Analytical Data - Berths 1A, 2A, 2B Basin, 3A, 3B, 3C and Intake RW7 - SVOCs, Metals and Wet Chemistry
Energy Transfer - Marcus Hook Terminal
August 2023

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Lab Sample ID	Ingestion-Dermal	Inhalation	180-160903-5			180-160903-4			180-161013-4			180-161013-3		
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	Nonresidential	Nonresidential												
WET CHEMISTRY (mg/kg)														
Cr (III) (mg/kg)	120,000	NA	55	J	0.21	48	J	0.21	45	J	0.21	48	J	0.21
Cr (VI) (mg/kg)	240	20	ND	UJ	0.60	ND	UJ	0.56	ND	UJ	0.59	ND	UJ	0.58
Cyanide, Total (mg/kg)	780	NA	0.74	J	0.57	0.74	J	0.50	0.81	J	0.54	0.74	J	0.43
Sulfide (mg/kg)	NA	NA	ND	UJ	28	68	J	26	31	J	27	39	J	27
Total Organic Carbon (mg/kg)	NA	NA	30000	J	2800	38000	J	2600	34000	J	2700	33000	J	2600

Notes:
% = Percent
Comp = Composite Sample
mg/kg = milligrams/kilogram
NA = No Criteria specified in current NJ SRS
Q = Qualifier
MDL = Method Detection Limit

Qualifier Definiti
J - The analyte wated.
U - The compoun
N - Presumtively
Shading indicates
Shading indicates

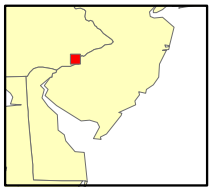
Criteria Source:
N.J.A.C. 7:26D R
58:10A-1 et seq.

FIGURES

Quad Source: ESRI, Mapping Service
USGS 2013. Marcus Hook PA, NJ, Del
USGS Quad, 1967. Revised 1970

N
W E
S

0 2,500 5,000 Feet



Quadrangle Location

Figure 1
Site Location Map -
Energy Transfer
Marcus Hook Terminal
Delaware River
Marcus Hook, Pennsylvania

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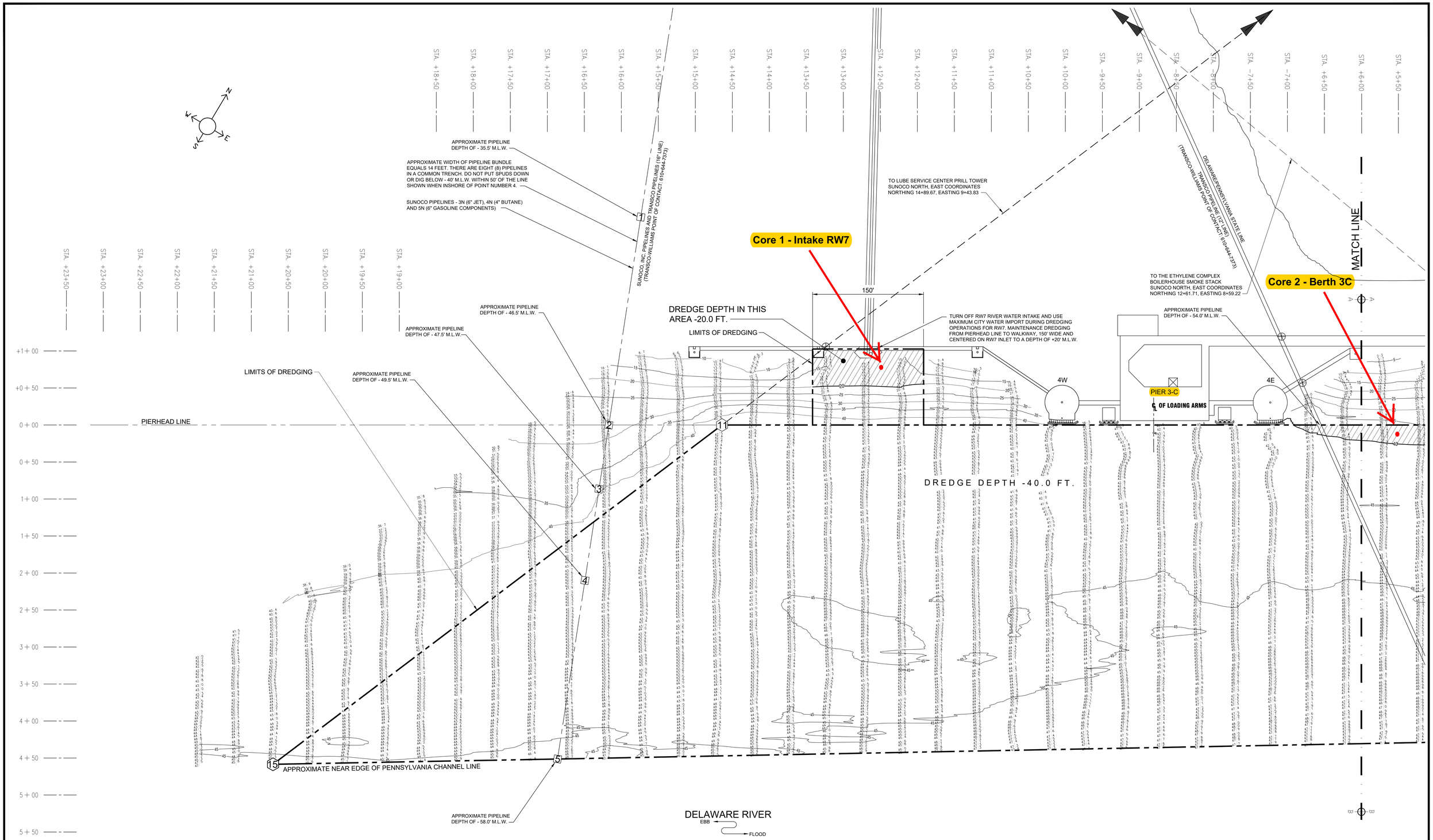

NOTES

1. HORIZONTAL CONTROL IS BASED ON NEW JERSEY 2900 STATE PLANE COORDINATES, NAD83, AS ESTABLISHED IN THE FIELD AND SOLELY FOR THE USE OF THIS HYDROGRAPHIC SURVEY.
2. ALL SOUNDINGS WERE TAKEN USING A TRIMBLE SPS 855 WITH RTK, HYPACK 16A SOFTWARE, A TELEDYNE ODOM HYDROTRAC CONTINUOUS RECORDING SURVEY FATHOMETER.
3. VERTICAL CONTROL WAS OBTAINED FROM KEYNET GPS (TRIMBLE VIRTUAL REFERENCE STATION [VRS] NETWORK) REAL-TIME KINEMATIC (RTK) CORRECTIONS TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), AND CONVERTED TO MEAN LOWER LOW WATER (M.L.L.W.) WHICH IS 3.00' BELOW NAVD88. NAVD88 CONVERSION OF 3.00' OBTAINED FROM THE ARMY CORP OF ENGINEERS.
4. SOUNDINGS WERE TAKEN ON MONDAY JULY 10, 2023.
5. THE INFORMATION DEPICED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE DATES INDICATED, AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
6. THE DECIMAL POINT (.) DENOTES THE SOUNDING LOCATION.
7. SOUNDINGS ARE REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.) AND ARE EXPRESSED IN FEET AND TENTHS OF A FOOT.
8. CONTOURS WERE INTERPOLATED WITH TRIMBLE NAVIGATION LIMITED SOFTWARE, TERRAMODEL VERSION 10.11.
9. CROSS HATCHING INDICATES AREAS THAT ARE ABOVE THE SPECIFIED MINIMUM DREDGE DEPTH.
10. DREDGE LIMITS WERE PROVIDED BY SUNOCO LOGISTICS' DRAWING "E_MHRF_C580001R00".
11. CHANNEL LOCATIONS WERE PROVIDED BY THE UNITED STATES ARMY CORPS OF ENGINEERS' DRAWINGS, "AAOA11PS.dwg" & "AAOA12PS.dwg".

LEGEND

LIMITS OF DREDGING

DATUM CHART

LOCAL BENCHMARK – BRASS DISK AT MOORING CELL 3W +12.07 (M.L.L.W.)

NAVD 88	+3.0 (M.L.L.W.)	12.07'
MEAN LOWER LOW WATER	0.0	

SITE PLAN

SCALE: 1" = 50.0'

0 50 100 150

REV.	DATE	APP#	DESCRIPTION	APPROVAL

seal

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S.T. HUDSON ENGINEERS, INC.
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900 Dudley Avenue
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Fax No. 856-342-8323

drawn	DJD	date	7/13/2023
checked	SD	FILE	E-1209
drftg. approval	TK	contract	23-019-05

MARCUS HOOK INDUSTRIAL COMPLEX — dwg. no. 2of4 — rev. 0

CONDITION HYDROGRAPHIC SURVEY

ENGINEERING RECORD

DRAWN BY	GMN
CHECKED BY	
APPROVED BY	
DATE	9/12/01
SCALE	1" = 50'+0"

OLD DRAWING NO.

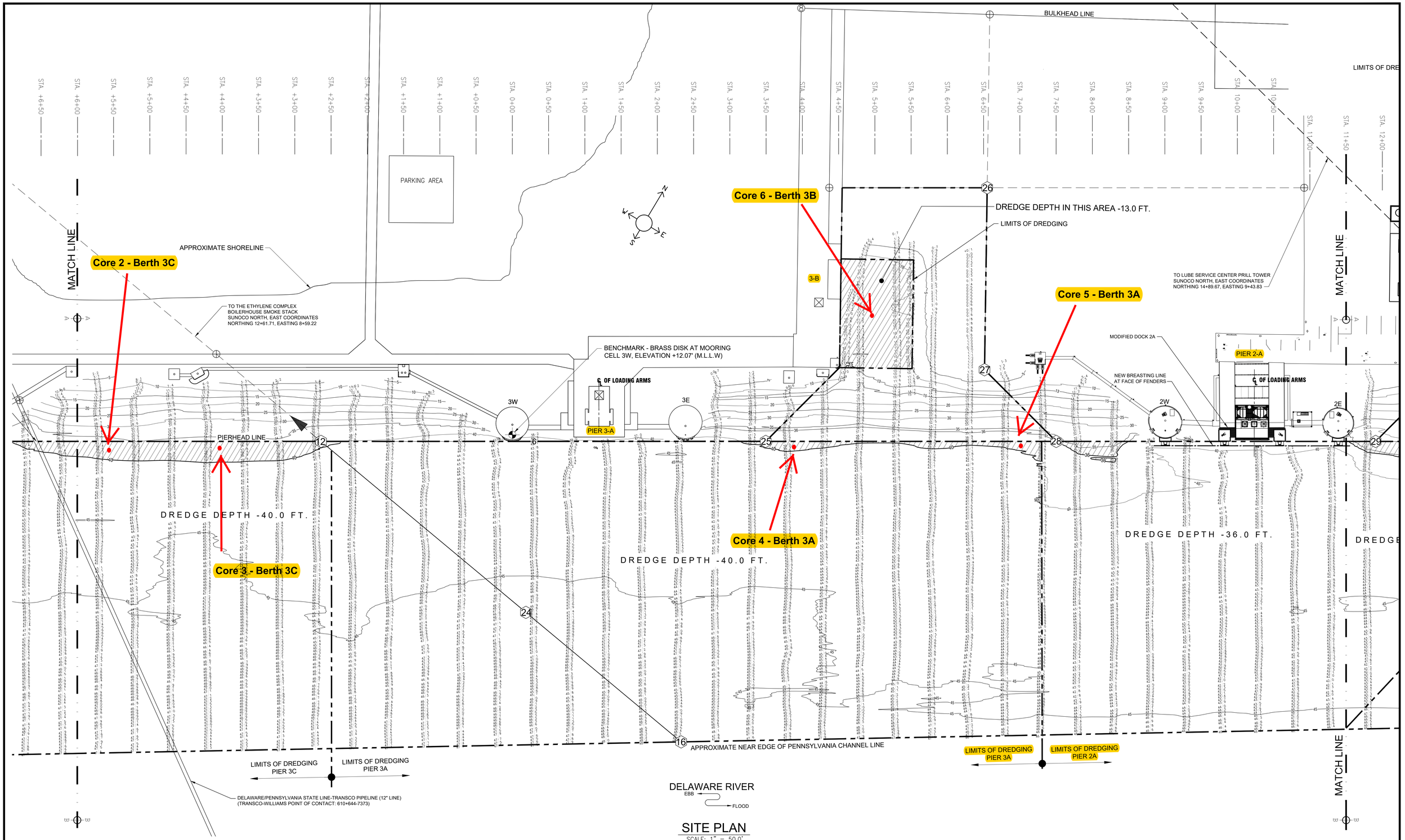
DWG. NO.

ENERGY TRANSFER PARTNERS

MARCUS HOOK INDUSTRIAL COMPLEX
SURVEY TEMPLATE
SHEET 2

TOWNSHIP OF MARCUS HOOK

Figure 2



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DATUM CHART

LOCAL BENCHMARK – BRASS DISK AT MOORING CELL 3W +12.07 (M.L.L.W.)

NAVD 88 +3.0 (M.L.L.W.)

MEAN LOWER LOW WATER 0.0

12.07'

LEGEND

LIMITS OF DREDGING

seal

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drawn	DJD	date	7/13/2023
checked	SD	FILE	E-1209
drftg. approval	TK	contract	23-019-05

MARCUS HOOK INDUSTRIAL COMPLEX
CONDITION HYDROGRAPHIC SURVEY

dwg. no. 3of4 | rev. 0

OLD DRAWING NO.

DWG. NO. **Figure 3**

REV.	DATE	APP#	DESCRIPTION	APPROVAL

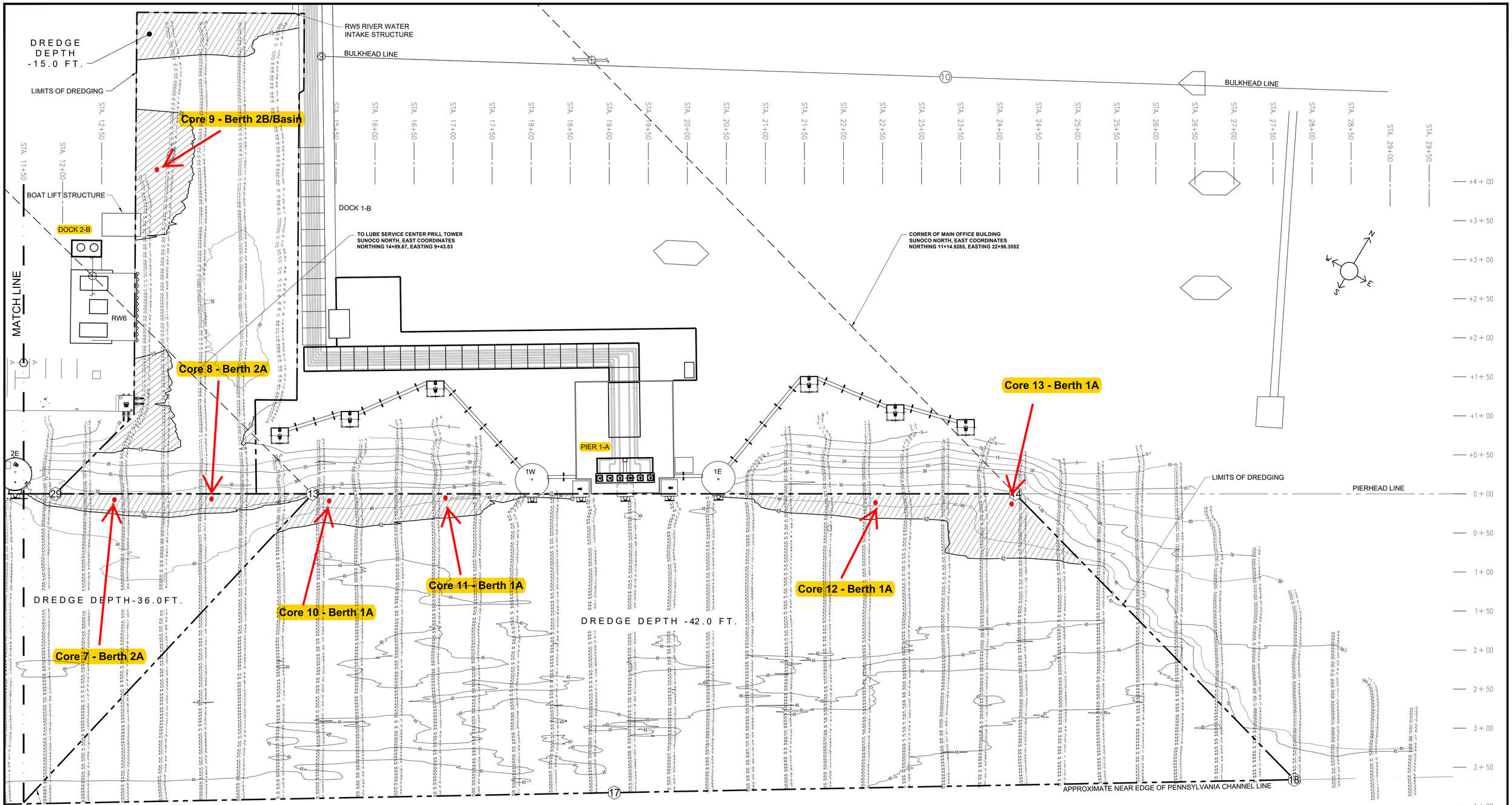
ENGINEERING RECORD

DRAWN BY	GMN
CHECKED BY	
APPROVED BY	
DATE	9/12/01
SCALE	1" = 50'+0"

MARCUS HOOK INDUSTRIAL COMPLEX
SURVEY TEMPLATE
SHEET 3

ENERGY TRANSFER PARTNERS

TOWNSHIP OF MARCUS HOOK



SITE PLAN

SCALE: 1" = 50.0'

0 50 100 150

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3. VERTICAL CONTROL WAS OBTAINED FROM KEYNET GPS (TRIMBLE VIRTUAL REFERENCE STATION [VRS] NETWORK) REAL-TIME KINEMATIC (RTK) CORRECTIONS TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), AND CONVERTED TO MEAN LOWER LOW WATER (M.L.L.W.) WHICH IS 3.00' BELOW NAVD88. NAVD88 CONVERSION OF 3.00' OBTAINED FROM THE ARMY CORP OF ENGINEERS.
4. SOUNDINGS WERE TAKEN ON MONDAY JULY 10, 2023.
5. THE INFORMATION DEPICED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE DATES INDICATED, AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
6. THE DECIMAL POINT (.) DENOTES THE SOUNDING LOCATION.
7. SOUNDINGS ARE REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.) AND ARE EXPRESSED IN FEET AND TENTHS OF A FOOT.
8. CONTOURS WERE INTERPOLATED WITH TRIMBLE NAVIGATION LIMITED SOFTWARE, TERRAMODEL VERSION 10.11.
9. CROSS HATCHING INDICATES AREAS THAT ARE ABOVE THE SPECIFIED MINIMUM DREDGE DEPTH.
10. DREDGE LIMITS WERE PROVIDED BY SUNOCO LOGISTICS' DRAWING "E_MHRF_C580001R00".
11. CHANNEL LOCATIONS WERE PROVIDED BY THE UNITED STATES ARMY CORPS OF ENGINEERS' DRAWINGS, "AAOA11PS.dwg" & "AAOA12PS.dwg".

LEGEND

LIMITS OF DREDGING

DATUM CHART

LOCAL BENCHMARK – BRASS DISK AT MOORING CELL 3W +12.07 (M.L.L.W.)

NAVD 88	+3.0 (M.L.L.W.)	12.07'
MEAN LOWER LOW WATER	0.0	

seal

S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
900 Dudley Avenue
Cherry Hill, N.J. 08002
Phone 856-342-6600
Fax No. 856-342-8323

drawn	DJD	date	7/13/2023
checked	SD	FILE	E-1209
drftg. approval	TK	contract	23-019-05

MARCUS HOOK INDUSTRIAL COMPLEX
CONDITION HYDROGRAPHIC SURVEY
dwg. no. 4of4 rev. 0

OLD DRAWING NO.

ENGINEERING RECORD

DRAWN BY	GMN
CHECKED BY	
APPROVED BY	
DATE	9/12/01
SCALE	1" = 50'-0"

REV.	DATE	APP#	DESCRIPTION	APPROVAL

ENERGY TRANSFER PARTNERS

MARCUS HOOK INDUSTRIAL COMPLEX
SURVEY TEMPLATE
SHEET 4
TOWNSHIP OF MARCUS HOOK

DWG. NO. Figure 4

ATTACHMENT 1
Volume Calculations

TABLE No. 1
ENERGY TRANSFER MARCUS HOOK
DREDGE VOLUME SUMMARY
JULY 2023

SITE: **ENERGY TRANSFER**

Marcus Hook Terminal
Marcus Hook, PA
July 10, 2023
23-219-05

DESCRIPTION	DESIGN DEPTH	"BEFORE DREDGE" VOLUME SUMMARY Materials within pay prism						"AFTER DREDGE" VOLUME SUMMARY Materials remaining within pay prism						TOTAL PAY QUANTITY (C.Y.)
		SURVEY DATE	REQUIRED (C.Y.)	2' OVERDEPTH (C.Y.)	3:1 Side Slopes	3:1 Side Slopes 2' O.D.	TOTAL (C.Y.)	SURVEY DATE	REQUIRED (C.Y.)	2' OVERDEPTH (C.Y.)	3:1 Side Slopes	3:1 Side Slopes 2' O.D.	TOTAL REMAINING (C.Y.)	
A Berth 3C	40.0'	7/10/2023	590	1,847	5,467	3,908	11,812		0	0	0	0	0	0
B Berth 3A	40.0'	7/10/2023	71	967	6,929	3,584	11,551		0	0	0	0	0	0
C Berth 2A	36.0'	7/10/2023	688	1,095	2,692	2,258	6,733		0	0	0	0	0	0
D Berth 1A	42.0'	7/10/2023	1,798	5,548	14,960	4,881	27,187		0	0	0	0	0	0
E Berth 3B	13.0'	7/10/2023	1,216	1,214	437	456	3,323		0	0	0	0	0	0
F RW7 Intake	20.0'	7/10/2023	316	345	0	0	661		0	0	0	0	0	0
G 2B Basin	15.0'	7/10/2023	745	2,219	0	0	2,964		0	0	0	0	0	0
	TOTALS		5,424	13,235	30,485	15,087	64,231		0	0	0	0	0	0

1. All volumes calculated via in-place measurements.
2. Volume quantities calculated using HYPACK ver. 2019 ALL Format.
3. Limits of dredging shown on STHE Survey Drawing **E-1209**.

S. T. Hudson Engineers, Inc.
900 Dudley Avenue
Cherry Hill, NJ 08002

ATTACHMENT 2
Core Logs

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/16/23	Time:	1235	Crew:	JP	
Coordinates:	N	355177.7	E	232812.9		Vessel:	Prattis	
Core#: 1-Intake RW7	Zone: NJ	Datum	NAD 83			Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-22.0		Core Penetration Length (ft.):			7.5		
Measured Water Depth [MWD] [ft.]:		24.8		Recovered Core Length (ft.):			4.7		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		5.8		Sample Length Retained (ft.):			2.8		
Corrected Depth @ MLLW [ft.]:		19.0		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		19.2							
Required Sample Core Length [SCL] [ft.]:		2.8							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Very loose, dark greyish-brown silt, trace fine sand, trace organics, firmer w/ depth.
Bottom 4.7		

# of containers:				
Type of container:	bucket	hardliner	cup	other

Conditions:

Comments: Sample processed and collected by client.

Core Volumes

Nominal core-barrel diameter	EST. Volume
3.0"	.25 gal/ft
3.5" 8.0"	.33 gal/ft
(4.0")	.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/15/23	Time:	1311	Crew:	JP	
Coordinates:	N	355467.8	E	233454.8		Vessel:	Prattis	
Core # :	2-Berth 3C	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-42.0		Core Penetration Length (ft.):			4.9		
Measured Water Depth [MWD] [ft.]:		45.1		Recovered Core Length (ft.):			3.1		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		5.9		Sample Length Retained (ft.):			2.6		
Corrected Depth @ MLLW [ft.]:		39.2		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		39.4							
Required Sample Core Length [SCL] [ft.]:		2.6							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Very loose, dark greyish-brown silt, trace clay, firmer w/ depth.
Bottom 3.1		

# of containers:				
Type of container:	bucket	hardliner	cup	other

Conditions:

Comments: Driven to refusal. Sample processed and collected by client.

Core Volumes

Nominal core-barrel diameter	EST. Volume
3.0"	.25 gal/ft
3.5" 8.0"	.33 gal/ft
(4.0")	.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/15/23	Time:	1246	Crew:	JP	
Coordinates:	N	355544.0	E	233582.9		Vessel:	Prattis	
Core # :	3-Berth 3C	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-42.0		Core Penetration Length (ft.):			7.2		
Measured Water Depth [MWD] [ft.]:		44.9		Recovered Core Length (ft.):			5.4		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		6.0		Sample Length Retained (ft.):			2.9		
Corrected Depth @ MLLW [ft.]:		38.9		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		39.1							
Required Sample Core Length [SCL] [ft.]:		2.9							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Very loose, dark greyish silt, fine sand, firmer w/ depth.
Bottom 5.4		

# of containers:				
Type of container:	bucket	hardliner	cup	other

Conditions:

Comments: Sample collected and processed by client.

Core Volumes

Nominal core-barrel diameter	EST. Volume
3.0"	.25 gal/ft
3.5" 8.0"	.33 gal/ft
(4.0")	.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/15/23	Time:	1218	Crew:	JP	
Coordinates:	N	355951.7	E	234263.2		Vessel:	Prattis	
Core # :	4-Berth 3A	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-42.0		Core Penetration Length (ft.):			6.6		
Measured Water Depth [MWD] [ft.]:		44.8		Recovered Core Length (ft.):			4.4		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		5.8		Sample Length Retained (ft.):			2.8		
Corrected Depth @ MLLW [ft.]:		39.0		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		39.2							
Required Sample Core Length [SCL] [ft.]:		2.8							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Very loose, dark greyish-brown silt, trace clay, firmer w/ depth.
Bottom 4.4		

					Core Volumes	
# of containers:					Nominal core-barrel	
Type of container:	bucket	hardliner	cup	other	diameter	EST. Volume
Conditions:					3.0"	.25 gal/ft
					3.5" 8.0"	.33 gal/ft
Comments: Sample processed and collected by client.					(4.0")	.50 gal/ft
					Liner Type: (Soft) Hard	
					Vibracorer: (P3) P5 VT6 Other	

Live Organisms Present	N		
Oil Present	N	Pushcorer	Slambar
Odor Present	N		
Debris Present	N	Eckman	Ponar: Standard / Petite
Within 10% of Req'd Core Length	Y		
Photo	Y	Box Core	

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/15/23	Time:	1157	Crew:	JP	
Coordinates:	N	356104.4	E	234521.6		Vessel:	Prattis	
Core # :	5-Berth 3A	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-42.0		Core Penetration Length (ft.):			8.0		
Measured Water Depth [MWD] [ft.]:		44.6		Recovered Core Length (ft.):			6.2		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		5.6		Sample Length Retained (ft.):			2.8		
Corrected Depth @ MLLW [ft.]:		39.0		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		39.2							
Required Sample Core Length [SCL] [ft.]:		2.8							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Dark greyish-brown silt, trace fine sand, firmer w/ depth.
Bottom 6.2		

# of containers:					
Type of container:	bucket	hardliner	cup	other	

Conditions:

Comments: Sample processed and collected by client.

Core Volumes

Nominal core-barrel diameter	EST. Volume
3.0"	.25 gal/ft
3.5" 8.0"	.33 gal/ft
(4.0")	.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/16/23	Time:	1206	Crew:	JP	
Coordinates:	N	356159.2	E	234260.5		Vessel:	Prattis	
Core # :	6-Berth 3B	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-15.0		Core Penetration Length (ft.):			10.0		
Measured Water Depth [MWD] [ft.]:		16.6		Recovered Core Length (ft.):			6.0		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		5.5		Sample Length Retained (ft.):			3.7		
Corrected Depth @ MLLW [ft.]:		11.2		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		11.3							
Required Sample Core Length [SCL] [ft.]:		3.7							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Greyish-brown silt, trace fine sand, trace organics, firmer w/ depth.
Bottom 6.0		

# of containers:				
Type of container:	bucket	hardliner	cup	other

Conditions:

Comments: Sample processed and collected by client.

Core Volumes		
Nominal core-barrel diameter		EST. Volume
3.0"		.25 gal/ft
3.5"	8.0"	.33 gal/ft
(4.0")		.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/15/23	Time:	1102	Crew:	JP	
Coordinates:	N	356389.9	E	235011.6		Vessel:	Prattis	
Core # :	7-Berth 2A	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-38.0		Core Penetration Length (ft.):			8.0		
Measured Water Depth [MWD] [ft.]:		39.7		Recovered Core Length (ft.):			5.2		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		4.9		Sample Length Retained (ft.):			3.0		
Corrected Depth @ MLLW [ft.]:		34.8		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		35.0							
Required Sample Core Length [SCL] [ft.]:		3.0							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Loose, dark grey silt, trace clay, firmer w/ depth.
Bottom 5.2		

# of containers:					
Type of container:	bucket	hardliner	cup	other	

Conditions:

Comments: Samples processed and collected by client.

Core Volumes

Nominal core-barrel diameter	EST. Volume
3.0"	.25 gal/ft
3.5" 8.0"	.33 gal/ft
(4.0")	.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/15/23	Time:	1025	Crew:	JP	
Coordinates:	N	356470.9	E	235128.9		Vessel:	Prattis	
Core # :	8-Berth 2A	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-38.0		Core Penetration Length (ft.):			7.7		
Measured Water Depth [MWD] [ft.]:		38.6		Recovered Core Length (ft.):			4.9		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		4.1		Sample Length Retained (ft.):			3.3		
Corrected Depth @ MLLW [ft.]:		34.5		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		34.7							
Required Sample Core Length [SCL] [ft.]:		3.3							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Dark greyish-brown silt, little fine sand, trace organics, firmer w/ depth.
Bottom 4.9		

# of containers:					
Type of container:	bucket	hardliner	cup	other	

Conditions:

Comments: Driven to refusal. Samples processed and collected by client.

Core Volumes

Nominal core-barrel diameter	EST. Volume
3.0"	.25 gal/ft
3.5" 8.0"	.33 gal/ft
(4.0")	.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/15/23	Time:	1123	Crew:	JP	
Coordinates:	N	356797.3	E	234856.9		Vessel:	Prattis	
Core # :	9-Berth 2B	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-17.0		Core Penetration Length (ft.):			8.5		
Measured Water Depth [MWD] [ft.]:		18.5		Recovered Core Length (ft.):			6.6		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		5.2		Sample Length Retained (ft.):			3.5		
Corrected Depth @ MLLW [ft.]:		13.3		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		13.5							
Required Sample Core Length [SCL] [ft.]:		3.5							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Loose, dark grey silt, some clay, firmer w/ depth.
Bottom 6.6		

# of containers:				
Type of container:	bucket	hardliner	cup	other

Conditions:

Comments: Sample processed and collected by client.

Core Volumes		
Nominal core-barrel diameter		EST. Volume
3.0"		.25 gal/ft
3.5"	8.0"	.33 gal/ft
(4.0")		.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/16/23	Time:	1020	Crew:	JP	
Coordinates:	N	356533.2	E	235257.5		Vessel:	Prattis	
Core # :	10-Berth 1A	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-42.0		Core Penetration Length (ft.):			6.5		
Measured Water Depth [MWD] [ft.]:		42.2		Recovered Core Length (ft.):			3.0		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		3.4		Sample Length Retained (ft.):			3.0		
Corrected Depth @ MLLW [ft.]:		38.8		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		39.0							
Required Sample Core Length [SCL] [ft.]:		3.0							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Very loose, dark greyish-brown silt, firmer w/ depth.
Bottom 3.0		

# of containers:				
Type of container:	bucket	hardliner	cup	other

Conditions:

Comments: Driven to refusal. Sample processed and collected by client.

Core Volumes

Nominal core-barrel diameter	EST. Volume
3.0"	.25 gal/ft
3.5" 8.0"	.33 gal/ft
(4.0")	.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/16/23	Time:	1041	Crew:	JP	
Coordinates:	N	356595.7	E	235343.6		Vessel:	Prattis	
Core # :	11-Berth 1A	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-42.0		Core Penetration Length (ft.):			5.0		
Measured Water Depth [MWD] [ft.]:		43.1		Recovered Core Length (ft.):			2.7		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		4.0		Sample Length Retained (ft.):			2.7		
Corrected Depth @ MLLW [ft.]:		39.1		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			Y / (N)		
Corrected Depth @ MLW [ft.]:		39.3							
Required Sample Core Length [SCL] [ft.]:		2.7							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Very loose, dark greyish-brown silt, some clay, trace gravel, firmer w/ depth.
Bottom 2.7		

# of containers:				
Type of container:	bucket	hardliner	cup	other

Conditions:

Comments: Driven to refusal. Sample processed and collected by client.

Core Volumes

Nominal core-barrel diameter	EST. Volume
3.0"	.25 gal/ft
3.5" 8.0"	.33 gal/ft
(4.0")	.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/16/23	Time:	1110	Crew:	JP	
Coordinates:	N	356899.5	E	235861.0		Vessel:	Prattis	
Core # :	12-Berth 1A	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-42.0		Core Penetration Length (ft.):			6.0		
Measured Water Depth [MWD] [ft.]:		43.8		Recovered Core Length (ft.):			4.4		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		4.6		Sample Length Retained (ft.):			2.6		
Corrected Depth @ MLLW [ft.]:		39.2		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		39.4							
Required Sample Core Length [SCL] [ft.]:		2.6							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Loose dark greyish-brown silt, some clay, firmer w/ depth.
Bottom 4.4		

# of containers:				
Type of container:	bucket	hardliner	cup	other

Conditions:

Comments: Sample processed and collected by client.

Core Volumes		
Nominal core-barrel diameter		EST. Volume
3.0"		.25 gal/ft
3.5"	8.0"	.33 gal/ft
(4.0")		.50 gal/ft

Liner Type: (Soft) Hard

Vibracorer: (P3) P5 VT6 Other

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

AQUA SURVEY, INC.

SEDIMENT CORE LOG

Client :	Weston Solutions, Inc.		Project :	Delaware River - Marcus Hook		Logger:	KS	
Job#:	43-095	Date:	8/16/23	Time:	1137	Crew:	JP	
Coordinates:	N	356976.9	E	236013.0		Vessel:	Prattis	
Core # :	13-Berth 1A	Zone: NJ	Datum	NAD 83		Deploy:	1	2	3
Project Depth (incl. 2.0 ft. Overdredge) [PD] [ft] MLW:		-42.0		Core Penetration Length (ft.):			6.5		
Measured Water Depth [MWD] [ft.]:		43.2		Recovered Core Length (ft.):			4.0		
Tide Adjust [TA] (+/- ft. from MLLW) [ft.]:		5.0		Sample Length Retained (ft.):			3.6		
Corrected Depth @ MLLW [ft.]:		38.2		Core Volume Retained (gal.):			-		
+ MLW Adjustment [ft.}		0.2		Collected to Project Depth:			(Y) / N		
Corrected Depth @ MLW [ft.]:		38.4							
Required Sample Core Length [SCL] [ft.]:		3.6							

All Length Measurements are in Decimal Feet

Sample Interval (ft.)	Sample Id #	Description
Top 0.0		
		Very loose, dark greyish-brown silt, trace organics, firmer w/ depth.
Bottom 4.0		

					Core Volumes	
# of containers:					Nominal core-barrel	
Type of container:	bucket	hardliner	cup	other	diameter	EST. Volume
Conditions:					3.0"	.25 gal/ft
					3.5" 8.0"	.33 gal/ft
Comments: Sample processed and collected by client.					(4.0")	.50 gal/ft
					Liner Type: (Soft) Hard	
					Vibracorer: (P3) P5 VT6 Other	

Live Organisms Present	N
Oil Present	N
Odor Present	N
Debris Present	N
Within 10% of Req'd Core Length	Y
Photo	Y

Pushcorer Slambar

Eckman Ponar: Standard / Petite

Box Core

MLW #td ver 030615

ATTACHMENT 3
Core Photographs

Core 1 – Sample A (Intake RW7)

Core 2 – Comp B (Berth 3C)

Core 3 – Comp B (Berth 3C)

Core 4 – Comp C (Berth 3A)

Core 5 – Comp C (Berth 3A)

Core 6 – Sample D (Berth 3B)

Core 7 – Comp E (Berth 2A)

Core 8 – Comp E (Berth 2A)

Core 9 – Sample F (Basin 2B)

Core 10 – Comp G (Berth 1A)

Core 11 – Comp G (Berth 1A)

Core 12 – Comp H (Berth1A)

Core 13 – Comp H (Berth1A)

ATTACHMENT 4
Raw Data on Thumb Drive