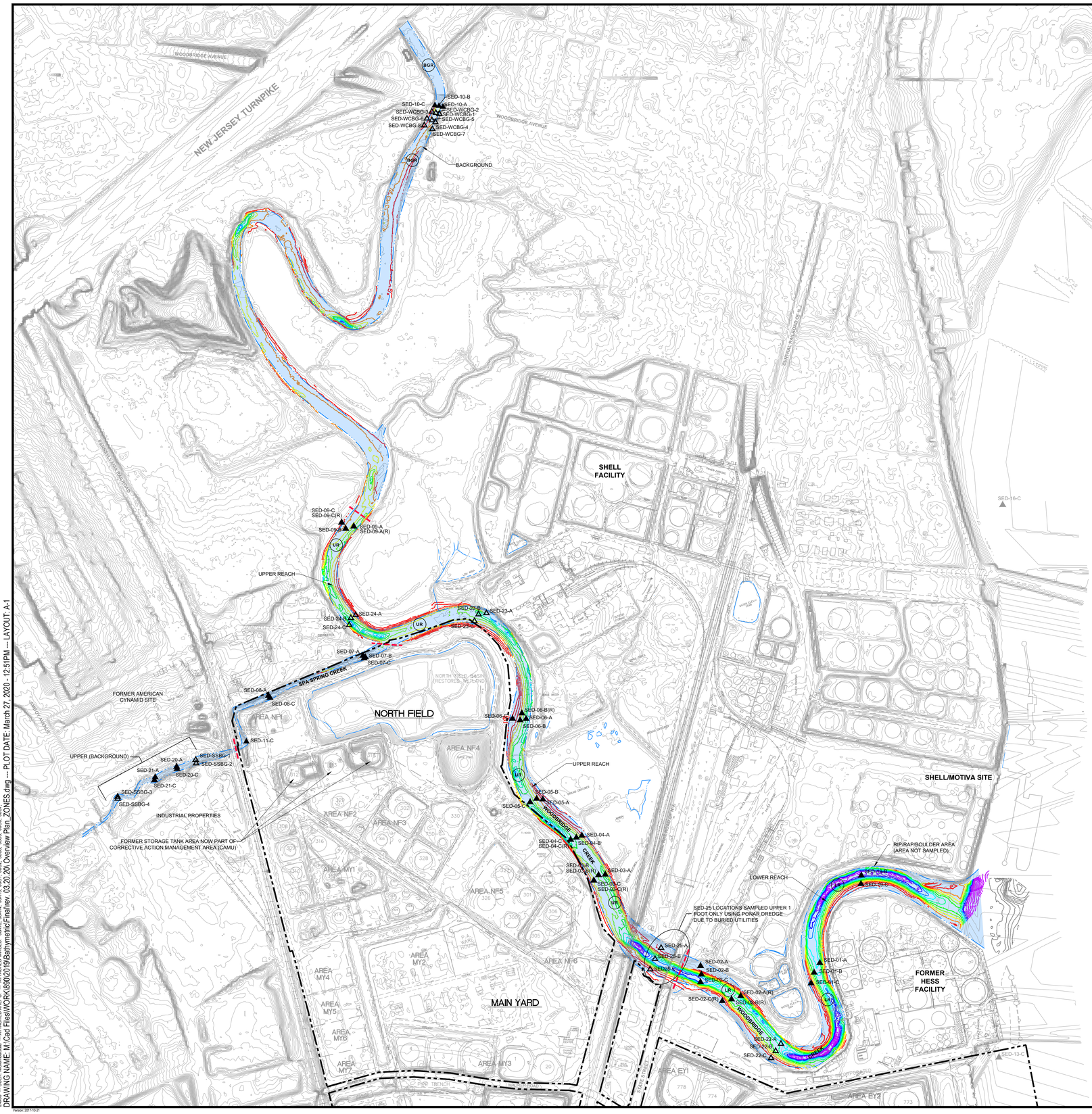

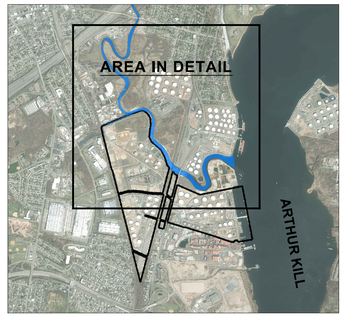

KEYMAP

SCALE: 1"=2500'

LEGEND

- FORMER CHEVRON PERTH AMBOY FACILITY BOUNDARY
- WATER FEATURE BOUNDARY (APPROXIMATE)
- CREEK REACH BOUNDARY (WOODBRIDGE CREEK, SPA SPRING CREEK)
- SEDIMENT SAMPLE LOCATIONS 2002 (NOT SUBSEQUENTLY SAMPLED)
- SEDIMENT SAMPLE LOCATION SAMPLED IN 2019 (ADDED PER SUPPLEMENTARY FIELD SAMPLING AND ANALYSIS WORKPLAN [2019])
- LOCATIONS SAMPLED PREVIOUSLY 2002 OR 2014, RE-SAMPLED IN 2019
- LR — WOODBRIDGE CREEK - LOWER REACH
- UR — WOODBRIDGE CREEK - UPPER REACH
- BGR — WOODBRIDGE CREEK - BACKGROUND

BATHYMETRIC CONTOUR INTERVALS (FEET-MSL)

1 -2 -3 -6 -7 -9 -10 -23

NOTES:

1. THE TOP OF BANK GROUND SURFACE ELEVATIONS ALONG CREEKS ARE APPROXIMATE AND BASED ON EXISTING ESRI AERIAL IMAGERY ACCESSED 9/18/2019.
2. REFERENCES TO THE BACKGROUND, UPPER, AND LOWER REACHES OF WOODBRIDGE CREEK PERTAIN ONLY TO THE SEDIMENT INVESTIGATION AND ARE NOT OFFICIAL DESIGNATIONS.
3. BATHYMETRIC CONTOURS BASED ON SEPTEMBER 2019 BATHYMETRIC SURVEY CONDUCTED BY AQUA SURVEY, INC. OF FLEMINGTON, NJ. VERTICAL DATUM IS NVD 1929.

DRAFT

0 300 600
SCALE IN FEET

PROJECT: SUPPLEMENTAL SEDIMENT INVESTIGATION
CHEVRON FACILITY
PERTH AMBOY, NEW JERSEY

TITLE: OVERVIEW PLAN WITH 2019 BATHYMETRY
SHEET 1 OF 3: SEDIMENT SAMPLE LOCATIONS

DRAWN BY:	M. GIAMBATTISTA	PROJ. NO.:	326731.2020
CHECKED BY:	W. CORDASCO		FIGURE A-1
APPROVED BY:	R. LIPPENCOTT		
DATE:	JANUARY 2020		

TRC
41 Spring Street
Suite 102
New Providence, NJ 07974
Phone: 908.988.1700

FILE NO.: Overview Plan_ZONES.dwg

24x36 -- USER: MGiambattista -- ATTACHED XREFS: -- ATTACHED IMAGES: J8A13, J8A14, J8A15; J8C1, J8C2, J8C3, J8C5, J8C6, J8C7;
DRAWING NAME: M:\Cad Files\WORK\890\2019\Bathymetric\Finallrev. 03.20.20\ Overview Plan_ZONES.dwg -- PLOT DATE: March 27, 2020 - 12:51PM -- LAYOUT: A-1
Version: 2017-10-21

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-01-A	SED-01-A-0.0-2.5	0-2.5	9/25/2019	EPH, TOTAL FRACTIONATED	23
				Aluminum	31400
				Arsenic	23.4
				Barium	73.8
				Cobalt	13.3
				Copper	39.8
				Manganese	599
				Nickel	38.1
				Vanadium	73.1
				EPH, TOTAL FRACTIONATED	8.7 J
	SED-01-A-2.5-5	2-5	9/25/2019	EPH, TOTAL FRACTIONATED	640
				EPH, TOTAL FRACTIONATED	1500
				Anthracene	0.47
				Arsenic	28.4
				Barium	106
				Benzo(a)pyrene	0.69
				Benzo(a)anthracene	0.93
				Benzo(ghi)perylene	0.44
				Benzo(k)fluoranthene	0.43
				bis(2-Ethylhexyl)phthalate	8.6
				Cadmium	3.53
				Chromium	89.8
				Chrysene	1.2
				Cobalt	27.2
				Copper	2280
				Dibenz(a,h)anthracene	0.18
				Fluoranthene	2
				Indeno(1,2,3-cd)pyrene	0.4
				Lead	402
				Mercury	2.87
				2-Methylnaphthalene	0.082 J
				Nickel	159
				Phenanthrene	0.95
				Pyrene	2
				Selenium	10.1
				Silver	2.84
				Total PHCs	10,222
				Vanadium	62.6
				Zinc	783
				EPH, TOTAL FRACTIONATED	1900
SED-01-B	SED-01-B-0.0-2.5	0-2.5	9/25/2019	EPH, TOTAL FRACTIONATED	1400
				EPH, TOTAL FRACTIONATED	8100
				Aluminum	28000
				Arsenic	20.8
				Barium	73.4
				Cobalt	13.1
				Copper	47.7
				Manganese	608
				Mercury	0.163 J
				Nickel	31.3
				Vanadium	82.1
				Benzo(a)pyrene	0.45
				Benzo(a)anthracene	0.36
				Benzo(ghi)perylene	0.39
				bis(2-Ethylhexyl)phthalate	0.56 J
				Chrysene	0.37
				Dibenz(a,h)anthracene	0.072 J
				Indeno(1,2,3-cd)pyrene	0.28
				Lead	129
				Mercury	0.315
				Nickel	48.2
				Selenium	22.6
				Silver	1.09 J
				Total PHCs	4,044
				EPH, TOTAL FRACTIONATED	950
SED-01-C	SED-01-C-0.0-2.5	0-2.5	9/27/2019	EPH, TOTAL FRACTIONATED	1900
				EPH, TOTAL FRACTIONATED	1400
				EPH, TOTAL FRACTIONATED	8100
				Aluminum	28000
				Arsenic	20.8
				Barium	73.4
				Cobalt	13.1
				Copper	47.7
				Manganese	608
				Mercury	0.163 J
				Nickel	31.3
				Vanadium	82.1
				Benzo(a)pyrene	0.45
				Benzo(a)anthracene	0.36
				Benzo(ghi)perylene	0.39
				bis(2-Ethylhexyl)phthalate	0.56 J
				Chrysene	0.37
				Dibenz(a,h)anthracene	0.072 J
				Indeno(1,2,3-cd)pyrene	0.28
				Lead	129
				Mercury	0.315
				Nickel	48.2
				Selenium	22.6
				Silver	1.09 J
				Total PHCs	4,044
				EPH, TOTAL FRACTIONATED	950
SED-02-A(R)	SED-02-A(R)-0.0-0.5	0-0.5	9/27/2019	EPH, TOTAL FRACTIONATED	26
				Acenaphthene	0.61
				Aluminum	21200
				Anthracene	1.3
				Arsenic	12.2
				Barium	185
				Benzo(a)pyrene	0.51
				Benzo(a)anthracene	0.89
				Benzo(ghi)perylene	0.3
				Cadmium	3.02
				Chromium	87.1
				Chrysene	1
				Cobalt	11.5
				Copper	980
				Dibenz(a,h)anthracene	0.098 J
				Fluoranthene	1.6
				Fluorene	1.3
				Indeno(1,2,3-cd)pyrene	0.25
				Lead	861
				Manganese	397
				Mercury	2.58
				2-Methylnaphthalene	3.1
				Naphthalene	0.72
				Nickel	79.7
				Phenanthrene	4.2
				Pyrene	2.2
				Selenium	13.4
				Silver	2.14
				Total PHCs	19,558
				Zinc	453
				Xylenes (total)	1.56
	SED-02-A(R)-0.4-0.5	0.4-0.5	9/27/2019	Acenaphthene	0.096 J
				Arsenic	11.8
				Benzo(a)pyrene	0.44
				Benzo(a)anthracene	0.37
				Benzo(ghi)perylene	0.48
				bis(2-Ethylhexyl)phthalate	0.82 J
				Copper	266
				Dibenz(a,h)anthracene	0.08 J
				Indeno(1,2,3-cd)pyrene	0.27
				Lead	92.6
				Mercury	0.508
				Nickel	45.4
				Pyrene	0.79
				Selenium	2.6 J
				Silver	1.5
				Total PHCs	4,561
				Zinc	216
				EPH, TOTAL FRACTIONATED	780
SED-02-B	SED-02-B(R)-0.0-0.5(A)	0-0.5	9/27/2019	Anthracene	0.11 J
				Arsenic	12.7
				Benzo(a)pyrene	0.68
				Benzo(a)anthracene	0.93
				Benzo(ghi)perylene	0.26
				bis(2-Ethylhexyl)phthalate	1.9
				Chrysene	0.46
				Copper	288
				Dibenz(a,h)anthracene	0.14
				Fluoranthene	0.82
				Indeno(1,2,3-cd)pyrene	0.37
				Lead	121
				Mercury	0.501
				Nickel	55.1
				Phenanthrene	0.26
				Pyrene	1.1
				Selenium	2.63
				Total PHCs	6,464
				Zinc	245
				EPH, TOTAL FRACTIONATED	1200
	SED-02-B(R)-0.5-1.0	0.5-1	9/27/2019	EPH, TOTAL FRACTIONATED	2100
				Acenaphthene	0.043 J
				Arsenic	43.2
				Barium	132
				Cobalt	13.8
				Copper	129
				Fluorene	0.093 J
				Lead	82.4
				Manganese	556
				Mercury	1.1
				2-Methylnaphthalene	0.3 J
				Nickel	37
				Zinc	172
				Aluminum	33100
				Arsenic	24.9
				Barium	132
				bis(2-Ethylhexyl)phthalate	2.3
				Cadmium	3.51
				Chromium	90.7
				Cobalt	20.8
				Copper	1790
				Lead	317
				Manganese	567
				Mercury	1.82
				Nickel	397
				Selenium	3.08 J
				Silver	5.71
				Zinc	886
				EPH, TOTAL FRACTIONATED	1100
	SED-02-B(R)-5.4-6	3.5-4	9/27/2019	EPH, TOTAL FRACTIONATED	7000
				Acenaphthene	0.77
				Acenaphthylene	0.61
				Aluminum	22000
				Anthracene	3
				Antimony	18.7
				Arsenic	141
				Barium	391
				Benzo(a)pyrene	0.47
				Benzo(a)anthracene	0.75
				Benzo(ghi)perylene	0.37
				Benzo(k)fluoranthene	0.29
				Cadmium	4.76
				Chromium	116
				Chrysene	1.8
				Cobalt	10.8
				Copper	733
				Dibenz(a,h)anthracene	0.09 J
				Fluoranthene	1.9
				Fluorene	0.82
				Indeno(1,2,3-cd)pyrene	0.24
				Lead	426
				Mercury	5.8
				2-Methylnaphthalene	5.82
				Naphthalene	0.63
				Nickel	48
				Phenanthrene	4.2
				Pyrene	3.6
				Selenium	5.45 J
				Silver	5.84
				Total PHCs	20.96
				Vanadium	63.3
				Zinc	889
				Xylenes (total)	5
				EPH, TOTAL FRACTIONATED	12000
SED-02-C(R)	SED-02-C(R)-0.0-0.5	0-0.5	9/27/2019	Acenaphthene	0.77
				Acenaphthylene	0.61
				Aluminum	22000
				Anthracene	3
				Antimony	18.7
				Arsenic	141
				Barium	391
				Benzo(a)pyrene	0.47
				Benzo(a)anthracene	0.75
				Benzo(ghi)perylene	0.37
				Benzo(k)fluoranthene	0.29
				Cadmium	4.76
				Chromium	116
				Chrysene	1.8
				Cobalt	10.8
				Copper	733
				Dibenz(a,h)anthracene	0.09 J
				Fluoranthene	1.9
				Fluorene	0.82
				Indeno(1,2,3-cd)pyrene	0.24
				Lead	426
				Mercury	5.8
				2-Methylnaphthalene	5.82
				Naphthalene	0.63
				Nickel	48
				Phenanthrene	4.2
				Pyrene	3.6
				Selenium	5.45 J
				Silver	5.84
				Total PHCs	20.96
				Vanadium	63.3
				Zinc	889
				Xylenes (total)	5
				EPH, TOTAL FRACTIONATED	12000

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-03-A	SED-03-A(R)-0.0-0.5	0-0.5	9/30/2019	EPH, TOTAL FRACTIONATED	2200
	SED-03-A(R)-5-10	5-10	9/30/2019	EPH, TOTAL FRACTIONATED	2000
				Aluminum	22000
				Anthracene	0.98
				Arsenic	39.4
				Arsenic	117
				Barium	426
				Benzo(a)anthracene	0.65
				Benzo(ghi)perylene	0.26
				Cadmium	7.38
				Chromium	119
				Chrysene	1.2
				Cobalt	12.5
				Copper	765
				Fluoranthene	1.1
				Fluorene	1.2
				Indeno(1,2,3-cd)pyrene	0.23
				Lead	429
				Manganese	342
				Mercury	2.81
				2-Methylnaphthalene	3.3
				Naphthalene	1.1
				Nickel	53.7
				Phenanthrene	5.3
				Pyrene	2
				Selenium	7.92
				Silver	5
				Total PHCs	17,98
				Vanadium	61.5
				Zinc	788
				Xylenes (total)	3.9
				EPH, TOTAL FRACTIONATED	11000
SED-03-B	SED-03-B(R)-0.0-0.5	0-0.5	9/30/2019	EPH, TOTAL FRACTIONATED	1.26
	SED-03-B(R)-0.5-1.0	0.5-1	9/30/2019	EPH, TOTAL FRACTIONATED	700
				Acenaphthene	0.24
				Aluminum	16000
				Anthracene	0.58
				Arsenic	17.8
				Barium	65.4
				Benzo(a)pyrene	0.74
				Benzo(a)anthracene	0.88
				Benzo(ghi)perylene	0.6
				Benzo(k)fluoranthene	0.46
				bis(2-Ethylhexyl)phthalate	11
				Cadmium	2.16
				Chrysene	1
				Cobalt	20.9
				Copper	505
				Dibenz(a,h)anthracene	0.16
				Fluoranthene	2.4
				Fluorene	0.28
				Indeno(1,2,3-cd)pyrene	0.56
				Lead	167
				Mercury	0.485
				2-Methylnaphthalene	0.16 J
				Nickel	155
				Phenanthrene	0.95
				Pyrene	2.1
				Selenium	5.7
				Silver	1.89
				Total PHCs	12,31
				Vanadium	65.1
				Zinc	313
				Acenaphthene	0.1
				Acenaphthylene	0.073 J
				Anthracene	0.2
				Arsenic	17.9
				Barium	74.4
				Benzo(a)anthracene	0.3
				Benzo(ghi)perylene	0.3
				bis(2-Ethylhexyl)phthalate	1.3
				Cobalt	11.8
				Copper	272
				Dibenz(a,h)anthracene	0.068 J
				Fluorene	0.17
				Lead	88.1
				Manganese	496
				Mercury	0.488
				2-Methylnaphthalene	0.38
				Nickel	35.1
				Phenanthrene	0.54
				Total PHCs	4,558
				Xylenes (total)	0.465
	SED-03-C(R)-0.0-0.5	0-0.5	9/30/2019	EPH, TOTAL FRACTIONATED	440
	SED-03-C(R)-5-10	5-10	9/30/2019	EPH, TOTAL FRACTIONATED	5400
	SED-03-C(R)-11.5	11.5	9/30/2019	EPH, TOTAL FRACTIONATED	16000
				Aluminum	18000
				Anthracene	1.3
				Arsenic	82
				Barium	216
				Benzene	0.9
				Benzo(a)pyrene	0.87
				Benzo(a)anthracene	1
				Benzo(ghi)perylene	0.77
				Benzo(k)fluoranthene	0.26
				bis(2-Ethylhexyl)phthalate	6.2
				Cadmium	11.9
				Chromium	114
				Chrysene	2.1
				Cobalt	11.3
				Copper	1000
				Dibenz(a,h)anthracene	0.11 J
				1,4-Dichlorobenzene	0.13 J
				Ethylbenzene	1.6
				Fluoranthene	1.7
				Fluorene	2.4
				Indeno(1,2,3-cd)pyrene	0.39
				Lead	318
				Mercury	8.54
				2-Methylnaphthalene	19
				Naphthalene	3.9
				Nickel	92.2
				Phenanthrene	7.4
				Pyrene	3.4
				Selenium	14.1
				Silver	4.92
				Total PHCs	45,32
				Vanadium	70.5
				Zinc	793
				Xylenes (total)	28.1
	SED-03-C(R)-2.5-3.3	2.5-3	9/30/2019	EPH, TOTAL FRACTIONATED	4500
				Acenaphthene	0.31
				Aluminum	22000
				Anthracene	0.23
				Arsenic	34.5
				Barium	86.7
				Benzene	0.8
				Cobalt	12.3
				Copper	106
				Ethylbenzene	1.5
				Fluorene	0.84
				Lead	57.2
				Manganese	318
				Mercury	0.762
				2-Methylnaphthalene	4
				Naphthalene	1.6
				Nickel	31.4
				Phenanthrene	0.93
				Pyrene	1.7 J
				Total PHCs	8,96
				Zinc	170
				Xylenes (total)	9.2
	SED-03-C(R)-6.0-6.5	6-6.5	9/30/2019	EPH, TOTAL FRACTIONATED	900
				EPH, TOTAL FRACTIONATED	2400
				Arsenic	75
				Barium	208
				Cadmium	5.77
				Chromium	127
				Cobalt	11.4
				Copper	638
				Lead	399
				Manganese	292
				Mercury	4.78
				Nickel	65.2
				Selenium	2.1 J
				Silver	3.3
				Zinc	616
				EPH, TOTAL FRACTIONATED	14000
	SED-04-B(I)-0.0-0.5	0-0.5	10/1/2019	EPH, TOTAL FRACTIONATED	480
	SED-04-B(I)-0.5-1.0	0.5-1	10/1/2019	EPH, TOTAL FRACTIONATED	1400
				Arsenic	34.4
				Barium	108
				bis(2-Ethylhexyl)phthalate	0.26
				Cadmium	1.32
				Copper	157
				Fluorene	0.048
				Lead	115
				Mercury	1.28
				2-Methylnaphthalene	0.082
				Nickel	28.3
				Zinc	222
				EPH, TOTAL FRACTIONATED	1500
	SED-04-B(I)-2.0-2.5(A)	2-2.5	10/1/2019	Arsenic	28.5
				Barium	88.3
				Benzo(ghi)perylene	0.2
				Cobalt	12.8
				Copper	131
				Lead	61.6
				Manganese	335
				Mercury	0.641
				2-Methylnaphthalene	0.18 J
				Nickel	41.1
				Zinc	232
				EPH, TOTAL FRACTIONATED	720

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-04-C	SED-04-C(R)-0.0-0.5	0-0.5	10/1/2019	EPH, TOTAL FRACTIONATED	33000
	SED-04-C(R)-5-10	5-10	10/1/2019	EPH, TOTAL FRACTIONATED	24000
				Acenaphthene	0.79
				Anthracene	1.6
				Arsenic	39.4
				Benzo(a)anthracene	0.51
				Chromium	82.9
				Chrysene	0.91
				Cobalt	10.7
				Copper	260
				Fluoranthene	0.64
				Fluorene	0.78
				Lead	212
				Mercury	1.18
				2-Methylnaphthalene	3.3
				Naphthalene	0.6
				Nickel	37.1
				Phenanthrene	3.5
				Pyrene	1.5
				Total PHCs	11,68
				Zinc	369
				Xylenes (total)	1.2
				EPH, TOTAL FRACTIONATED	1600
	SED-04-C(R)			Acenaphthene	0.87
				Aluminum	19000
				Anthracene	2.5
				Arsenic	98.2
				Barium	173
				Benzo(a)pyrene	0.79
				Benzo(a)anthracene	1.1
				Benzo(ghi)perylene	0.55
				Cadmium	1.26
				Chrysene	1.9
				Cobalt	10.6
				Copper	403
				Fluoranthene	1.7
				Fluorene	2.8
				Lead	218
				Manganese	260
				Mercury	2.18
				2-Methylnaphthalene	12
				Naphthalene	1.3
				Nickel	54.9
				Phenanthrene	11
				Pyrene	6.4
				Selenium	2 J
				Total PHCs	41,76
				Zinc	335
				EPH, TOTAL FRACTIONATED	4900
	SED-04-C(R)-2.0-2.5	2-2.5	10/1/2019	EPH, TOTAL FRACTIONATED	1400
				EPH, TOTAL FRACTIONATED	1900
				Acenaphthene	0.079
				Arsenic	37.1
				Barium	78.6
				Benzo(a)pyrene	0.59
				Benzo(a)anthracene	1.1
				Benzo(ghi)perylene	0.79
				Benzo(k)fluoranthene	0.43
				bis(2-Ethylhexyl)phthalate	2.6
				Cadmium	5.53
				Chrysene	1.1
				Cobalt	10.8
				Copper	2450
				Dibenz(a,h)anthracene	0.16
				Fluoranthene	1.8
				Fluorene	0.68
				Indeno(1,2,3-cd)pyrene	0.32
				Lead	189
				Manganese	406
				Mercury	1.13
				2-Methylnaphthalene	0.29 J
				Naphthalene	0.37
				Nickel	48.9
				Phenanthrene	2.3
				Pyrene	2.8
				Silver	1.9
				Total PHCs	15,14
				Zinc	344
				Xylenes (total)	0.195
				EPH, TOTAL FRACTIONATED	4600
				EPH, TOTAL FRACTIONATED	10 J
				EPH, TOTAL FRACTIONATED	13
				Anthracene	0.1
				Arsenic	93
				Barium	221
				bis(2-Ethylhexyl)phthalate	0.59
				Cadmium	5.1
				Chromium	105
				Copper	408
				Fluorene	0.096
				Lead	273
				Mercury	2.83
				Nickel	38.5
				Phenanthrene	0.26
				Silver	3.6
				Zinc	622

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-05-A	SED-05-A(R)-0.0-0.5	0-0.5	10/1/2019	EPH, TOTAL FRACTIONATED	1200
	SED-05-A(R)-5-10	5-10	10/1/2019	EPH, TOTAL FRACTIONATED	1600
				Acenaphthene	0.26
				Anthracene	0.61
				Arsenic	44.2
				Barium	133
				Benzene	0.4 J
				Benzo(a)pyrene	0.59
				Benzo(a)anthracene	0.95
				Benzo(ghi)perylene	0.44
				bis(2-Ethylhexyl)phthalate	1.8
				Cadmium	2.38
				Chrysene	1.2
				Cobalt	10.1
				Copper	778
				Dibenz(a,h)anthracene	0.13 J
				1,2-Dichlorobenzene	0.052 J
				1,4-Dichlorobenzene	0.28 J
				Fluoranthene	1.3
				Fluorene	0.92
				Indeno(1,2,3-cd)pyrene	0.26
				Lead	298
				Mercury	1.02
				2-Methylnaphthalene	2.3
				Naphthalene	0.87
				Nickel	55.6
				Phenanthrene	2.5
				Pyrene	2
				Silver	2.14
				Total PHCs	13,96
				Vanadium	60.7
				Zinc	398
				Xylenes (total)	1.23
	SED-05-A(R)			EPH, TOTAL FRACTIONATED	2500
				Acenaphthene	0.88
				Acenaphthylene	0.31
				Anthracene	0.97
				Arsenic	61.5
				Barium	124
				Benzo(a)pyrene	0.65
				Benzo(a)anthracene	1.1
				Benzo(ghi)perylene	0.73
				bis(2-Ethylhexyl)phthalate	5.4
				Cadmium	5.92
				Chromium	88.1
				Chrysene	1.5
				Cobalt	10.2
				Copper	593
				Dibenz(a,h)anthracene	0.16 J
				Fluoranthene	2.1
				Fluorene	1.2
				Indeno(1,2,3-cd)pyrene	0.29
				Lead	380
				Mercury	1.79
				2-Methylnaphthalene	6.7
				Naphthalene	7.6
				Phenanthrene	6.4
				Pyrene	3.3
				Selenium	3.12 J
				Silver	3.3
				Total PHCs	23,22
				Vanadium	60.5
				Zinc	443
				Xylenes (total)	0.81
				EPH, TOTAL FRACTIONATED	14000
	SED-05-A(R)-2.0-2.5	2-2.5	10/1/2019	EPH, TOTAL FRACTIONATED	960
				EPH, TOTAL FRACTIONATED	2600
				Acenaphthene	0.69
				Aluminum	28000
				Arsenic	95.3
				Barium	180
				Cobalt	13.1
				Copper	264
				Fluorene	0.2
				Lead	191
				Manganese	339
				Mercury	5.12
				2-Methylnaphthalene	1.5
				Naphthalene	0.24
				Nickel	46.2
				Phenanthrene	0.56
				Silver	2.08
				Total PHCs	13,7
				Zinc	285
				Xylenes (total)	0.22
	SED-05-B			EPH, TOTAL FRACTIONATED	35
				EPH, TOTAL FRACTIONATED	150
				Acenaphthene	0.18 J
				Anthracene	0.32
				Arsenic	34.3
				Benzo(a)pyrene	0.49
				Benzo(a)anthracene	0.42
				Benzo(ghi)perylene	0.59
				bis(2-Ethylhexyl)phthalate	2.6
				Cadmium	3.24
				Chrysene	0.8
				Cobalt	10.7
				Copper	699
				Fluoranthene	1.1
				Indeno(1,2,3-cd)pyrene	1.2
				Lead	249
				Mercury	1.66
				Nickel	128
				Phenanthrene	0.97 J
				Pyrene	3.7
				Selenium	11.4
				Silver	1.56 J
				Total PHCs	20,94
				Zinc	583
				EPH, TOTAL FRACTIONATED	3300
				EPH, TOTAL FRACTIONATED	2600

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-06-C	SED-06-C(R)-0.0-0.5	0-0.5	10/2/2019	EPH, TOTAL FRACTIONATED	1200
	SED-06-C(R)-5-10	5-10	10/2/2019	EPH, TOTAL FRACTIONATED	1900
				Acenaphthene	0.26
				Anthracene	0.61
				Arsenic	44.2
				Barium	133
				Benzene	0.4 J
				Benzo(a)pyrene	0.59
				Benzo(a)anthracene	0.95
				Benzo(ghi)perylene	0.44
				bis(2-Ethylhexyl)phthalate	1.8
				Cadmium	2.38
				Chrysene	1.2
				Cobalt	10.1
				Copper	778
				Dibenz(a,h)anthracene	0.13 J
				1,2-Dichlorobenzene	0.052 J
				1,4-Dichlorobenzene	0.28 J
				Fluoranthene	1.3
				Fluorene	0.92
				Indeno(1,2,3-cd)pyrene	0.26
				Lead	298
				Mercury	1.02
				2-Methylnaphthalene	2.3
				Naphthalene	0.87
				Nickel	55.6
				Phenanthrene	2.5
				Pyrene	2
				Silver	2.14
				Total PHCs	13,96
				Vanadium	60.7
				Zinc	398
				Xylenes (total)	1.23
	SED-06-C(R)			EPH, TOTAL FRACTIONATED	2500
				Acenaphthene	0.88
				Acenaphthylene	0.31
				Anthracene	0.97
				Arsenic	61.5
				Barium	124
				Benzo(a)pyrene	0.65
				Benzo(a)anthracene	1.1
				Benzo(ghi)perylene	0.73
				bis(2-Ethylhexyl)phthalate	5.4
				Cadmium	5.92
				Chromium	88.1
				Chrysene	1.5
				Cobalt	10.2
				Copper	593
				Dibenz(a,h)anthracene	0.16 J
				Fluoranthene	2.1
				Fluorene	1.2
				Indeno(1,2,3-cd)pyrene	0.29
				Lead	380
				Mercury	1.79
				2-Methylnaphthalene	6.7
				Naphthalene	7.6
				Phenanthrene	6.4
				Pyrene	3.3
				Selenium	3.12 J
				Silver	3.3
				Total PHCs	23,22
				Vanadium	60.5
				Zinc	443
				Xylenes (total)	0.81
				EPH, TOTAL FRACTIONATED	14000
SED-09-A(R)	SED-09-A(R)-0.0-0.5	0-0.5	10/10/2019	EPH, TOTAL FRACTIONATED	960
	SED-09-A(R)-5-10	5-10	10/10/2019	EPH, TOTAL FRACTIONATED	2600
				Aluminum	28000
				Arsenic	95.3
				Barium	180
				Cobalt	13.1
				Copper	264
				Fluorene	0.2
				Lead	191
				Manganese	339
				Mercury	5.12
				2-Methylnaphthalene	1.5
				Naphthalene	0.24
				Nickel	46.2
				Phenanthrene	0.56
				Silver	2.08
				Total PHCs	13,7
				Zinc	285
				Xylenes

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-07-A	SED-07-A/2.0-2.5	2-2.5	10/16/2019	Aluminum	24300
				Barium	54.6
				Cobalt	13.3
				Manganese	520
				Nickel	**32.4**
				Silver	***1.66***
SED-07-B	SED-07-B/0.0-0.5	0-0.5	10/14/2019	EPH, TOTAL FRACTIONATED	35
	SED-07-B/0.5-1.0	0.5-1	10/14/2019	EPH, TOTAL FRACTIONATED	43
SED-07-C	SED-07-C/0.0-0.5	0-0.5	10/16/2019	EPH, TOTAL FRACTIONATED	250
	SED-07-C/0.5-1.0	0.5-1	10/16/2019	EPH, TOTAL FRACTIONATED	83
	SED-07-C/2.0-2.5	2-2.5	10/16/2019	EPH, TOTAL FRACTIONATED	3.7 J
SED-08-A	SED-08-A/0.0-0.5	0-0.5	10/14/2019	EPH, TOTAL FRACTIONATED	6.6 J
	SED-08-A/2.0-2.5(A)	2-2.5	10/14/2019	Barium	207
	SED-08-A/2.0-2.5(B)	2-2.5	10/14/2019	Aluminum	18300
				Barium	265
SED-08-C	SED-08-C/0.0-0.5	0-0.5	10/14/2019	EPH, TOTAL FRACTIONATED	51 J
	SED-08-C/3.0-3.5	3-3.5	10/14/2019	Aluminum	21200
				Arsenic	**34.6**
				Barium	378
				Manganese	276
				EPH, TOTAL FRACTIONATED	32 J
SED-11-C	SED-11-C/0.0-0.5	0-0.5	10/8/2019	EPH, TOTAL FRACTIONATED	5.7 J
	SED-11-C/0.5-1.0	0.5-1	10/8/2019	EPH, TOTAL FRACTIONATED	12 J
	SED-11-C/2.0-2.5	2-2.5	10/8/2019	Aluminum	22900
				Arsenic	**8.95**
				Barium	58.5
				Cobalt	13.9
				Nickel	**23.5**
				EPH, TOTAL FRACTIONATED	13 J
SED-20-A	SED-20-A/2.0-2.5	2-2.5	10/8/2019	Acenaphthene	***0.2***
				Anthracene	**0.39**
				Benzo(a)pyrene	**0.81**
				Benzo(a)anthracene	**0.79**
				Benzo(ghi)perylene	**0.61**
				Benzo(k)fluoranthene	**0.45**
				Chrysene	**0.85**
				Cobalt	10.8
				Copper	**39.3**
				Dibenz(a,h)anthracene	**0.12**
				Fluoranthene	**2.4**
				Fluorene	***0.19***
				Indeno(1,2,3-cd)pyrene	**0.53**
				Phenanthrene	**1.9**
				Pyrene	**1.9**
				Total PAHs	**12.33**
				Zinc	**221**
				EPH, TOTAL FRACTIONATED	46

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-20-C	SED-20-C/2.0-2.5	2-2.5	10/8/2019	Arsenic	**8.75**
				Barium	50.3
				Cobalt	12.1
				EPH, TOTAL FRACTIONATED	9.2 J
SED-21-A	SED-21-A/2.0-2.5	2-2.5	9/24/2019	Acenaphthene	***0.09*** J
				Anthracene	**0.21**
				Benzo(a)pyrene	**0.47**
				Benzo(a)anthracene	**0.54**
				Benzo(ghi)perylene	**0.33**
				Benzo(k)fluoranthene	**0.3**
				Chrysene	**0.58**
				Dibenz(a,h)anthracene	**0.099** J
				Fluoranthene	**1.4**
				Fluorene	***0.088*** J
				Indeno(1,2,3-cd)pyrene	**0.25**
				Phenanthrene	**0.84**
				Pyrene	**1.2**
				Total PAHs	**7.081**
				EPH, TOTAL FRACTIONATED	49
SED-21-C	SED-21-C/2.0-2.5	2-2.5	9/24/2019	Acenaphthene	***0.15***
				Anthracene	**0.42**
				Benzo(a)pyrene	**1.1**
				Benzo(a)anthracene	**1.1**
				Benzo(ghi)perylene	**0.86**
				Benzo(k)fluoranthene	**0.62**
				bis(2-Ethylhexyl)phthalate	***6.4***
				Chrysene	**1.3**
				Dibenz(a,h)anthracene	**0.26**
				Fluoranthene	**3.1**
				Fluorene	***0.19***
				Indeno(1,2,3-cd)pyrene	**0.75**
				Lead	**184**
				2-Methylnaphthalene	**0.09** J
				Phenanthrene	**1.9**
				Pyrene	**2.6**
				Total PAHs	**15.987**
				EPH, TOTAL FRACTIONATED	55

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-SSBG-1	SED-SSBG-1/0.0-0.5	0-0.5	9/24/2019	Cobalt	11.4
				Lead	**52.2**
				Zinc	**168**
				EPH, TOTAL FRACTIONATED	19
	SED-SSBG-1/2.0-2.5	2-2.5	9/24/2019	Acenaphthylene	**0.055** J
				Anthracene	**0.11**
				Benzo(a)anthracene	**0.29**
				Chrysene	**0.42**
				Cobalt	15.9
				Copper	**105**
				Fluorene	**0.066** J
				Lead	**80.4**
				Nickel	**41.7**
				Pyrene	**0.74**
				Zinc	**297**
				EPH, TOTAL FRACTIONATED	1200
SED-SSBG-2	SED-SSBG-2/0.0-0.5	0-0.5	9/24/2019	Acenaphthene	***0.27***
				Acenaphthylene	**0.049** J
				Anthracene	**0.66**
				Arsenic	**9.64** J
				Benzo(a)pyrene	**1.3**
				Benzo(a)anthracene	**1.5**
				Benzo(b)fluoranthene	2.1
				Benzo(ghi)perylene	**0.91**
				Benzo(k)fluoranthene	**0.65**
				Chrysene	**1.7**
				Cobalt	10.9
				Copper	**39.6**
				Dibenz(a,h)anthracene	**0.21**
				Fluoranthene	**4.1**
				Fluorene	***0.37***
				Indeno(1,2,3-cd)pyrene	**0.88**
				Phenanthrene	2.9
				Pyrene	2.8
				Total PAHs	**20.489**
				Zinc	**193**
				EPH, TOTAL FRACTIONATED	83
	SED-SSBG-2/2.0-2.5 (A)	2-2.5	9/24/2019	Aluminum	19700
				Barium	71.2
				Cobalt	10.8
				EPH, TOTAL FRACTIONATED	4.7 J
	SED-SSBG-2/2.0-2.5(B)	2-2.5	9/24/2019	Aluminum	21300
				Arsenic	**8.44**
				Barium	58.5
				Cobalt	22.5
				Nickel	**31.6**
				EPH, TOTAL FRACTIONATED	5.6 J

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-SSBG-3	SED-SSBG-3/0.0-0.5	0-0.5	9/24/2019	Acenaphthene	***0.63***
				Anthracene	**1.1**
				Benzo(a)pyrene	1.9
				Benzo(a)anthracene	2
				Benzo(b)fluoranthene	2.3
				Benzo(ghi)perylene	**1.3**
				Benzo(k)fluoranthene	**0.86**
				Chrysene	**2.5**
				Copper	**47.2**
				Dibenz(a,h)anthracene	0.36
				Fluoranthene	5.5
				Fluorene	***0.61***
				Indeno(1,2,3-cd)pyrene	**0.98**
				2-Methylnaphthalene	**0.56**
				Naphthalene	**0.23**
				Phenanthrene	4.7
				Pyrene	4.2
				Total PAHs	**29.73**
				EPH, TOTAL FRACTIONATED	96
	SED-SSBG-3/2.0-2.5	2-2.5	9/24/2019	Acenaphthene	***0.063*** J
				Acenaphthylene	**0.063** J
				Anthracene	**0.99**
				Benzo(a)pyrene	**1.6**
				Benzo(a)anthracene	1.9
				Benzo(b)fluoranthene	2.1
				Benzo(ghi)perylene	**0.94**
				Benzo(k)fluoranthene	**0.9**
				Chrysene	**1.9**
				Cobalt	12.5
				Dibenz(a,h)anthracene	0.28
				Fluoranthene	**4.4**
				Fluorene	***0.16***
				Indeno(1,2,3-cd)pyrene	**0.9**
				Phenanthrene	**0.8**
				Pyrene	3.1
				Total PAHs	**20.096**
				EPH, TOTAL FRACTIONATED	49

Location ID	Field ID	Depth	Date	Parameter	Concentration (mg/kg)
SED-SSBG-4	SED-SSBG-4/0.0-0.5	0-0.5	9/24/2019	Benzo(ghi)perylene	**0.28**
				Cobalt	10.6
				Indeno(1,2,3-cd)pyrene	**0.26**
				EPH, TOTAL FRACTIONATED	30
	SED-SSBG-4/2.0-2.5	2-2.5	9/24/2019	Acenaphthene	***0.027*** J
				Benzo(a)anthracene	**0.4**
				Benzo(ghi)perylene	**0.33**
				Benzo(k)fluoranthene	**0.34**
				Chrysene	**0.52**
				Cobalt	13.7
				Copper	**59.7**
				Dibenz(a,h)anthracene	**0.091** J
				Fluoranthene	**1**
				Fluorene	**0.025** J
				Indeno(1,2,3-cd)pyrene	**0.3**
				Lead	**159**
				Nickel	**29**
				Phenanthrene	**0.41**
				Pyrene	**0.9**
				Total PAHs	**5.394**
				Zinc	**363**
				EPH, TOTAL FRACTIONATED	340

EXPLANATION:

NJDEP Ecological Screening Criteria (ESC) For Saline Sediment

Parameter	ESC ER-L	ESC ER-M
Acenaphthene	0.016	0.5
Acenaphthylene	0.044	0.64
Aluminum	--	18000
Anthracene	0.085	1.1
Arsenic	8.2	70
Barium	--	48
Benzo(a)pyrene	0.43	1.6
Benzo(a)anthracene	0.261	1.6
Benzo(b)fluoranthene	--	1.8
Benzo(ghi)perylene	0.17	--
Benzo(k)fluoranthene	0.24	--
bis(2-Ethylhexyl)phthalate	0.18216	2.64651
Chrysene	0.384	2.8
Cobalt	--	10
Copper	34	270
Dibenz(a,h)anthracene	0.063	0.26
EPH, TOTAL FRACTIONATED	--	--
Fluoranthene	0.6	5.1
Fluorene	0.019	0.54
Indeno(1,2,3-cd)pyrene	0.2	--
Lead	47	218
Manganese	--	260
2-Methylnaphthalene	0.07	0.67
Naphthalene	0.16	2.1
Nickel	21	52
Phenanthrene	0.24	1.5
Pyrene	0.665	2.6
Silver	1	3.7
Total PAHs	4	45
Zinc	150	410

Note:
ESC = NJDEP Ecological Screening Criteria, March 2009
ESC ER-L = Saline Water Sediment Effects Range Low (per NJDEP ESC)
ESC ER-M = Saline Water Sediment Effects Range Medium (per NJDEP ESC)
Bold indicates concentrations above the ESC ER-L
Underline indicates concentrations above the ESC ER-M
J = Estimated value below sample reporting limit
Values in italics indicate MDL above applicable criterion.
All concentrations are in milligrams per kilogram (mg/kg).
Only constituents with concentrations above the referenced standard or criteria are presente

DRAFT

PROJECT: SUPPLEMENTAL SEDIMENT INVESTIGATION
CHEVRON FACILITY
PERTH AMBOY, NEW JERSEY

TITLE: OVERVIEW PLAN WITH 2019 BATHYMETRY
SHEET 3 OF 3: SEDIMENT SAMPLE LABORATORY
ANALYTICAL RESULTS - SPA SPRING CREEK

DRAWN BY:	M. GIAMBATTISTA	PROJ. NO.:	326731.2020
CHECKED BY:	W. CORDASCO	FIGURE A-1	
APPROVED BY:	R. LIPPENCOTT		
DATE:	JANUARY 2020		

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FILE NO.: Overview Plan_ZONES.dwg

24x36 --- USER: MGiambattista --- ATTACHED XREFS: --- ATTACHED IMAGES: J8A13, J8A14, J8A15, J8C1, J8C2, J8C3, J8C5, J8C6, J8C7
DRAWING NAME: M:\Cad Files\WORK\8890\2019\Bathymetric\Final\rev. 03.20.20\Overview Plan_ZONES.dwg --- PLOT DATE: March 27, 2020 - 1:43PM --- LAYOUT: A-1 (3)
Version: 2017-10-21