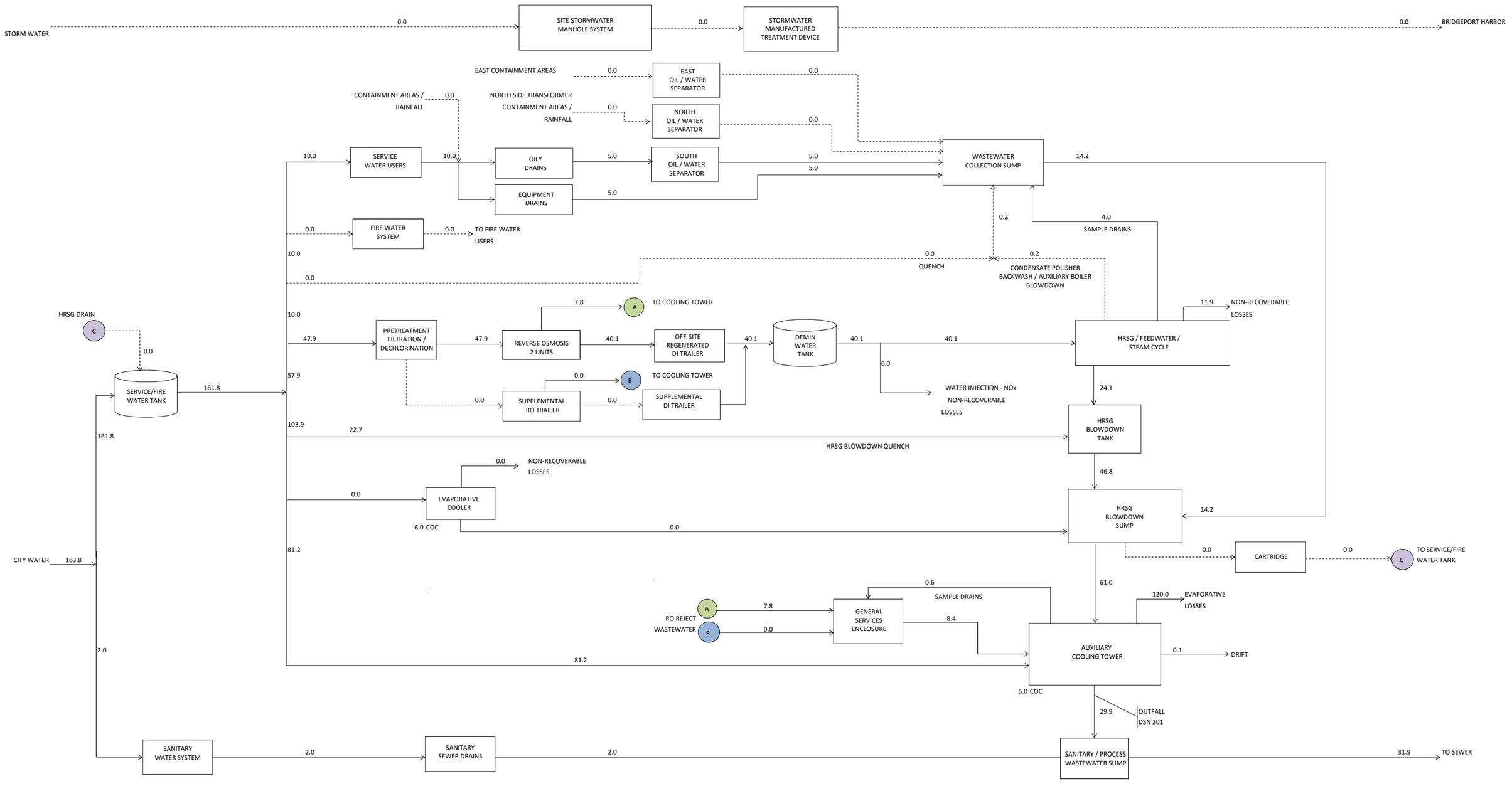
Figure 1 - Water Balance Diagram - Average Annual Conditions - Auxiliary Cooling Tower Operated at 5 Cycles of Concentration



NOTES:
1. FLOWS ARE IN GALLONS PER MINUTE.
2. DASHED LINES REPRESENT INTERMITTENT FLOWS.

Black & Veatch Project: 191547

TOTAL PLANT WATER DEMAND	**163.8 GPM**	**0.236 MGD**
TOTAL PLANT WASTEWATER DISCHARGE	**31.9 GPM**	**0.046 MGD**

CASE:	CASE #1 - AVG ANNUAL, GE CASE 1, NATURAL GAS, 59F, EVAP COOL OFF, NOX OFF		
WATER:	CITY WATER	AMBIENT TEMP (F):	59.0
CTG FUEL	NATURAL GAS	RANGE (F):	10
CC CTG/STG CONFIG	1x1	CYCLES OF CONCENTRATION (COC):	5.0
DUCT FIRING	OFF	EVAPORATIVE COOLING	OFF

BLACK & VEATCH
Building a world of difference.

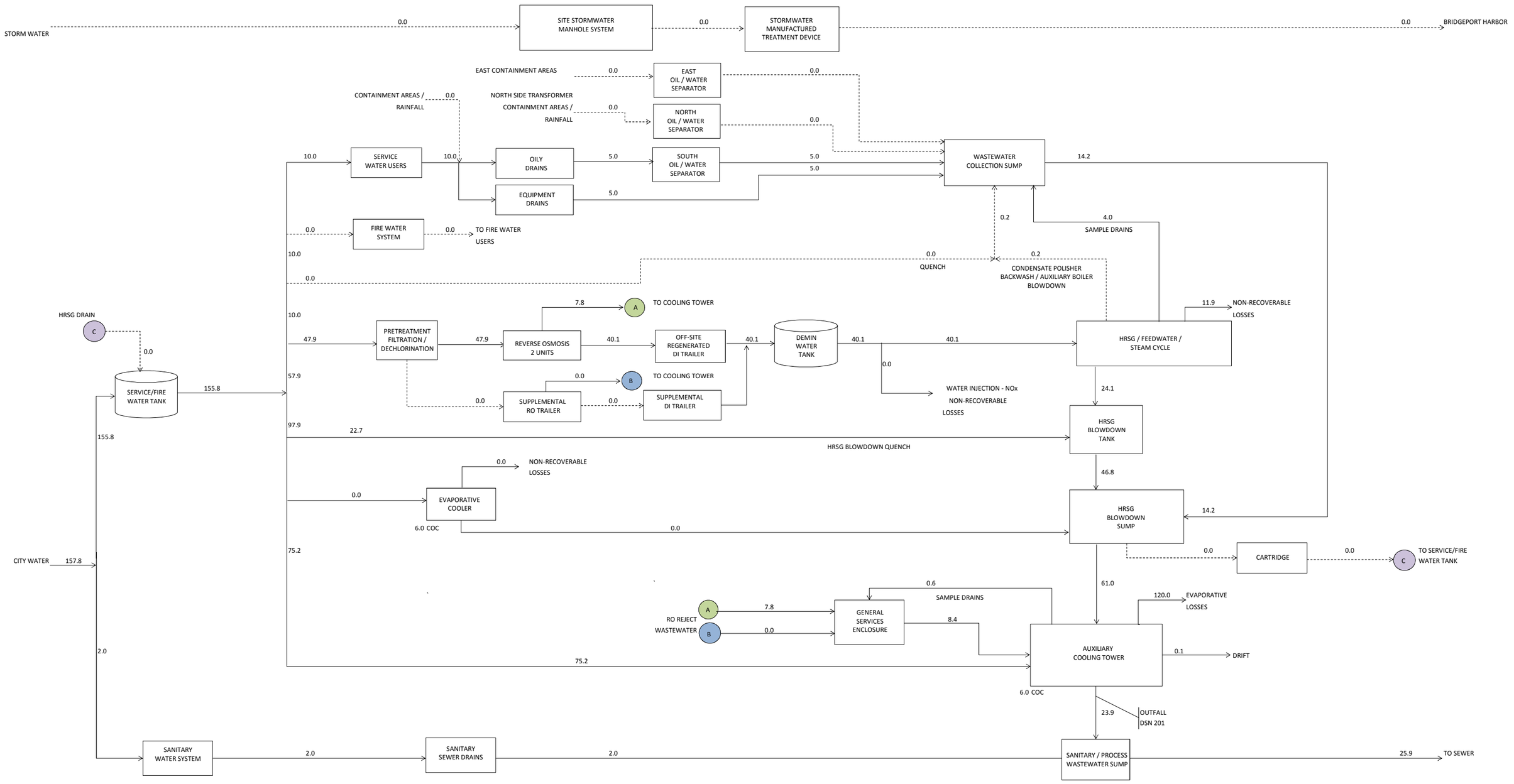
Eng:	AJF	Dwg:	CMB
		Date:	10/24/2016

BRIDGEPORT HARBOR UNIT 05
1X1 COMBINED CYCLE PLANT
WATER MASS BALANCE - AUXILIARY COOLING TOWER

CASE #1 - AVG ANNUAL, GE CASE 1, NATURAL GAS, 59F, EVAP COOL OFF, NOX OFF

REV 3

Figure 2 - Water Balance Diagram - Average Annual Conditions - Auxiliary Cooling Tower Operated at 6 Cycles of Concentration



NOTES:
1. FLOWS ARE IN GALLONS PER MINUTE.
2. DASHED LINES REPRESENT INTERMITTENT FLOWS.

Black & Veatch Project: 191547

TOTAL PLANT WATER DEMAND	**157.8 GPM**	**0.227 MGD**
TOTAL PLANT WASTEWATER DISCHARGE	**25.9 GPM**	**0.037 MGD**

CASE:	CASE #1 - AVG ANNUAL, GE CASE 1, NATURAL GAS, 59F, EVAP COOL OFF, NOX OFF		
WATER:	CITY WATER	AMBIENT TEMP (F):	59.0
CTG FUEL	NATURAL GAS	RANGE (F):	10
CC CTG/STG CONFIG	1x1	CYCLES OF CONCENTRATION (COC):	6.0
DUCT FIRING	OFF	EVAPORATIVE COOLING	OFF

BLACK & VEATCH
Building a world of difference.

Eng:	AJF	Dwg:	CMB
		Date:	10/24/2016

BRIDGEPORT HARBOR UNIT 05
1X1 COMBINED CYCLE PLANT
WATER MASS BALANCE - AUXILIARY COOLING TOWER

CASE #1 - AVG ANNUAL, GE CASE 1, NATURAL GAS, 59F, EVAP COOL OFF, NOX OFF

REV 3

Table 1 - Water Balance Table - Auxiliary Colling Tower Operated at 5 Cycles of Concentration

BRIDGEPORT HARBOR UNIT 05
1X1 COMBINED CYCLE PLANT
WATER MASS BALANCE - FLOW SHEET
B&V PROJECT NUMBER: 191547

AUXILIARY COOLING TOWER - 5 COC

DATE: 10/24/2016
REV: 3
Dwg: CMB
Eng: AJF

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	
WATER MASS BALANCE							
CC CTG/STG CONFIGURATION	1x1	1x1	1x1	1x1	1x1	1x1	
CYCLE HEAT REJECTION	ACC	ACC	ACC	ACC	ACC	ACC	
AUXILIARY COOLING HEAT REJECTION	COOLING TOWER	COOLING TOWER	COOLING TOWER	COOLING TOWER	COOLING TOWER	COOLING TOWER	
AMBIENT TEMPERATURE, F	59	90	35	90	59	35	
RELATIVE HUMIDITY	60.0%	70.0%	50.0%	70.0%	60.0%	50.0%	
CTG FUEL	NATURAL GAS	NATURAL GAS	ULSD	NATURAL GAS	NATURAL GAS	ULSD	
CTG LOAD LEVEL, %	100%	100%	100%	100%	100%	100%	
DUCT FIRING	OFF	ON	OFF	ON	ON	ON	
EVAPORATIVE COOLING	OFF	ON	OFF	ON	ON	OFF	
PLANT CAPACITY FACTOR	100%	100%	100%	100%	100%	100%	
COOLING TOWER							
EVAPORATION RATE, GPM	120	120	120	120	120	120	
CIRCULATING WATER RATE, GPM	13,000	13,000	13,000	13,000	13,000	13,000	
DRIFT, % OF CIRC WATER FLOW RATE	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	
CYCLES OF CONCENTRATION	5.0	5.0	4.7	5.0	5.0	4.7	
HOT WATER TEMPERATURE, DEG F	100.0	100.0	100.0	100.0	100.0	100.0	
COLD WATER TEMEPRATURE, DEG F	90.0	90.0	90.0	90.0	90.0	90.0	
SAMPLE PANEL DRAINS, GPM	0.6	0.6	0.6	0.6	0.6	0.6	
QUENCHED HRSG BLOWDOWN MAKEUP, GPM	61.0	74.2	0.0	74.3	72.0	0.0	
SERVICE WATER MAKEUP RATE, GPM	81.2	66.6	56.1	66.5	69.1	58.1	
TOTAL RO REJECT MAKEUP, GPM	7.8	9.2	96.9	9.2	9.0	94.9	
DRIFT RATE, GPM	0.1	0.1	0.1	0.1	0.1	0.1	
BLOWDOWN DISCHARGE TO SEWER, GPM	29.9	29.9	32.3	29.9	29.9	32.3	
HRSG / CONDENSER							
CONDENSER DUTY, KLBS/HR	899.5	1,080.1	917.2	1,082.3	1,047.6	1,084.7	
DEMIN WATER MAKEUP, PERCENT	2%	2%	2%	2%	2%	2%	
HRSG RECOVERED BLOWDOWN, PERCENT	67%	67%	67%	67%	67%	67%	
HRSG NON-RECOVERED BLOWDOWN, PERCENT	33%	33%	33%	33%	33%	33%	
HRSG BLOWDOWN TEMPERATURE, DEG F	212	212	212	212	212	212	
QUENCH WATER TEMPERATURE, DEG F	140	140	140	140	140	140	
HRSG RECOVERED BLOWDOWN, GPM	24.1	28.9	24.6	29.0	28.1	29.0	
HRSG NON-RECOVERED BLOWDOWN, GPM	11.9	14.2	12.1	14.3	13.8	14.3	
HRSG QUENCH WATER REQUIRED, GPM	22.7	27.2	23.1	27.3	26.4	27.3	
SAMPLE DRAINS, GPM	4.0	4.0	4.0	4.0	4.0	4.0	
COND. POL. BACKWASH / AUX BOILER BLOWDOWN, GPM	0.2	0.2	0.2	0.2	0.2	0.2	
CYCLE MAKEUP WATER FLOW RATE, GPM	40.1	47.3	40.8	47.4	46.0	47.5	
EVAP COOLER / WATER INJECTION							
EVAP COOLER MAKEUP FLOW RATE, GPM	0.0	23.0	0.0	23.0	19.9	0.0	
EVAP COOLER CYCLES OF CONCENTRATION	0.0	5.0	0.0	5.0	5.0	0.0	
EVAP COOLER BLOWDOWN RATE, GPM	0.0	3.8	0.0	3.8	3.3	0.0	
EVAP COOLER NON-RECOVERABLE LOSSES, GPM	0.0	19.2	0.0	19.2	16.6	0.0	
WATER INJECTION-Nox, GPM	0.0	0.0	508.3	0.0	0.0	490.3	
PLANT SITE							
STORM WATER, GPM	0.0	0.0	0.0	0.0	0.0	0.0	
CITY WATER DEMAND, GPM	163.8	185.4	675.4	185.4	182.4	659.6	
SERVICE WATER SYSTEM DEMAND, GPM	161.8	183.4	735.2	183.4	180.4	728.1	
SERVICE WATER USERS-AVERAGE, GPM	5.0	5.0	5.0	5.0	5.0	5.0	
OILY WATER PRODUCERS-AVERAGE, GPM	5.0	5.0	5.0	5.0	5.0	5.0	
POTABLE USE, SANITARY DRAINS, GPM	2.0	2.0	2.0	2.0	2.0	2.0	
FIRE WATER SYSTEM	0.0	0.0	0.0	0.0	0.0	0.0	
CONTAINMENT DRAINS/RAINFALL, GPM	0.0	0.0	0.0	0.0	0.0	0.0	
DISCHARGE TO SEWER, GPM	31.9	31.9	34.3	31.9	31.9	34.3	
TOTAL NON-RECOVERABLE, GPM (INCLUDING EVAP)	132.0	153.6	640.5	153.6	150.5	624.7	
DEMIN SYSTEM							
RO RECOVERY, PERCENT	83.7%	83.7%	83.7%	83.7%	83.7%	85.0%	
SOLIDS REJECTION, PERCENT	95%	95%	95%	95%	95%	95%	
TOTAL DEMIN SYSTEM THROUGHPUT, GPM	47.9	56.5	646.0	56.6	55.0	632.7	
TOTAL DEMIN WATER PRODUCED, GPM	40.1	47.3	549.1	47.4	46.0	537.8	
PERMANENT RO REJECT FLOW RATE, GPM	7.8	9.2	70.6	9.2	9.0	70.6	
PERMANENT DEMIN PRODUCT WATER, GPM	40.1	47.3	400.0	47.4	46.0	400.0	
SUPPLEMENTAL RO REJECT RATE, GPM	0.0	0.0	26.3	0.0	0.0	24.3	
SUPPLEMENTAL DEMIN PRODUCT WATER, GPM	0.0	0.0	149.1	0.0	0.0	137.8	

Case #	Description
1	CASE #1 - AVG ANNUAL, GE CASE 1, NATURAL GAS, 59F, EVAP COOL OFF, NOX OFF
2	CASE #2 - SUMMER DESIGN, GE CASE 2, NATURAL GAS, 90F, EVAP COOL ON, NOX OFF
3	CASE #3 - WINTER, GE CASE 3, ULSD, 35F, EVAP COOL OFF, NOX ON
4	CASE #4 - SUMMER DESIGN, GE CASE 1.5, NATURAL GAS, 90F, EVAP COOL ON, NOX OFF
5	CASE #5 - AVG ANNUAL, GE CASE 4.1, NATURAL GAS, 59F, EVAP COOL ON, NOX OFF
6	CASE #6 - WINTER, GE CASE 6, ULSD, 35F, EVAP COOL OFF, NOX ON

Notes:

1. Full HRSG Drain to be filtered and be transferred back to Service/Fire Water Tank

Table 2 - Water Balance Table - Auxiliary Cooling Tower Operated at 6 Cycles of Concentration

BRIDGEPORT HARBOR UNIT 05
1X1 COMBINED CYCLE PLANT
WATER MASS BALANCE - FLOW SHEET
B&V PROJECT NUMBER: 191547

AUXILIARY COOLING TOWER - 6 COC

DATE: 10/24/2016
REV: 3
Dwg: CMB
Eng: AJF

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	
WATER MASS BALANCE							
CC CTG/STG CONFIGURATION	1x1	1x1	1x1	1x1	1x1	1x1	
CYCLE HEAT REJECTION	ACC	ACC	ACC	ACC	ACC	ACC	
AUXILIARY COOLING HEAT REJECTION	COOLING TOWER	COOLING TOWER	COOLING TOWER	COOLING TOWER	COOLING TOWER	COOLING TOWER	
AMBIENT TEMPERATURE, F	59	90	35	90	59	35	
RELATIVE HUMIDITY	60.0%	70.0%	50.0%	70.0%	60.0%	50.0%	
CTG FUEL	NATURAL GAS	NATURAL GAS	ULSD	NATURAL GAS	NATURAL GAS	ULSD	
CTG LOAD LEVEL, %	100%	100%	100%	100%	100%	100%	
DUCT FIRING	OFF	ON	OFF	ON	ON	ON	
EVAPORATIVE COOLING	OFF	ON	OFF	ON	ON	OFF	
PLANT CAPACITY FACTOR	100%	100%	100%	100%	100%	100%	
COOLING TOWER							
EVAPORATION RATE, GPM	120	120	120	120	120	120	
CIRCULATING WATER RATE, GPM	13,000	13,000	13,000	13,000	13,000	13,000	
DRIFT, % OF CIRC WATER FLOW RATE	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	
CYCLES OF CONCENTRATION	6.0	6.0	4.7	6.0	6.0	4.7	
HOT WATER TEMPERATURE, DEG F	100.0	100.0	100.0	100.0	100.0	100.0	
COLD WATER TEMEPRATURE, DEG F	90.0	90.0	90.0	90.0	90.0	90.0	
SAMPLE PANEL DRAINS, GPM	0.6	0.6	0.6	0.6	0.6	0.6	
QUENCHED HRSG BLOWDOWN MAKEUP, GPM	61.0	74.2	0.0	74.3	72.0	0.0	
SERVICE WATER MAKEUP RATE, GPM	75.2	60.6	56.1	60.5	63.1	58.1	
TOTAL RO REJECT MAKEUP, GPM	7.8	9.2	96.9	9.2	9.0	94.9	
DRIFT RATE, GPM	0.1	0.1	0.1	0.1	0.1	0.1	
BLOWDOWN DISCHARGE TO SEWER, GPM	23.9	23.9	32.3	23.9	23.9	32.3	
HRSG / CONDENSER							
CONDENSER DUTY, KLBS/HR	899.5	1,080.1	917.2	1,082.3	1,047.6	1,084.7	
DEMIN WATER MAKEUP, PERCENT	2%	2%	2%	2%	2%	2%	
HRSG RECOVERED BLOWDOWN, PERCENT	67%	67%	67%	67%	67%	67%	
HRSG NON-RECOVERED BLOWDOWN, PERCENT	33%	33%	33%	33%	33%	33%	
HRSG BLOWDOWN TEMPERATURE, DEG F	212	212	212	212	212	212	
QUENCH WATER TEMPERATURE, DEG F	140	140	140	140	140	140	
HRSG RECOVERED BLOWDOWN, GPM	24.1	28.9	24.6	29.0	28.1	29.0	
HRSG NON-RECOVERED BLOWDOWN, GPM	11.9	14.2	12.1	14.3	13.8	14.3	
HRSG QUENCH WATER REQUIRED, GPM	22.7	27.2	23.1	27.3	26.4	27.3	
SAMPLE DRAINS, GPM	4.0	4.0	4.0	4.0	4.0	4.0	
COND. POL. BACKWASH / AUX BOILER BLOWDOWN, GPM	0.2	0.2	0.2	0.2	0.2	0.2	
CYCLE MAKEUP WATER FLOW RATE, GPM	40.1	47.3	40.8	47.4	46.0	47.5	
EVAP COOLER / WATER INJECTION							
EVAP COOLER MAKEUP FLOW RATE, GPM	0.0	23.0	0.0	23.0	19.9	0.0	
EVAP COOLER CYCLES OF CONCENTRATION	0.0	5.0	0.0	5.0	5.0	0.0	
EVAP COOLER BLOWDOWN RATE, GPM	0.0	3.8	0.0	3.8	3.3	0.0	
EVAP COOLER NON-RECOVERABLE LOSSES, GPM	0.0	19.2	0.0	19.2	16.6	0.0	
WATER INJECTION-Nox, GPM	0.0	0.0	508.3	0.0	0.0	490.3	
PLANT SITE							
STORM WATER, GPM	0.0	0.0	0.0	0.0	0.0	0.0	
CITY WATER DEMAND, GPM	157.8	179.4	675.4	179.4	176.4	659.6	
SERVICE WATER SYSTEM DEMAND, GPM	155.8	177.4	735.2	177.4	174.4	728.1	
SERVICE WATER USERS-AVERAGE, GPM	5.0	5.0	5.0	5.0	5.0	5.0	
OILY WATER PRODUCERS-AVERAGE, GPM	5.0	5.0	5.0	5.0	5.0	5.0	
POTABLE USE, SANITARY DRAINS, GPM	2.0	2.0	2.0	2.0	2.0	2.0	
FIRE WATER SYSTEM	0.0	0.0	0.0	0.0	0.0	0.0	
CONTAINMENT DRAINS/RAINFALL, GPM	0.0	0.0	0.0	0.0	0.0	0.0	
DISCHARGE TO SEWER, GPM	25.9	25.9	34.3	25.9	25.9	34.3	
TOTAL NON-RECOVERABLE, GPM (INCLUDING EVAP)	132.0	153.6	640.5	153.6	150.5	624.7	
DEMIN SYSTEM							
RO RECOVERY, PERCENT	83.7%	83.7%	83.7%	83.7%	83.7%	85.0%	
SOLIDS REJECTION, PERCENT	95%	95%	95%	95%	95%	95%	
TOTAL DEMIN SYSTEM THROUGHPUT, GPM	47.9	56.5	646.0	56.6	55.0	632.7	
TOTAL DEMIN WATER PRODUCED, GPM	40.1	47.3	549.1	47.4	46.0	537.8	
PERMANENT RO REJECT FLOW RATE, GPM	7.8	9.2	70.6	9.2	9.0	70.6	
PERMANENT DEMIN PRODUCT WATER, GPM	40.1	47.3	400.0	47.4	46.0	400.0	
SUPPLEMENTAL RO REJECT RATE, GPM	0.0	0.0	26.3	0.0	0.0	24.3	
SUPPLEMENTAL DEMIN PRODUCT WATER, GPM	0.0	0.0	149.1	0.0	0.0	137.8	

Case #	Description
1	CASE #1 - AVG ANNUAL, GE CASE 1, NATURAL GAS, 59F, EVAP COOL OFF, NOX OFF
2	CASE #2 - SUMMER DESIGN, GE CASE 2, NATURAL GAS, 90F, EVAP COOL ON, NOX OFF
3	CASE #3 - WINTER, GE CASE 3, ULSD, 35F, EVAP COOL OFF, NOX ON
4	CASE #4 - SUMMER DESIGN, GE CASE 1.5, NATURAL GAS, 90F, EVAP COOL ON, NOX OFF
5	CASE #5 - AVG ANNUAL, GE CASE 4.1, NATURAL GAS, 59F, EVAP COOL ON, NOX OFF
6	CASE #6 - WINTER, GE CASE 6, ULSD, 35F, EVAP COOL OFF, NOX ON

Notes:

1. Full HRSG Drain to be filtered and be transferred back to Service/Fire Water Tank

Table 3 - Projected Unit 5 Water Conditioning Program Summary

AUXILIARY COOLING TOWER

Chemicals	Chemical Supplier	Name, Concentration	Density (lb/gal)	Dose (ppm)	Flow (gph)	Flow (lb/hr)	Purpose	Tank/Tote & Quantity	Site Storage	Tank/Tote Connections	Comments
Sodium Hypochlorite	Univar	Sodium Hypochlorite, 12.5%	10.09	0.2	1.43	14.4287	Oxidant - Biofilm control	Tote, 400 gal	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	Feed skid equipped with 1" female cam-lock
Acid	Univar	Sulfuric Acid, 93%	15.28	10.8	0.1	1.528	pH and Scale control	Tote, 400 gal	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	Acid will be diluted to 3% before feeding to tower. Feed skid equipped with 1" female cam-lock
Antiscalant	GE	Polymer Dispersant, Gengard GN8203, or equivalent	9.61	30	0.09	0.8649	Scale control	Tote, 400 gal	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	Feed skid equipped with 1" female cam-lock
Corrosion Inhibitor	GE	Corrosion Inhibitor, Gengard GN7300, or equivalent	10.78	30	0.13	1.4014	Corrosion Inhibition	Tote, 400 gal	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	Feed skid equipped with 1" female cam-lock
					Total =	18.2					

CYCLE FEEDWATER / CONDENSATE / HRSG DRUM

Chemicals	Chemical Supplier	Name, Concentration	Density (lb/gal)	Dose (ppm)	Flow (gph)	Flow (lb/hr)	Purpose	Tank/Tote & Quantity	Site Storage	Connections	Comments
Ammonia	GE	Ammonia Hydroxide, Steamate NA1321 19%, or equivalent	7.71	2	3.25	25.1	pH Control	Tote, 400 gal	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	Feed skid equipped with 1" female cam-lock
Amine	GE	Filming Amine, Steamate HRSG02, or equivalent	8.1	2	3.25	26.3	pH Control	Tote, 400 gal	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	Feed skid equipped with 1" female cam-lock
Phosphate	GE	Trisodium Phosphate, Optisperse HP3100, 3%, or equivalent	8.67	5	3.4	29.5	pH buffer and hardness/scale removal for HP and IP drums	Two (2) Totes, 400 gal each	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	Feed skid equipped with 1" female cam-lock. One HP and one IP phosphate tote.
					Total =	80.9					

HRSG / SCR

Chemicals	Chemical Supplier	Name, Concentration	Density (lb/gal)	Dose (ppm)	Flow (gph)	Flow (lb/hr)	Purpose	Tank/Tote & Quantity	Site Storage	Connections	Comments
Ammonia	GE	Ammonia Hydroxide, Steamate NA1321 19%, or equivalent	7.71	TBD	173.89	1340.7	SCR Catalyst Reagent	Bulk Tank, 20,000 gals	The amount of storage allowed in the tank.	Two (2) 2" Female Cam-lock connections on unloading skid for tank fill and vent.	
					Total =	1340.7					

AUXILIARY BOILER

Chemicals	Chemical Supplier	Name, Concentration	Density (lb/gal)[1]	Dose (ppm)	Flow (gph)	Flow (lb/hr)	Purpose	Tank/Tote & Quantity	Site Storage	Connections	Comments
Ammonia	GE	Ammonia Hydroxide, Steamate NA1321 19%, or equivalent	7.71	4	0.12	0.9	pH Control	Tote, 400 gals	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	Feed skid equipped with 1" female cam-lock
					Total =	0.9					

1. Density is Design Basis.

CLOSED CYCLE COOLING WATER

Chemicals	Chemical Supplier	Name, Concentration	Density (lb/gal)	Dose (ppm)	Flow (gph)	Flow (lb/hr)	Purpose	Tank/Tote & Quantity	Site Storage	Connections	Comments
Corrosion Inhibitor	GE	GE Technology, CorrShield MD4100, or equivalent	8.97	40-50 ppm	--	--	Corrosion Inhibition	Drum, 50 gal	Estimate one to two spare drums	Connections for tote hookup will be finalized with chemical supplier	Closed system. Continuous feed of chemical is not necessary. Intermittent service. No feed skid. Feed via chemical pot feeder.
Glycol	Univar	Polypropylene Glycol, > 99%, or equivalent	8.83	45% water/glycol solution	--	--	Freeze Protection	Drum, 50 gal	Estimate one to two spare drums	Connections for tote hookup will be finalized with chemical supplier	Closed system. Continuous feed of chemical is not necessary. Intermittent service. No feed skid. Feed via chemical pot feeder. Univar provides at > 99% solution. Diluted to 45% glycol solution for dose.

DEMINERALIZED WATER *

Chemicals	Chemical Supplier	Name, Concentration	Density (lb/gal)	Dose (ppm)	Flow (gph)	Flow (lb/hr)	Purpose	Tank/Tote & Quantity	Site Storage	Connections	Comments
Acid	Evoqua	Sulfuric Acid, 77-100%	15.28	--	0.5	7.6	pH control	Tote, 400 gals	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	
Sodium Bisulfite	Evoqua	Sodium Bisulfite, 50%	10.84	--	0.25	2.7	Dechlorination	Tote, 400 gals	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	
Antiscalant	Evoqua	Avista Technologies, VITEC 3000 NSF, or equivalent	9.42	--	0.5	4.7	Solubility and Scale Control	Tote, 400 gals	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	
Caustic	Evoqua	Gehring-Montgomery, Caustic Liquid Soda, 50%, or equivalent	12.8	--	0.5	6.4	CO2 removal	Tote, 400 gals	Estimate one to two spare totes	Connections for tote hookup will be finalized with chemical supplier	
					Total =	21.4					

TURBINE GENERATOR

Chemicals	Chemical Supplier	Name, Concentration	Density (lb/ft3)[1]	Dose (ppm)	Flow (gph)	Flow (lb/hr)	Purpose	Tank/Tote & Quantity	Site Storage	Connections	Comments
Hydrogen	Air Products	H2, 100%	0.0056			17	Generator Cooling	Trailer/bottle storage. ~30,000 ft3 (<200 lb)	The amount of storage allowed in the trailer.	Connections for trailer hookup will be finalized with chemical supplier	
Carbon Dioxide	Air Products	CO2, 100%	0.12346			890	Generator Hydrogen Cooling Purge	36 Bottles Total, 465 ft3 per Bottle	The amount of storage allowed in the trailer.	N/A	
					Total =	907					

1. Density is Design Basis.

NOTE: All Chemicals listed above and on previous page are proposed based on the design of the respective systems. Chemical brand, SDS and feed rates are subject to change based on final commissioning and operation.

CLIENT AWARD PIE (CTG, STG, HRSG) (GE)
Sign EpCM Contract
CKOM
ACCESS TO SITE FOR SOIL BORING
AWARD ACC
AWARD XFMRS
AIR PERMIT APPROVAL
ALL PERMITS IN HAND FOR CONSTR
DEMO AND SOIL REMEDIATION COMPLETE (BY PSEG)
START CONSTRUCTION (SOIL, U/G, & FDN)
DCS HARDWARE FREEZE
DCS SOFTWARE FREEZE
EARLY HRSG DELIV (NOTE 1)
CEMS DELIV
EARLY CTG DELIV
EARLY STG DELIV
DCS I/O CAB DELIV TO PDC VENDOR
PLANT CONTROL SYS DELIV (DCS)
BACK ENERGIZE TO GIS FROM SINGER SUBSTATION
DCS SOFTWARE DELIV TO SITE
BACK FEED POWER AVAILABLE FROM OWNER
BACK ENERGIZE TRANSFORMERS
LAST DELIV ACC
HYDRO HRSG
MECH COMPLETE
FIRST FIRE
STEAM BLOWS
PLANNED COD
COD

	2016												2017												2018												2019						
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
	-04	-03	-02	-01	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38

GEOTECH
DEVELOP SPEC; BIDS / RVW/ AWARD; INIT. GEOTECH INVEST; GEOTECH INVEST; GEOTECH REPORT

SITE DEVELOPMENT
SITE DEVELOPMENT (DEMO/SOIL REMEDIATION) (BY PSEG)
SITE DESIGN
SITE FILL
U/G UTILITY DESIGN
SHEET PILE
U/G UTILITY INSTALLATION
DEVELOP PRE-CAST STRUCTURES SPEC (01 1808)
BID/AWARD PRE-CAST STRUCTURES
FABRICATE/DELIVER PRE-CAST STRUCTURES

STEAM TURBINE AREA
RCV CTG DSGN INFO; RCV STG DSGN INFO; RCV HRSG DSGN INFO
SUBSTRUCTURE DESIGN
DEVELOP SUBSTRUCTURE SPEC (71.0201)
BID / AWARD SUBSTRUCTURES
SUB MOBILIZE
ST & MISC PILING
ST MAT
ST COLUMNS
ST TABLE TOP
CURE/ REMOVE FORMS
ST AREA SMALL FNDS
STEEL ERECTION ST RACK
VOLUME ERECTION/HYDRO PIPING (ECB, TWC, FWF, SGG, SGJ, TGC, TGA, TGD, TGM)
INSULATE PIPING
STG ON GEAR
FAB & DELIVER ST (BY PSEG)
ST DELIVERY WINDOW
STEAM TURBINE ERECTION
LID FLUSH & RESTORE
DEV STRC STL SPEC
BID / AWARD STRUCTURAL STL
ASSEMBLE ST BRIDGE CRANE
FAB & DELIVER STEEL
DEVELOP PEMB SPEC
BID / AWARD PEMB
VENDOR PEMB DESIGN
FAB & DELIVER PEMB
SUB MOBILIZE
TURBINE BLDG ERECTION
HVAC / LIGHTING

AIR COOLED CONDENSER
ACC PILING
ACC FOUNDATIONS
FIRST ACC DELIVERY
DEVELOP MECHANICAL SUBCONTRACTOR SPEC (77.111)
BID / AWARD MECHANICAL ERECTION
SUB MOBILIZE
ACC MECHANICAL ERECTION
LAST ACC DELIVERY
ACC CHECKOUT
DEVELOP ACC SPEC
BID/ AWARD ACC
VENDOR DESIGN
FAB AND DELIVER ACC
ACC ELECTRICAL CABLE INSTALL & TERMINATE

HRSG AREA
HRSG AREA SMALL FNDS
COMMON PIPE RACK & FINGER RACK STEEL ERECTION
RELEASE P91 RAW MATERIAL
DEVELOP HP PIPING SPEC
BID / AWARD HP PIPING
MILL ORDER MATERIAL
FAB/DELIVER
MECHANICAL & ELECTRICAL PIPE RACK INSTALLATION
COMPLETE ERECTION
HRSG PILING
HRSG FND
HRSG HEAVY ERECTION
HRSG PIPING & INTERNALS
HYDRO
CHEM CLEAN & RESTORE
SSA
STEAM BLOW & STEAM LINE FLUSH
BYPASS OPERATION / METAL STEAM BLOWING
PLANT TUNING, SCREEN REMOVAL, NOISE TESTING
EMISSION TESTS / PERFORMANCE TESTS
INSULATE
HRSG DELIVERY WINDOW
FAB & DELIVER HRSG (BY PSEG)

CTG AREA
CT AREA SMALL FNDS
CT DELIVERY WINDOW
CT PILING
CT FOUNDATION
CT ERECTION
CT C/O
FAB & DELIVER CT (BY PSEG)

FUEL GAS EQUIPMENT
DEVELOP FUEL GAS EQUIPMENT SPEC
BID / AWARD FUEL GAS EQUIPMENT
FAB & DELIVER FUEL GAS EQUIPMENT
SET FUEL GAS EQUIPMENT
C/O
FUEL GAS EQP FDN

AUX POWER
PILE
ADMIN BLDG FDN
ADMIN BLDG ERECTION
INTERIORS
PPA
DEVELOP ELECT/I&C SPEC (73.0200)
BID / AWARD ELECT/I&C SUB
MOBILIZE
TRAY
INSTALL ELEC EQUIP
API / APH
COA
APD
GTL
APC
FINAL CHECKOUT OF ELEC SYS
FAB & DELIVER DCS (BY PSEG)
INSTALL DCS
DEVELOP ELECT EQUIP SPEC
BID / AWARD ELECT EQUIP
FAB & DELIVER PDC & LV ELECTRICAL EQUIPMENT
DEVELOP XFMR SPEC
BID / AWARD XFMRS
FAB & DELIVER SU / AUX XFMR
GSU LATE DELIV
UAT DELIV
INSTALL IPB/GB
INSTALL FIRE PROTECTION
XFMRS PILING
XFMRS FND AND WALLS
GSU ERECTION
UAT ERECTION

MISC STRUCTURES
DEVELOP FE TANK SPEC
BID / AWARD FE TANKS
FAB & DELIVER TANK MATERIAL
ERECT SERVICE / FIRE WATER and DEMIN TANK
SET FUEL OIL EQUIP
WWC / FWF
WTD
WSC
ECA, EC8, FWA, FWC FLUSH
TANK PILING
ERECT FUEL OIL TANK
C/O
TANK FNDS
BLDG PILING
BLDG FND
GENERAL SERVICES BLDG
SET EQUIPMENT

ASSUMPTIONS:
EAST COAST LOCATION
WINTER IS A FACTOR
FREEZE PROTECTION REQUIRED
UNION SITE
GE ST & CT
PILING REQUIRED (MACHINES, HRSG, RACK)
CONSTRUCTION IS 5-10s / STARTUP 6-10s
INDOOR UNITS (STICT BLDG)
DUAL FUEL CT

UNDERGROUND PIPING WILL RUN ABOVE DUCTBANKS.
EMH's, AND O/W SEPARATOR WILL BE DELIVERED AFTER CONSTRUCTION MOB.
UG PIPE INSTALLED TO PROGRESS BY AREA FOLLOWING DUCTBANKS.
WORK FROM DEEPEST EXCAVATION FIRST,
WILL START TO PREFABRICATE UG PIPE UPON CONST MOB.
CONDUIT STUB-UP DETAILS WILL BE AVAILABLE TO INSTALL WHEN MAIN DUCTBANK RUN IS PLANNED.
SHOP FABRICATE LARGE BORE PIPE & SMALL BORE STEAM PIPE.
HANGER INSTALLATION WILL OCCUR ALONG WITH STEEL ERECTION FOR STICK BUILT RACKS.
STICK BUILT UTILITY RACKS
WILL HAVE CERTIFIED FINAL VENDOR DRAWINGS FOR INSTALLATION.
PARTIAL ST STEEL ERECTION PRIOR TO ST ERECTION FOR PERMANENT ACCESS.

SYSTEM CODE KEY / LEGEND

APB	AC POWER SUPPLY (120V/208V)
APC	AC POWER SUPPLY (480V)
APD	AC POWER SUPPLY (4160V)
APH	DC POWER
API	ESSENTIAL SERVICE
CAA	COMPRESSED/INSTRUMENT AIR
COA	DCS
ECA	AUXILIARY COOLING WATER
ECB	CLOSED CYCLE COOLING WATER
FGA	FUEL GAS STORAGE & SUPPLY
FOB	FUEL OIL SUPPLY
FWA	BOILER FEEDWATER
SGG	MAIN STEAM
SGJ	HOT REHEAT STEAM
SGK	COLD REHEAT STEAM
SGH	LOW PRESSURE STEAM
FWC	CONDENSATE
SGF	BOILER VENTS & DRAINS
TGC	ST SEALS & DRAINS
PSA	AUXILIARY STEAM
TGA	STEAM TURBINE
TGD	ST LUBE OIL
TGM	ST GEN COOLING & PURGE
FWF	WATER CYCLE MAKEUP & STORAGE
WSC	SERVICE WATER
WWC	WASTE WATER DRAINAGE /TRMNT
WSA	WATER PRE-TREATMENT
WTD	DEMIN WATER MAKEUP
STG	FIRE PROTECTION
GTL	GENERATOR STEPUP TRANSFORMER
FWC	CONDENSATE
SGA	HRSG
SC	HVAC
WSE	FIRE PROTECTION-WTR SPLY

(SYSTEM CODES REPRESENT COMMISSIONING OF THAT SYSTEM)

FATOFF FIRST ATTEMPT TO OBTAIN FIRST FIRE

NOTE 1: "FINISH HRSG DELIV" INCLUDES HRSG MODULES, DRUMS, INLET DUCT, STAIRS, PLATFORMS, LADDERS, SMALL BORE PIPING, LARGE BORE PIPING, AND EXHAUST STACK.

ENGINEERING ACTIVITIES
PROCUREMENT ACTIVITIES
BLDG ERECTION ACTIVITIES
CIVIL ERECTION ACTIVITIES
MECH/ELECT ERECTION ACTIVITIES
STARTUP ACTIVITIES

NO.	DATE	REVISIONS & RECORD OF ISSUE	DWN	CHK	APP
5	22SEP16	REVISED FOR MILESTONE DESCRIPTIONS	AF	DL	
4	18AUG16	REVISED FOR LEVEL 3 SCHEDULE	AF	DL	
3	11Jul16	PROGRESS THROUGH 08 JUL 16	DL	AF	SN
2	27Jun16	PROGRESS THROUGH 11 JUN 16	DL	AF	SN

BLACK & VEATCH
Building a world of difference.

BRIDGEPORT HARBOR UNIT 5
1 ON 1 COMBINED CYCLE PROJECT
LEVEL 1 EXECUTION SCHEDULE

James R. Morrissey
Attorney

VIA ELECTRONIC MAIL AND FedEx

September 29, 2016

Mr. Robert Stein
Chairman
The Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: The United Illuminating Company's Notice of Exempt Modification to an Existing Energy Facility at 120 Henry Street, Bridgeport, Connecticut

Dear Chairman Stein:

Pursuant to Regulations of Connecticut State Agencies ("R.C.S.A.") § 16-50j-58, The United Illuminating Company ("UI" or the "Company") hereby notifies the Connecticut Siting Council (the "Council") of its intent to make exempt modifications (the "Project") to its substation at 120 Henry Street, in Bridgeport, Connecticut ("Singer Substation," "Substation," or "Facility"). The $625 filing fee, as well as two copies of this Notice of Exempt Modification ("Notice"), are enclosed herewith.

UI has not included engineering drawings that depict the Facility and show the modifications, as requested in the Council's Modification of Existing Energy Facilities Application Guide, dated April 2013, as such drawings contain Critical Energy Infrastructure Information ("CEII"). If the Council so desires, UI can supplement this letter with the aforementioned drawings accompanied by a motion for protective order.

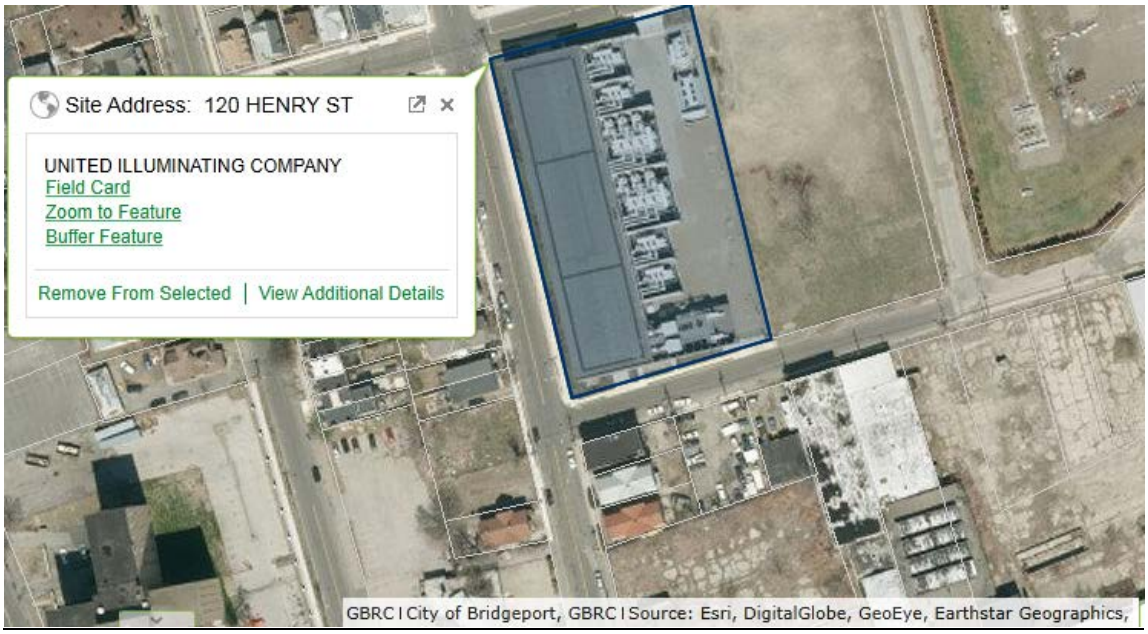
Additionally, UI has not included a noise analysis with this Notice as the modifications primarily concern the grounding and installation of gas insulated switchgear ("GIS") equipment at the site and will have no impact on the noise produced by the Facility.

157 Church Street, New Haven, CT 06510
Telephone 203-499-2864, Fax 203-499-3664
www.uinet.com, james.morrissey@uinet.com

Existing Energy Facility

The site is located at 120 Henry Street, in Bridgeport, Connecticut. The Company acquired this parcel on December 30, 2005 and owns it in fee simple. The latitude and longitude of the Facility is 41.167192 by -73.1852267. The Facility's boundaries are depicted in the following satellite images.

Source: Google Earth



Proposed Modifications

PSEG Power Connecticut LLC ("PSEG") has petitioned the Council to build a natural gas combined cycle plant at its Bridgeport Harbor Station. (*See* Connecticut Siting Council Petition 1218.) This plant will interconnect to UI's Singer Substation. The proposed UI modifications (the "Project") to the Facility will allow PSEG's 345kV underground circuit to terminate at the gas-insulated Singer Substation.

Within Singer Substation, UI will install the requisite equipment to interface with the new PSEG 345kV cable system (e.g. surge arrestors, metering equipment, etc.). In addition, the Company will make minor upgrades to its protection, control, and monitoring systems. Other than the addition of two communication cables (that PSEG will install, own and operate), UI will not make any modifications outside of the Substation building. Moreover, the Company will not make (or direct) any modification outside of the Substation property boundary.

Specifically, UI's scope of work includes engineering, material, labor, construction, inspection, and testing associated with the following:

- Installation of one set of 345 kV GIS cable sealing end enclosures and related equipment (e.g., surge arrestors, metering devices, etc.);
- Upgrading of existing line relays and breaker failure relays to latest firmware versions;
- Updating of relay settings for the new line and circuit breakers 34C-41T-2 and 34C-42T-2 and a review of existing relay settings for other elements both within Singer Substation and at remote terminals, as needed;
- Integration of gas zone monitoring for new GIS zones into existing gas monitoring in multiple systems; and
- Updates/edits of the SCADA related communication equipment interfaces and databases including those of the human machine interface and any displays.

As the proposed modifications relate solely to facilitating a generator interconnection, the changes will not impact the existing Facility's structural capability or produce a meaningful impact on electric and magnetic fields or noise levels at the Facility boundaries.

Compliance with R.C.S.A. § 16-50j-57(b)

As stated above, pursuant to R.C.S.A. § 16-50j-57, UI believes that the proposed changes do not constitute a modification to an existing facility that may have a substantial adverse environmental effect and thus the Project is exempt from the requirement to obtain a certificate pursuant to Section 16-50k of the Connecticut General Statutes. Specifically, consistent with § 16-50j-57(b), the proposed changes to the existing site do not:

(A) Extend the boundaries of the site beyond the existing fenced compound;
(B) Increase the height of existing associated equipment;
(C) Increase noise levels at the site boundary by 6 decibels or more, or to levels that exceed state and local criteria;
(D) Manage electric and magnetic field levels at the site boundary in a manner that is inconsistent with the Council's Best Management practices for Electric and Magnetic Fields;
(E) Cause a significant adverse change or alteration in the physical or environmental characteristics of the site; or
(F) Impair the structural integrity of the facility, as determined in a certification provided by a professional engineer licensed in Connecticut, where applicable.

UI intends to initiate the work on or after the Council's acknowledgement that the proposed activities are exempt.

Please do not hesitate to contact me at (203) 499-2864 should you have any questions regarding this notice.

Very truly yours,

James R. Morrissey
Attorney
UIL Holdings Corporation
Counsel for The United Illuminating Company

Enclosure

cc: *via email only*
Mayor Joseph P. Ganim, City of Bridgeport
Melanie Bachman, Esq., Connecticut Siting Council
Stephen J. Humes, Esq. Holland & Knight
Meredith Hiller, Esq. Holland & Knight

Proof of Service

The undersigned hereby certifies, in accordance with Regulations of Connecticut State Agencies § 16-50j-58, that this Notice of Exempt Modification was sent by email on September 29, 2016 to the chief elected official of the City of Bridgeport, Connecticut.

_____

James R. Morrissey

Coastal Site Plan Application
City of Bridgeport, Connecticut

Bridgeport Harbor Station Unit 5

APPENDIX 4
Noise Report

PREPARED FOR:
PSEG FOSSIL, LLC
August 31, 2016

Bridgeport Harbor Station Unit 5
Combined Cycle Facility
Final Permit Acoustical Report

Bridgeport Harbor Station Unit 5
PSEG Power Connecticut LLC
1 Atlantic Street
Bridgeport CT

Prepared by:
AKRF, Inc.
307 Fellowship Road, Suite 214
Mt. Laurel, NJ 08054

August 25, 2016

TABLE OF CONTENTS

This report investigates detailed noise control measures for the proposed Bridgeport Harbor Station Unit 5 Combined Cycle Facility project in Bridgeport, Connecticut. Station noise levels at nearby noise receptors produced by individual components of the proposed new Unit 5 Combined Cycle Facility were calculated using a computer-based 3D acoustical propagation model (the CadnaA model). Predicted noise levels were compared to applicable noise regulations to determine what noise control measures would be necessary to ensure Unit 5 Combined Cycle Facility's compliance with applicable noise regulations. This report includes specifics regarding noise mitigation measures, and also provides a summary of mitigation performance requirements for several components of the project.

This report follows and compliments a "*Bridgeport Harbor Station Unit 5 Combined Cycle Facility Noise Control Recommendations*" report issued by AKRF on March 5, 2015. The prior report is superseded, as the data and information provided in this analysis is more detailed and based on current project design inputs.

It was prepared based on design, operational, and component data that was developed during the detailed design phase. The prior report was based on conceptual designs. The conclusions, based on the required mitigation of certain components are essentially unchanged.

EXECUTIVE SUMMARY

The Bridgeport Harbor Station Unit 5 Combined Cycle Facility project in Bridgeport, Connecticut (CT) will comply with noise code levels for both start-up and steady-state conditions at all noise receptors in the study area. The noise levels in the surrounding community evaluated at noise receptor locations from all sound sources of the plant (combined) meet CT State noise regulations, which are 10 dB more restrictive than City of Bridgeport noise regulations.

Existing noise control features listed in this report and necessary additional mitigation requirements were modeled to assess and conclude that the project will meet code. The design engineers for the project will incorporate all mitigation measures and acoustical performance requirements into the final design of the facility. The noise levels listed in this report have been confirmed by design engineers for the project and manufacturers of various specialized plant equipment. The mitigation measures discussed in the Mitigation Requirements will be implemented into design performance requirements for equipment listed, as part of bid documentation for the equipment.

ACOUSTICAL FUNDAMENTALS

Sound is typically measured in units called decibels (dB) and frequency — measured in Hertz (Hz) — is the rate at which sound pressures fluctuate in a cycle over a given quantity of time. Frequency defines sound in terms of pitch components. Sometimes sound is filtered or separated into one-third octaves or octaves reported in the geometric mean of the octave frequency range of the band. One of the simplified scales that accounts for the dependence of perceived loudness on frequency is the use of a weighting network, known as A-weighting (dBA) in the measurement system, to simulate response of the human ear. Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods have been developed. The "equivalent sound level," L_{eq}, is the constant sound level that, in a given situation and time period (e.g., 1 hour or 24 hours), conveys the same sound energy as the actual time-varying sound. Statistical values are used to represent the sound level that is exceeded a given percentage of the measurement sample period (e.g., L_{90} values represent levels exceeded 90% of the time and are typically used to isolate a steady/constant noise source from transient environmental ambient noises).

The average ability of an individual to perceive changes in noise levels is well documented (see **Table 1**). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

Table 1
Average Ability to Perceive Changes in Noise Levels

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt, Beranek and Newman, Inc. *Fundamentals and Abatement of Highway Traffic Noise*, Report No. PB-222-703. Prepared for Federal Highway Administration. June 1973.

Various federal agencies provide guidance on acceptable noise level increases resulting from infrastructure and other noise-producing projects. Both the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) specify 6 dBA as the threshold of a significant noise level increase potentially requiring noise mitigation. While those agencies' criteria are not applicable to this project, they are illustrative of typical significant noise evaluation criteria.

APPLICABLE NOISE REGULATIONS, STANDARDS, AND CRITERIA

CONNECTICUT STATE NOISE REGULATIONS

The State of Connecticut has set forth regulations for the Control of Noise prepared by the State of Connecticut Department of Energy and Environmental Protection (DEEP). These regulations define three classes of noise zone (property from which noise is emitted or at which noise is received) based on land uses and their respective sensitivities to noise. **Table 2** summarizes the three classes of noise zone.

Table 2
Connecticut Noise Zone Classifications

Noise Zone Class	Included Land Uses
Class A	Residences and other places where people sleep, religious activities, cultural activities, nature and forest preserves.
Class B	Commercial, retail, agricultural, government, and institutional.
Class C	Industrial, manufacturing, warehousing, military, and mining.
Sources: State of Connecticut Regulations for Control of Noise (RCSA Section 22a-69-1 to 22a-69-7.4)	

The regulations prohibit "excessive" noise to be created beyond the boundary of any noise zone, with the thresholds for excessive noise being defined based on the noise zone class of the emitter's noise zone and the receiver's noise zone. The Bridgeport Harbor Station, including the proposed Unit 5 Combined Cycle Facility, would be a Class C noise zone according to these definitions, and the surrounding residential areas and Seaside Park would be Class A noise zones, and the surrounding commercial areas would be Class B noise zones. **Table 3** shows the thresholds for excessive noise from a Class C noise emitter.

Table 3
Excessive Noise Level Thresholds From a Class C Noise Emitter (in dBA)

Receiving Noise Zone	Excessive Noise Level Threshold
Class A (7AM to 10PM)	61
Class A (10PM to 7AM)	51
Class B	66
Class C	70
Sources: State of Connecticut Regulations for Control of Noise (RCSA Section 22a-69-1 to 22a-69-7.4)	

However, the Connecticut noise regulations allow for short-term exceedances of these thresholds. The prescribed allowable exceedances are 8 dBA for 5 minutes per hour, 6 dBA for 7.5 minutes per hour, and 3 dBA for 15 minutes per hour.
In cases where background noise levels not subject to the Connecticut noise regulations exceed the above levels, emitted noise levels more than 5 dBA greater than the background noise level will be considered excessive.

CITY OF BRIDGEPORT NOISE REGULATIONS

The City of Bridgeport has also set forth noise control regulations in Chapter 8.80 of the Bridgeport Municipal Code. The regulations prohibit noise emissions above a specified threshold to be created beyond the property of the noise emitter, with the prohibited noise level thresholds being defined based on the emitter's and receiver's respective land uses.

The City of Bridgeport noise regulations define specific noise level limits for the Bridgeport Harbor Station as shown in **Table 4**.

Table 4
Prohibited Noise Level Thresholds From Bridgeport Harbor Station (in dBA)

Receptor's Land Use	Prohibited Noise Level Threshold
Residential (7AM to 6PM, weekdays; 9AM to 6PM, weekends)	71
Residential (6PM to 7AM, weekdays; 6PM to 9AM, weekends)	61
Commercial	76
Industrial	80
Sources: Bridgeport, Connecticut Noise Control Regulations (Bridgeport, Connecticut Code of Ordinances Chapter 8.80)	

PROJECT NOISE REGULATIONS

The Connecticut DEEP noise regulations are more stringent than the City of Bridgeport regulations for the station by a difference of 10 dBA. Additionally, the two regulations define the night-time hours differently. Because the Connecticut DEEP regulation is more stringent, compliance with that code will be taken as assurance that both regulations are met.

STUDY AREA

AKRF's noise analysis is summarized at six noise receptor locations detailed below and shown in **Figure 1**.

Figure 1 – Study Area and Noise Receptor Locations

- **Site 1** is located at the southwest corner boundary of the Bridgeport Harbor Generating Station, south of Henry Street, adjacent to the location of the proposed Unit 5 Combined Cycle Facility site. This location is representative of the east property line of the potential future residential development on the former Remington Shaver Plant west of the station and south of Henry Street. These future residences will be the closest residences to the project site if / when they are constructed.
- **Site 1a** is located along the west boundary of the Bridgeport Harbor Generating Station, south of Henry Street and north of Site 1. This location is also representative of the east property line of the potential future residential development on the former Remington Shaver Plant west of the station and south of Henry Street.
- **Site 1b** is located at an elevation of approximately 65 feet at the expected location of the east façade of the nearest residential building included in the future residential development on the former Remington Shaver Plant west of the station and south of Henry Street. It is representative of worst case noise levels at elevated locations in that potential future development.
- **Site 2** is located on Henry Street immediately east of Main Street. This location is representative of residences along Main Street immediately south of Henry Street, whose rear façades face the project site. These are the closest existing residences to the project site.
- **Site 3** is located on Atlantic Street immediately west of Main Street. This location is representative of residential buildings on Main and Atlantic Streets near the intersection of Main and Atlantic Streets.
- **Site 4** is located at the intersection of Seaview Street and Newfield Avenue. This location is representative of residences across Bridgeport Harbor from the project site.

NOISE PREDICTION METHODOLOGY

GENERAL NOISE ANALYSIS METHODOLOGY

The noise analysis consisted of the following steps:

- Select sensitive "worst case" noise receptors near the station for analysis;
- Use the CadnaA noise calculation model and the equipment manufacturers' and / or design engineers' noise level information to calculate noise levels resulting from the proposed Unit 5 Combined Cycle Facility at each selected receptor, assuming base equipment specifications with no optional noise controls implemented;
- Review and rank noise emitting components of the facility for purposes of mitigation prioritization and evaluation for start-up and steady state operations;
- In instances where exceedances are identified, examine noise level contribution from each piece of equipment to determine the amount of noise reduction needed for each piece of equipment to ensure compliance with applicable regulations; and
- Use the CadnaA model to calculate noise levels resulting from the proposed Combined Cycle Facility at each selected receptor with the noise reduction previously determined.

COMPUTER-BASED NOISE PREDICTION MODEL

The CadnaA model, a state-of-the-art tool for acoustical analysis, was used to evaluate noise levels from the proposed project. The CadnaA model is nationally-recognized computerized three-dimensional model developed by DataKustik for sound prediction and assessment. This model is approved for noise prediction by review agencies such as Federal Highway Administration (FHWA). The CadnaA model allows the user to model several different sound source types, including point sources, line sources, and area sources. The model can be used for the analysis of a wide variety of sound sources, including stationary sources (e.g., construction equipment, industrial equipment, power generation equipment, etc.), transportation sources (e.g., roads, highways, railroad lines, busways, airports, etc.), and other specialized sources (e.g., sporting facilities, etc.) The model takes into account the sound power levels of the sound sources, attenuation with distance, ground contours, reflections from barriers and structures, surface absorption, attenuation due to shielding, etc. The CadnaA model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2.

MAJOR COMPONENTS (EXISTING NOISE CONTROL FEATURES OF DESIGN)

TURBINE BUILDING

The turbine building will contain the gas turbine and steam turbine for the project. The gas turbine will consume large volumes of air through the acoustically-designed inlet filter and exhaust combustion air to the Heat Recovery Steam Generator (HRSG) component of the plant. The steam turbine will be fed through combustion-heated steam from the HRSG, and will exhaust steam to the Air Cooled Condenser (ACC) through steam trunks/headers. The turbine building will incorporate significant noise control features. A summary of the turbine building components and the corresponding noise emission levels utilized in the acoustical model are presented in **Table 5**.

The CT compartment vent fan was identified to cause an exceedance of noise codes. AKRF has worked with design engineers to investigate all available noise mitigation options for this fan located on the top of the turbine building. A redirection of the fan exhaust to the East (away from nearby residential properties) has been confirmed with the turbine manufacturer and will be included in the final design. Please see **Figure 2** for a diagram of the vent fan redirection.

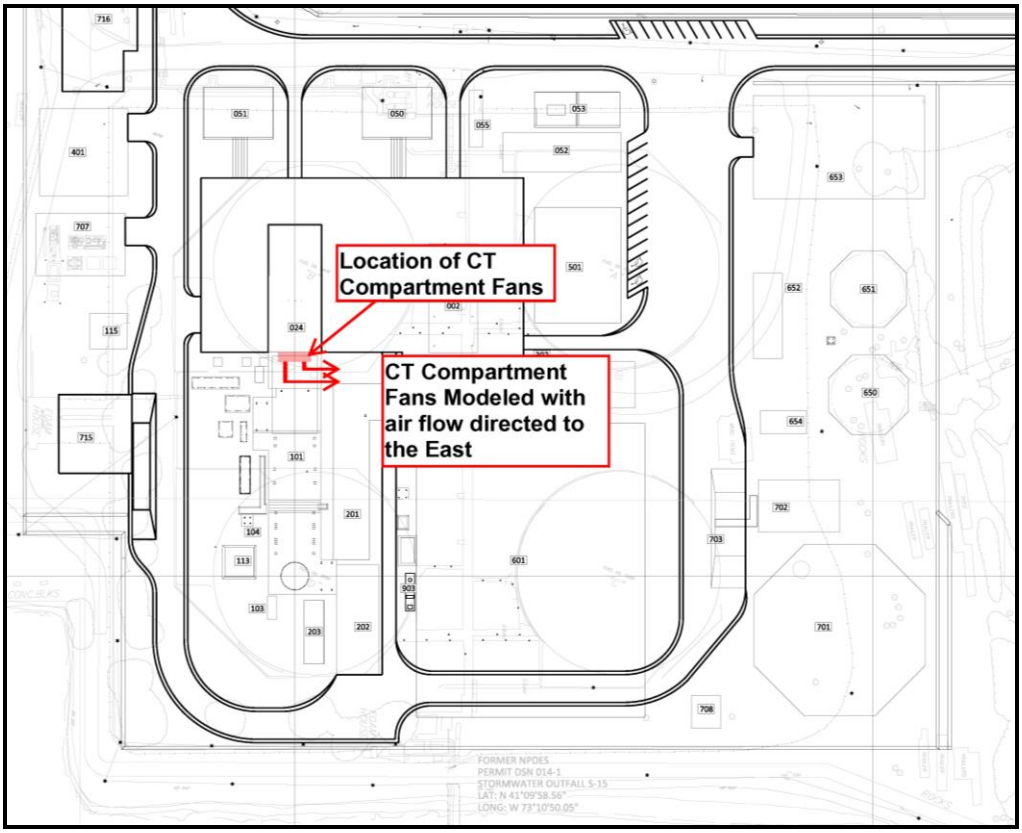


Figure 2 – Redirected CT Compartment Vent Fan Exhaust

Table 5

Turbine Building Components – Noise Model and Noise Control Features

SOURCE	OPERATING CONDITION	NOISE REDUCTION	NOISE MODEL SOUND POWER LEVEL (LwA)		QUANTITY
			START UP	STEADY STATE	
CT Compartment Vent Fan	Start Up & Steady State	Low noise fan and redirection East	98	98	1
CTG Inlet Filter Face	Start Up & Steady State	Acoustically lined hood and 12' silencer	83	83	1
Plant Air Compressor	Start Up & Steady State	Building	60	60	1
CTG Inlet Duct	Start Up & Steady State	Building	74	74	1
Lube Oil Module	Start Up & Steady State	Building	80	80	1
Inlet Plenum	Start Up & Steady State	Building	73	73	1
Turbine Compartment	Start Up & Steady State	Building	78	78	1
GT Exhaust Diffuser	Start Up & Steady State	Building	78	78	1
GT Load Compt	Start Up & Steady State	Building	73	73	1
GT Generator	Start Up & Steady State	Building	87	87	1
A651 Steam Turbine	Start Up & Steady State	Building	81	81	1
Steam Turbine Generator	Start Up & Steady State	Building	82	82	1
ST Lube Oil Emerg Cooling Water Pump	Start Up & Steady State	Building	72	72	2
Steam Turbine Lube Oil Pumps	Start Up & Steady State	Building	75	75	2
HP Steam to Cold Reheat Bypass to ACC duct	Start Up Only	Building	63	0	1

Notes:

Sources: BHS Equipment Cadna Noise Sources 8-19-2016_Rev8 table. Compartment Fans Flow Direction received on 7/26/2016 from Black & Veatch.

HRSG

The HRSG recovers heat energy from the gas turbine exhaust and uses this heat to produce steam. The steam is used to feed a steam turbine as a way to generate additional electrical power. The HRSG is a very large component and has several connected sections shown in **Figure 3**. The HRSG will incorporate acoustical shroud/cladding as indicated in red on **Figure 4** and **Figure 5**. The acoustical shroud performance has been carefully reviewed by GE and is based on acoustical modeling. In summary, the HRSG will be fully shrouded around sections T1 and T2, and shrouded along the western face for sections B1 and B2.

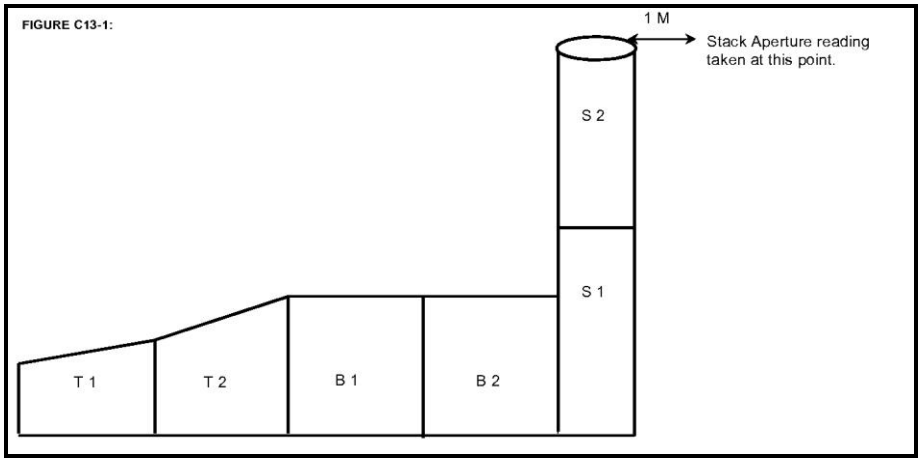


Figure 3 – HRSG Sections
Source: Figure C13-1 GE Energy DWG No. IHG-000199-C13 Revision C dated July 1, 2016

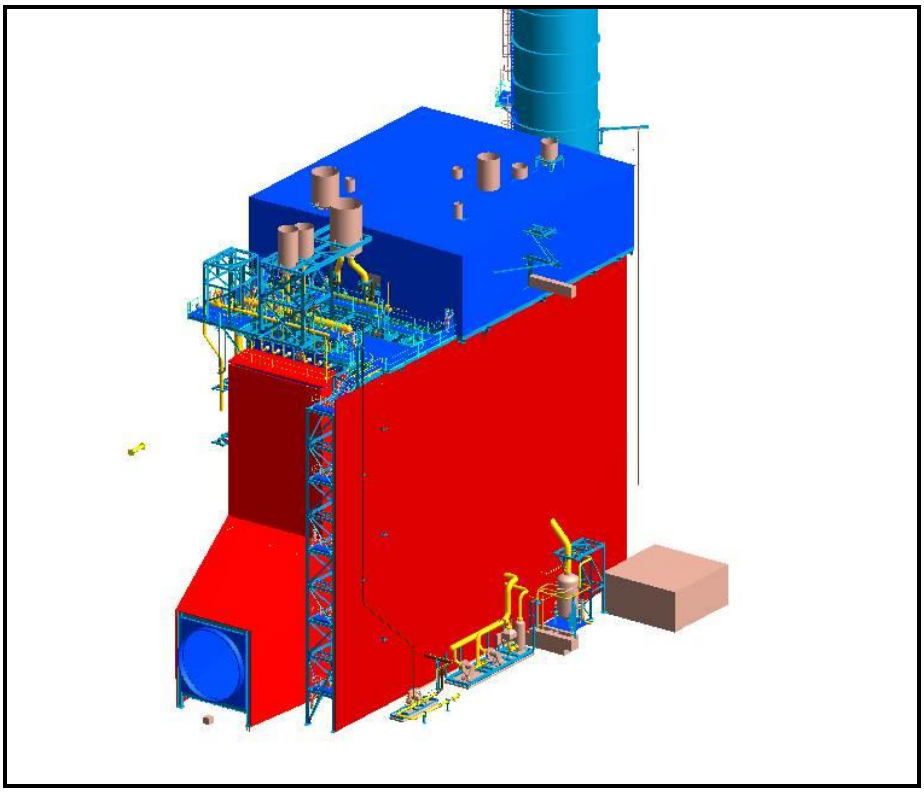


Figure 4 – HRSG Acoustical Shroud/Cladding (indicated in red) – West Elevation
Source: "Bridgeport Shroud REV2" PowerPoint file dated July 8, 2016

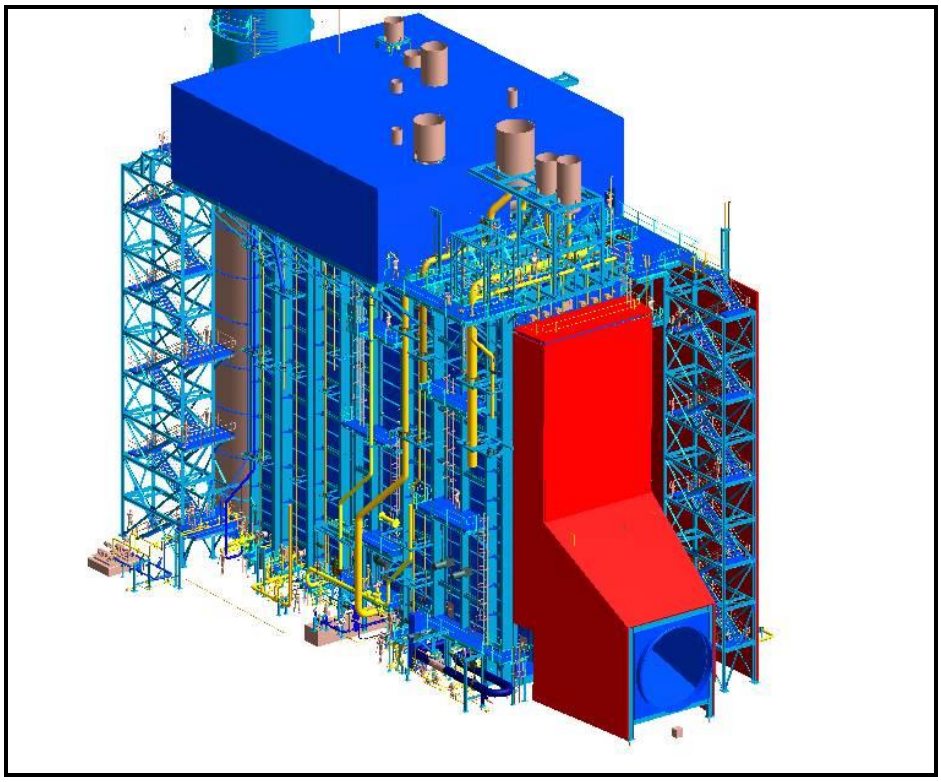


Figure 5 – HRSG Acoustical Shroud/Cladding (indicated in red) – East Elevation
Source: "Bridgeport Shroud REV2" PowerPoint file dated July 8, 2016

The HRSG also incorporates vent silencers on Startup Vents and Blowdown (BD) Tank Vents which exit through the roof of the HRSG penthouse. A summary of HRSG components and the corresponding noise emission levels utilized in the acoustical model are summarized in **Table 6**.

Table 6
HRSG Components – Noise Model and Noise Control Features

SOURCE	OPERATING CONDITION	NOISE REDUCTION	NOISE MODEL SOUND POWER LEVEL (LwA)		QUANTITY
			START UP	STEADY STATE	
HRSG Body/Breakout T1	Start Up & Steady State	GE Rev C Shroud	86	86	1
HRSG Body/Breakout T2	Start Up & Steady State	GE Rev C Shroud	83	83	1
HRSG Body/Breakout B1	Start Up & Steady State	GE Rev C Shroud on the Western face	88 (West) 97 (Top and East)	88(West) 97 (Top and East)	1
HRSG Body/Breakout B2	Start Up & Steady State	GE Rev C Shroud on the Western face	88 (West) 95 (Top and East)	88(West) 95 (Top and East)	1
Stack Breakout S1	Start Up & Steady State	Insulated To Damper	84	84	1
Stack Breakout S2	Start Up & Steady State		66	66	1
HRSG Stack	Start Up & Steady State		85	85	1
HRSG SRV Discharges	Emergency Only		N/A	N/A	1
HRSG Startup Vents	Start Up Only	Silencer	94	0	6
HRSG BD Tank Vent	Start Up & Steady State	Silencer	90	90	1

Notes:

Sources: BHS Equipment Cadna Noise Sources 8-19-2016_Rev8 table, Bridgeport HRSG shroud REV 2 PowerPoint received 7/8/2016, Silencer information received 7/8/2016, additional silencer information received 8-5-2016

AIR COOLED CONDENSER (ACC)

The Air-Cooled Condenser (ACC) is comprised of many individual components that contribute to its noise emissions. Some components such as vacuum pumps are only used during start-up conditions and are modeled separately from steady-state conditions. The ACC presents acoustical design challenges and is generally the loudest component of a combined cycle power plant. As such, it was placed to the east on the site, further away from residential receptors. This project will utilize best-available technology to minimize noise from the ACC. The steam risers and steam headers which connect the ACC to the steam turbine in the turbine building are known to cause an exceedance of noise codes. The ACC manufacturer is responsible for providing additional attenuation requirements as outlined in the Mitigation section of this report. The steam trunk, four (4) steam risers and four (4) steam headers are indicated in red in **Figure 6** and **Figure 7**. A summary of ACC components and the corresponding noise emission levels utilized in the acoustical model are summarized in **Table 7**.

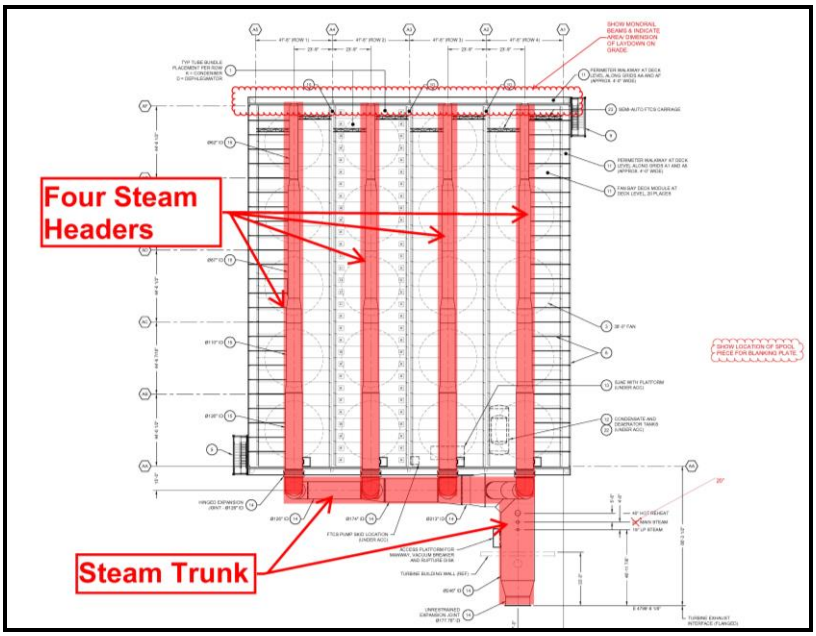


Figure 6 – Air Cooled Condenser – Top Plan
(Steam Trunk, Four Steam Risers and Four Steam Headers indicated in red)

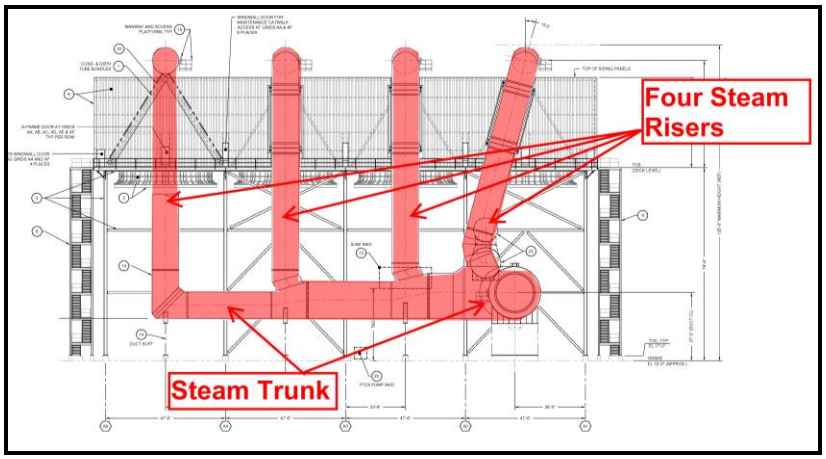


Figure 7 – Air Cooled Condenser – West Elevation
(Steam Trunk, Four Steam Risers and Four Steam Headers indicated in red)

Table 7

Air Cooled Condenser (ACC) Components – Noise Model and Noise Control Features

SOURCE	OPERATING CONDITION	NOISE REDUCTION	NOISE MODEL SOUND POWER LEVEL (LwA)		QUANTITY
			START UP	STEADY STATE	
Steam Jet Air Ejector (Holding)	Steady State Only	Acoustic wrap	0	91	2
Vacuum Pumps (Hogging)	Start Up Only	Enclosure	98	0	2
Ultra Low Noise Fans	Start Up & Steady State	Ultra low noise fans	94	94	20
Motors and Gearboxes	Start Up & Steady State	Low noise, sound attenuating covers	87	87	20
Steam Duct Drain Pot Pump Skid	Start Up & Steady State		102	102	2
CT Air Inlet Heating Pumps	Start Up & Steady State	Enclosure	87	87	2
Condensate Pumps	Start Up & Steady State		105	105	2
ACC Steam Trunk	Start Up & Steady State	non-insulated	103	98	1
Four ACC Steam Risers	Start Up & Steady State	non-insulated	102	82	4
Four ACC Steam Headers	Start Up & Steady State	non-insulated	104	82	4
HP Direct Bypass to ACC duct (Cascade)	Start Up Only		90	0	1
HRH Steam Bypass to ACC duct	Start Up Only		92.5	0	1
LP Steam Bypass to ACC duct	Start Up Only		91	0	1
Deaerator	Start Up & Steady State		105	105	1

Notes: Shading indicates Additional Mitigation Requirement as detailed in end of report for incorporation into detailed design / component specifications

Sources: BHS Equipment Cadna Noise Sources 8-19-2016_Rev8 table, Bridgeport Harbor ACC Noise – Options for Noise Reduction received 7/1/2016, Bridgeport Harbor ACC – Steam Ducts received 7/8/2016

AUXILIARY BOILER

The auxiliary boiler may be utilized for building heating uses and is assumed to run during some but limited steady-state conditions for building space heating. The auxiliary boiler stack discharge will be attenuated through a silencer (i.e. a muffler). A summary of auxiliary boiler components and the corresponding noise emission levels utilized in the acoustical model are summarized in **Table 8**.

Table 8
Auxiliary Boiler – Noise Model and Noise Control Features

SOURCE	OPERATING CONDITION	NOISE REDUCTION	NOISE MODEL SOUND POWER LEVEL (LwA)		QUANTITY
			START UP	STEADY STATE	
Aux boiler stack discharge	Start Up & Steady State	Aux Boiler Stack Silencer	101	101	1
Aux boiler casing	Start Up & Steady State	Building	75	75	1
Aux boiler FD fan	Start Up & Steady State	Muffler/silencer	102	102	1
Aux Steam System Feedwater Pumps	Start Up & Steady State	Building	75	75	2

Notes:
Sources: BHS Equipment Cadna Noise Sources 8-19-2016_Rev8 table

GENERAL SERVICES BUILDING

The general services building houses a variety of noise-producing pumps, but will provide a minimum attenuation of 27 dBA for pump noise. A summary of general services building components and the corresponding noise emission levels utilized in the acoustical model are summarized in **Table 9**.

Table 9
General Services Building Components – Noise Model and Noise Control Features

SOURCE	OPERATING CONDITION	NOISE REDUCTION	NOISE MODEL SOUND POWER LEVEL (LwA)		QUANTITY
			START UP	STEADY STATE	
(GSB) Sump Pumps	Start Up & Steady State	Underground / Covered Pit	101	101	2
Demineralized Water Pumps	Start Up & Steady State	Building	74	74	2
Service Water Pumps	Start Up & Steady State	Building	75	75	2
Closed Cycle Cooling Water Pumps	Start Up & Steady State	Building	78	78	2
Phosphate Transfer Pumps	Start Up & Steady State	Building	72	72	1
CT Water Injection Pumps	Start Up & Steady State	Building	80	80	2

Notes:
Sources: BHS Equipment Cadna Noise Sources 8-19-2016_Rev8 table, Updated BHS Equipment Cadna Noise Sources Rev 5 received 8-3-2016

MISCELLANEOUS PLANT COMPONENTS

A variety of miscellaneous plant components will contribute to plant noise emissions. Final mitigation design and equipment specification is ongoing, and the noise levels identified will be implemented. The major noise-producing components and the proposed ongoing mitigation is described below. A summary of miscellaneous plant components and the corresponding noise emission levels utilized in the acoustical model are summarized in **Table 10**.

Transformers (Outdoor)

Outdoor transformers (CTG-GSU, STG-GSU and Unit Aux) will include safety (blast) walls and noise mitigation walls. AKRF has worked with design engineers to develop extensions of these blast walls so that they function as sound barrier walls. The walls will be 25 feet tall and surround the transformers as indicated schematically in **Figure 8**.

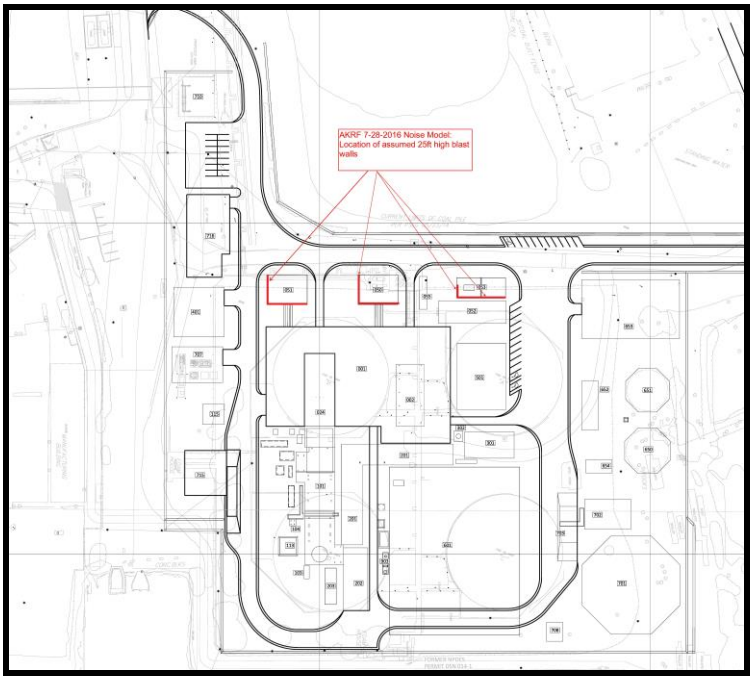


Figure 8 – Outdoor Transformer (CTG-GSU, STG-GSU and Unit Aux) Sound Barrier Walls

Fuel Gas Compressor

The fuel gas compressor is an extremely noisy component and is located in an area that places it close to future residential property boundaries. Although the fuel gas compressor will be placed in an enclosure, this enclosure must be ventilated with large louvers that will require acoustical treatment to contain the compressor noise within the vented enclosure. AKRF has worked with design engineers to relocate the fuel gas compressor and associated vented enclosure to an appropriate location that utilizes the most distance between it and the nearest residential property boundaries. The relocated fuel gas compressor is shown schematically in **Figure 9**.

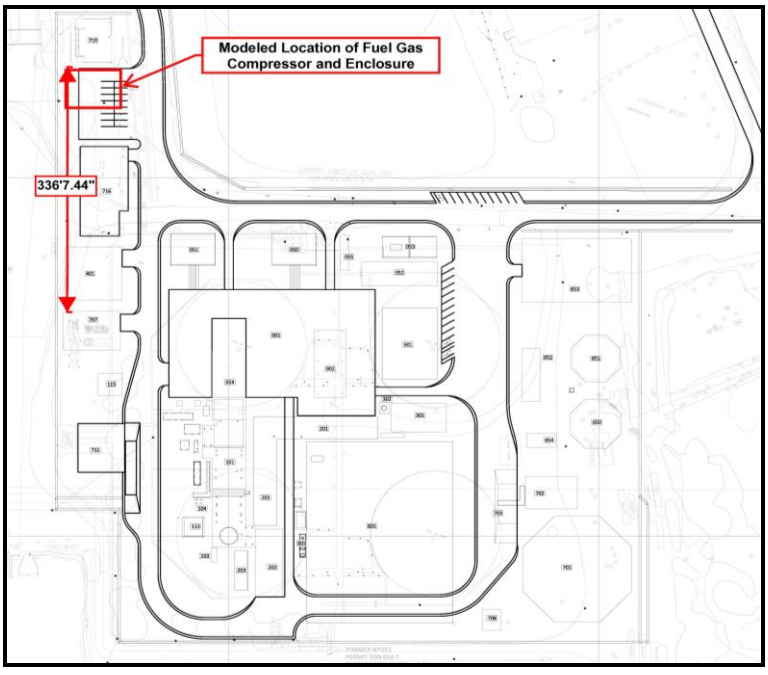


Figure 9 – Relocated Fuel Gas Compressor and Enclosure

The fuel gas compressor enclosure and associated ventilation louvers will provide 30 dBA attenuation of the fuel gas compressor noise.

Emergency Generator

Although the emergency generator is primarily for emergency conditions only, it will require periodic testing possibly during startup or steady-state conditions. It will not be tested during night time periods. The emergency generator includes a sound-attenuating enclosure and silencer. AKRF has worked with design engineers to theoretically include additional attenuation on the engine silencer. The emergency generator will need to include a supplemental engine silencer which provides an additional 10 dBA of engine exhaust noise. PSEG is implementing procedural guidance to assure that the emergency generator is not tested during night time hours.

Table 10

Miscellaneous Components – Noise Model and Noise Control Features

SOURCE	OPERATING CONDITION	NOISE REDUCTION	NOISE MODEL SOUND POWER LEVEL (LwA)		QUANTITY
			START UP	STEADY STATE	
Aux Cooling Tower	Start Up & Steady State	Ultra Quiet Fans	99	99	1
Aux Cooling Water Pumps	Start Up & Steady State	Enclosure	90	90	2
Emergency Generator Housing	Start Up & Steady State	Enclosure	110	110	1
Emergency Generator Exhaust	Start Up & Steady State	Supplemental Muffler	108	108	1
CTG-GSU	Start Up & Steady State	25' Sound Barrier Wall	99	99	1
STG-GSU	Start Up & Steady State	25' Sound Barrier Wall	97	97	1
Unit Aux Xfrmr	Start Up & Steady State	25' Sound Barrier Wall	105	105	2
Station Service Xfrmr	Start Up & Steady State	Building	78	78	6
LTE Recirculation Pumps		Building	75	75	2
Fuel Oil Ship Unloading Pumps	Start Up & Steady State	Enclosure	78	78	2
Fuel Oil Unloading Pumps	Start Up & Steady State	Building	73	73	2
HP/IP Feedwater Pumps	Start Up & Steady State	Building	87	87	2
NG M&R Station	Start Up & Steady State		83	83	1
Fuel Gas Compressor	Start Up & Steady State	Relocated Building / Acoustical Louvers	91	91	1
Ammonia Transfer Pumps	Start Up & Steady State	Building	70	70	2
Boiler BD Sump Pumps	Start Up & Steady State	Building	76	76	2
Fire Pump Enclosure	Emergency Only	Enclosure	N/A	N/A	1

Notes: Shading indicates Additional Mitigation Requirement as detailed in end of report for incorporation into detailed design / component specifications

Sources: BHS Equipment Cadna Noise Sources 8-19-2016_Rev8 table, Updated BHS Equipment Cadna Noise Sources Rev 5 received 8-3-2016

MITIGATION REQUIREMENTS

All mitigation listed in this report has been developed with plant design engineers utilizing best-available information and technology. The mitigation requirements are listed with specific acoustical performance requirements below, and will be implemented during detailed design and equipment specification / procurement.

ACC STEAM RISERS AND ACC STEAM HEADERS

The ACC steam risers and ACC steam headers (indicated in red **Figure 6** and **Figure 7**) require additional noise attenuation for start-up conditions.

ACC Steam Risers

ACC Steam Risers start-up noise will be reduced by an additional 14 dBA. The ACC manufacturer and design engineers will confirm noise emission values utilized in the modeling that forms the basis for this report, which AKRF understands were provided from other project specifications. If needed actual measured values will be obtained from similar equipment already in service elsewhere in the country. AKRF has included the level of attenuation necessary, which will require acoustical treatments such as modified bypass valves, independent insulated enclosures, double-wall ducts and/or proprietary sound barrier wraps/lagging.

ACC Steam Headers

ACC Steam Header start-up noise will be reduced by an additional 12 dBA. The ACC manufacturer and design engineers will confirm noise emission values utilized in the modeling that forms the basis for this report, which AKRF understands were provided from other project specifications. If needed actual measured values will be obtained from similar equipment already in service elsewhere in the country. AKRF has included the level of attenuation necessary, which will require acoustical treatments such as modified bypass valves, independent insulated enclosures, double-wall ducts and/or proprietary sound barrier wraps/lagging.

Note: Low-noise emission bypass valves were included in the noise model utilized for the basis of this report. However, the effects of ACC Steam Riser and ACC Steam Header noise reductions that could result from the use of low-noise emission bypass valves is expected to partially or fully provide the required mitigation, but was not be modelled as acoustical data is still in development. Measured values should be obtained from similar application to confirm effective noise mitigation utilizing this approach. This will be the responsibility of the design engineering teams through equipment specification / procurement.

OUTDOOR TRANSFORMER (BLAST) WALLS

The outdoor transformers require additional noise attenuation. In order for the blast walls to perform as noise mitigation sound barrier walls, they will be 25 feet tall and surround the transformers as indicated schematically in **Figure 8**.

FUEL GAS COMPRESSOR BUILDING AND RELOCATION

The fuel gas compressor requires additional noise attenuation in the form of a sound attenuating enclosure (including ventilation louvers) and relocation on plant site. The relocated fuel gas compressor is shown schematically in **Figure 9**. The fuel gas compressor enclosure and associated ventilation louvers will provide 30 dBA attenuation of the fuel gas compressor noise.

EMERGENCY GENERATOR EXHAUST

The emergency generator exhaust will require additional noise attenuation. The emergency generator will need to include a supplemental engine silencer, or be specified with a high-performance silencer which provides an additional 10 dBA attenuation of engine exhaust noise to those listed in **Table 10**. PSEG is

implementing procedural guidance to assure that the emergency generator is not tested during night time hours.

PREDICTED NOISE LEVELS WITH RECOMMENDED NOISE CONTROL MEASURES

Noise levels at each receptor site resulting from operation of the proposed Unit 5 Combined Cycle Facility were calculated according to the methodology described above for the condition with all of the noise control measures in the above Mitigation Requirements section implemented. The resulting noise levels are shown in **Table 11**.

Table 11
Combined Cycle Facility Noise Levels With All Noise Control Measures

Site	Combined Cycle Facility Noise Level	Combined Cycle Facility Code Exceedance?
Steady State		
1	50	No
1a	49	No
1b	47	No
2	38	No
3	34	No
4	47	No
Start Up		
1	51	No
1a	51	No
1b	50	No
2	42	No
3	37	No
4	49	No
Notes:		

CONCLUSIONS

The noise levels in the surrounding community evaluated at noise receptor locations from all sound sources of the plant (combined) will comply with Connecticut State noise regulations, which are 10 dB more restrictive than City of Bridgeport noise regulations. Specifically, the plant will meet the Connecticut night time limit of 51 dBA. Code compliance was evaluated for both steady-state and start-up conditions with acceptable results. Emergency conditions, such as non-testing use of the emergency generator, were not evaluated, as allowed by the applicable regulations and codes. In order to meet the Connecticut State noise regulations, all equipment listed in this report will be specified to comply with the noise levels listed, and some equipment will be required to implement additional noise mitigation measures as outlined in the Mitigation Requirements section of this report. The noise levels listed in this report have been confirmed by design engineers for the project and manufacturers of various specialized plant equipment. The mitigation measures discussed in the Mitigation Requirements will be implemented into design performance requirements for equipment listed, as part of bid documentation for the equipment. Final implementation of noise mitigation may differ slightly than shown, but will comply with the noise levels or required mitigation listed and will fully comply with noise regulations.

REV 0

STORMWATER POLLUTION CONTROL PLAN

Bridgeport Harbor Station Unit 5

B&V PROJECT NO. 191547
B&V FILE NO. 58.5406.1101.06

PREPARED FOR

PSEG Power Connecticut, LLC

25 AUGUST 2016

BLACK & VEATCH
Building a world of difference.

Prepared by: Paige Snow — 8-21-16

Signature — Date

Paige Snow

Printed Name

Reviewed by: Blia Her — 8-21-2016

Signature — Date

BLIA HER

Printed Name

Professional Engineer: — 22 AUG 2016

Signature — Date

MARK A VANCE

Printed Name

27447

License No.

Approved by: — 22-Aug-2016

Signature — Date

MICHAEL E. DRAKE

Printed Name

Table of Contents

REVISION SUMMARY

Note that this page is included for information at this time. The submission of this SWPCP, with any City-required revisions, to Connecticut Department of Energy and Environmental Protection (CT DEEP) will follow City of Bridgeport review.

PSEG Power Connecticut LLC shall amend the SWPCP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to waters of the State and which has not otherwise been addressed in the SWPCP; or

2. The SWPCP proves ineffective in:

    a. Eliminating or significantly minimizing pollutants from sources identified in the SWPCP and as required by the general permit; or
    b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity.

3. To address issues or deficiencies identified during an inspection by the qualified professional, the Southwest Conservation District (SCD), or the Connecticut Department of Energy and Environmental Protection (CT DEEP).

4. Additionally, the SWPCP will be amended to identify any new contractor or subcontractor that will implement any measure of the SWPCP site (Certifications required of contractors and subcontractors are contained in Appendix C).

Modification Date	Reason

1.0 INTRODUCTION

1.1 General

PSEG Power Connecticut LLC (PSEG) is proposing to modernize its Bridgeport Harbor Station (BHS) located at 1 Atlantic Street in the City of Bridgeport, Fairfield County, Connecticut (CT) through construction of a 485 MW combined cycle generating facility known as BHS Unit 5 (BHS 5). The BHS Unit 5 project will result in a new modern energy center through installation of state-of-the-art power generation equipment. A general site location map is included as Figure 1 in Appendix B, Project Figures and Drawings. An aerial photograph of the site and surrounding area is included as Figure 2 in Appendix B, Project Drawings and Figures.

This Stormwater Pollution Control Plan (SWPCP) addresses the installation of the new generation equipment associated with BHS Unit 5. The Facility will be built in the southerly portion of the Site in an area currently occupied by four No. 6 aboveground fuel oil storage tanks comprising the BHS tank farm.

As a separate project being implemented in 2016, PSEG will remove the four fuel oil tanks, three smaller underground fuel tanks, and appurtenant structures at the tank farm. In a Notice of Exempt Modification filed on February 5, 2016, PSEG notified the Connecticut Siting Council of its plan to construct a new fuel oil tank, remove the four existing No. 6 fuel oil storage tanks and three smaller underground fuel oil storage tanks, and perform limited site remediation in accordance with the CT DEEP approved Revised Remedial Action Plan dated August 2004 and August 2016. Accordingly, a separate SWPCP will address demolition and remediation activities in accordance with the Revised Remedial Action Plan.

Pursuant to Section 402 of the Clean Water Act, stormwater discharges from certain construction activities to waters of the United States requires authorization by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. The Connecticut Department of Energy and Environmental Protection (CT DEEP) has been delegated the authority to issue NPDES permits in Connecticut by the Environmental Protection Agency (EPA). Construction activities that disturb one or more acres are regulated under the State of Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities ((DEEP_WPED-GP-015; General Permit), effective October 1, 2013.

PSEG will submit a Registration Form (Notice of Intent) for the Project and has prepared and will implement this SWPCP. A copy of the General Permit and associated Permit Application Transmittal Form are also included in Appendix A, Registration Form and General Permit.

1.2 Design Guidance

The overall objective of the SWPCP is to reduce pollutants in stormwater discharges that may result from construction activities by: limiting soil disturbance; installing and maintaining erosion and sediment control measures; implementing best management practices (BMPs); and stabilizing disturbed areas. The erosion and sediment control measures were selected, designed, and will be installed and maintained to meet the requirements of the General Permit.

Guidance for the selection of structural and non-structural BMPs was obtained from the following regulatory programs and/or documents:

- CT DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities;
- 2002 Connecticut Guidelines for Erosion and Sediment Control;
- City of Bridgeport Connecticut, Department of Public Facilities, Stormwater Management Manual (April 6, 2009); and,
- 2004 Connecticut Stormwater Quality Manual.

1.3 Draft SWPCP Certification Statements

The Owner's Certification Statement, Contractor's/Subcontractor's Certification Statements and the Certified Professional's Certification Statement are contained in Appendix C. All contractors and subcontractors will sign a Contractor Certification Form stating that they will adhere to the requirements of this SWPCP and the terms and conditions of the General Permit.

1.4 Responsibilities of Participants

The following summarizes the major responsibilities of participants.

PSEG Power Connecticut LLC will be responsible for the following:

1. Sign the Owner Certification Statement and have a CT-licensed professional engineer sign the Preparer Certification Statement (Appendix C).
2. Coordinate submittal of a Notice of Intent (NOI) at least 60 days prior to commencement of construction (Appendix A, Registration Form and General Permit).
3. Maintain a copy of the SWPCP, NOI, CT DEEP's acknowledgment of the NOI, CT DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (Appendix A), inspection reports (Appendix D, Inspection Report Form) and other required documents onsite through the duration of construction activities.
4. Provide copies of the SWPCP to agencies having jurisdiction or regulatory control over the Project.
5. Have a qualified professional inspect the site and certify that the appropriate pre-construction erosion and sediment control measures outlined herein or required by the CT DEEP General Permit have been installed and will operate as designed.
6. Have a qualified professional conduct inspections and monitoring in accordance with the General Permit (Appendix D).
7. Update the SWPCP when there is a significant modification to the design or construction practices that may have a significant effect on the potential for the discharge of pollutants to receiving waters.
8. Once final stabilization is achieved, and required inspections have completed, submit a Notice of Termination (NOT) to the CT DEEP.
9. Retain the SWPCP and SWPCP records, including the NOI, NOT, and inspection reports, for a minimum of 5 years from the date the site reached final stabilization.

Construction Contractor(s) and Subcontractor(s)

1. Contractors involved in soil disturbing activities must sign the Contractor Certification Statement in Appendix C.
2. Provide training to employees working onsite on the contents of the SWPCP and their responsibilities for installation, maintenance and compliance with the terms and conditions of the General Permit.

3. Fully implement the SWPCP**,** including maintenance and repair of erosion and sediment controls, as necessary, and comply with the terms and conditions of CT DEEP's General Permit (Appendix A).

1.5 Participant Contact Information

Participant	Project Manager
PSEG Power Connecticut LLC	Name: Michael Stagliola - Project Director Address: 1 Atlantic Street, Bridgeport CT Phone: 203-551-6001 Name: Jeffrey Pantazes – Senior Technical Director AKRF, Inc., agent for owner / Project Manager Phone: 856-359-7645
Engineering, Procurement and Construction (EPC) Contractor	Name: John Morrow - Project Manager Address: 11401 Lamar Avenue Overland Park, KS 66211 Phone: 913-458-2516

1.6 Post Construction Stormwater Management Practices

Post-construction stormwater management practices are designed and will be installed, operated and maintained to meet the performance criteria in the 2004 Connecticut Stormwater Quality Manual and comply with the terms and conditions of CT DEEP's General Permit for the Discharge of Stormwater Associated with Industrial Activity. Post-construction stormwater management controls are described in Section 5 of the SWPCP.

1.7 Endangered, Threatened and Species of Special Concern

Federal and State agencies were contacted and/or databases reviewed regarding the potential presence of federal or state-listed endangered, threatened or special concern species within the Project site and vicinity. Results are summarized below:

A Request for Natural Diversity Data Base (NDDB) State Listed Species Review was initially filed with the CT DEEP on October 21, 2014 and was subsequently updated in February 2016. A response was received from the CT DEEP dated March 12, 2016 concerning state-listed species. The CT DEEP concluded that it does not anticipate negative impacts to State-listed species (RCSA Sec. 26-306) resulting from the proposed activity (construction and operation of BHS Unit 5) at the site based upon the information contained within the NDDB. A copy of the NDDB request and the CT DEEP's response is included in Appendix F, Threatened and Endangered Species Review.

To ensure potential concerns regarding federally-protected species are assessed, PSEG also consulted with the United States Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation System (IPAC) Version 1.4 database. The IPAC database review indicated the possible presence of several species that should be considered in an effects analysis for the Project. The USFWS emphasizes that the resource list is to be used for planning purposes only and it is not an official species list. A copy of the IPAC report generated for the Project site is provided in Appendix F.

From the Endangered Species Act Species List (USFWS Endangered Species Program), one species was identified: the Roseate tern (Sterna dougallii). The endangered Roseate tern has the potential to occur in the project area. This species is a seabird of the tern family Sternidae. The species breeds on the Atlantic coasts of Europe and North America, and winters south to the Caribbean and western Africa. Both the European and North American populations have been in long term decline, though active conservation measures have reversed the decline in the last few years at some colonies. Roseate terns feed by plunge-diving for fish, almost invariably from the sea; and it is more marine than related tern species, only rarely visiting freshwater on the coast to bathe, –but not fish. Roseate terns breed in colonies along coasts and on islands, nesting in a ground scrape, usually in a hollow or within dense vegetation. They typically lay from one to three eggs (USFWS 2014).

The existing Bridgeport Generating Station site (including the proposed area of development) is not nesting habitat for roseate terns; however, the surrounding waters of the Pequonnock River/Bridgeport Harbor may serve as foraging habitat for the species. The construction and operation of the proposed project is not expected to adversely affect breeding or foraging habitat for Roseate terns because all proposed project elements are located landward of the high tide line.

The USFWS's IPAC database did not identify any critical habitats or National Wildlife Refuges within the project area. However, the IPAC consultation also identified other USFWS Migratory Birds (USFWS Migratory Bird Program) having potential to occur in the project area. The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. Table 1 below summarizes USFWS Migratory Birds (USFWS Migratory Bird Program) having potential to occur in the project area:

Table 1: USFWS Migratory Birds Having Potential to Occur in Project Area

Species Name	Bird of Conservation Concern	Seasonal Occurrence in Project Area
American Oystercatcher (*Haematopus palliatus*)	Yes	Year-round
American bittern (*Botaurus lentiginosus*)	Yes	Breeding
Bald eagle (*Haliaeetus leucocephalus)*	Yes	Year-round
Black rail (*Laterallus jamaicensis*)	Yes	Breeding
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	Yes	Breeding
Blue-winged Warbler (*Vermivora pinus*)	Yes	Breeding
Canada Warbler (*Wilsonia canadensis*)	Yes	Breeding
Horned Grebe (*Podiceps auritus*)	No	Wintering
Least Bittern (*Ixobrychus exilis*)	Yes	Breeding
Least tern (*Sterna antillarum*)	Yes	Breeding
Pied-billed Grebe (*Podilymbus podiceps*)	Yes	Year-round
Purple Sandpiper (*Calidris maritima*)	Yes	Wintering
Rusty Blackbird (*Euphagus carolinus*)	Yes	Wintering
Saltmarsh Sparrow (*Ammodramus caudacutus*)	Yes	Breeding
Seaside Sparrow (*Ammodramus maritimus*)	Yes	Year-round
Snowy Egret (*Egretta thula*)	Yes	Breeding
Wood Thrush (*Hylocichla mustelina*)	Yes	Breeding
Worm eating Warbler (*Helmitheros vermivorum*)	Yes	Breeding

Potential impacts to nesting or foraging habitat for migratory birds will be avoided through installation and maintenance of erosion and sediment controls during construction, and use and maintenance of structural and non-structural best management practices during operation. As such, construction and operation of the proposed project and related improvements at the BHS site are not expected to result in any take of any of the species listed above.

Osprey (Pandion haliaetus) are also present in the vicinity of the site, with intermittent nesting on or near waterfront structures at BHS. The proposed new plant is removed from these locations and will not cause a significant adverse change or alteration in the physical or environmental characteristics of the BHS site. As such, Osprey habitat will not be adversely impacted by the project. Off-season removal of osprey nests on waterfront structures will be coordinated with CT DEEP if and as required.

The National Oceanic and Atmospheric Administration (NOAA) lists the Atlantic Ocean waters within Long Island Sound within the square affecting tidal waters south of the following: Bridgeport, CT., Fairfield, CT., Blackrock, CT., Southport, CT., Green Farms, CT., and Greenfield, CT., along with Black Rock Harbor from the entrance to the Pequonnock River west to Sherwood Pt. (just east of Sherwood Mill Pond) within Long Island Sound as Essential Fish Habitat (EFH) for the species and life stages listed in Table 2.

Table 2: NOAA Essential Fish Habitat Species and Life Stages for the Project Area

Species Name	Eggs	Larvae	Juveniles	Adults
Atlantic salmon *(Salmo salar)*			X	X
Pollock *(Pollachius virens)*			X	X
Whiting *(Merluccius bilinearis)*				X
Red hake *(Urophycis chuss)*	X	X	X	X
Winter flounder *(Pseudopleuronectes americanus)*	X	X	X	X
Windowpane flounder *(Scophthalmus aquosus)*	X	X	X	X
American plaice *(Hippoglossoides platessoides)*			X	X
Ocean pout *(Macrozoarces americanus)*	X	X	X	X
Atlantic sea herring *(Clupea harengus)*			X	X
Bluefish *(Pomatomus saltatrix)*			X	X
Atlantic mackerel *(Scomber scombrus)*	X	X	X	X
Summer flounder *(Paralichthys dentatus)*			X	
Scup *(Stenotomus chrysops)*	X	X	X	X
Black sea bass *(Centropristis striata)*	n/a		X	
King mackerel *(Scomberomorus cavalla)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
Cobia *(Rachycentron canadum)*	X	X	X	X
Sand tiger shark *(Carcharias taurus)*		X		

Potential impacts to essential fish habitat (EFH) will be avoided through installation and maintenance of erosion and sediment controls during construction, use and maintenance of structural and non-structural best management practices during operation, and the Project's proposed use of an air cooled

condenser for heat dissipation, which will reduce water use and discharge. Therefore, the proposed Project will not have a significant adverse impact on wildlife, finfish, or shellfish habitat.

1.8 Cultural Resources

AKRF evaluated potential effects of the proposed combined cycle Project on historic and archaeological resources. The proposed generating equipment will be installed on approximately 14 acres of previously disturbed land at the existing BHS. The new combined cycle Project will be sited in an area where four above-ground fuel oil storage tanks are currently located. These existing oil storage tanks, which were installed in 1968, will be removed in advance of the proposed Project. As the Project development will occur within a previously disturbed industrial area/site, environmental impacts to historical or archaeological resources are minimized as compared with the development of a similar project on a "greenfield" site.

A consultation letter was sent to the Connecticut State Historic Preservation Office (SHPO) on December 3, 2014. SHPO reviewed the Project in accordance with Section 106 of the National Historic Preservation Act of 1966. Based on this review, the SHPO concluded that no historic properties will be affected by this project. This conclusion was updated by the SHPO on March 21, 2016, wherein SHPO concluded that the current proposed development plans will not impact neighboring historic properties. As a result, the previous findings of the SHPO would not change and no additional cultural resources investigations are warranted.

Based on the above, the Project will have no effect upon cultural resources in or eligible for inclusion in the National Register of Historic Places. Copies of correspondence with the SHPO are included in Appendix G, Cultural Resources.

1.9 Revisions to the SWPCP

In accordance with the requirements of the General Permit, the SWPCP will be amended whenever:

1. There is a change in contractors or subcontractors; or
2. There is a change in design, construction, operation or maintenance at the site that has the potential for the discharge of pollutants to the waters of the State and has not otherwise been addressed in the SWPCP; or
3. If the actions required by the SWPCP fail to prevent pollution, necessitating modifications to the erosion and sedimentation control measures.

The Commissioner of the CT DEEP may also require the registrant to revise the SWPCP if it does not meet one or more of the minimum requirements of the General Permit.

PSEG will retain an updated copy of the SWPCP required by the General Permit at the construction site from the date construction is initiated until the date construction is completed.

1.10 Project Completion – Records Retention

The construction of the Bridgeport Unit 5 Combined Cycle Plant will be considered complete when all disturbed areas have been satisfactorily stabilized and all temporary erosion control measures have been removed. In addition, stabilization measures must be documented as effective for a minimum of three (3) months after the cessation of construction activities before a Notice of Termination (NOT) Form will be filed with the CT DEEP. After construction is completed, PSEG will be responsible for maintaining structural and non-structural stormwater pollution control measures.

For a period of at least five years from the date that construction is complete, PSEG will retain copies of the Plan and all reports required by the General Permit, and records of all data used to complete the registration for the General Permit, unless the commissioner specifies another time period in writing. Inspection records must be retained as part of the Plan for a period of five (5) years after the date of inspection. After the construction is completed, PSEG will be responsible for maintaining the post construction stormwater pollution control measures.

In accordance with the General Permit (Section 6(c)), PSEG will retain the SWPCP and all required reports and data relevant to the SWPCP for five years following the completion of construction.

1.11 Contents of the SWPCP

The SWPCP is organized into five parts:

- Section 1 - Introduction
- Section 2 – Existing Conditions
- Section 3 – Project Description
- Section 4 – Pollution Prevention Controls and Management Practices
- Section 5 - Post Construction Stormwater Management Controls

The Project will be constructed in accordance with the Project drawings provided in Appendix B and pursuant to regulatory approvals. During construction, the construction contractor and/or subcontractors will be responsible for implementing all elements of the SWPCP.

Throughout the construction process, PSEG or PSEG's agent and the Contractor or Subcontractor will periodically inspect and monitor erosion and sediment control measures and discharges. Inspection and monitoring activities will be performed in accordance with the frequencies specified in the General Permit. The results of the inspections will be documented; a copy of the inspection form to be used is provided in Appendix D.

2.0 EXISTING CONDITIONS

2.1 Overview

The BHS site consists of approximately 58.8 acres on Bridgeport Harbor just south of Bridgeport's transportation center and ferry terminal. See Figures 1 and 2 in Appendix B. Two existing generating units at the property supply ISO-NE with about 400 MWs of power (current summer rating), or enough power to supply electric capacity and energy to approximately half a million residential customers. BHS's existing operating units include Unit 3, which runs primarily on coal and uses fuel oil for startup, and a jet-fueled combustion turbine peaking unit.

The proposed Facility will be built on the southerly portion of the Site in an area currently occupied by four No. 6 fuel oil storage tanks. As a separate project being implemented in 2016, PSEG is removing these existing tanks and constructing a single replacement fuel oil storage tank to the north of the Facility, closer to Unit 3. Following demolition of these four tanks, the tank farm area will be remediated prior to construction of the Unit 5 Project. Remediation work will be performed under a separate SWPCP in accordance with the CT DEEP approved Revised Remedial Action Plan dated August 2004 and a Revised Remedial Action Plan submitted in August 2016.

Two wetland areas are located off the southeast corner of the BHS Unit 5 site, but will not be impacted during construction or operation of the proposed project. The stormwater outfall for the new plant is located in excess of 500 feet from the wetland connection to Bridgeport Harbor.

2.2 Topography and Drainage

Existing topography, surface cover conditions and drainage patterns across the project area are shown on Drawing Numbers 191547-DS-3000B through 191547-DS-3000F in Appendix B. Areas not shaded on the drawing represent bare soil or earthen materials. Existing site elevations within the proposed area of development generally range from approximately 5 feet (NAVD88) to 10 feet (NAVD88). The secondary containment berm surrounding the tank farm area has an average top elevation of about 16 feet (NAVD88).

Within the limits of the tank farm berm, stormwater currently infiltrates or evaporates. (Note, however, that the facility is authorized to discharge stormwater from within the tank farm containment berm into Bridgeport Harbor under its existing NPDES permit.) Drainage from the eastern, southern and southwestern portions of the development area discharges either to Bridgeport Harbor primarily via sheet flow or to the two delineated wetland areas via sheet flow. A few catch basins are located in the northwestern corner of the proposed development area, which ultimately discharge to Bridgeport Harbor through an outfall owned and operated by the City of Bridgeport. The City's outfall is located in the southwest corner of the property.

2.3 Soils

A soils map for the Project area is included in Appendix E, Web Soil Survey. The soils map identifies the approximate locations of major soil types mapped by the United States Department of Agriculture

(USDA) Natural Resources Conservation Service (NRCS). Soils mapping was obtained from the NRCS Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).

The Project site is located within an area primarily mapped as Udorthents – Urban land complex, which consists of nearly level urban land composed of coarse textured and moderately coarse textured soils. In Fairfield County, these soils are considered moderately well drained or well drained, as described below:.

Udorthents – Urban land complex (Map Unit No. 306) : Slopes are 0 to 25 percent. This component is on urban land. The parent material consists of drift. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 59 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 4 percent. This soil does not meet hydric criteria. Urban Land (Map Unit No. 307) is present where at least 85 percent of the surface is covered with concrete, asphalt, or other impervious building material or manmade structure.

The project area is primarily located within Hydrologic Soils Group B (See Appendix E). Group B soils have a moderate infiltration rate when thoroughly wet. They consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. The remainder of the BHS site is designated within Hydrologic Soil Group D as it is designated as urban land.

2.4 Preliminary Geotechnical Investigation

Geotechnical investigation for BHS 5 is currently in progress to update the information obtained in prior site investigations. Preliminary geotechnical borings and information from the BHS site collected during 2006 indicate that sub-surface conditions may be generally characterized as follows:

- The 1889 USGS topographic map of the area shows the shoreline slightly east of Russell Street. When originally constructed, available plans from the 1960's show that most of the plant area was submerged. The shoreline encompassed the southern half of the tank farm extending out to Tongue Point lighthouse. Much of the fill placed to reclaim the remainder of the site consisted of hydraulic fill.
- Test borings provide a generalized subsurface profile consisting, in descending order of: 11 to 23.5 feet of fill; organic silt grading to organic sand; medium dense to dense layers of sand, silty sand and gravelly sand; decomposed and weathered rock; and bedrock composed of schistose gneiss at depths of 61 to 117 feet.
- The existing fill materials contain soil and miscellaneous debris. The fills east of the Unit 3 stack may have been placed in the 1800's and early 1900's as the City of Bridgeport expanded. The fills closer to the river were placed during the construction of the power plant in the 1960's.
- At borings located to the west and south of the Unit 3 stack, the organic soils extended to depths of 17 to 25 feet and consisted of organic silt.

At boring locations closer to the Pequonnock River, the organic soils extended to depths of 59 and 56 feet, respectively, and contain more sand.

- The naturally deposited inorganic soils are predominantly medium dense to dense silty sand, sandy silt and silt. These materials extend to depths up to 106 feet.
- The bedrock is mapped as the Derby Hill member of the Orange formation in "The Bedrock Geology of the Long Hill and Bridgeport Quadrangles", State of Connecticut. Depth to bedrock was estimated to range from approximately 60 feet to 107 feet.

2.5 Sensitive Resources

In addition to Bridgeport Harbor, both freshwater and tidal wetlands are present at the BHS site and are located east of the proposed project site. The boundaries of these wetlands were determined by a field delineation conducted on April 9, 2014 by GEI Consultants, Inc. (See Figure 3 and Drawing Numbers 191547-DS-3000B and 191547-DS-3000D in Appendix B).

A Preliminary Jurisdictional Determination (JD) for the site wetlands was issued by the United States Army Corps of Engineers (USACE) on August 1, 2016. CT DEEP regulates activities in both freshwater and tidal wetlands. The USACE regulates certain work activities proposed within navigable waters under Section 10 of the Rivers and Harbors Act of 1899 (Section 10). In addition, the USACE also regulates the discharge of dredged or fill material into wetlands under Section 404 of the Clean Water Act.

The construction of the proposed project will not result in the disturbance of either mapped wetland area. During construction, the proposed sheet pile wall and appropriate soil erosion and sediment control measures (e.g., silt fence) will be installed to prevent sediment from entering the wetlands.

2.6 Surface Waters

Bridgeport Harbor is classified as SB. Class SB waters in Connecticut have the following designated uses:

- Habitat for marine fish and aquatic life and wildlife;
- Commercial shellfish harvesting;
- Recreation;
- Industrial water supply; and,
- Navigation.

As summarized in the 2014 State of Connecticut Integrated Water Quality Report, receiving waters surrounding the site are designated as falling within Segment ID: CT-W1_001-SB. This segment covers 1.434 square Miles, primarily within Bridgeport Harbor, but encompasses the entire PSEG Power Connecticut LLC property. Segment CT-W1_001-SB is listed as "Not Supporting" for aquatic life, recreation and shellfish harvesting.

Causes for Impairment identified by CT DEEP are listed below:

Waterbody Segment ID	Name	Type	Size	Units	Impaired Designated Use	Cause	Comment
CT-W1_001-SB	LIS WB Inner - Bridgeport Harbor, Bridgeport	Estuary	1.434	sq. mi.	Habitat for Marine Fish, Other Aquatic Life and Wildlife	Dissolved oxygen saturation	Potential sources industrial point source discharges, municipal discharges,

							landfills, illicit discharges, remediation sites, groundwater contamination, onsite treatment systems, combined sewer overflow
CT-W1_001-SB	LIS WB Inner - Bridgeport Harbor, Bridgeport	Estuary	1.434	sq. mi.	Habitat for Marine Fish, Other Aquatic Life and Wildlife	Nutrient/ Eutrophication Biological Indicators	Potential sources include permitted and non-permitted stormwater, illicit discharge, CSOs/SSOs, marinas, insufficient septic systems, nuisance wildlife/pets
CT-W1_001-SB	LIS WB Inner - Bridgeport Harbor, Bridgeport	Estuary	1.434	sq. mi.	Habitat for Marine Fish, Other Aquatic Life and Wildlife	Oxygen, dissolved	Potential sources include permitted and non-permitted stormwater, illicit discharge, CSOs/SSOs, marinas, insufficient septic systems, nuisance wildlife/pets
CT-W1_001-SB	LIS WB Inner - Bridgeport Harbor, Bridgeport	Estuary	1.434	sq. mi.	Habitat for Marine Fish, Other Aquatic Life and Wildlife	PCBs	Potential sources industrial point source discharges, municipal discharges, landfills, illicit discharges, remediation sites, groundwater contamination, onsite treatment systems, combined sewer overflow
CT-W1_001-SB	LIS WB Inner - Bridgeport Harbor, Bridgeport	Estuary	1.434	sq. mi.	Habitat for Marine Fish, Other Aquatic Life and Wildlife	PAH's	Potential sources industrial point source discharges, municipal discharges, landfills, illicit discharges, remediation sites, groundwater contamination, onsite treatment systems, combined sewer overflow
CT-W1_001-SB	LIS WB Inner - Bridgeport Harbor, Bridgeport	Estuary	1.434	sq. mi.	Recreation	Enterococ-cus	Potential sources industrial point source discharges, municipal discharges, landfills, illicit discharges, remediation sites, groundwater contamination, onsite treatment systems, combined sewer overflow

The receiving waters are not impaired due to sediment deposition or siltation.

2.7 Groundwaters

The groundwater quality classification for the site, as established by Connecticut's Water Quality Standards, is "GB." The designated uses for groundwaters classified as "GB" include, industrial process water, cooling waters, and baseflow for hydraulically-connected surface water bodies. Such groundwaters are presumed to not be suitable for human consumption without prior treatment. There is no public water supply aquifer protection areas located in the site vicinity.

2.8 Flooding Potential/Mitigation

The Project site has been subject to periodic flooding related to its proximity to Long Island Sound, relatively flat topography and resulting poor drainage under certain storm conditions. Periodic flooding can occur during major coastal storm events, particularly when these events occur simultaneously with unusually high tides (i.e., spring tides) and sustained onshore winds capable of producing a storm surge.

As shown on the FEMA Flood Insurance Rate Map (FIRM) dated 2013 (Panel 441 of 626, Map Number 09001C0441G Revised July 8, 2013), the majority of the existing Bridgeport Harbor Station site is mapped within the 100-year floodplain (Zone AE), at an elevation of 14 feet (NAVD88) (See Figure 4 in Appendix B). The existing base elevations at the BHS site range from approximately 5.0 feet to 10.0 feet (NAVD88). The existing tank farm berm has an average elevation of approximately 16 feet (NAVD88).

Except for the tank farm containment berm, elevations within the proposed area of development currently range from approximately 7.0 feet to 10.0 feet above mean sea level (NAVD88). As a proactive measure to protect against flooding, site grades in the development area will be raised to a minimum elevation of 16.5 feet (NAVD88) using structural fill. In addition, a sheet pile retaining wall having a minimum top elevation of 20.00 to 21.75 feet (NAVD88) will be installed around the perimeter of the development area. This sheet pile wall will taper down to an elevation of approximately 12.5 feet (NAVD88) as it follows the eastern road ramp. The sheet pile wall reduces the facility's overall footprint, assists in avoiding impacts to the adjacent wetlands during construction and operation, and limits the potential for future flood damage to occur during coastal storm events up to the 500 year storm. Major process equipment will be located within the elevated portion of the development area. Activities outside of the proposed sheet pile wall will be limited to utility interconnections (water, sewer, natural gas, electrical, etc.), which will be installed at or below existing site grades. Delineated wetland resources will also be protected during construction through implementation of structural erosion and sediment controls and non-structural best management practices.

3.0 PROJECT DESCRIPTION

3.1 Overview

BHS Unit 5 will consist of a 485 MW dual fuel, single train combined cycle power plant. The plant will include a combustion turbine (similar to a very large jet engine) to turn an electric generator, a heat recovery steam generator (HRSG), and a steam turbine. Waste heat from the combustion turbine is routed through the HRSG to create steam, powering the steam turbine which generates additional power. Using the waste heat from the combustion turbine to generate electricity makes a combined-cycle plant very efficient. The Facility will primarily run on natural gas, with provisions to use Ultra Low

Sulfur Distillate (ULSD) fuel for up to 30 days (720 hours) per year as a back-up fuel, ensuring fuel diversity and dependability.

PSEG has selected a GE 7HA.02 gas turbine for the project. The GE turbine is an industry-leading, high-efficiency, air-cooled gas turbine, with more than 59% combined-cycle efficiency, enabling the most cost-effective conversion of fuel to electricity. Additionally, the Project design incorporates an air-cooled condenser to minimize the Facility's operational water requirements, and eliminate the need to use Bridgeport Harbor water for cooling, thereby avoiding surface water withdrawals and associated impacts. Aquarion Water Company, the local water utility, will supply the Facility's water requirements. Wastewater will be discharged to the Bridgeport Water Pollution Control Authority's collection system for treatment at the West Side Water Pollution Control Plant (WPCP). The Southern Connecticut Gas Company ("SCG") operates an existing high pressure natural gas lateral pipeline connection which terminates at the Emera Bridgeport Energy power plant located at 10 Atlantic Street. This existing pipeline is capable of delivering natural gas to the project through a new take-off connection.

The Project has signed a Large Generator Interconnection Agreement ("LGIA") with Independent System Operator – New England (ISO-NE) and United Illuminating Company ("UI"). Under the terms of this agreement, PSEG will construct, own and operate a single radial 345-kV underground transmission cable electrically interconnecting the Project with UI's Singer Substation. Connecting to UI's Singer Substation will require some limited construction to install the underground cable in the public right of way. PSEG and / or UI will obtain the necessary street opening permits from the City of Bridgeport (the "City") and has obtained consent through the LGIA with UI to allow the interconnection to its substation.

3.2 Site Area/Limit of Disturbance

As shown on the Overall Site Plot Plan (Drawing Number 191547-5GAU-G1000 in Appendix B), BHS Unit 5 will be located on approximately 14 acres of industrial land, located in the City of Bridgeport, Connecticut. The main footprint (main plant inside the sheet pile wall) of the Project will encompass approximately 13 acres and the associated stormwater infiltration trenches and access driveways will occupy an additional 1 acre.

The limit of disturbance for the project is shown on Drawing Number 191547-5STE-3100 in Appendix B. Construction support activities, including newly created laydown, staging areas, construction trailers, and access roads will result in a total disturbance of approximately 20 acres.

Existing BHS laydown and parking areas that are currently stabilized with paved and or aggregate surfaces will also be used during construction. These areas are not included as disturbed areas, as clearing, grubbing or grading activities are not required. Additional offsite laydown areas may also be used, but are subject to further negotiation with land owners.

3.3 Estimated Project Duration

Construction of BHS Unit 5 is anticipated to begin during the first quarter of 2017, following completion of demolition and remediation activities at the existing tank farm area and upon receipt of necessary regulatory approvals. The construction schedule is for a 24 to 26 month construction duration. Provisional acceptance and commercial operation are targeted for June 2019.

Construction activities are anticipated to occur five (5) to six (6) days per week (Monday through Saturday) during the hours of 7:00 AM through 6:00 PM.

3.4 Erosion and Sediment Controls

Structural and non-structural erosion and sediment controls will be used during the construction process and permanent stabilization measures and Best Management Practices (BMPs) will be used during facility operation to properly manage sediment and pollutant loads associated with stormwater runoff to adjacent wetlands and waterways.

Project engineering and soil erosion and sediment control drawings applicable to this SWPCP are listed below. They are provided as attachments to the Coastal Site Plan application and will be provided in Appendix B, Project Drawings and Figures when this SWPCP is submitted to CT DEEP. They include:

Site Development Plan Drawings

Drawing Number	Description
191547-DS-3000A	COVER SHEET
191547-DS-3000AA	SITE DEVELOPMENT DRAWING LIST
191547-5GAU-G1000	OVERALL SITE PLOT PLAN
191547-5GAU-G1001	OVERALL SITE ARRANGEMENT
191547-DS-3000B to DS-S3000F	EXISTING CONDITIONS PLAN
191547-DS-1032A	UTILITY PLAN
191547-DS-1032B	UTILITY PLAN
191547-DS-1034 and DS-1034A to DS-1034B	DRAINAGE AREA PLAN
191547-DS-1036 and DS-1036A to DS-1036D	CONSTRUCTION PHASE 1
191547-DS-1037 and DS-1037A to DS-1037D	CONSTRUCTION PHASE 2
191547-DS-1038 and DS-1038A to DS-1038D	CONSTRUCTION PHASE 3
191547-DS-1039 and DS-1039A to DS-1036D	CONSTRUCTION PHASE 4
191547-DS-1040 and DS-1040A to DS-1040D	CONSTRUCTION PHASE 5
191547-DS-1041 and DS-1041A to DS-1041B	CONSTRUCTION PLAN
191547-DS-1042 and DS-1042A to DS-1042E	BARGE AREAS
191547-5STF-S3000	GRADING & DRAINAGE KEY PLAN & GENERAL NOTES & LEGEND
191547-5STF-S3001	GRADING & DRAINAGE
191547-5STF-S3002	GRADING & DRAINAGE
191547-5STF-S3003	GRADING & DRAINAGE
191547-5STF-S3004 and S3004A	GRADING & DRAINAGE
191547-5STF-S3005	GRADING & DRAINAGE
191547-5STF-S3006	GRADING & DRAINAGE
191547-5STF-S3007	GRADING & DRAINAGE
191547-5STF-S3050	GRADING SECTION & DETAILS
191547-5STE-S3100	EROSION CONTROL KEY PLAN, GENERAL NOTES & LEGEND

191547-5STE-S3101	EROSION CONTROL
191547-5STE-S3102	EROSION CONTROL
191547-5STE-S3103	EROSION CONTROL
191547-5STD-S3200	SURFACING & FENCING KEY PLAN, GENERAL NOTESS & LEGEND
191547-5STD-S3201	SURFACING & FENCING PLAN
191547-5STD-S3202	SURFACING & FENCING PLAN
191547-5STD-S3203	SURFACING & FENCING PLAN
191547-5STF-S3900A	CATCH BASIN & MANHOLE DETAILS
191547-5STF-S3900B	CATCH BASIN & MANHOLE DETAILS
191547-5STF-S3900C	CATCH BASIN & MANHOLE DETAILS
191547-5STF-S3901	RIPRAP DETAILS
191547-5STE-S3920A	EROSION CONTROL SECTION & DETAILS
191547-5STE-S3920B	EROSION CONTROL SECTION & DETAILS
191547-5STE-S3920C	EROSION CONTROL SECTION & DETAILS

3.5 Erosion Control Structural Practices

The overall approach to erosion and sediment control is to minimize soil disturbance to the extent possible, install temporary erosion and sediment control devices, and seed or mulch where needed. The size and placement of erosion and sediment control devices was based on site conditions and experience with similar projects of this type. Additional erosion and sediment control devices will be installed if the qualified professional determines that site conditions require them.

Erosion and sediment control devices will be installed and maintained in accordance with the specifications contained in the 2002 Connecticut Guidelines for Erosion and Sediment Control at the locations shown on Drawing Numbers 191547-5STE-S3101 through 191547-5STE-S3103 in Appendix B. Selection of additional erosion and sediment control measures will be on an "as-needed basis" depending on site specific conditions, as directed by the qualified professional.

Note that main plant area will be surrounded by a sheet pile wall during the bulk of the grading activities at the site (i.e., the sheet pile wall will be installed during the early phase of construction coincident with raising site grades using structural fill). Further, the sheet pile wall will have a top elevation of up to 21.75 feet NAVD88, which is above the finish grade elevation of the main plant area. This effectively isolates the primary construction area for BHS Unit 5 from direct runoff to receiving waters until the stormwater collection system is installed.

Structural controls are used to divert runoff flows away from disturbed areas, or otherwise limit the discharge of pollutants from exposed areas to the degree attainable. The types of structural controls to be implemented during project construction include:

- Stabilized construction entrances;
- Erosion control blankets, or equivalent;
- Temporary drainage/diversion swales;
- Temporary check dams;
- Silt fencing;
- Straw bale barriers;
- Temporary sediment sumps;

- Concrete washout area;
- FRAC tanks/filter bags; and
- Catch basin inlet protection.

Design specifications and maintenance requirements are provided on the erosion and sediment control detail drawings in Appendix B (Drawing Numbers 191547-5STE- S3920A through 191547-5STE- S3920C). Brief descriptions of the types of structural control measures that will be used are presented below:

Stabilized Construction Entrances. To prevent the deposition of materials onto public roadways, stabilized construction entrances will be installed and maintained at all points of construction ingress and egress.

Erosion Control Blankets. Erosion control blankets or equivalent techniques will be used to stabilize 3:1 slopes (or shallower), where vegetative stabilization is used. Erosion control blankets help hold soil particles in place and retain soil moisture, which promotes seed germination. The blankets also provide the seedlings protection from intense sunlight during early stages of growth. Erosion control blankets can also be used as a protective lining along vegetated drainage swales.

Temporary Drainage/Diversion Swales. Temporary diversion swales are used to divert "clean" runoff from entering active work zones. Drainage swales are used in conjunction with temporary check dams to collect and convey runoff to sediment sumps.

Temporary Check Dams. Temporary check dams are used to reduce runoff velocities in drainage swales, trap suspended sediment and provide for infiltration. As such, temporary check dams effectively reduce sediment loading rates to sediment sumps or FRAC tanks.

Silt Fences. Silt fences consist of support posts with filter fabric. The fence is installed along the down slope or side slope of a disturbed area, but not across drainage channels. Runoff velocity is reduced, allowing sediment to settle on the uphill side. Silt fences will be placed along down gradient perimeters that drain away from disturbed surfaces.

Straw Bales. Straw bales act as a temporary measure similar to a silt fence. When used, straw bales will be tightly packed in a linear or crenellated fashion, and each bale will be secured with two stakes. Bales with broken strings or wires will be replaced. Straw bales can be used in conjunction with silt fence, if necessary.

Temporary Sediment Sump/FRAC tanks and sediment bag filters. Temporary sediment sumps will be used on an as needed basis to collect runoff from drainage areas located within the sheet pile wall surrounding the primary development area. The discharge from a temporary sediment sump will be directed to one or more FRAC tanks, as required, prior to discharge through a sediment filter bag. FRAC tanks will be inspected and emptied to ensure proper functioning. Accumulated sediment will be returned to the site and stabilized. If filter bags become clogged or impaired, they will be replaced immediately.

Concrete washout area. A designated concrete wash out area will be established onsite. Waste concrete collected in the washout area will be properly disposed offsite at an appropriately licensed facility.

Catch Basin Inlet Protection. Catch basin inlet protection will be installed around existing and newly installed catch basins located down gradient of active construction areas to trap sediment prior to entering the subsurface drainage piping.

All reasonable precautions to minimize soil erosion resulting from construction activities will be taken. There will be prompt action taken throughout the duration of construction to control such erosion. To minimize soil disturbance, construction vehicles will be confined to designated work areas and equipment and material storage areas. Soil disturbance will be limited to the areas identified on the plan drawings.

Permanent stabilization practices will be installed when construction is complete in any given work area. In areas where construction activity is likely to stop and start again, or if the seasonal timing is such that permanent cover cannot be established, temporary stabilization measures can be used, such as mulching.

3.6 Construction Phasing

Construction of BHS Unit 5 will proceed in three major time frames, as further defined on the five sets of Construction Phasing Plans (DS-1036 to DS-1040 all sheets), as follows:

Site Work - This phase of construction encompasses the initial clearing, backfill, pile driving, and concrete operations. Silt fence will be installed around the perimeter of the worksite, and catch basin inlet protection will be used at any existing catch basins to minimize sediment transport into adjacent wetlands and waterways. As indicated above, a sheet pile wall encircling the main plant area will be installed during the early phases of construction. Temporary gravel haul routes and stabilized construction entrances/exits will be constructed for earthwork, pile driving, and concrete operations to minimize offsite tracking of sediment and dust generation. Additional silt fence and turbidity curtains will be deployed, as necessary, if fill is transported to the site via barge. Watering trucks will be used to help stabilize temporary haul routes, disturbed surfaces in active construction areas and control fugitive dust, as necessary.

As site grades are raised, temporary drainage swales and rock check dams will be installed and adjusted, as necessary, to allow stormwater runoff to be controlled and treated prior to discharge. If necessary, site grades will be “bowled” temporarily to detain runoff in a shallow swale or sump for infiltration or subsequent processing through FRAC tanks and sediment filter bags prior to discharge.

Because site grades will be raised, major construction dewatering activities are not anticipated. If required, construction dewatering effluent will be pumped to a temporary sediment sump or FRAC tank equipped with a sediment filter bag to allow for solids separation prior to discharge.

Mechanical & Electrical Installation - This phase of work addresses the heavy mechanical and electrical construction work effort after major foundations are placed up to the start of Commissioning. As the permanent storm water management system is installed, catch basin inlet protection will be installed and maintained. Where applicable, vegetative and/or rock surfaces will be established and maintained as soon as practical. The silt fence, hay bales, stabilized construction entrances/exits as well as any haul roads will also be maintained during this phase of construction. To allow deliveries of heavy components, access routes form the barge mooring areas will be stabilized using aggregate during this phase.

Commissioning – At the start of commissioning, final surface stabilization practices will be installed and the permanent stormwater management system will be fully operational.

3.7 General Construction Sequence

The general sequence of construction activities and the general order in which they will occur are presented on Drawing Number 191547-5STE-S3100 in Appendix B and summarized below. Note that some activities will occur concurrently or in overlapping phases throughout the duration of the construction effort. Note that durations (*) overlap and are not additive.

Activity	Estimated Duration*
Mobilization	3 Weeks
Install Temporary Power for Construction	3 Weeks
Disconnect Power to Site of Work	1 Week
Install Soil Erosion and Sediment Control Measures	2 Weeks
Prepare Staging and Laydown Areas	3 Weeks
Install Trailers and Parking Lot	4 Weeks
Install Permanent Sheet Pile Retaining Wall	2 Weeks
Import Structural Fill, Spread and Compact Soil in Layers 8" Thick (Loose Measure) to Rough Grade Elevation	20 Weeks
Prepare Access Roads and Construction Ingress and Egress Roads	5 Weeks
Construct Storm Water Drainage System	8 Weeks
Concrete Work, Including All Associated Excavation for the Pile Caps, Footings, Slabs, Walls, Roofs, Stacks, and Other Miscellaneous Work	20 Weeks
Construct Underground Utilities and Underground Oil Water Separator	10 Weeks
Complete Structural, Architectural, Electrical and Mechanical Works Including but Not Limited to: Plumbing, Roofing, Ceilings, Walls, Floors, ACC(Air Cooled Condensers), Lighting and Communication Systems, Air Condition and Ventilation of Buildings, Tanks, Structural Steel, Mechanical and Electrical Equipment, Pre-Engineered Metal Buildings	52 Weeks
Provide and Install Above Ground ULSD (Ultra Low Sulfur Diesel) Tank	10 Weeks
Remove All Temporary Construction Access Roads and Install Final Fill and Sheet Pile Retaining Wall	3 Weeks
Finish Grading and Surfacing for Roads and Other Areas	4 Weeks
Install Infiltration Trenches for Access Drives	2 Weeks
Testing and Commissioning of All Buildings, Mechanical, Electrical and Other Works and Training of Owner's Staff	8 Weeks
Remove All Erosion and Sediment Control Measures	1 Week
Demobilization	2 Weeks

The detailed Phasing Plan for site construction and raising site grades is shown on Drawing Numbers 191547-DS-1036 through Drawing Number 191547-DS-1040, all sheets, as noted above.

3.8 Work Area Delineation

As part of site preparation, construction and laydown areas will be surveyed and staked to clearly identify the limit of disturbance prior to clearing, grading, vehicular access or equipment/material delivery. When staking out or delineating a work area, the following steps will be taken:

- The limit of disturbance will be marked in accordance with the erosion and sediment control plan drawings.
- Wetland areas will be clearly marked in the field with flagging and silt fencing will be installed as noted on the erosion and sediment control plan drawings in Appendix B to avoid inadvertent intrusion by construction equipment.

3.9 Vegetation Clearing

Woody vegetation in construction laydown areas, fabrication areas or construction areas will be cut and removed for proper disposal at an approved offsite disposal, composting or recycling facility. Burning or onsite disposal of woody vegetation is prohibited.

3.10 Construction Laydown Areas

Construction laydown areas are required to properly supervise construction activities (i.e., temporary office trailers), manage construction parking, provide for the temporary storage of construction equipment and materials, and allow space for component fabrication. Erosion and sediment controls for laydown areas, where necessary, are shown on the erosion and sediment control plan drawings in Appendix B.

Construction laydown areas are shown on Drawing Number 191547-DS-1041 A and B in Appendix B. The construction area plan maximizes use of existing stabilized onsite construction and parking areas, when available. These areas will be developed in a phased manner, as required to support construction activities. Development may include placement of additional aggregate/crushed stone cover materials, when needed, to provide a uniform surface. Existing drainage patterns will not be altered.

3.11 Barge Unloading Area

Structural fill and heavy equipment will be delivered to the site by barge. Up to three barge unloading areas are proposed: one has been designated for structural fill and all three may allow delivery of heavy equipment (See Drawing Number 191547-DS-1042A for possible barge unloading locations). The proposed layout for the structural fill unloading area is shown on Drawing Number 191547-DS-1042B in Appendix B. The heavy equipment barge unloading areas are shown on Drawings 191547-DS-1042C through 191547-DS-1042E in Appendix B.

Design details for the material (i.e., structural fill) unloading area are shown on Drawing Number 191547-DS-1042B in Appendix B. As shown, a spud barge measuring up to approximately 50 feet by 30 feet will be positioned roughly 40 feet offshore of the mean high water line. It will be stabilized through deployment of support feet having a diameter of approximately 5 feet. The spud barge will serve as a working platform for material barge unloading. Unloading will be accomplished using a crane equipped

with a clamshell bucket (or equivalent). The crane will remove structural fill from the barge and place it in a hopper. Any material spilled during transfer will fall to a deflection chute and returned to the material barge. The hopper will feed a conveyor to transport fill to a designated stockpile located either on the shore or within the sheet pile surrounded work area. Fill will be loaded into dump trucks using a front end loader or further conveyed to the site of placement. Although a turbidity curtain will be deployed from the spud barge to the shoreline, the conveyer will be equipped with a catch tray to reduce material falling from the conveyer into the ocean. Silt fencing will be used along the shoreline.

The material barge(s) will be approximately 100 feet long and 30 feet wide. They will be delivered to the site by tug and positioned parallel to shore for unloading. The channel ward side of the material barges will extend approximately 100 feet from the mean high water line.

Design details for the heavy equipment unloading areas are shown on Drawing Numbers 191547-DS1042C to 191547-DS-1042E in Appendix B. Barge mooring area #1, shown on Drawing Number 191547-DS-1042E, is the preferred location, as it has the most direct route to the work area. Barge mooring areas #2 and #3, shown on Drawing Numbers 191547-DS-1042C and 191547-DS-1042D, are existing barge mooring locations. A spud barge measuring approximately 80 feet by 260 feet will be positioned as closely to the mean high water line, as the depth at low tide may allow. Mooring areas #2 and #3 may allow mooring directly to the existing facility; however, mooring areas #1 may require a larger spud barge and crane as the distance from the rock revetment to the barge is increased. The spud barge will be stabilized through deployment of support feet having a diameter of approximately 5 feet. The spud barge will serve as a working platform for the crane during heavy equipment offloading. Equipment barges will have variable dimensions, depending on the weight and size of the components and equipment being delivered.

Spud barges, material barges and equipment barges will be equipped with warning lights as required by United States Coast Guard regulations to serve as an aid to navigation.

3.12 Surface Stabilization

Final surface stabilization practices are shown on Drawing Numbers 191547-5STD-S3200 through S3203 in Appendix B. For those areas for which construction activity will be temporarily suspended for a period of greater than 14 days, temporary stabilization measures shall be implemented within 3 days of such suspension of activity. Stabilization measures used during project construction may include: temporary seeding, mulching, permanent seeding or placement of final cover materials. If weather (i.e., snow cover) precludes the initiation of stabilization, then stabilization measures will be undertaken as soon as practicable. In areas where construction activity will resume within seven days, then stabilization practices do not have to be initiated on that portion of the site.

Final vegetative stabilization will be considered complete when all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established.

3.13 Maintenance

To ensure proper operation of the soil erosion and sediment controls, routine maintenance activities will be performed when needed. Routine maintenance activities will include the following:

- Silt fences will be inspected for depth of sediment, tears or sags in the fabric, and to see if the fabric is securely attached to the posts. Posts will also be inspected to ensure that they are firmly set in the ground. Should the fabric on the silt fence decompose or become ineffective, and the barrier is still necessary, the fabric will be promptly replaced. Built-up sediment will be removed from silt fences when sediment accumulations reach one-third the height of the barrier and returned to the construction site.
- Straw bale barriers will be inspected for depth of sediment, broken strings and barrier integrity. Straw bale barriers shall be replaced when the strings have broken or when bales become degraded by the elements. Two stakes will be maintained in every bale. Firm contact will be maintained between adjacent bales and between the bales and the ground. Built-up sediment will be removed where accumulations reach one half the aboveground height of any straw bale barrier and returned to the construction site.
- Temporary check dams will be inspected to ensure that the center of the dam is lower than the edges. Erosion caused by high flows around the edges of a temporary check dam will be corrected immediately. If excessive sedimentation is observed downstream from a temporary check dam, the check dam shall be adjusted immediately. Built-up sediment shall be removed where accumulations reach one-half of the height of a temporary check dam and returned to the construction site.
- Conveyance structures shall be maintained so as to operate in the design condition. When necessary, velocity-attenuating devices, such as riprap or other means, will be used to accomplish the desired result. Foreign debris will not be allowed to accumulate in temporary drainage swales, drainage ditches and temporary sediment sumps. Accumulated silt, broken branches and other debris that interferes with drainage or sediment collection will be removed.
- Stabilized construction entrances will be inspected daily and maintained periodically to ensure their proper function.

4.0 Pollution Prevention Controls and Management Practices

4.1 Good Housekeeping Practices

Good housekeeping is a major component of the pollution prevention program for the project. Onsite contractors will be required to keep work areas free of litter and properly manage construction and demolition debris, oils and chemicals. All oils, hazardous materials, wastes and unused materials will be removed from the work site at the completion of the job.

Storage, handling and disposal procedures to be implemented are described in the subsections below.

4.2 Solid Waste

The Contractor will comply with all regulations governing the onsite management and offsite disposal of solid wastes generated during construction activities. A solid waste management program will be implemented that encourages recycling practices through the placement of appropriate onsite containers. Solid waste and debris that cannot be recycled, reused, or salvaged will be stored in onsite containers for offsite disposal. Cigarette butts, plastic wrappers, and other waste materials capable of being dispersed by wind or water will be placed in approved containers. Loose materials will not be allowed at the jobsite and all trash will be disposed of in covered dumpsters. The prospective waste hauling/disposal contractors will be required to provide documentation showing they have required permits/licenses in place prior to being awarded the work.

4.3 Sanitary Waste

Portable sanitary facilities will be used by construction and craft workers during construction. These facilities will be maintained under contract with a local, licensed vendor. The portable sanitary facilities will be tip-proof, anchored in place, and located away from wetlands, water bodies and storm drains. Temporary construction trailers may be equipped with sanitary facilities connected to the City's wastewater collection system.

4.4 Hazardous Waste

PSEG will ensure compliance with applicable regulations governing the onsite management and offsite disposal of hazardous wastes generated during construction activities. Potentially hazardous materials, such as asbestos containing materials or residual oil, will be managed separately or segregated from other wastes for proper offsite recycling or disposal at an appropriately licensed facility. Waste oils or other fluids from construction equipment may also be periodically generated. In addition, detergents or solvents and associated rinse waters may be generated during pre-operational cleaning of equipment. These materials will be collected and disposed of properly. Potential waste hauler/disposal contractors will be required to provide documentation showing that they have required licenses in place prior to being awarded any work.

To properly manage and dispose of hazardous wastes generated during construction activities, PSEG will oversee compliance with CT DEEP hazardous waste regulations, including:

- Reviewing the list of potential materials to be used to determine if less hazardous or non-hazardous replacements can be used.
- Separate hazardous waste from normal waste through segregation of storage areas and proper labeling of containers;
- Use appropriate storage and DOT approved transportation containers along with secondary containment measures, where applicable;
- Inspect (and record inspections on a separate inspection log) the hazardous waste storage area, and any temporary satellite accumulation areas, at least weekly and assure that the storage of each container and the volumes stored comply with the applicable requirements;
- Verify that the hazardous waste transporters servicing the Project have all required licenses, registrations and/or a valid USEPA identification number and that the waste will be disposed of at an approved/licensed facility prior to shipping;
- Transport all hazardous waste under a cradle-to-grave system of manifests;
- Follow accurate recordkeeping requirements as to the quantity and nature of hazardous wastes generated onsite, and maintain a file of Material Safety Data Sheets (MSDS) (also referred to as Safety Data Sheets) for all onsite chemicals;
- Do not store hazardous wastes within 100 feet of the adjacent wetland, or Bridgeport Harbor (Mean High Water); and
- Ensure that contractors provide properly trained employees and/or other handlers of hazardous waste on the proper reporting, storage, inspection and handling requirements.

4.5 Construction Materials

Construction materials will be stored in a manner that minimizes exposure to precipitation and runoff, where appropriate, or otherwise to prevent the contamination of stormwater and the environment. For pollutant materials that must be kept dry (fertilizers, plaster, dry ingredients, etc.), indoor storage, temporary shelters, storage trailers, tarpaulins, or other means will be used to keep these materials from being exposed to stormwater. Inert materials that are normally exposed to precipitation shall be placed in upland areas away from stormwater conveyances in a manner that does not concentrate runoff.

Construction materials stored onsite must be stored in a neat, orderly manner in appropriate containers with appropriate labels. Products must be kept in their original containers with the original manufacturer's label, unless the containers are not re-sealable. Manufacturer's recommendations for proper storage, use, and disposal will be followed.

Material Safety Data Sheets (MSDS) (also referred to as Safety Data Sheets) will be retained while the product is being used or stored onsite in accordance with applicable Occupational Safety and Health

Administration (OSHA) regulations (29 CFR 1926.33). Containers will be kept closed unless the material is being transferred. All transfer operations will be monitored and not left unattended. To the extent practicable, toxic chemicals or petroleum products will not be stored or transferred within 100 feet of the adjoining wetland on the eastern side of the Project, or Bridgeport Harbor. This applies to storage and does not apply to normal operation or use of equipment in these areas. All employees and/or other handlers of hazardous materials must be properly trained and instructed on the proper reporting and handling requirements.

4.6 Construction Equipment

Appropriate spill response material will be maintained on site and personnel will be trained in its location and use.

Onsite construction vehicles and equipment, including contractor employee vehicles, will be inspected prior to arrival on-site and will be periodically inspected and monitored for leaks while on site. Construction vehicles or equipment containing fuel, oil, anti-freeze or hydraulic fluids, must receive regular preventative maintenance to reduce the risk of leakage. Equipment leaking oil, fuel, anti-freeze or hydraulic fluid will be repaired immediately or removed from the construction site. Construction equipment and contractor vehicles will be parked in designated parking areas at the end of the working day, except where it is necessary to maintain continuity of construction.

Petroleum products and hydraulic fluids that are not in vehicles will be stored in tightly sealed containers that are clearly labeled. Gasoline and fuel storage vessels will be stored within a double walled tank or a secondary containment, constructed of an impervious material, capable of holding 110% of the vessel capacity. Fire suppression equipment will be maintained on site.

All chemical and petroleum product containers stored onsite (excluding those contained within vehicles and equipment) will be provided with impermeable containment that holds at least 110% of the volume of the largest container, or 10% of the total volume of all containers in the area, whichever is greater, without overflow from the containment area. All chemicals and their containers stored under a roofed area except for those chemicals stored in containers of 100 gallon capacity or more, in which case a roof is not required. Double-walled tanks satisfy this requirement.

Whenever feasible, construction equipment will be refueled in an upland area at least 100 feet from Bridgeport Harbor or the adjacent wetland, and away from conveyance channels. Refueling activities will be performed under continual surveillance with extreme care. Where there is no reasonable alternative, refueling may occur within these setbacks, but only after proper precautions are taken to prevent an accidental spill. Drip pans must be used and a supply of absorbent pads must be available and utilized, as necessary. In the event of a release, the spill will be promptly cleaned up in accordance with the spill response and clean up procedures identified in Section 4.11.

Washing of equipment or machinery in any watercourse, or conveyance to the onsite wetland will not be allowed. In addition, runoff resulting from washing operations will not be allowed to enter any watercourses or wetlands.

If a fuel or oil spill occurs during construction, then appropriate regulatory notifications will be made and contaminated soil will be removed from the worksite and properly disposed in accordance with CT DEEP requirements.

4.7 Construction Dewatering

Because site grades will be raised, significant construction dewatering is not anticipated. However, during construction it may be necessary to remove water from localized work areas. If this occurs, the discharge of water from an excavation area will be pumped at a controlled rate into a temporary retention structure (i.e., FRAC tank or portable sediment tank) to settle suspended material, and will then discharged through a filter bag. When filter bags are used, the effluent will be allowed to drain onto a stabilized upland area. Additional erosion and sediment controls will be installed, where necessary, based on observed field conditions.

Trapped sediment collected during dewatering activities will be returned to the construction site, graded and stabilized.

4.8 Temporary Soil Stockpiles

Due to space constraints, it is not anticipated that temporary onsite storage of cut or fill material would be routinely utilized. Excavated surface materials that are not anticipated to be suitable for reuse on site would be disposed of offsite. In addition, only limited temporary storage would be required adjacent to excavations. Finally, fill material would be delivered and placed immediately, whenever possible, to eliminate the need for double handling. If temporary stockpiles are used, the stockpile will be stabilized using covers, silt fencing or straw bales.

4.9 Utility Notifications

As required, PSEG will notify all utilities in the project area through the “Call Before You Dig” program (1-800-922-4455) 3 to 10 days prior to any excavation work to be performed onsite or offsite.

During final design, PSEG will consult with owners and operators of aboveground and underground utilities located within the project vicinity to ensure that potential construction and operations related impacts are avoided or mitigated. This may include relocation of utility interconnections, where necessary.

4.10 Dust Suppression

High traffic areas will be covered with a gravel/aggregate surface and construction areas will be wetted, as needed, to minimize dust generation. Chemical dust suppressants will not be used. The volume of water sprayed for controlling dust shall be minimized so as to prevent the runoff. No discharge of dust control water shall contain or cause visible oil sheen, floating solids, visible discoloration, or foaming in the receiving stream.

4.11 Washout Areas

Washout of applicators, containers, vehicles and equipment for concrete, paint and other materials will be conducted in designated washout areas. There shall be no surface discharge of washout wastewaters

from these areas. Such washout shall be conducted: (1) at least 50 feet from any stream, wetland or other sensitive resource; or (2) in an entirely self-contained washout system. PSEG shall clearly flag off and designate areas to be used for washing. Contractors will conduct such activities only in these areas. PSEG will direct all washwater into a container or pit designed such that no overflows can occur during rainfall or after snowmelt. Dumping of liquid wastes in storm sewers is prohibited.

The Contractor will remove and dispose of hardened concrete waste from concrete washout areas. At least once per week PSEG will inspect any containers or pits used for washout to ensure structural integrity, adequate holding capacity, and to check for leaks or overflows. If there are signs of leaks, holes or overflows in the containers or pits that could lead to a discharge, they will be repaired prior to further use. The Contractor must remove hardened concrete waste whenever the hardened concrete has accumulated to a height of 1/2 of the container or pit or as necessary to avoid overflows. A record of maintenance and inspections shall be included per Appendix D.

4.12 Spill Response and Cleanup Procedures

PSEG will ensure compliance with federal, state and local laws, regulations and regulatory agreements pertaining to immediate and follow-up reporting and cleanup of spills or releases of petroleum products or hazardous substances. A spill event is defined as any escape of a substance from a container used in the normal course of storage, transfer, processing or use. Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under Section 311 of the Clean Water Act (CWA) (40 CFR 110.10 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (40 CFR 302.4).

Federal and State laws require a responsible party to notify government agencies and to contain, clean up, and dispose of any spilled/contaminated material. Onsite contractors will be required to report spills or releases of oil or hazardous materials in any quantity to PSEG. PSEG will be responsible for coordinating immediate response actions, retaining licensed spill contractors, when necessary, and satisfying local, state, and federal reporting requirements. Immediate response actions and cleanup activities will vary depending on the type of material spilled and the damage caused. Continued cleanup may include determining the extent of contamination, selecting a cleanup technology, and completing corrective actions.

PSEG will notify CT DEEP of reportable releases to the environment by calling 860-424-3338 or Toll Free at 1-866-DEP-SPIL (1-866-337-7745). Federal agencies will be notified, if required, of reportable releases by calling the National Response Center at 1-800-424-8802.

4.13 Construction Phase Inspections/Monitoring

4.13.1 Pre-Construction/Plan Implementation

PSEG will use a qualified professional to assess the site and certify in an inspection report that the appropriate erosion and sediment controls described in this SWPCP have been installed or implemented. Within the first 30 days following commencement of construction, a qualified soil erosion and sediment control professional or a qualified professional engineer will inspect the site. The site shall

be inspected at least once and no more than three times during the first 90 days to confirm compliance with the General Permit and proper initial implementation of all control measures designated in the SWPCP for the site for the initial phase of construction. The following conditions apply:

Because the Project will disturb more than 15 acres, the inspector shall be someone who:

1. is not an employee, as defined by the Internal Revenue Service in the Internal Revenue Code of 1986, of the registrant;
2. has not engaged in any activities associated with the preparation, planning, designing or engineering of such plan for soil erosion and sediment control or plan for engineered stormwater management systems on behalf of such registrant;
3. is not under the same employ as any person who engaged in any activities associated with the preparation, planning, designing or engineering of such plans and specifications for soil erosion and sediment control or plans and specifications for engineered stormwater management systems on behalf of such registrant; and
4. has no ownership interest of any kind in the project for which the registration is being submitted.

4.13.2 During Construction

Inspection procedures for routine inspections shall be addressed and implemented in the following manner:

1. The Contractor shall maintain a rain gauge onsite to document rainfall amounts. At least once a week and within 24 hours of the end of a storm that generates a discharge, a qualified inspector, shall inspect, at a minimum, the following: disturbed areas of the construction activity that have not been finally stabilized; all erosion and sedimentation control measures; all structural control measures; soil stockpile areas; washout areas and locations where vehicles enter or exit the site. These areas shall be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to the receiving waters. Locations where vehicles enter or exit the site shall also be inspected for evidence of off-site sediment tracking. For storms that end on a weekend, holiday or other time after which normal working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms that equal or exceed 0.5 inches. For storms of less than 0.5 inches, an inspection shall occur immediately upon the start of the subsequent normal working hours. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months.
2. The qualified inspector(s) shall evaluate the effectiveness of erosion and sediment controls, structural controls, stabilization practices, and any other controls implemented to prevent pollution and determine if it is necessary to install, maintain, or repair such controls and/or practices to improve the quality of stormwater discharge(s).
3. A report shall be prepared and retained as part of the Plan in Appendix D. This report shall summarize: the scope of the inspection; name(s) and qualifications of personnel making the inspection; the date(s) of the inspection; weather conditions including precipitation information;

major observations relating to erosion and sediment controls and the implementation of the Plan; a description of the stormwater discharge(s) from the site; and any water quality monitoring performed during the inspection. The report shall be signed by PSEG or his/her authorized representative in accordance with the "Certification of Documents" section of the General Permit.

The report shall include a statement that, in the judgment of the qualified inspector(s) conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the SWPCP and General Permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions required to bring the site back into compliance. Non-engineered corrective actions (as identified in the Guidelines) shall be implemented on site within 24 hours and incorporated into a revised SWPCP within three (3) calendar days of the date of inspection unless another schedule is specified in the Guidelines. Engineered corrective actions (as identified in the Guidelines) shall be implemented on site within seven (7) days and incorporated into a revised SWPCP within ten (10) days of the date of inspection, unless another schedule is specified in the Guidelines or is approved by the Commissioner. During the period in which any corrective actions are being developed and have not yet been fully implemented, interim measures shall be implemented and described on an inspection report, to minimize the potential for the discharge of pollutants from the site.

Inspectors from the CT DEEP and potentially the appropriate Soil Conservation District may inspect the site for compliance with the General Permit at any time construction activities are ongoing and upon completion of construction activities to verify the final stabilization of the site and/or the installation of post-construction stormwater management measures.

4.13.3 Turbidity Monitoring Requirements

Turbidity monitoring will be performed once per month when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall.

The permittee is only required to take samples during normal working hours. If sampling is discontinued due to the end of normal working hours, the permittee shall resume sampling the following morning or the morning of the next working day following a weekend or holiday, as long as the discharge continues.

Sampling may be temporarily suspended any time conditions exist that may reasonably pose a threat to the safety of the person taking the sample. Such conditions may include high winds, lightning, impinging wave or tidal activity, intense rainfall or other hazardous condition. Once the unsafe condition is no longer present, sampling shall resume.

If there is no stormwater discharge during a month, sampling is not required. Stormwater sampling will be performed in accordance with procedures defined in the General Permit.

4.13.4 Reporting

Within thirty (30) days following the end of each month, PSEG shall enter the stormwater sampling result(s) on the Stormwater Monitoring Report (SMR) form (available at www.ct.gov/deep/stormwater) and submit it in accordance with the NetDMR provisions. If there was no discharge during any given monitoring period, the permittee shall submit the form as required with the words "no discharge" entered in place of the monitoring results. If the permittee monitors any discharge more frequently than required by this general permit, the results of this monitoring shall be included in additional SMRs for the month in which the samples were collected.

For a period of at least five years from the date that construction is complete, the permittee shall retain copies of the Plan and all reports required by the General Permit, and records of all data used to complete the registration for the General Permit, unless the Commissioner specifies another time period in writing. Inspection records must be retained as part of the SWPCP for a period of five (5) years after the date of the final post-construction inspection.

4.13.5 Post-Construction

Prior to filing a Notice of Termination, PSEG will have a qualified professional perform a final site inspection. The qualified professional must certify the following:

- the site has undergone final stabilization using either vegetative or structural stabilization methods;
- temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed;
- permanent stormwater management and erosion control measures have been installed;
- an operation and maintenance plan reflecting final design conditions and specifications has been prepared.

The phrase "final stabilization" means that soil-disturbing activities at the site have been completed and final surface cover practices have been installed. Where vegetative stabilization practices are used, a uniform, perennial vegetative cover with a density of eighty (80) percent or higher must be achieved.

4.14 Construction Phase Maintenance

Temporary erosion and sediment controls installed as part of this SWPCP, as well as temporary vegetative or surface stabilization measures, will be maintained until final stabilization measures are in place. Maintenance requirements for each type of control implemented are included on the Erosion and Sediment Control Detail Sheets contained in Appendix B. Controls shall be repaired or replaced, as necessary, and as noted on inspection reports.

5.0 Post-Construction Stormwater Management Controls

5.1 Post Construction Stormwater Management Practices

The combined cycle plant will be equipped with a stormwater management system designed to satisfy applicable water quality requirements for major development, per the 2004 Connecticut Stormwater Quality Manual. The Facility's stormwater management systems combine use of cover stabilization practices, a subsurface gravity collection and conveyance system, manufactured treatment devices and discharge control practices (i.e., riprap outlet protection). Stormwater from the site discharges to Bridgeport Harbor (i.e., tidal waters); therefore, stream channel protection, conveyance protection, and peak flow attenuation criteria do not apply. The main plant area includes land uses with potentially higher pollutant loadings, so groundwater recharge criteria are also not applicable. Infiltration trenches will be used to manage stormwater runoff from the plant access drives.

Treatment for the water quality volume (WQV)/water quality flow (WQF) for the main plant area will be accomplished through installation of manufactured treatment devices and use of surface treatments that minimize the contribution of suspended solids or nutrients, such as nitrogen and phosphorus, to receiving waters.

5.2 Factors Limiting Use of Conventional Stormwater Management Practices

Other than for BHS Unit 5 access roads, traditional stormwater management practices are not recommended for managing the water quality volume from the main plant area for the following reasons:

- presence of existing or proposed subsurface utility interconnections and infrastructure;
- presence of onsite freshwater and tidal wetlands, which have been avoided to the maximum extent practicable;
- space constraints.

Taken collectively, the above factors limit the constructability (i.e., represent significant space constraints) as well as the long term operability of traditional or standard stormwater management approaches. To overcome these constraints, manufactured treatment devices will be used for post-construction stormwater management from the main plant area.

5.3 Manufactured Treatment Devices (MTDs)

PSEG will ensure that the requirements for selection and use of manufactured treatment devices (MTDs) contained in the 2004 Connecticut Stormwater Quality Manual are followed. In addition, PSEG will ensure that manufacturer's recommendations concerning design details for the systems selected, including structural integrity, configuration, assembly, and installation, are used. They include, but are not limited to, manufacturer's recommendations for pretreatment, bypass, overflow, head configuration, inflow and outflow rates, separation distance, accessibility, and safety.

The MTDs will be installed in an offline configuration. To demonstrate compliance with water quality criteria, they will be certified by the New Jersey Center for Advanced Technology (NJCAT) to provide a

minimum 80% total suspended solids (TSS) removal. Based on current design, Contech "Jellyfish" MTDs will be used. NJCAT certification data/information is included in Appendix H.

Operation and long term maintenance of the units will be the responsibility of PSEG. Routine maintenance will be performed in accordance with manufacturer's recommendations.

5.4 Grading and Drainage Plans

Grading and drainage plans are provided on Drawing Numbers 191547-5STF-S3000 through 191547-5STF-S3007 in Appendix B. Clean fill will be imported to the site to raise site grades. A sheet pile retaining wall will be installed to encircle the main plant area. Access drives and parking areas will be paved. Remaining yard areas will be surfaced with a minimum four inch layer of Number 57 crushed stone. All disturbed/exposed areas that are not otherwise stabilized using aggregate, roofs, concrete (i.e., equipment pads or secondary containment structures), or paved surfaces will be stabilized with topsoil and seeded with a New England conservation/wildlife mix, to establish a cover of native grasses, forbs, wildflowers, and legumes to provide both soil stability and wildlife habitat value.

The primary development area served by the stormwater management system covers approximately 13 acres. Runoff will be managed using both structural and non-structural best management practices (BMPs). Stormwater runoff will discharge to Bridgeport Harbor (i.e., to tidal waters) from a newly constructed outfall. Since flooding conditions in the Bridgeport Harbor are driven by coastal storm surge rather than rainfall runoff, site stormwater runoff will not adversely impact downstream flooding conditions.

The structural components of the system combine use of cover stabilization practices, a subsurface gravity collection and conveyance system, secondary containment structures for tanks and equipment containing oils or chemicals, MTDs and outfall protection practices. Drainage from the main plant area will be collected in catch basins and routed to MTDs through a subsurface gravity collection system. In accordance with City of Bridgeport requirements, the subsurface gravity collection system is sized to manage the 25-year, 24-hour rainfall event.

NJCAT certified manufactured treatment devices (MTDs) sized to manage the CT DEEP water quality flow will be used to satisfy total suspended solids (TSS) removal requirements. As indicated in Section 5.2, the MTDs will be installed in an off-line configuration, with excess flows diverted directly to the outfall. MTD's are frequently selected as a preferred stormwater management option for brownfield sites and sites having limited space for installation of conventional stormwater management structures, since MTDs require significantly less space than conventional stormwater management practices.

Non-structural BMPs will include but not be limited to: routine inspection and maintenance provisions for equipment and material storage areas; standard operating procedures for proper handling and management of chemicals and fuel oil; and proper management of stormwater that collects in secondary containment basins or structures. All non-structural BMPs will be documented as part of the site's Stormwater Pollution Prevention Plan (SPPP) prior to facility operation.

A new stormwater outfall will be constructed to discharge treated stormwater from the BHS Unit 5 main plant area into Bridgeport Harbor at the location shown on Drawing Number 191547-5STF-S3006 in Appendix B. A design drawing for the outfall is shown on Drawing Number 191547-5STF-S3050 in Appendix B. The proposed outfall will consist of an outfall pipe and riprap outlet protection. The outfall pipe will consist of a 53-inch by 34-inch elliptical pipe having an approximate invert elevation of 4.0 feet (NAVD88). As shown on Drawing Number 191547-5STF-S3050, the mean high water (MHW) elevation at the proposed discharge location is elevation 3.15 feet (NAVD88) and the mean low water (MLW) elevation is -3.6 feet (NAVD88).

Immediately downstream of the outfall, rock riprap will be used for energy dissipation to prevent scour and protect against bank erosion. Design details for the rock riprap are shown on Drawing Number 191547-5STF-S3901. Backup calculations for riprap are included in Appendix I.

Drainage from access roads to the BHS Unit 5 site will be directed to infiltration trenches. At a minimum, the infiltration trenches will capture and infiltrate the water quality volume associated with 1-inch of rainfall. Use of the proposed infiltration practices satisfies CT DEEP's water quality treatment requirements for 80% TSS removal.

5.5 Collection System Design Calculations

Backup calculations for the BHS Unit 5 stormwater management system are contained in Appendix I. They include the following:

Calculation Number	Title
58.0821.1121.01	Containment Design for Miscellaneous Tanks, Transformers, and Chemical/Oil Unloading Areas
58.5406.1101.01	Stormwater System Design
58.5406.1101.04	Site Infiltration Trench Depth and Surface Area
58.5406.1101.05	Rip Rap Sizes for Wave Protection
58.5406.1101.07	Post-Development Runoff Rate
58.5406.1101.08	Pre-Development Runoff Rate
58.5406.1101.09	Stormwater Outfall Riprap Apron Sizing
58.5406.1101.10	Site Water Quality Flow Calculation
58.5406.1101.11	Site Water Quality Volume Calculation
58.5406.1101.13	Ditch Depth Check Calculation
58.5406.1101.14	Site Stormwater Reinforced Concrete Pipe Cover

5.6 Post Construction Inspection and Maintenance Procedures

The MTDs are expected to become the repositories for sediment, trash, debris, and other pollutants targeted by the CT DEEP Stormwater Management Rules. For this reason, the MTDs require maintenance, including regular inspection and cleaning, sediment and debris removal, and periodic filter cleaning or replacement. In accordance with manufacturer's recommendations, the following procedures for routine inspection and maintenance will be followed. Note that inspection frequencies and maintenance activities will be subject to revision based on observed (i.e., site specific) operating performance characteristics.

Initial inspection of the Jellyfish filter system will be performed from the surface. Maintenance activities will require a combination of procedures conducted from the surface and with worker entry into the structure. The Jellyfish filter system's patent pending technology has no moving parts, facilitating the inspection and maintenance process.

5.6.1 Inspection Frequency

Prior to placing the MTDs into service, a post-construction inspection will be performed. Routine inspections are recommended by the manufacturer during the first year of operation to accurately assess the sediment and floatable pollutant accumulation rate, and to ensure that the automatic backwash feature is functioning properly. Routine inspections will be performed in accordance with the CT DEEP stormwater regulations. Inspections will also be performed immediately following a spill event that could potentially impact MTD performance characteristics.

5.6.2 Maintenance Frequency

All structural components of the stormwater collection and treatment systems will be inspected for cracking, subsidence, spalling, erosion, and deterioration, annually. Maintenance of treatment units, collection sumps and catch basins will be performed using vacuum trucks on an annual basis or as necessary based on routine inspection and monitoring. The vacuum service industry is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. All vacuum truck cleanout operations at the site will be performed by a licensed liquid waste hauler.

The frequency of maintenance will be increased or reduced based on observed conditions. If the sediment load is high, maintenance may be required semi-annually. Conversely, if the sediment load is low, maintenance may be required less frequently. Maintenance will be performed immediately after a spill or release occurs or once the sediment depth in the Jellyfish units reaches the manufactures recommended cleanout level of 12 inches. Any oily waste products collected (i.e., oil/chemical/fuel spills) will be removed by an appropriately licensed waste management company.

In accordance with manufactures recommendation, filter cartridges must be cleaned and re-commissioned, or replaced, every 12 months or when the automatic backwash feature no longer functions, whichever occurs first. The automatic backwash function will be disabled if the filter cartridges become saturated with sediment. This saturated condition is indicated if the backwash pool contains more than 3 inches depth of water after 12 or more hours of dry weather have elapsed since the most recent rainfall/runoff event.

5.6.3 Training

The Jellyfish filter system will be inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins. Since some of the maintenance procedures require manned entry into the Jellyfish structure, only professional maintenance service providers trained in confined space entry procedures will be allowed to enter the vessel. Service provider companies typically have personnel who are trained and certified in confined space entry procedures according to local, state, and federal standards. The qualifications and training records of the service provider and their entry supervisor will be requested during service

provider selection. Before entry, training records of personnel assigned to this task, as well as their job safety analysis, entry equipment, and personal protective equipment, will be examined by the facility's Safety Officer.

For typical inspection and maintenance activities, no specific supplemental training is required for the Jellyfish filter system. Information provided in this document and in the Jellyfish Filter System Operation and Maintenance Manual (provided to the system owner at delivery) contains sufficient guidance to maintain the system properly.

5.6.4 Jellyfish Inspection/Maintenance

Manufacturer's recommendations for maintenance and cleanout of the Jellyfish MTDs will be followed. Jellyfish units should be cleaned out once the sediment depth reaches 12 inches. If sediment accumulates beyond 12 inches in depth, filter cartridge life and sediment removal efficiency may be reduced. Generally, the minimum cleaning frequency is once annually, although the actual frequency will be determined through more frequent monitoring and adjusted based on such inspection results.

Filter cartridges should be cleaned and re-commissioned, or replaced, every 12 months or when the automatic backwash feature no longer functions, whichever occurs first. If filter cartridges become saturated with sediment, the system may not provide filtration treatment at the designed water quality flow rate, and unfiltered water may bypass the filter cartridges.

The automatic backwash function will be disabled if the filter cartridges become saturated with sediment. This saturated condition is indicated if the backwash pool contains more than 3 inches of water after 12 or more hours of dry weather have elapsed since the most recent runoff event.

The unit should be cleaned out immediately after an oil or fuel spill. If an oil spill exceeds the oil capacity of the system, subsequent spills may not be captured and may cause fouling of the filter cartridges. In addition, if debris clogs the inlet of the system, removal efficiency of sediment, hydrocarbons, and gross pollutants may be reduced. In addition, if a downstream blockage occurs, a backwater condition may occur in the system and removal efficiency of sediment, hydrocarbons, and gross pollutants may be reduced.

5.6.5 Inspection Equipment

The following equipment will be maintained onsite for MTD inspections:

- Manhole access cover lifting tool
- Oil dipstick or sampling tool
- Sediment probe
- Flashlight
- Camera
- Data log
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

The Jellyfish filter system will be inspected from the surface through the standard surface manhole access cover. Sediment and oil depth inspections will be performed with a sediment probe and oil dipstick. Sediment and oil depth will be measured through the 30-inch diameter maintenance access port. The internal components of the units will be visually inspected for signs of obvious damage.

A visual inspection of the units will also be performed for floatable pollutant accumulation, such as litter and hydrocarbons, by shining a flashlight into the 30-inch diameter maintenance access port. Visual inspection of the backwash pool (6-inch high kidney-shaped or oval-shaped weir) will also be performed to check for standing water in the pool. If at least 12 hours of dry weather have elapsed since the most recent rainfall/runoff event and the backwash pool contains more than 3 inches of water, the filter cartridges are likely saturated with sediment and should be cleaned or replaced.

A visual inspection of the upstream diversion chamber will also be performed for floatable pollutant and sediment accumulation. Debris potentially impacting the operation of diversion weirs will be removed. Excess sediment accumulation within the diversion chamber will be removed using a vacuum truck.

5.6.6 Maintenance Equipment

Equipment required for routine maintenance of the MTDs includes the following:

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal, if necessary
- Manhole access cover lifting tool
- Oil dipstick or sampling tool
- Sediment probe
- Flashlight
- Camera
- Data log
- Safety cones and caution tape
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, proper respiratory gear, and safety harness for specially trained personnel if confined space entry is required
- Replacement cartridges are required if manual cleaning and re-commissioning of existing cartridges is not possible or adequate to restore proper system function
- Jellyfish cartridge backflush pipe

5.6.7 Jellyfish Maintenance Procedures

Recommended maintenance procedures for the Jellyfish units are outlined below:

1. The Jellyfish filter system can be maintained through the standard surface manhole access cover. All access covers should be removed to provide additional light and ventilation. If custom doors were installed instead of frames and covers, open all doors.

2. Insert the oil dipstick or sampling tool into the 30-inch diameter maintenance access port. If oil is present, pump off the oil layer into separate containment using a small pump and tubing. Some maintenance service providers may elect to use the vacuum hose if the oil amount is small.
3. Maintenance cleaning of accumulated floatable litter and sediment is performed with a vacuum hose inserted through the 30-inch diameter maintenance access port.
4. Using the vacuum hose, decant the water from the lower chamber to the sanitary sewer, if permitted by the local regulatory authority (Bridgeport WPCA), or into a separate containment tank.
5. Remove the sludge from the bottom of the unit using the vacuum hose.
6. Complete sediment removal may be facilitated by inserting a water hose with jet nozzle through a hole in the cartridge deck where a filter cartridge has been removed. Use the water jet to break up sediment on the bottom of the vessel that is farthest from the 30-inch diameter maintenance access port. Rinse this sediment toward the maintenance access port for easy vacuum removal.
7. To access the cartridge deck for manual cleaning or replacement of filter cartridges, descend the ladder that is built into structure's sidewall, observing all precautions for safe and proper confined space entry. Note that the cartridge deck may be slippery. Care should be taken to avoid stepping directly onto the cartridge heads or onto the backwash pool weir.
8. A manual backflush of the cartridges is recommended to remove a high percentage of accumulated sediment from the filtration tentacles, restore flow capacity, and extend the service life of the cartridges. A Jellyfish Cartridge Backflush Pipe (12-inch diameter x 3-feet length threaded plastic pipe with flapper valve) may be purchased from Imbrium Systems that allows each cartridge to be selectively backwashed using water that is supplied from either (a) the previously decanted water stored in a vactor truck compartment; (b) clean water from a separate water truck delivered to the site; or (c) water from a nearby fire hydrant or other clean water source.

   Manual backflush procedure: Twist the threaded lid on the cartridge head counter-clockwise to remove the lid and expose the tentacle holes. Carefully screw in the threaded Jellyfish Cartridge Backwash Pipe over the exposed tentacle holes. Do not over-tighten. Fill the Pipe with water (approximately 16 gallons). Pull the cord to open the flapper valve and backflush the water through the cartridge. Refill the Pipe and backflush a second time. The full Pipe contents should drain within approximately 20 seconds to remove a high percentage of accumulated sediment and restore the flow capacity of the cartridge. Remove the Pipe and reinstall the lid hand-tight.

   Inspection of cartridge after manual backflushing: After manually backflushing the first cartridge, a visual inspection of the filtration tentacles is recommended. With the threaded lid removed, lift the cartridge (using the lifting loops in the cartridge head) so that the filtration tentacle bundle is exposed. If upon visual inspection the degree or nature of any remaining sediment accumulation on the tentacles shows that the manual backwash was not effective, provisions must be made to replace all the spent cartridges with new cartridges as soon as

possible. To re-commission a cleaned and regenerated cartridge, or to install a new cartridge, place the cartridge into the cartridge hole and re-install the threaded lid hand-tight to secure the cartridge.

New cartridges are lightweight (less than 20 pounds), and can be easily lowered down to a worker on the cartridge deck. Care should be taken not to bend or otherwise damage the tentacles during the handling and installation procedures.

For safety purposes, it is recommended that each spent cartridge be removed and replaced one at a time, such that there is never more than one cartridge hole exposed. Removable cartridge hole cover plates can be purchased from Imbrium Systems, if required.

9. If necessary, remove spent cartridges from the vessel.

10. After cartridge service has been completed, the backflush water may be removed by vacuum hose.

11. Re-fill the lower chamber with water, where required, by the local jurisdiction.

12. State and local disposal requirements for recovered pollutants and spent filter cartridges must be followed. In most cases the sediment and spent filter cartridges, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.

5.6.8 Disposal Requirements

Petroleum Based Pollutants

Petroleum-based pollutants captured by the oil/water separator or Jellyfish filter system (oil/fuel spills) will be removed and disposed of by a licensed waste management company.

Disposal Sites

A listing of approved disposal and recycling sites for sediment, trash, debris, and other material removed from the stormwater collection system will be included in the site's SPPP prior to commissioning of the MTDs.

5.6.9 Replacement Parts

Replacement parts for the Jellyfish units including: filter cartridges, cartridge hole cover plates, cartridge adaptors and other components can be ordered by contacting:

Imbrium Systems Corporation
888-279-8826
www.imbrium systems.com

5.6.10 Equipment Warranties/Users Manuals/Equipment Lists

Originals or copies of manufacturers' warranties on pertinent components of the MTDs will be included in the sites SPPP prior to commissioning.

Appendix A

Draft Registration Form and General Permit

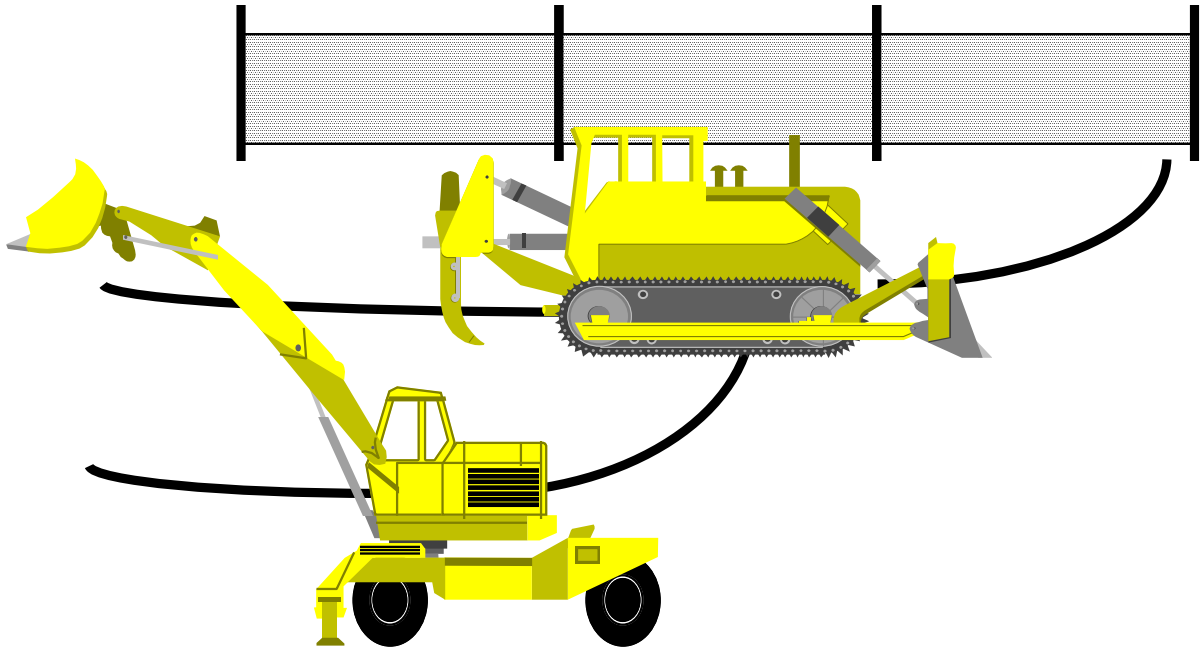
General Permit Registration Form for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (To be completed prior to submission to the CT DEEP.)

- General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities



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General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

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General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Section 1. Authority

This general permit is issued under the authority of section 22a-430b of the Connecticut General Statutes.

Section 2. Definitions

The definitions of terms used in this general permit shall be the same as the definitions contained in section 22a-423 of the Connecticut General Statutes and section 22a-430-3(a) of the Regulations of Connecticut State Agencies. As used in this general permit, the following definitions shall apply:

"*x-year, 24-hour rainfall event*" means the maximum 24-hour precipitation event with a probable recurrence interval of once in the given number of years (i.e. x=2, 25 or 100), as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States," May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

"*Annual sediment load*" means the total amount of sediment carried by stormwater runoff on an annualized basis.

"*Aquifer protection area*" means aquifer protection area as defined in section 22a-354h of the Connecticut General Statutes.

"*Best engineering practices*" means the design of engineered control measures to control pollution to the maximum extent achievable using measures that are technologically available and economically practicable.

"*CFR*" means the Code of Federal Regulations.

"*Coastal area*" means coastal area as defined in section 22a-93(3) of the Connecticut General Statutes.

"*Coastal waters*" means coastal waters as defined in section 22a-93(5) of the Connecticut General Statutes.

"*Commissioner*" means commissioner as defined in section 22a-2(b) of the Connecticut General Statutes.

"*Construction activity*" means any activity associated with construction at a site including, but not limited to, clearing and grubbing, grading, excavation, and dewatering.

"*Department*" means the Department of Energy & Environmental Protection.

"*Developer*" means a person who or municipality which is responsible, either solely or partially through contract, for the design and construction of a project site.

"*Dewatering wastewater*" means wastewater associated with the construction activity generated from the lowering of the groundwater table, the pumping of accumulated stormwater or uncontaminated groundwater from an excavation, the pumping of surface water from a cofferdam, or pumping of other surface water that has been diverted into a construction site.

"*District*" means a soil and water conservation district established pursuant to section 22a-315 of the Connecticut General Statutes. Appendix E lists the Districts, their geographic delineations, and contact information.

"*Disturbance*" means the execution of any of the construction activity(ies) defined in this general permit.

"*Effective Impervious Cover*" is the total area of a site with a Rational Method runoff coefficient of 0.7 or greater (or other equivalent methodology) from which stormwater discharges directly to a surface water or to a storm sewer system.

"*Engineered stormwater management system*" means any control measure and related appurtenances which requires engineering analysis and/or design by a professional engineer.

"*Erosion*" means the detachment and movement of soil or rock fragments by water, wind, ice and gravity.

"*Fresh-tidal wetland*" means a tidal wetland with an average salinity level of less than 0.5 parts per thousand.

"*Grab sample*" means an individual sample collected in less than fifteen minutes.

"*Groundwater*" means those waters of the state that naturally exist or flow below the surface of the ground.

"*Guidelines*" means the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, established pursuant to section 22a-328 of the Connecticut General Statutes.

"*High Quality Waters*" means those waters defined as high quality waters in the Connecticut Water Quality Standards published by the Department, as may be amended.

"*Impaired water(s)*" means those surface waters of the state designated by the commissioner as impaired pursuant to Section 303(d) of the Clean Water Act and as identified in the most recent State of Connecticut Integrated Water Quality Report.

"*In Responsible charge*" means professional experience for which the Commissioner determines that a professional's primary duties consistently involve a high level of responsibility and decision making in the planning and designing of engineered stormwater management systems or in the planning and designing of soil erosion and sediment controls for residential and commercial construction projects. The Commissioner shall consider the following in determining whether a professional's experience qualifies as responsible charge experience:

(i) the level of independent decision-making exercised;

(ii) the number of individuals and the disciplines of the other professionals that the professional supervised or coordinated;

(iii) the extent to which a professional's responsibilities consistently involved the review of work performed by other professionals involved the planning and designing of engineered stormwater management systems or the planning and designing of soil erosion and sediment controls for residential and commercial construction projects;

(iv) the extent to which a professional's responsibilities consistently involved the planning and designing of engineered stormwater management systems or the planning and designing of soil erosion and sediment controls for residential and commercial construction projects and whether such responsibilities were an integral and substantial component of the professional's position;

(v) the nature of a professional's employer's primary business interests and the relation of those interests to planning and designing of engineered stormwater management systems or to planning and designing of soil erosion and sediment controls for residential and commercial construction projects;

(vi) the extent to which a professional has engaged in the evaluation and selection of scientific or technical methodologies for planning and designing of engineered stormwater management systems or for planning and designing of soil erosion and sediment controls for residential and commercial construction projects;

(vii) the extent to which a professional drew technical conclusions, made recommendations, and issued opinions based on the results of planning and designing of engineered stormwater management systems or of planning and designing of soil erosion and sediment controls for residential and commercial construction projects; or

(viii) any other factor that the Commissioner deems relevant.

"*Individual permit*" means a permit issued to a specific permittee under section 22a-430 of the Connecticut General Statutes.

"*Inland wetland*" means wetlands as defined in section 22a-38 of the Connecticut General Statutes.

"*Landscape Architect*" means a person with a currently effective license issued in accordance with chapter 396 of the Connecticut General Statutes.

"*Linear Project*" includes the construction of roads, railways, bridges, bikeways, conduits, substructures, pipelines, sewer lines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities in a long, narrow area.

"*Locally approvable project*" means a construction activity for which the registration is not for a municipal, state or federal project and is required to obtain municipal approval for the project.

"*Locally exempt project*" means a construction activity for which the registration is for a project authorized under municipal, state or federal authority and may not be required to obtain municipal approval for the project.

"*Low Impact Development*" or "*LID*" means a site design strategy that maintains, mimics or replicates pre-development hydrology through the use of numerous site design principles and small-scale treatment practices distributed throughout a site to manage runoff volume and water quality at the source.

"*Minimize*", for purposes of implementing the control measures in Section 5(*b*)(2) of this general permit, means to reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practice.

"*Municipal separate storm sewer system*" or "*MS4*" means conveyances for stormwater (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) owned or operated by any municipality and discharging to surface waters of the state.

"*Municipality*" means a city, town or borough of the state as defined in section 22a-423 of the Connecticut General Statutes.

"*Nephelometric Turbidity Unit*" or "*NTU*" means a unit measure of turbidity from a calibrated nephelometer.

"*Normal Working Hours*", for the purposes of monitoring under Section 5(*c*) of this general permit, are considered to be, at a minimum, Monday through Friday, between the hours of 8:00 am and 6:00 pm, unless additional working hours are specified by the permittee.

"*Permittee*" means any person who or municipality which initiates, creates or maintains a discharge in accordance with Section 3 of this general permit.

"*Person*" means person as defined in section 22a-423 of the Connecticut General Statutes.

"*Phase*" means a portion of a project possessing a distinct and complete set of activities that have a specific functional goal wherein the work to be completed in the phase is not dependent upon the execution of work in a later phase in order to make it functional.

"*Point Source*" means any discernible, confined and discrete stormwater conveyance (including but not limited to, any pipe, ditch, channel, tunnel, conduit, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft) from which pollutants are or may be discharged.

"*Professional Engineer*" or *"P.E.*" means a person with a currently effective license issued in accordance with chapter 391 of the Connecticut General Statutes.

"*Qualified Inspector*" means an individual possessing either (1) a professional license or certification by a professional organization recognized by the commissioner related to agronomy, civil engineering, landscape architecture, soil science, and two years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and commercial construction projects in accordance with the Guidelines; or (2) five years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and commercial construction projects in accordance with the Guidelines; or (3) certification by the Connecticut Department of Transportation (DOT).

"*Qualified professional engineer*" means a professional engineer who has, for a minimum of eight years, engaged in the planning and designing of engineered stormwater management systems for residential and commercial construction projects in accordance with the Guidelines and the Stormwater Quality Manual including, but not limited to, a minimum of four years in responsible charge of the planning and designing of engineered stormwater management systems for such projects.

"*Qualified soil erosion and sediment control professional*" means a landscape architect or a professional engineer who: (1) has for a minimum of eight years engaged in the planning and designing of soil erosion and sediment controls for residential and commercial construction projects in accordance with the Guidelines including, but not limited to, a minimum of four years in responsible charge of the planning and designing of soil erosion and sediment controls for such projects; or (2) is currently certified as a professional in erosion and sediment control as designated by EnviroCert International, Incorporated (or other certifying organization acceptable to the commissioner) and has for a minimum of six years experience engaged in the planning and designing of soil erosion and sediment controls for residential and commercial construction projects in accordance with the Guidelines including, but not limited to, a minimum of four years in responsible charge in the planning and designing of soil erosion and sediment controls for such projects.

"*Registrant*" means a person or municipality that files a registration.

"*Registration*" means a registration form filed with the commissioner pursuant to Section 4 of this general permit.

"*Regulated Municipal Separate Storm Sewer System*" or "*Regulated MS4*" means the separate storm sewer system of the City of Stamford or any municipally-owned or -operated separate storm sewer system (as defined above) authorized by the most recently issued General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 general permit) including all those located partially

or entirely within an Urbanized Area and those additional municipally-owned or municipally-operated Small MS4s located outside an Urbanized Area as may be designated by the commissioner.

"*Retain*" means to hold runoff on-site to promote vegetative uptake and groundwater recharge through the use of runoff reduction or LID practices or other measures. In addition, it means there shall be no subsequent point source release to surface waters from a storm event defined in this general permit or as approved by the commissioner.

"*Runoff reduction practices*" means those post-construction stormwater management practices used to reduce post-development runoff volume delivered to the receiving water, as defined by retaining the volume of runoff from a storm up to the first half inch or one inch of rainfall in accordance with Sections 5(b)(2)(C)(i)(a) or (b), respectively. Runoff reduction is quantified as the total annual post-development runoff volume reduced through canopy interception, soil amendments, evaporation, rainfall harvesting, engineered infiltration, extended filtration or evapo-transpiration.

"*Sediment*" means solid material, either mineral or organic, that is in suspension, is transported, or has been moved from its site of origin by erosion.

"*Site*" means geographically contiguous land on which a construction activity takes place or on which a construction activity for which authorization is sought under this general permit is proposed to take place. Non-contiguous land or water owned by the same person shall be deemed the same site if such land is part of a linear project (as defined in this section) or is otherwise connected by a right-of-way, which such person controls.

"*Soil*" means any unconsolidated mineral and organic material of any origin.

"*Stabilize"* means the use of measures as outlined in the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, or as approved by the commissioner, to prevent the visible movement of soil particles and development of rills.

"*Structural measure*" means a measure constructed for the temporary storage and/or treatment of stormwater runoff.

"*Standard Industrial Classification Code*" or "*SIC Code*" means those codes provided in the Standard Industrial Classification Manual, Executive Office of the President, Office of Management and Budget 1987.

"S*tandard of care*", as used in Section 3(b), means to endeavor to perform in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances.

"*Stormwater*" means waters consisting of rainfall runoff, including snow or ice melt during a rain event.

"*Stormwater Quality Manual*" means the 2004 Connecticut Stormwater Quality Manual published by the Connecticut Department of Energy & Environmental Protection, as amended.

"*Surface water*" means that portion of waters, as the term "waters" is defined in section 22a-423 of the Connecticut General Statutes, located above the ground surface.

"*Tidal wetland*" means a wetland as that term is defined in section 22a-29(2) of the Connecticut General Statutes.

"*Total disturbance*" means the total area on a site where soil will be exposed or susceptible to erosion during the course of all phases of a project.

"*Total Maximum Daily Load*" or "*TMDL*" means the maximum capacity of a surface water to assimilate a pollutant as established by the commissioner, including pollutants contributed by point and non-point sources and a margin of safety.

"*Upland soils*" means soils which are not designated as poorly drained, very poorly drained, alluvial, or flood plain by the National Cooperative Soils Survey, as may be amended, of the Natural Resources Conservation Service of the United States Department of Agriculture and/or the inland wetlands agency of the municipality in which the project will take place.

"*Water company*" means water company as defined in section 25-32a of the Connecticut General Statutes.

"*Water Quality Standards or Classifications*" means those water quality standards or classifications contained in the Connecticut Water Quality Standards published by the Department, as may be amended.

"*Water Quality Volume*" or "*WQV*" means the volume of runoff generated by one inch of rainfall on a site as defined in the 2004 Connecticut Stormwater Quality Manual, as amended.

Section 3. Authorization Under This General Permit

(a) Eligible Activities

This general permit authorizes the discharge of stormwater and dewatering wastewaters to surface waters from construction activities on a site, as defined in this general permit, with a total disturbance of one or more acres of land area on a site, *regardless of project phasing*.

In the case of a larger plan of development (such as a subdivision), the estimate of total acres of site disturbance shall include, but is not limited to, road and utility construction, individual lot construction (e.g. house, driveway, septic system, etc.), and all other construction associated with the overall plan, regardless of the individual parties responsible for construction of these various elements.

(b) Requirements for Authorization

This general permit authorizes the construction activity listed in the "Eligible Activities" section (Section 3(*a*)) of this general permit provided:

(1) Coastal Management Act

Such construction activity must be consistent with all applicable goals and policies in section 22a-92 of the Connecticut General Statutes, and must not cause adverse impacts to coastal resources as defined in section 22a-93(15) of the Connecticut General Statutes. Please refer to the Appendix D for additional guidance.

(2) Endangered and Threatened Species

Such activity must not threaten the continued existence of any species listed pursuant to section 26-306 of the Connecticut General Statutes as endangered or threatened and must not result in the destruction or adverse modification of habitat designated as essential to such species. See Appendix A.

(3) Aquifer Protection Areas

Such construction activity, if it is located within an aquifer protection area as mapped under section 22a-354b of the General Statutes, must comply with regulations adopted pursuant to section 22a-354i of the General Statutes. Please refer to the Appendix C for additional guidance.

For any construction activity regulated pursuant to sections 8(c) and 9(b) of the Aquifer Protection Regulations (section 22a-354i(1)-(10) of the Regulations of Connecticut State Agencies), the Stormwater Pollution Control Plan (Plan) must assure that stormwater run-off generated from the regulated construction activity (i) is managed in a manner so as to prevent pollution of groundwater, and (ii) complies with all the requirements of this general permit.

(4) Mining Operations Exception

The stormwater discharge resulting from an activity classified as Standard Industrial Classification 10 through 14 (the mining industry) is not authorized by this general permit and is regulated under the most recently issued General Permit for the Discharge of Stormwater Associated with Industrial Activity.

(5) Discharge to POTW

The stormwater is *not* discharged to a Publicly Owned Treatment Works (POTW).

(6) Discharge to Groundwater

The stormwater is *not* discharged entirely to groundwater, meaning a stormwater discharge to a surface water will not occur up to a 100-year, 24-hour rainfall event.

(7) Such construction activity must be consistent with the Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) for those river components and tributaries which have been designated as Wild and Scenic by the United States Congress. Further, such construction activities must not have a direct and adverse effect on the values for which such river designation was established. Please refer to Appendix H for additional guidance.

(8) Certification Requirements for Registrants and other Individuals

As part of the registration for this general permit, the registrant and any other individual or individuals responsible for preparing the registration submits to the commissioner a written certification which, at a minimum, complies with the following requirements:

(A) The registrant and any other individual or individuals responsible for preparing the registration and signing the certification has completely and thoroughly reviewed, at a minimum, this general permit and the following regarding the activities to be authorized under such general permit:

(i) all registration information provided in accordance with Section 4(*c*)(2) of such general permit;

(ii) the project site, based on a site inspection;

(iii) the Stormwater Pollution Control Plan; and

(iv) any plans and specifications and any Department approvals regarding such Stormwater Pollution Control Plan;

(B) The registrant and any other individual or individuals responsible for preparing the registration and signing the certification pursuant to this general permit has, based on the review described in section 3(*b*)(8)(A) of this general permit, made an affirmative determination to:

(i) comply with the terms and conditions of this general permit;

(ii) maintain compliance with all plans and documents prepared pursuant to this general permit including, but not limited to, the Stormwater Pollution Control Plan;

(iii) properly implement and maintain the elements of the Stormwater Pollution Control Plan; and

(iv) properly operate and maintain all stormwater management systems in compliance with the terms and conditions of this general permit to protect the waters of the state from pollution;

(C) Such registrant and any other individual or individuals responsible for preparing the registration certifies to the following statement: "I hereby certify that I am making this certification in connection with a registration under such general permit, submitted to the commissioner by [INSERT NAME OF REGISTRANT] for an activity located at [INSERT ADDRESS OF PROJECT OR ACTIVITY] and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(*b*)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(*b*)(8)(B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

(9) The registrant has submitted to the commissioner a written certification by a professional engineer or, where appropriate, a landscape architect licensed in the State of Connecticut for the preparation, planning and design of the Stormwater Pollution Control Plan and stormwater management systems:

(A) The professional engineer or landscape architect shall certify to the following statement:

"I hereby certify that I am a [professional engineer][landscape architect] licensed in the State of Connecticut. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by [INSERT NAME OF REGISTRANT] for an activity located at [INSERT ADDRESS OF PROJECT OR ACTIVITY]. I certify that I have thoroughly and completely reviewed the Stormwater

Pollution Control Plan for the project or activity covered by this certification. I further certify, based on such review and on the standard of care for such projects, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, the Stormwater Quality Manual, as amended, and the conditions of the general permit, and that the controls required for such Plan are appropriate for the site. I further certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement in this certification may subject me to sanction by the Department and/or be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

(B) Nothing in this section shall be construed to authorize a professional engineer or a landscape architect to engage in any profession or occupation requiring a license under any other provision of the general statutes without such license.

(10) Plan Review and Certification by a District for Locally Approvable Projects

For those Plans not reviewed in accordance with Section 3(*b*)(11), below, the registrant has submitted to the commissioner a written certification by the appropriate regional District for the review of the Stormwater Pollution Control Plan pursuant to Appendix F, which, at a minimum, complies with the following requirements:

(A) the Plan Review Certification must be signed by the District. Information on the District review process is outlined in the Memorandum of Agreement provided in Appendix F. In cases where the District is unable to complete review of the Plan within the time limits specified in the Memorandum of Agreement in Appendix F, a notice to that effect signed by the District may be submitted in lieu of the certification.

(B) the Stormwater Pollution Control Plan has been prepared in accordance with the requirements of Section 5(*b*) of the general permit.

(C) Nothing in this subsection shall be construed to authorize District personnel to engage in any profession or occupation requiring a license under any other provision of the general statutes without such license.

(11) Plan Review and Certification by a Qualified Soil Erosion and Sediment Control Professional and Qualified Professional Engineer for Locally Approvable Projects

For those Plans not reviewed in accordance with Section 3(*b*)(10), above, the registrant has submitted to the commissioner a written certification by a qualified professional engineer or a qualified soil erosion and sediment control professional in accordance with the following requirements:

(A) for projects disturbing more than one acre and less than fifteen (15) acres, such qualified soil erosion and sediment control professional or qualified professional engineer:

(i) is not an employee, as defined by the Internal Revenue Service in the Internal Revenue Code of 1986, of the registrant; and

(ii) has no ownership interest of any kind in the project for which the registration is being submitted.

(B) for projects disturbing fifteen (15) acres or more, such qualified soil erosion and sediment control professional or qualified professional engineer:

(i) is not an employee, as defined by the Internal Revenue Service in the Internal Revenue Code of 1986, of the registrant;

(ii) did not engage in any activities associated with the preparation, planning, designing or engineering of such plan for soil erosion and sediment control or plan for stormwater management systems on behalf of such registrant;

(iii) is not under the same employ as any person who engaged in any activities associated with the preparation, planning, designing or engineering of such plans and specifications for soil erosion and sediment control or plans and specifications for stormwater management systems on behalf of such registrant; and

(iv) has no ownership interest of any kind in the project for which the registration is being submitted.

(C) The qualified professional engineer or qualified soil erosion and sediment control professional signing the certification has, at a minimum, completely and thoroughly reviewed this general permit and the following regarding the discharges to be authorized under such general permit:

(i) all registration information provided in accordance with Section 4(*c*)(2) of such general permit;

(ii) the site, based on a site inspection;

(iii) the Stormwater Pollution Control Plan;

(iv) the Guidelines;

(v) the Stormwater Quality Manual, if applicable; and

(vi) all non-engineered and engineered stormwater management systems, including any plans and specifications and any Department approvals regarding such stormwater management systems.

(D) Affirmative Determination

(i) The qualified soil erosion and sediment control professional signing the certification must have made an affirmative determination, based on the review described in section 3(*b*)(11)(C) of this general permit that:

(a) the Stormwater Pollution Control Plan prepared and certified pursuant to the registration is adequate to assure that the project or activity authorized under this general permit, if implemented in accordance with the Stormwater Pollution Control Plan, will comply with the terms and conditions of such general permit; and

(b) all non-engineered stormwater management systems:

(*1*) have been designed to control pollution to the maximum extent achievable using measures that are technologically available and economically

practicable and that conform to those in the Guidelines and the Stormwater Quality Manual;

(*2*) will function properly as designed;

(*3*) are adequate to ensure compliance with the terms and conditions of this general permit; and

(*4*) will protect the waters of the state from pollution.

(ii) The qualified professional engineer signing the certification must have made an affirmative determination, based on the review described in section 3(*b*)(11)(C) of this general permit that:

(a) the Stormwater Pollution Control Plan prepared and certified pursuant to the registration is adequate to assure that the activity authorized under this general permit, if implemented in accordance with the Stormwater Pollution Control Plan, will comply with the terms and conditions of such general permit; and

(b) all non-engineered and engineered stormwater management systems:

(*1*) have been designed to control pollution to the maximum extent achievable using measures that are technologically available and economically practicable and that conform to those in the Guidelines and the Stormwater Quality Manual;

(*2*) will function properly as designed;

(*3*) are adequate to ensure compliance with the terms and conditions of this general permit; and

(*4*) will protect the waters of the state from pollution.

(E) The qualified professional engineer or qualified soil erosion and sediment control professional shall, provided it is true and accurate, certify to the following statement:

"I hereby certify that I am a qualified professional engineer or qualified soil erosion and sediment control professional, or both, as defined in the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and as further specified in sections 3(*b*)(11)(A) and (B) of such general permit. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by [INSERT NAME OF REGISTRANT] for an activity located at [INSERT ADDRESS OF PROJECT OR ACTIVITY]. I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(*b*)(11)(C) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I further certify that I have made the affirmative determination in accordance with Sections 3(*b*)(11)(D)(i) and (ii) of this general permit. I understand that this certification is part of a registration submitted in accordance with Section 22a-430b of Connecticut General Statutes and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be

punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

(F) Nothing in this subsection shall be construed to authorize a qualified soil erosion and sediment control professional or a qualified professional engineer to engage in any profession or occupation requiring a license under any other provision of the general statutes without such license.

(12) New Discharges to Impaired Waters

New stormwater discharges directly to an impaired water, as indicated in the State's Integrated Water Quality Report, must be in accordance with the following conditions:

(A) Stormwater discharges that go directly to impaired waters seeking authorization under this general permit shall comply with the requirements of this subsection (B) below if the indicated cause or potential cause of the impairment is one of the following:

- Site Clearance (Land Development or Redevelopment)
- Post-Development Erosion and Sedimentation
- Source Unknown (if cause of impairment is Sedimentation/Siltation)

(B) Such stormwater discharge is authorized if the permittee complies with the requirements of Section 5(*b*)(3) of this permit and receives a written affirmative determination from the commissioner that the discharge meets the requirements of that section. In such case, the permittee must keep a copy of the written determination onsite with the Plan. If the permittee does not receive such affirmative determination, the construction activity is not authorized by this general permit and must obtain an individual permit.

(c) Registration

Pursuant to the "Registration Requirements" section (Section 4) of this general permit, a completed registration with respect to the construction activity shall be filed with the commissioner as follows:

(1) Locally Approvable Projects

The registration must:

(A) Be electronically submitted, along with all required elements in subsections (B), (C) and (D), below, at least sixty (60) days prior to the planned commencement of the construction activity.

(B) Include the Registration Form (available at www.ct.gov/deep/stormwater).

(C) Include any additional forms and information regarding compliance and/or consistency with the Coastal Management Act, Impaired Waters (including TMDL requirements), Endangered and Threatened Species, and Aquifer Protection Areas that may be required pursuant to the "Requirements of Authorization" section (Section 3(*b*)).

(D) Include a Plan Review Certification in accordance with the "Plan Review Certification" (Section 5(*b*)(8)).

Locally Approvable projects may also choose to make their Plan electronically available in accordance with Section 4(*c*)(2)(N) of this general permit. The 60 day period cited in subsection

(A), above, will not begin until all required elements have been submitted. Failure to include any of these required submissions shall be grounds to reject the registration.

(2) Locally Exempt Projects

The registration must:

(A) Be electronically submitted, along with all required elements in subsections (B), (C) and (D), below, at least:

(i) sixty (60) days prior to the planned commencement of the construction activity if the site has a total disturbed area of between one (1) and twenty (20) acres; ***or***

(ii) ninety (90) days prior to the planned commencement of construction activity if the site:

(a) has a total disturbed area greater than twenty (20) acres;

(b) discharges to a tidal wetland (that is not a fresh-tidal wetland) within 500 feet of the discharge point; ***or***

(c) is subject to the impaired waters provisions of Section 3(*b*)(12).

(B) Include the Registration Form (available at www.ct.gov/deep/stormwater).

(C) Include any additional forms and information regarding compliance and/or consistency with the Coastal Management Act, Impaired Waters (including TMDL requirements), Endangered and Threatened Species, and Aquifer Protection that may be required pursuant to the "Requirements of Authorization" section (Section 3(*b*)).

(D) Include an electronic copy of the Stormwater Pollution Control Plan (Plan) (or a web address where the electronic Plan can be downloaded) for the commissioner's review. The electronic Plan shall be in Adobe™ PDF format or similar publicly available format in common use. **DO NOT INCLUDE** in this electronic copy any pages or other material that do not pertain to stormwater management or erosion and sedimentation control (such as electrical and lighting plans, boundary or lot surveys, building plans, non-stormwater related detail sheets, etc.).

The 60 or 90 day periods cited in subsections (A), above, will not begin until all required elements have been submitted. Failure to include any of these required submissions shall be grounds to reject the registration.

(3) Re-Registration of Existing Projects

For sites previously registered under any previous version of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and for which no Notice of Termination has been submitted pursuant to the "Termination Requirements" section (Section 6), a Re-Registration Form (available at www.ct.gov/deep/stormwater) pursuant to Section 4(*c*)(3) shall be submitted on or before February 1, 2014. The re-registration fee is payable (or waived) in accordance with Section 4(c)(1)(A)(iii). Resubmission of the permittee's Plan is not required unless specifically requested by the commissioner.

(d) Small Construction

For construction projects with a total disturbance of between one and five acres, the permittee shall adhere to the erosion and sediment control land use regulations of the municipality in which the construction activity is conducted, as well as the Guidelines and the Stormwater Quality Manual.

No registration or Plan review and certification shall be required for such construction activity provided a land-use commission of the municipality (i.e. planning/zoning, wetland, conservation, etc) reviews and issues a written approval of the proposed erosion and sediment control measures, pursuant to the requirements of section 22a-329 of the Connecticut General Statutes. In the absence of such municipal commission approval, the permittee shall register with the DEEP under the requirements for a Locally Exempt Project and comply with all applicable conditions of this general permit.

(e) Geographic Area

This general permit applies throughout the State of Connecticut.

(f) Effective Date and Expiration Date of this General Permit

The registration provisions of Section 3(*c*) and 4 of this General Permit, including any applicable definitions or provisions referred to in those sections insofar as they facilitate submission of a registration, shall be effective September 1, 2013. All remaining provisions of this General Permit shall be effective on October 1, 2013. The provisions of this General Permit shall expire on September 30, 2018.

(g) Effective Date of Authorization

A construction activity is authorized by this general permit at such time as specified in subsections (1) and (2), below.

(1) Authorization Timelines

The activity is authorized based on the following timelines unless superseded by subsection (2), below:

(A) for locally approvable projects, sixty (60) days after the submission of the registration form required by Section 4(*c*), or

(B) for locally exempt projects under 20 acres, sixty (60) days after the submission of the registration form required by Section 4(*c*), or

(C) for locally exempt projects over 20 acres, ninety (90) days after the submission of the registration form required by Section 4(*c*).

(2) Alternate Authorization Timelines

If one of the following conditions for authorization applies, that condition shall supersede those of subsection (1), above:

(A) for sites for which the registration and Plan availability and review provisions of Section 4(e) are completed prior to the authorization periods in subsection (1), above, the commissioner may authorize the activity upon such completion, or

(B) for sites subject to the conditions of Section 3(b)(2), 3(*b*)(12) and/or Section 5(*a*)(2), the activity is authorized on the date of the commissioner's affirmative determination and/or approval, or

(C) for sites authorized by any previous version of this general permit and for which no Notice of Termination has been submitted pursuant to the "Termination Requirements" section (Section 6), the activity is authorized effective October 1, 2013. Authorization under this general permit shall cease if a re-registration form is not submitted on or before February 1. 2014.

(h) Revocation of an Individual Permit

If a construction activity is eligible for authorization under this general permit and such activity is presently authorized by an individual permit, the existing individual permit may be revoked by the commissioner upon a written request by the permittee. If the commissioner revokes such individual permit in writing, such revocation shall take effect on the effective date of authorization of such activity under this general permit.

(i) Issuance of an Individual Permit

If the commissioner issues an individual permit under section 22a-430 of the Connecticut General Statutes, authorizing a construction activity authorized by this general permit, this general permit shall cease to authorize that activity beginning on the date such individual permit is issued.

Section 4. Registration Requirements

(a) Who Must File a Registration

With the exception noted in the "Small Construction" section (Section 3(*d*)) of this general permit, any person or municipality which initiates, creates, originates or maintains a discharge described in the "Eligible Activities" section (Section 3(*a*)) of this general permit shall file with the commissioner a registration form that meets the requirements of the "Contents of Registration" section (Section 4(*c*)) of this general permit (or a re-registration form) and the applicable fee within the timeframes and in the amounts specified in Sections 3(*c*) and 4(*c*)(1)(A), respectively. Any such person or municipality filing a registration remains responsible for maintaining compliance with this general permit.

(b) Scope of Registration

Each registration shall be limited to the discharge at or from one site; no registration shall cover discharges at or from more than one site.

(c) Contents of Registration

(1) Fees

(A) Registration Fee

A registration, if required, shall not be deemed complete unless the registration fee has been paid in full.

(i) Locally Approvable Projects

A registration fee of $625.00 shall be submitted to the Department with the registration form.

(ii) Locally Exempt Projects

A registration fee shall be submitted with a registration form as follows:

(a) For sites with total disturbance of between one (1) and twenty (20) acres, the fee shall be $3,000.

(b) For sites with total disturbance equal to or greater than twenty (20) acres and less than fifty (50) acres, the fee shall be $4,000.

(c) For sites with total disturbance equal to or greater than fifty (50) acres, the fee shall be $5,000.

The fees for municipalities shall be half of those indicated in subsections (a), (b) and (c) above pursuant to section 22a-6(b) of the Connecticut General Statutes. State and Federal agencies shall pay the full fees specified in this subsection.

(iii) Re-registration

(a) For sites that registered under the previous version of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities prior to September 1, 2012 and for which no Notice of Termination has been submitted pursuant to the "Termination Requirements" section (Section 6), the re-registration fee shall be $625 payable with submission of the re-registration form within one hundred twenty (120) days from the effective date of this general permit. If a Notice of Termination is submitted prior to that time, no registration or fee are required.

(b) For sites that registered under the previous version of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities on or after September 1, 2012 and for which no Notice of Termination has been submitted pursuant to the "Termination Requirements" section (Section 6), the re-registration fee is waived.

(B) The registration fee shall be paid electronically or by check or money order payable to the Department of Energy & Environmental Protection.

(C) The registration fee is non-refundable.

(2) Registration Form

A registration shall be filed electronically on forms prescribed and provided by the commissioner (available at: www.ct.gov/deep/stormwater) and shall include, but not be limited to, the following:

(A) Legal name, address, and telephone number of the registrant. If the registrant is a person (as defined in Section 2 of this permit) transacting business in Connecticut and is registered with the Connecticut Secretary of the State, provide the exact name as registered with the Connecticut Secretary of the State.

(B) Legal name, address and telephone number of the owner of the property on which the construction activity will take place.

(C) Legal name, address and telephone number of the primary contact for departmental correspondence and inquiries, if different from the registrant.

(D) Legal name, address and telephone number of the developer of the property on which the construction activity is to take place.

(E) Legal name, address and daytime and off-hours telephone numbers of the general contractor(s) or other representative(s), if different from the developer.

(F) Legal name, address and telephone number of any consultant(s), engineer(s) or landscape architect(s) retained by the permittee to prepare the registration and Stormwater Pollution Control Plan.

(G) Location address or description of the site for which the registration is filed.

(H) The estimated duration of the construction activity.

(I) Indication of the normal working hours of the site.

(J) A brief description of the construction activity, including, but not limited to:

(i) Total number of acres to be disturbed, regardless of phasing.

(ii) Assurance that construction is in accordance with the Guidelines and local erosion and sediment control ordinances, where applicable.

(iii) For sites in the Coastal Boundary, documentation that the DEEP Office of Long Island Sound Programs or local governing authority has issued a coastal site plan approval or a determination that the project is exempt from coastal site plan review (see Appendix D) in accordance with section 22a-92 and 22a-93(15) of the Connecticut General Statutes.

(iv) Documentation that the construction activity will not threaten the continued existence of any species listed pursuant to section 26-306 of the Connecticut General Statutes as endangered or threatened and will not result in the destruction or adverse modification of habitat designated as essential to such species (see Appendix A).

(v) For sites discharging to certain impaired waters, as specified in Section 3(*b*)(12), documentation that the construction activity meets the requirements of that section and Section 5(*b*)(3) for authorization under this general permit.

(vi) Assurance that the construction activity is not located within an aquifer protection area (see Appendix C) as mapped under section 22a-354b of the Connecticut General Statutes or, if it is located within an aquifer protection area, that the construction activity will comply with regulations adopted pursuant to section 22a-354i of the Connecticut General Statutes.

(vii) For a proposed locally approvable project, a plan review certification from the appropriate District, qualified soil erosion and sediment control professional, and/or qualified professional engineer in accordance with Section 5(*b*)(10) or (11) or a notice from the District that they were unable to complete the Plan review within the time limits specified in the Memorandum of Agreement in Appendix F.

(K) A brief description of the stormwater discharge, including:

(i) The name of the municipal separate storm sewer system or immediate surface water body or wetland to which the stormwater runoff will discharge;

(ii) Verification of whether or not the site discharges to a tidal wetland (that is not a fresh-tidal wetland) within 500 feet of the discharge point, to a high quality water or to an impaired water with or without a TMDL;

(iii) The name of the watershed or nearest waterbody to which the site discharges.

(iv) Location of the stormwater discharge(s) including latitude and longitude.

(L) The total effective impervious cover for the site before and after the proposed construction activity.

(M) Documentation that the proposed construction activity has been reviewed for consistency with state Historic Preservation statutes, regulations, and policies including identification of any potential impacts on property listed or eligible for listing on the Connecticut Register of Historic Places. A review conducted for an Army Corps of Engineers Section 404 wetland permit would meet this qualification. Refer to Appendix G for guidance on conducting the required review.

(N) Registrants for locally approvable projects may, if they choose, attach an electronic copy of their Plan to their registration or provide a web address where their Plan may be downloaded. If an electronic plan is not provided, the registrant is still subject to the requirements for submission of a Plan to the commissioner or a member of the public pursuant to the "Plan Availability" section (Section 4(e)(2)). An electronic Plan shall be in Adobe™ PDF format or similar publicly available format in common use. **DO NOT INCLUDE** in the Plan any pages or other material that do not pertain to stormwater management or erosion and sedimentation control (such as electrical and lighting plans, boundary or lot surveys, building plans, non-stormwater related detail sheets, etc.).

(O) Registrants for all locally exempt projects must submit an electronic copy of their Plan or a web address where the electronic Plan can be downloaded. The electronic Plan shall be in Adobe™ PDF format or similar publicly available format in common use. **DO NOT INCLUDE** in this Plan any pages or other material that do not pertain to stormwater management or erosion and sedimentation control (such as electrical and lighting plans, boundary or lot surveys, building plans, non-stormwater related detail sheets, etc.).

(P) The certification of the registrant and of the individual or individuals responsible for actually preparing the registration, in accordance with Section 3(*b*)(8).

(Q) For all registrations, a design certification must be signed by a professional engineer in accordance with Section 3(*b*)(9).:

(R) For registrations for locally approvable projects a review certification must be signed by either: (i) a District in accordance with Section 3(*b*)(10), or (ii) a qualified soil erosion and sediment control professional and/or qualified professional engineer in accordance with either Section 3(*b*)(11).

If the registrant is not capable of submitting electronically, a paper form may be submitted in accordance with Section 4(*d*).

(3) Re-Registration Form

For sites previously registered under any previous version of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and for which no Notice of Termination has been submitted pursuant to the "Termination Requirements" section (Section 6), a re-registration shall be filed electronically pursuant to Sections 3(*c*)(3) and 3(*g*) on forms prescribed and provided by the commissioner (available at: www.ct.gov/deep/stormwater) and shall include, but not be limited to, the following:

(A) Legal name, address, and telephone number of the registrant. If the registrant is a person (as defined in Section 2 of this permit) transacting business in Connecticut and is registered with the Connecticut Secretary of the State, provide the exact name as registered with the Connecticut Secretary of the State.

(B) The previously issued permit number (beginning with GSN).

(C) Legal name, address and telephone number of the owner of the property on which the construction activity will take place.

(D) Legal name, address and telephone number of the primary contact for departmental correspondence and inquiries, if different from the registrant.

(E) Legal name, address and telephone number of the developer of the property on which the subject construction activity is to take place.

(F) Legal name, address and daytime and off-hours telephone numbers of the general contractor(s) or other representative(s), if different from the developer.

(G) Legal name, address and telephone number of any consultant(s) or engineer(s) retained by the permittee to prepare the registration and Stormwater Pollution Control Plan.

(H) Location address or description of the site for which the re-registration is filed.

(I) Indication of the normal working hours of the site.

(J) The estimated duration of the construction activity.

(K) The signature of the registrant and of the individual or individuals responsible for actually preparing the re-registration, each of who shall certify in writing as follows:

"I hereby certify that I am making this certification in connection with a registration under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner by [INSERT NAME OF REGISTRANT] for an activity located at [INSERT ADDRESS OF PROJECT OR ACTIVITY] and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that all designs and plans for such activity meet the current terms and conditions of the general permit in accordance with Section 5(b)(5)(C) of such general permit and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section

3(*b*)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

If the registrant is not capable of submitting electronically, a paper form may be submitted in accordance with Section 4(*d*).

(d) Where to File a Registration

A registration (available at: www.ct.gov/deep/stormwater) shall be filed electronically with the commissioner in accordance with Section 3(*c*)(2) or (3). If the registrant does not have the capability to submit electronically, a paper registration may be filed at the following address:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

(e) Availability of Registration and Plan

By the fifteenth (15th) day of each month, the commissioner shall post on the DEEP website a list of registrations submitted in the previous month.

(1) Registration Availability

On or before fifteen (15) days from the date of posting by the commissioner, members of the public may review and comment on a registration. Any electronically available Plans will be posted with the corresponding registration.

(2) Plan Availability

(A) Electronic Plan Availability

For an electronically available Plan, on or before fifteen (15) days from the date of posting by the commissioner, members of the public may review and comment on a registrant's Plan.

(B) Non-Electronic Plan Availability

For any Plan that is not electronically available, on or before fifteen (15) days from the date of a registration posting by the commissioner, members of the public may submit a written request to the commissioner to obtain a copy of a registrant's Plan. The commissioner shall inform the registrant of the request and the name of the requesting party. If the commissioner does not already have access to a copy of the requested Plan, the registrant shall submit a copy of their Plan to the commissioner within seven (7) days of their receipt of such request. On or before fifteen (15) days from the date the commissioner makes a Plan available to the requesting party, they may submit written comments on the Plan to the commissioner.

(f) Additional Information

The commissioner may require a permittee to submit additional information that the commissioner reasonably deems necessary to evaluate the consistency of the subject construction activity with the requirements for authorization under this general permit.

(g) Additional Notification

For discharges authorized by this general permit to a regulated municipal separate storm sewer system, a copy of the registration and all attachments thereto shall also be submitted to the owner and operator of that system.

For discharges authorized by this general permit to a DOT separate storm sewer system, a copy of the registration and all attachments thereto shall also be submitted to the DOT upon request.

For discharges within a public drinking water supply watershed or aquifer area, a copy of the registration and the Plan described in subsection 5(*b*) of this general permit shall be submitted to the water company.

For discharges to river components and tributaries which have been designated as Wild and Scenic under the Wild and Scenic Rivers Act, a copy of the registration and the Plan described in 5(*b*) of this general permit shall be submitted to the applicable Wild and Scenic Coordinating Committee. Please refer to Appendix H for additional guidance

In addition, a copy of this registration and the Plan shall be available upon request to the local inland wetlands agency established pursuant to section 22a-42 of the Connecticut General Statutes, or its duly authorized agent.

(h) Action by Commissioner

(1) The commissioner may reject without prejudice a registration if it does not satisfy the requirements of the "Contents of Registration" section (subsection 4(*c*)) of this general permit. Any registration refiled after such a rejection shall be accompanied by the fee specified in the "Fees" subsection (subsection 4(*c*)(1)) of this general permit.

(2) The commissioner may disapprove a registration if is inconsistent with the requirements for authorization under the "Requirements for Registration" section (Section 3(*b*)) of this general permit, or for any other reason provided by law.

(3) Disapproval of a registration under this subsection shall constitute notice to the registrant that the subject construction activity must be authorized under an individual permit.

(4) Rejection or disapproval of a registration shall be in writing.

(i) Transition to New General Permit

On or after August 1, 2013, up until and including August 31, 2013, a person filing a new registration for a site may file such registration: (a) under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities that expires on September 30, 2013; or (b) this general permit. A person filing a new registration for a site shall <u>not</u> register under both the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities that expires on September 30, 2013 and this general permit. After August 31, 2013, a person filing a new registration for a site shall only register under this general permit and shall be authorized pursuant to Section 3(*g*) of this general permit.

(Note: Any person who, on or after August 1, 2013, up until and including August 31, 2013, files a new registration for a site under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities that expires on September 30, 2013 shall, after October 1, 2013, re-register such site pursuant to Section 3(*c*)(3) and Section 4(*c*)(3) of this general permit.)

A person re-registering a site pursuant to Section 3(*c*)(3) and Section 4(*c*)(3) of this general permit may submit the required re-registration information anytime on or after August 1, 2013.

(j) Latest Date to Submit a Registration Under this General Permit

No person shall submit a registration under this general permit after June 30, 2018.

Section 5. Conditions of this General Permit

The permittee shall meet all requirements of this general permit at all times. In addition, a permittee shall be responsible for conducting authorized construction activities in accordance with the following conditions:

(a) Conditions Applicable to Certain Discharges

(1) Structures and Dredging in Coastal and Tidal Areas

Any person who or municipality that discharges stormwater into coastal tidal waters for which a permit is required under section 22a-361 of the Connecticut General Statutes (structures and dredging) or section 22a-32 of the Connecticut General Statutes (Tidal Wetlands Act), shall obtain such permit(s) from the commissioner. A tidal wetland permit is required for the placement of any sediment upon a tidal wetland, whether it is deposited directly or indirectly.

(2) Discharges to Tidal Wetlands

Any site which has a post-construction stormwater discharge to a tidal wetland (that is not a fresh-tidal wetland) where such discharge is within 500 feet of the tidal wetland, shall discharge such stormwater through a system designed to retain and infiltrate the volume of stormwater runoff generated by 1 inch of rainfall on the site. If there are site constraints that would prevent retention of this volume on-site (e.g., brownfields, capped landfills, bedrock, elevated groundwater, etc.), documentation must be submitted, for the commissioner's review and written approval, which explains the site limitations and offers an alternative retention volume. In such cases, the portion of 1 inch that cannot be retained must be provided with additional stormwater treatment so as to protect water quality. Any such treatment shall be designed, installed and maintained in accordance with the Stormwater Quality Manual.

For sites unable to comply with this section, the commissioner, at the commissioner's sole discretion, may require the submission of an individual permit in lieu of authorization under this general permit.

(3) Toxicity to Aquatic and Marine Life

The discharge shall not cause pollution due to acute or chronic toxicity to aquatic and marine life, impair the biological integrity of aquatic or marine ecosystems, or result in an unacceptable risk to human health.

(4) Water Quality Standards

The stormwater discharge shall not cause or contribute to an exceedance of the applicable Water Quality Standards in the receiving water.

(5) High Quality Waters

Any new or increased stormwater discharge to high quality waters shall be discharged in accordance with the Connecticut Anti-Degradation Implementation Policy in the Water Quality Standards.

(b) Stormwater Pollution Control Plan

All registrants shall develop and maintain on-site a Stormwater Pollution Control Plan (Plan) for the construction activity authorized by this general permit. Once the construction activity begins, the permittee shall perform all actions required by such Plan and shall maintain compliance with the Plan thereafter. The Plan shall be designed to minimize (as defined in Section 2): (1) pollution caused by soil erosion and sedimentation during and after construction; and (2) stormwater pollution caused by use of the site after construction is completed.

(1) Development and Contents of Plan

(A) The Plan shall consist of site plan drawings and a narrative. The Plan shall be prepared in accordance with sound engineering practices, and shall be consistent with the Guidelines and the 2004 Connecticut Stormwater Quality Manual (available at http://www.ct.gov/deep/stormwater). The Plan shall also be consistent with any remedial action plan, closure plan or other plan required by any other DEEP permit.

(B) The Plan shall include, at a minimum, the following items:

(i) Site Plan

Site drawings indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, the location of major structural and non-structural controls (as specified in subsection 5(*b*)(2), below), the location of areas where stabilization practices are expected to occur, areas which will be vegetated following construction, monitored outfalls, surface waters, impaired waters (identifying those with and without a TMDL), high quality waters, inland wetlands, tidal wetlands, fresh-tidal wetlands, and locations where stormwater will be discharged to a surface water (both during and post-construction);

(ii) Site Description

(a) A narrative description of the nature of the construction activity;

(b) An estimate of the total area of the site and the total area of the site that is expected to be disturbed by construction activities;

(c) An estimate of the average runoff coefficient of the site after construction activities are completed;

(d) The name of the immediate receiving water(s) and the ultimate receiving water(s) of the discharges authorized by this general permit; and

(e) Extent of wetland acreage on the site.

(iii) Construction Sequencing

The Plan shall clearly identify the expected sequence of major construction activities on the site and corresponding erosion and sediment controls and shall include an estimated timetable for all construction activities, which shall be revised as necessary to keep the Plan current. Wherever possible, the site shall be phased to avoid the disturbance of over five acres at one time (or a lesser area of disturbance as required in the "Impaired Waters" section (Section 5(*b*)(3)). The Plan shall clearly show the limits of disturbance for the entire construction activity and for each phase.

(iv) Control Measures

The Plan shall include a description, in narrative and on the site plan drawings, of appropriate control measures that will be performed at the site to minimize the discharge of pollutants to waters of the state. Control measures shall be implemented in accordance with Section 5(*b*)(2) below. In addition, the following information shall be provided:

(a) Calculations supporting the design of sediment and floatables removal controls pursuant to Section 5(*b*)(2)(C)(ii)(b).

(b) Calculations supporting the design of velocity dissipation controls pursuant to Section 5(*b*)(2)(C)(ii)(c).

(v) Runoff Reduction and Low Impact Development (LID) Information

Where runoff reduction practices and/or LID measures are utilized, the following information shall be included in the site plan and narrative:

(a) The location of the site's streams, floodplains, all wetlands, riparian buffers, slopes 3:1 and steeper, and vegetation identified for preservation and non-disturbance during construction such as forested areas, hay fields, and old fields;

(b) Natural drainage patterns, swales, and other drainage ways, that are not streams, floodplains, or wetland areas;

(c) The location of all areas with soils suitable for infiltration[1] and areas of the site best suited for infiltration for the siting of runoff reduction practices and LID design measures;

(d) The location of all areas unsuitable or least suitable for infiltration for the siting of areas of development/building;

(e) The location of all post-construction stormwater management measures, runoff reduction practices and LID design measures developed pursuant to subsection 5(*b*)(2)(C)(i) below;

(f) Identification of areas inappropriate for the infiltration of stormwater runoff from land uses with a significant potential for groundwater pollution;

1 Infiltration rates must be measured by a field permeability test. The measured field design infiltration rate is equal to one-half the field-measured infiltration rate.

(g) A narrative describing the nature, purpose, implementation and long-term maintenance of the post-construction measures, runoff reduction practices and LID design measures;

(h) Calculations, for measures developed pursuant to Section 5(*b*)(2)(C)(i), illustrating the retention of the water quality volume or half the water quality volume for the site, as applicable, including a discussion of the impact of any runoff reduction and/or LID practices on these calculations.

(i) A narrative describing any site constraints that prevent retention of the appropriate volume specified in Section 5(*b*)(2)(C)(i) including: an explanation of the site limitations; a description of the runoff reduction practices implemented; an explanation of why the amount retained constitutes the maximum extent achievable; an alternative retention volume; and a description of the measures used to provide additional stormwater treatment for sediment, floatables and nutrients above the alternate volume up to the water quality volume.

(j) Calculations showing the proposed effective impervious cover for the site and, where necessary or appropriate for measures developed for linear projects pursuant to Section 5(*b*)(2)(C)(i), each outfall drainage area.

(vi) Inspections

The Plan shall include a narrative of all inspection personnel conducting the routine inspections, their responsibilities and procedures pursuant to subsection 5(*b*)(4)(B) below. The Plan shall also include documentation of the qualifications of the inspector(s) and the findings, actions and results of all inspections conducted at the site.

(vii) Monitoring

The Plan shall provide a narrative of the stormwater monitoring procedures pursuant to Section 5(*c*). This narrative shall include documentation of the monitoring frequency, personnel conducting monitoring, identification of monitored outfalls, methodology for monitoring, provisions for monitoring a linear project (if applicable), the site's normal working hours, the method for measuring turbidity and a copy of all monitoring records.

(viii) Contractors

(a) The Plan shall clearly identify each contractor and subcontractor that will perform construction activities on the site that have the potential to cause pollution of the waters of the State. The Plan shall include a copy of the certification statement in the "Contractor Certification Statement" section, below, signed by each such contractor and subcontractor.

(b) Contractor Certification Statement

The Plan shall include the following certification signed by each contractor and subcontractor identified in the Plan as described above:

"I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or

subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including, but not limited to, the requirements of the Stormwater Pollution Control Plan prepared for the site."

The certification shall include the name and title of the person providing the signature; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

(c) Subdivisions

Where individual lots in a subdivision or other common plan of development are conveyed or otherwise the responsibility of another person or municipality, those individual lot contractors shall be required to comply with the provisions of this general permit and the Stormwater Pollution Control Plan, and shall sign the certification statement in the "Contractor Certification Statement" section, above, regardless of lot size or disturbed area. In such cases, the permittee shall provide a copy of the Plan to each individual lot contractor, obtain signed certifications from such contractors and retain all signed certifications in the Plan.

(ix) Impaired Waters

For construction activities that discharge to impaired waters, as specified in "New Discharges to Impaired Waters" (Section 3(*b*)(12)), the Plan shall include a description of the provisions for controlling the construction and post-construction stormwater discharges to these waters pursuant to subsection 5(*b*)(3) below.

(2) Stormwater Control Measures

Control Measures are required Best Management Practices (BMPs) that the permittee must implement to minimize the discharge of pollutants from the permitted activity. The term "minimize" means reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practice.

Control Measures shall be designed in accordance with the Guidelines, the Stormwater Quality Manual or the DOT Qualified Products List (http://www.ct.gov/dot/lib/dot/documents/dresearch/conndot_qpl.pdf). Use of controls to comply with the "Erosion and Sediment Controls" section (subsection (A) below) of this general permit that are not included in those resources must be approved by the commissioner or the commissioner's designated agent. The narrative and drawings of controls shall address the following minimum components:

(A) Erosion and Sediment Controls

(i) Soil Stabilization and Protection

The Plan shall include a narrative and drawings of interim and permanent soil stabilization practices for managing disturbed areas and soil stockpiles, including a schedule for implementing the practices. The Permittee shall ensure that existing vegetation is preserved to the maximum extent practicable and that disturbed portions of the site are minimized and stabilized.

Where construction activities have permanently ceased or when final grades are reached in any portion of the site, stabilization and protection practices as specified in Chapter 5 of the Guidelines or as approved by the commissioner or his/ her designated agent shall be implemented within seven days. Areas that will remain disturbed but inactive for at least thirty days shall receive temporary seeding or soil protection within seven days in accordance with the Guidelines.

Areas that will remain disturbed beyond the seeding season as identified in the Guidelines, shall receive long-term, non-vegetative stabilization and protection sufficient to protect the site through the winter. In all cases, stabilization and protection measures shall be implemented as soon as possible in accordance with the Guidelines or as approved by the commissioner or his/ her designated agent.

A reverse slope bench is required for any slope steeper than 3:1 (horizontal: vertical) that exceeds 15 feet vertically, except when engineered slope stabilization structures or measures are included or a detailed soil mechanics analysis has been conducted to verify stability. Engineered analyses and measures must be designed by a CT licensed Professional Engineer with experience in geotechnical engineering or soil mechanics.

(ii) Structural Measures

The Plan shall include a narrative and drawings of structural measures to divert flows away from exposed soils, store flows or otherwise limit runoff and minimize the discharge of pollutants from the site. Unless otherwise specifically approved in writing by the commissioner or his/ her designated agent, or if otherwise authorized by another state or federal permit, structural measures shall be installed on upland soils.

For points of discharge from disturbed sites with a total contributing drainage area of between two to five acres, a temporary sediment trap must be installed in accordance with the Guidelines. For points of discharge from disturbed sites with a total contributing drainage area greater than five acres, a temporary basin must be designed and installed in accordance with the Guidelines. Such trap(s) or basin(s) must be maintained until final stabilization of the contributing area as defined in "Notice of Termination" (Section 6(a)).

The requirement for sediment traps or basins shall not apply to flows from off-site areas and flows from the site that are either undisturbed or have undergone final stabilization where such flows are diverted around the temporary sediment trap or basin. Any exceptions must be approved in writing by the commissioner or his/ her designated agent.

(iii) Maintenance

The Plan shall include a narrative of the procedures to maintain in good and effective operating conditions all erosion and sediment control measures, including vegetation, and all other protective measures identified in the site plan. Maintenance of all erosion and sediment controls shall be performed in accordance with the Guidelines, or more frequently as necessary, to protect the waters of the state from pollution.

(B) Dewatering Wastewaters

Dewatering wastewaters shall be managed in accordance with the Guidelines. Dewatering wastewaters discharged to surface waters shall be discharged in a manner that minimizes the discoloration of the receiving waters. The Plan shall include a narrative and drawings of the

operational and structural measures that will be used to ensure that all dewatering wastewaters will not cause scouring or erosion or contain suspended solids in amounts that could reasonably be expected to cause pollution of surface waters of the State. Unless otherwise specifically approved in writing by the commissioner or his/ her designated agent, or if otherwise authorized by another state or federal permit, dewatering measures shall be installed on upland soils.

No discharge of dewatering wastewater(s) shall contain or cause a visible oil sheen, floating solids, or foaming in the receiving water.

(C) Post-Construction Stormwater Management

The Plan shall include a narrative and drawings of measures that will be installed during the construction process to minimize the discharge of pollutants in stormwater discharges that will occur after construction operations have been completed. Post-construction stormwater management measures shall be designed and implemented in accordance with the Stormwater Quality Manual, the DOT Qualified Products List or as approved by the commissioner or his/ her designated agent in writing. Unless otherwise specifically provided by the commissioner in writing, or authorized by another state or federal permit, structural measures shall be placed on upland soils. The Plan shall include provisions to address the long-term maintenance of any post-construction stormwater management measure installed.

(i) Post-Construction Performance Standards

The permittee shall utilize runoff reduction practices (as defined in Section 2) to meet runoff volume requirements based on the conditions below. For sites unable to comply with these conditions, the commissioner, at the commissioner's sole discretion, may require the submission of an individual permit in lieu of authorization under this general permit.

(a) Redevelopment

For sites that are currently developed with an effective impervious cover of forty percent or more and for which the permittee is proposing redevelopment, the permittee shall design the site in such a manner as to retain on-site half the water quality volume (as defined in Section 2) for the site and provide additional stormwater treatment without retention for discharges up to the full water quality volume for sediment, floatables and nutrients to the maximum extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practice. In cases where the permittee is not able to retain half the water quality volume, the permittee shall design the redevelopment to retain runoff volume to the maximum extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practice. In such cases, additional stormwater treatment up to the full water quality volume is still required. Any such treatment shall be designed, installed and maintained in accordance with the Stormwater Quality Manual. If retention of the half the water quality volume is not achieved, the permittee shall submit a report to the commissioner describing: the measures taken to maximize runoff reduction practices on the site; the reasons why those practices constitute the maximum extent achievable; the alternative retention volume; and a description of the measures used to provide additional stormwater treatment above the alternate volume up to the water quality volume. In the case of linear redevelopment projects (e.g. roadway reconstruction or widening) for the developed portion of

the right of way: (1) for projects that may be unable to comply with the full retention standard, the alternate retention and treatment provisions may also be applied as specified above, or (2) for projects that will not increase the effective impervious cover within a given watershed, the permittee shall implement the additional stormwater treatment measures referenced above, but will not be required to retain half of the water quality volume.

(b) Other Development

The following performance standard applies to all sites that are currently undeveloped or are currently developed with less than forty percent effective impervious cover. For these sites, the permittee shall design the site to retain the water quality volume for the site. If there are site constraints that would prevent retention of this volume on-site (e.g., brownfields, capped landfills, bedrock, elevated groundwater, etc.), documentation must be submitted, for the commissioner's review and written approval, which: explains the site limitations; provides a description of the runoff reduction practices implemented; provides an explanation of why this constitutes the maximum extent achievable; offers an alternative retention volume; and provides a description of the measures used to provide additional stormwater treatment for sediment, floatables and nutrients above the alternate volume up to the water quality volume. Any such treatment shall be designed, installed and maintained in accordance with the Stormwater Quality Manual. In the case of linear projects that do not involve impervious surfaces (e.g. electrical transmission rights-of-way or natural gas pipelines), retention of the water quality volume is not required as long as the post-development runoff characteristics do not differ significantly from pre-development conditions.

(ii) Post-Construction Control Measures

(a) Runoff Reduction and Low Impact Development ("LID") Practices

The site design shall incorporate runoff reduction practices, low impact development ("LID") practices or other measures to meet the performance standards in subsection (i) above, promote groundwater recharge and minimize post-construction impacts to water quality. Please refer to Appendix B for additional guidance information.

(b) Suspended Solids and Floatables Removal

The permittee shall install post-construction stormwater management measures designed to minimize the discharge of suspended solids and floatables (e.g. oil and grease, other floatable liquids, floatable solids, trash, etc.) from stormwater. A goal of 80 percent removal of the annual sediment load from the stormwater discharge shall be used in designing and installing stormwater management measures. The Plan shall provide calculations supporting the capability of such measures in achieving this goal and any third-party verification, as applicable, of the sediment removal efficiencies of such measures. This goal is not intended to limit local approval authorities from requiring a higher standard pursuant to local requirements.

(c) Velocity Dissipation

Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow to the receiving watercourse so that the natural physical and biological characteristics and functions are maintained and protected.

(D) Other Controls

The following additional controls shall be implemented:

(i) Waste Disposal: Best management practices shall be implemented to minimize the discharge of litter, debris, building materials, hardened concrete waste, or similar materials to waters of the State. A narrative of these practices shall be provided in the Plan.

(ii) Washout Areas

Washout of applicators, containers, vehicles and equipment for concrete, paint and other materials shall be conducted in a designated washout area. There shall be no surface discharge of washout wastewaters from this area. Such washout shall be conducted: (1) outside of any buffers and at least 50 feet from any stream, wetland or other sensitive resource; or (2) in an entirely self-contained washout system. The permittee shall clearly flag off and designate areas to be used for washing and conduct such activities only in these areas. The permittee shall direct all washwater into a container or pit designed such that no overflows can occur during rainfall or after snowmelt.

In addition, dumping of liquid wastes in storm sewers is prohibited. The permittee shall remove and dispose of hardened concrete waste consistent with practices developed for the "Waste Disposal" section (subparagraph 5(*b*)(2)(D)(i), above). At least once per week, the permittee must inspect any containers or pits used for washout to ensure structural integrity, adequate holding capacity, and to check for leaks or overflows. If there are signs of leaks, holes or overflows in the containers or pits that could lead to a discharge, the permittee shall repair them prior to further use. For concrete washout areas, the permittee shall remove hardened concrete waste whenever the hardened concrete has accumulated to a height of ½ of the container or pit or as necessary to avoid overflows. A narrative of maintenance procedures and a record of maintenance and inspections shall be included in the Plan.

(iii) Off-site vehicle tracking of sediments and the generation of dust shall be minimized. Wet dust suppression shall be used, in accordance with section 22a-174-18(b) of the Connecticut General Statutes, for any construction activity that causes airborne particulates. The volume of water sprayed for controlling dust shall be minimized so as to prevent the runoff of water. No discharge of dust control water shall contain or cause a visible oil sheen, floating solids, visible discoloration, or foaming in the receiving stream.

(iv) All post-construction stormwater structures shall be cleaned of construction sediment and any remaining silt fence shall be removed upon stabilization of the site.

(v) All chemical and petroleum product containers stored on the site (excluding those contained within vehicles and equipment) shall be provided with impermeable containment which will hold at least 110% of the volume of the largest container, or

10% of the total volume of all containers in the area, whichever is larger, without overflow from the containment area. All chemicals and their containers shall be stored under a roofed area except for those chemicals stored in containers of 100 gallon capacity or more, in which case a roof is not required. Double-walled tanks satisfy this requirement.

(3) Additional Control Measures for Impaired Waters

For construction activities that discharge directly to impaired waters, as specified in "New Discharges to Impaired Waters" (Section 3(*b*)(12)), the Plan shall include the following provisions:

(A) In lieu of the provisions of "Construction Sequencing" (Section 5(*b*)(1)(B)(iii)), no more than 3 acres may be disturbed at any one time. For those areas for which construction activity will be temporarily suspended for a period of greater than 14 days, temporary stabilization measures shall be implemented within 3 days of such suspension of activity. For all areas, permanent stabilization shall be implemented within 30 days of disturbance; ***or***

(B) The Plan shall document that measures are in place to ensure that there will be no discharge to the impaired water from rain events up to a 2-year, 24-hour rain event while construction activity is occurring; ***or***

(C) For discharges to impaired waters with an established TMDL:

(i) the Plan shall document that there is sufficient remaining Waste Load Allocation (WLA) in the TMDL to allow the discharge, ***and***

(ii) measures shall be implemented to ensure the WLA will not be exceeded, ***and***

(iii) stormwater discharges shall be monitored, if applicable, for any indicator pollutant identified in the TMDL for every rain event that produces a discharge to ensure compliance with the WLA. Such monitoring shall be in addition to the requirements specified in Section 5(*c*), ***or***

(iv) the specific requirements for stormwater discharges specified in the TMDL are met.

Construction activities discharging to impaired waters that do not comply with this subsection are not authorized by this general permit.

(4) Inspections

All construction activities submitting a registration for this general permit shall be inspected initially for Plan implementation and then weekly for routine inspections.

(A) Plan Implementation Inspections

Within the first 30 days following commencement of the construction activity on the site, the permittee shall contact: (1) the appropriate District; or (2) a qualified soil erosion and sediment control professional or a qualified professional engineer to inspect the site. The site shall be inspected at least once and no more than three times during the first 90 days to confirm compliance with the general permit and proper initial implementation of all controls measures designated in the Plan for the site for the initial phase of construction. For sites not inspected by District personnel, the following conditions shall apply:

(i) for projects disturbing more than one acre and less than fifteen (15) acres, the inspector shall be someone who:

(a) is not an employee, as defined by the Internal Revenue Service in the Internal Revenue Code of 1986, of the registrant, and

(b) has no ownership interest of any kind in the project for which the registration is being submitted.

(ii) for projects disturbing fifteen (15) acres or more, the inspector shall be someone who:

(a) is not an employee, as defined by the Internal Revenue Service in the Internal Revenue Code of 1986, of the registrant, and

(b) has not engaged in any activities associated with the preparation, planning, designing or engineering of such plan for soil erosion and sediment control or plan for engineered stormwater management systems on behalf of such registrant, and

(c) is not under the same employ as any person who engaged in any activities associated with the preparation, planning, designing or engineering of such plans and specifications for soil erosion and sediment control or plans and specifications for engineered stormwater management systems on behalf of such registrant, and

(d) has no ownership interest of any kind in the project for which the registration is being submitted.

The permittee may use, if they wish, the same person(s) that provided the Plan Review Certification pursuant to Section 5(*b*)(11).

(B) Routine Inspections

The permittee shall routinely inspect the site for compliance with the general permit and the Plan for the site until a Notice of Termination has been submitted. Inspection procedures for these routine inspections shall be addressed and implemented in the following manner:

(i) The permittee shall maintain a rain gauge on-site to document rainfall amounts. At least once a week and within 24 hours of the end of a storm that generates a discharge, a qualified inspector (provided by the permittee), as defined in the "Definitions" section (Section 2) of this general permit, shall inspect, at a minimum, the following: disturbed areas of the construction activity that have not been finally stabilized; all erosion and sedimentation control measures; all structural control measures; soil stockpile areas; washout areas and locations where vehicles enter or exit the site. These areas shall be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to the receiving waters. Locations where vehicles enter or exit the site shall also be inspected for evidence of off-site sediment tracking. For storms that end on a weekend, holiday or other time after which normal working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms that equal or exceed 0.5 inches. For storms of less than 0.5 inches, an inspection shall occur immediately upon the start of the subsequent normal working hours. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months.

(ii) The qualified inspector(s) shall evaluate the effectiveness of erosion and sediment controls, structural controls, stabilization practices, and any other controls implemented

to prevent pollution and determine if it is necessary to install, maintain, or repair such controls and/or practices to improve the quality of stormwater discharge(s).

(iii) A report shall be prepared and retained as part of the Plan. This report shall summarize: the scope of the inspection; name(s) and qualifications of personnel making the inspection; the date(s) of the inspection; weather conditions including precipitation information; major observations relating to erosion and sediment controls and the implementation of the Plan; a description of the stormwater discharge(s) from the site; and any water quality monitoring performed during the inspection. The report shall be signed by the permittee or his/her authorized representative in accordance with the "Certification of Documents" section (subsection 5(*i*)) of this general permit.

The report shall include a statement that, in the judgment of the qualified inspector(s) conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the Plan and permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions required to bring the site back into compliance. Non-engineered corrective actions (as identified in the Guidelines) shall be implemented on site within 24 hours and incorporated into a revised Plan within three (3) calendar days of the date of inspection unless another schedule is specified in the Guidelines. Engineered corrective actions (as identified in the Guidelines) shall be implemented on site within seven (7) days and incorporated into a revised Plan within ten (10) days of the date of inspection, unless another schedule is specified in the Guidelines or is approved by the commissioner. During the period in which any corrective actions are being developed and have not yet been fully implemented, interim measures shall be implemented to minimize the potential for the discharge of pollutants from the site.

(iv) Inspectors from the DEEP and the appropriate District may inspect the site for compliance with this general permit at any time construction activities are ongoing and upon completion of construction activities to verify the final stabilization of the site and/or the installation of post-construction stormwater management measures pursuant to Section 6(*a*).

(v) Additional inspections, reports and documentation may also be required to comply with the "Monitoring Requirements" section (Section 5(*c*)).

(5) Keeping Plans Current

The Permittee is responsible for keeping their Plan in compliance with this general permit at all times. This may involve any or all of the following:

(A) The permittee shall amend the Plan if the actions required by the Plan fail to prevent pollution or fail to otherwise comply with any other provision of this general permit. The Plan shall also be amended whenever there is a change in contractors or subcontractors at the site, or a change in design, construction, operation, or maintenance at the site which has the potential for the discharge of pollutants to the waters of the state and which has not otherwise been addressed in the Plan.

(B) The commissioner may notify the permittee at any time that the Plan and/or the site do not meet one or more of the minimum requirements of this general permit. Within 7 days of such notice, or such other time as the commissioner may allow, the permittee shall make the required changes to the Plan and perform all actions required by such revised Plan. Within 15 days of such notice, or such other time as the commissioner may allow, the permittee shall submit to the commissioner a written certification that the requested changes have been

made and implemented and such other information as the commissioner requires, in accordance with the 'Duty to Provide Information" and "Certification of Documents" sections (subsections 5(*h*) and 5(*i*)) of this general permit.

(C) For any stormwater discharges authorized under any previous version of this general permit, the existing Plan shall be updated by February 1, 2014, as applicable, in accordance with the "Development and Contents of the Plan" (subsection 5(*b*)(1)), "Stormwater Control Measures" (subsection 5(*b*)(2)), "Routine Inspections" (subsection 5(*b*)(4)(B)), and "Monitoring" (subsection 5(*c*)) sections of this general permit, except for the post-construction measures in subsection 5(*b*)(2)(C)(i)(a) & (b) and 5(*b*)(2)(C)(ii)(a). The permittee shall maintain compliance with such Plan thereafter. For previously authorized sites discharging to impaired waters or other sensitive areas, the commissioner may require additional control measures or provide authorization under an individual permit pursuant to Sections 4(*h*) and 3(*i*).

(6) Failure to Prepare, Maintain or Amend Plan

In no event shall failure to complete, maintain or update a Plan, in accordance with the "Development of Contents of the Plan" and "Keeping Plans Current" sections (subsections 5(*b*)(1) and 5(*b*)(5)) of this general permit, relieve a permittee of responsibility to implement any actions required to protect the waters of the state and to comply with all conditions of the permit.

(7) Plan Signature

The Plan shall be signed and certified as follows:

(A) The Plan shall be signed by the permittee in accordance with the "Certification of Documents" section (subsection 5(*i*)) of this general permit.

(B) The Plan shall include certification by all contractors and subcontractors in accordance with the "Contractors" section (subsection 5(*b*)(1)(B)(viii)) of this general permit.

(C) The Plan shall include a copy of the certification by a professional engineer or landscape architect made in accordance with Section 3(*b*)(9) of this general permit.

(8) Plan Review Certification

For a locally approvable project pursuant to Section 3(*c*) of this general permit, a copy of the Plan review certification made in accordance with either Section 3(*b*)(10) or (11) shall be maintained with the Plan. Note that construction activities reviewed and certified pursuant to those sections are still subject to the local erosion and sediment control and stormwater management regulations of the municipality in which the activity is conducted.

(9) Plan Submittal

The Plan shall be submitted to the commissioner and other certain parties under the following conditions:

(A) All Locally Exempt Projects with greater than one acre of soil disturbance shall submit an electronic copy of the Plan and a completed Registration Form to the commissioner.

(B) For all other projects, the permittee shall provide a copy of the Plan, and a completed Registration Form for this general permit to the following persons immediately upon request:

(i) The commissioner at his or her request or at the request of a member of the public during the registration and Plan availability period pursuant to Section 4(*e*);

(ii) The municipal planning commission, zoning commission and/or inland wetlands agency, or its respective enforcement officer or designated agent;

(iii) In the case of a stormwater discharge through a municipal separate storm sewer system, the municipal operator of the system;

(iv) In the case of a stormwater discharge located within a public drinking water supply watershed or aquifer area, the water company responsible for that water supply.

DO NOT SUBMIT any pages or other material that do not pertain to stormwater management or erosion and sedimentation control (such as electrical and lighting plans, boundary or lot surveys, building plans, non-stormwater related detail sheets, etc.).

(c) Monitoring Requirements

The primary requirements for monitoring turbidity are summarized in the table below:

Table 1

Area of Soil Disturbance	*Monitoring Required?*	*Monitoring Frequency*	*Sample Method*
Sites which disturb 1 acre or more, but less than 5 acres	Only IF a Registration is required	Monthly IF a Registration is required	Procedure consistent with 40 CFR Part 136
Sites which disturb 5 acres or more	Yes	Monthly	Procedure consistent with 40 CFR Part 136

(1) Turbidity Monitoring Requirements

(A) Monitoring Frequency

(i) Sampling shall be conducted in accordance with Table 1, above, at least once every month, when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall is achieved.

(ii) The permittee is only required to take samples during normal working hours as defined in Section 2. The site's normal working hours must be identified in the Plan pursuant to Section 5(*b*)(1)(B)(vii). If sampling is discontinued due to the end of normal working hours, the permittee shall resume sampling the following morning or the morning of the next working day following a weekend or holiday, as long as the discharge continues.

(iii) Sampling may be temporarily suspended any time conditions exist that may reasonably pose a threat to the safety of the person taking the sample. Such conditions may include high winds, lightning, impinging wave or tidal activity, intense rainfall or other

hazardous condition. Once the unsafe condition is no longer present, sampling shall resume.

(iv) If there is no stormwater discharge during a month, sampling is not required.

(B) Sample Collection

(i) All samples shall be collected from discharges resulting from a storm event that occurs at least 24 hours after any previous storm event generating a stormwater discharge. Any sample containing snow or ice melt must be identified on the Stormwater Monitoring Report form. Sampling of snow or ice melt in the absence of a storm event is not a valid sample.

(ii) Samples shall be grab samples taken *at least* three separate times during a storm event and shall be *representative* of the flow and characteristics of the discharge(s). Samples may be taken manually or by an in-situ turbidity probe or other automatic sampling device equipped to take individual turbidity readings (i.e. not composite). The first sample shall be taken within the first hour of stormwater discharge from the site. In cases where samples are collected manually and the discharge begins outside of normal working hours, the first sample shall be taken at the start of normal working hours.

(C) Sampling Locations

(i) Sampling is required of all point source discharges of stormwater from disturbed areas except as may be modified for linear projects under subparagraph (ii) below. Where there are two or more discharge points that discharge substantially identical runoff, based on similarities of the exposed soils, slope, and type of stormwater controls used, a sample may be taken from just one of the discharge points. In such case, the permittee shall report that the results also apply to the substantially identical discharge point(s). No more than 5 substantially identical outfalls may be identified for one representative discharge. If such project is planned to continue for more than one year, the permittee shall rotate twice per year the location where samples are taken so that a different discharge point is sampled every six months. The Plan must identify each outfall authorized by this permit and describe the rationale for any substantially identical outfall determinations.

(ii) Linear Projects

For a linear project, as defined in Section 2, the protocols of subparagraph (i), above, shall apply except that up to 10 substantially identical outfalls may be identified for one representative discharge.

(iii) All sampling point(s) shall be identified in the Plan and be clearly marked in the field with a flag, stake, or other visible marker.

(D) Sampling and analysis shall be prescribed by 40 CFR Part 136.

(E) Turbidity Values

The stormwater discharge turbidity value for each sampling point shall be determined by taking the average of the turbidity values of all samples taken at that sampling point during a given storm.

(2) Stormwater Monitoring Reports

(A) Within thirty (30) days following the end of each month, permittees shall enter the stormwater sampling result(s) on the Stormwater Monitoring Report (SMR) form (available at www.ct.gov/deep/stormwater) and submit it in accordance with the NetDMR provisions in subsection F, below, or, if the permittee has opted out of NetDMR, to the following address:

Bureau of Materials Management and Compliance Assurance
Water Permitting and Enforcement Division (Attn: DMR Processing)
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

(B) If there was no discharge during any given monitoring period, the permittee shall submit the form as required with the words "no discharge" entered in place of the monitoring results.

(C) If the permittee monitors any discharge more frequently than required by this general permit, the results of this monitoring shall be included in additional SMRs for the month in which the samples were collected.

(D) If sampling protocols are modified due to the limitations of normal working hours or unsafe conditions in accordance with Section 5(c)(1)(A)(ii) or (iii) above, a description of and reason for the modifications shall be included with the SMR.

(E) If the permittee samples a discharge that is representative of two or more substantially identical discharge points, the permittee shall include the names or locations of the other discharge points.

(F) NetDMR Reporting Requirements

(i) Prior to one-hundred and eighty (180) days after the issuance of this permit, the Permittee may either submit monitoring data and other reports to the Department in hard copy form or electronically using NetDMR, a web-based tool that allows Permittees to electronically submit stormwater monitoring reports through a secure internet connection. Unless otherwise approved in writing by the commissioner, no later than one-hundred and eighty (180) days after the issuance of this permit the Permittee shall begin reporting electronically using NetDMR. Specific requirements regarding subscription to NetDMR and submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

(a) Submittal of NetDMR Subscriber Agreement

On or before fifteen (15) days after the issuance of this permit, the Permittee and/or the person authorized to sign the Permittee's discharge monitoring reports ("Signatory Authority") as described in RCSA Section 22a-430-3(b)(2) shall contact the Department at deep.netdmr@ct.gov and initiate the NetDMR subscription process for electronic submission of Stormwater Monitoring Report information. Information on NetDMR is available on the Department's website at www.ct.gov/deep/netdmr. On or before ninety (90) days after issuance of this permit the Permittee shall submit a signed and notarized copy of the *Connecticut DEEP NetDMR Subscriber Agreement* to the Department.

(b) Submittal of Reports Using NetDMR

Unless otherwise approved by the commissioner, on or before one-hundred and eighty (180) days after issuance of this permit, the Permittee and/or the Signatory Authority shall electronically submit SMRs required under this permit to the Department using NetDMR in satisfaction of the SMR submission requirements of Sections 5(*c*)(2)(A) of this permit.

SMRs shall be submitted electronically to the Department no later than the 30th day of the month following the completed reporting period. Any additional monitoring conducted in accordance with 40 CFR 136 shall be submitted to the Department as an electronic attachment to the SMR in NetDMR. Once a Permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of SMRs to the Department. NetDMR is accessed from: http://www.epa.gov/netdmr.

(c) Submittal of NetDMR Opt-Out Requests

If the Permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for electronically submitting SMRs, the commissioner may approve the submission of SMRs in hard copy form ("opt-out request"). Opt-out requests must be submitted in writing to the Department for written approval on or before fifteen (15) days prior to the date a Permittee would be required under this permit to begin filing SMRs using NetDMR. This demonstration shall be valid for twelve (12) months from the date of the Department's approval and shall thereupon expire. At such time, SMRs shall be submitted electronically to the Department using NetDMR unless the Permittee submits a renewed opt-out request and such request is approved by the Department.

All opt-out requests and requests for the NetDMR subscriber form should be sent to the following address or by email at deep.netdmr@ct.gov:

Attn: NetDMR Coordinator
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

(d) Reporting and Record Keeping Requirements

(1) For a period of at least five years from the date that construction is complete, the permittee shall retain copies of the Plan and all reports required by this general permit, and records of all data used to complete the registration for this general permit, unless the commissioner specifies another time period in writing. Inspection records must be retained as part of the Plan for a period of five (5) years after the date of inspection.

(2) The permittee shall retain an updated copy of the Plan required by this general permit at the construction site from the date construction is initiated at the site until the date construction at the site is completed.

(e) Regulations of Connecticut State Agencies Incorporated into this General Permit

The permittee shall comply with sections 22a-430-3 and 22a-430-4 of the Regulations of Connecticut State Agencies which are hereby incorporated into this general permit, as if fully set forth herein.

(f) Reliance on Registration

In evaluating the registrant's registration, the commissioner has relied on information provided by the registrant. If such information proves to be false or incomplete, any authorization reliant on such information may be suspended or revoked in accordance with law, and the commissioner may take any other legal action provided by law.

(g) Duty to Correct and Report Violations

Upon learning of a violation of a condition of this general permit, unless otherwise specified in this general permit, a permittee shall immediately take all reasonable action to determine the cause of such violation, correct and mitigate the results of such violation, prevent further such violation, and report in writing such violation and such corrective action to the commissioner within five (5) days of the permittee's learning of such violation. Such information shall be filed in accordance with the "Certification of Documents" section (Section 5(*i*)) of this general permit.

(h) Duty to Provide Information

If the commissioner requests any information pertinent to the construction activity or to compliance with this general permit or with the permittee's authorization under this general permit, the permittee shall provide such information within fifteen (15) days of such request or other time period as may be specified in writing by the commissioner. Such information shall be filed in accordance with the "Certification of Documents" section (Section 5(*i*)) of this general permit.

(i) Certification of Documents

Unless otherwise specified in this general permit, any document, including but not limited to any notice, information or report, which is submitted to the commissioner under this general permit shall be signed by the permittee, or a duly authorized representative of the permittee, and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with section 22a-6 of the Connecticut General Statutes, pursuant to section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

(j) Date of Filing

For purposes of this general permit, the date of filing with the commissioner of any document is the date such document is received by the commissioner. The word "day" as used in this general permit means the calendar day; if any date specified in the general permit falls on a Saturday, Sunday, or legal holiday, such deadline shall be the next business day thereafter.

(k) False Statements

Any false statement in any information submitted pursuant to this general permit may be punishable as a criminal offense, in accordance with section 22a-6 of the Connecticut General Statutes, pursuant to section 53a-157b of the Connecticut General Statutes.

(l) Correction of Inaccuracies

Within fifteen (15) days after the date a permittee becomes aware of a change in any information in any material submitted pursuant to this general permit, or becomes aware that any such information is inaccurate or misleading or that any relevant information has been omitted, such permittee shall correct the inaccurate or misleading information or supply the omitted information in writing to the commissioner. Such information shall be filed in accordance with the certification requirements prescribed in Section 5(*i*) of this general permit.

(m) Transfer of Authorization

Any authorization issued by the commissioner under this general permit is transferable only in accordance with the provisions of section 22a-6o of the General Statutes. Any person or municipality proposing to transfer any such authorization shall submit a license transfer form to the commissioner. The transferee is not authorized to conduct any activities under this general permit until the transfer is approved by the commissioner (typically 30 days). The transferee may adopt by reference the Plan developed by the transferor. The transferee shall amend the Plan as required by the "Keeping Plans Current" Section 5(b)(5) of this general permit).

(n) Reopener

At such time as the USEPA may institute a new rule for post-construction stormwater management or modify the requirements for their National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Activities (CGP) to institute a numeric Effluent Limitation Guideline (ELG) for turbidity in stormwater discharges from construction activities, the commissioner may reopen this general permit pursuant to the Section 40 Part 122.62(a) of the Code of Federal Regulations for implementation of these elements.

(o) Other Applicable Law

Nothing in this general permit shall relieve the permittee of the obligation to comply with any other applicable federal, state and local law, including but not limited to the obligation to obtain any other authorizations required by such law.

(p) Other Rights

This general permit is subject to and does not derogate any present or future rights or powers of the State of Connecticut and conveys no rights in real or personal property nor any exclusive privileges, and is subject to all public and private rights and to any federal, state, and local laws pertinent to the property or construction activity affected by such general permit. In conducting any construction activity authorized hereunder, the permittee may not cause pollution, impairment, or destruction of the air, water, or other natural resources of this state. The issuance of this general permit shall not create any presumption that this general permit should or will be renewed.

Section 6. Termination Requirements

(a) Notice of Termination

At the completion of a construction project registered pursuant to the "Registration Requirements" section (Section 4) of this general permit, a Notice of Termination must be filed with the commissioner. A project shall be considered complete after all post-construction measures are installed, cleaned and functioning and the site has been stabilized for at least three months following the cessation of construction activities. A site is considered stabilized when there is no active erosion or sedimentation present and no disturbed areas remain exposed **for all phases**.

(1) Post-Construction Inspection

For locally approvable projects, once all post-construction stormwater measures have been installed in accordance with the Post-Construction Stormwater Management section (subsection 5(*b*)(2)(C)) and cleaned of any construction sediment or debris, the registrant shall contact the appropriate Conservation District or a qualified soil erosion and sediment control professional and/or a qualified professional engineer, as appropriate, who will inspect the site to confirm compliance with these post-construction stormwater measures. This person(s) shall not be an employee, as defined by the Internal Revenue Service in the Internal Revenue Code of 1986, of the permittee and shall have no ownership interest of any kind in the project for which the site's registration was submitted.

(2) Final Stabilization Inspection

For all projects, once the site has been stabilized for at least three months, the registrant shall have the site inspected by a qualified inspector to confirm final stabilization. The registrant shall indicate compliance with this requirement on the Notice of Termination form.

(b) Termination Form

A termination notice shall be filed on forms prescribed and provided by the commissioner and shall include the following:

(1) The permit number as provided to the permittee on the permit certificate.

(2) The name of the registrant as reported on the general permit registration form (DEEP-PED-REG-015).

(3) The address of the completed construction site.

(4) The dates when:

(A) All storm drainage structures were cleaned of construction debris pursuant to the "Other Controls" section (subsection 5(*b*)(2)(D)) of this general permit; and

(B) The post-construction inspection was conducted pursuant to subsection 6(*a*)(1), above; and

(C) The date of completion of construction; and

(D) The date of the final stabilization inspection pursuant to subsection 6(*a*)(2), above.

(5) A description of the post-construction activities at the site.

(6) Signatures of:

(A) The permittee; and

(B) The person certifying the post-construction inspection pursuant to subsection 6(*a*)(1), above.

(c) Where to File a Termination Form

A termination form shall be filed with the commissioner at the following address:

CENTRAL PERMITS PROCESSING UNIT
BUREAU OF MATERIALS MANAGEMENT & COMPLIANCE ASSURANCE
DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Section 7. Commissioner's Powers

(a) Abatement of Violations

The commissioner may take any action provided by law to abate a violation of this general permit, including but not limited to penalties of up to $25,000 per violation per day under Chapter 446k of the Connecticut General Statutes, for such violation. The commissioner may, by summary proceedings or otherwise and for any reason provided by law, including violation of this general permit, revoke a permittee's authorization hereunder in accordance with sections 22a-3a-2 through 22a-3a-6, inclusive, of the Regulations of Connecticut State Agencies. Nothing herein shall be construed to affect any remedy available to the commissioner by law.

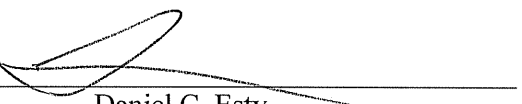
(b) General Permit Revocation, Suspension, or Modification

The commissioner may, for any reason provided by law, by summary proceedings or otherwise, revoke or suspend this general permit or modify to establish any appropriate conditions, schedules of compliance, or other provisions which may be necessary to protect human health or the environment.

(c) Filing of an Individual Permit Application

If the commissioner notifies a permittee in writing that such permittee must obtain an individual permit if he wishes to continue lawfully conducting the construction activity, the permittee shall file an application for an individual permit within thirty (30) days of receiving the commissioner's notice. While such application is pending before the commissioner, the permittee shall continue to comply with the terms and conditions of this general permit. Nothing herein shall affect the commissioner's power to revoke a permittee's authorization under this general permit at any time.

Issued: August 21, 2013



Daniel C. Esty
Commissioner

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

APPENDIX A

Endangered and Threatened Species

In order to be eligible for coverage under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities ("GP" or "the GP"), under section 3(*b*)(2) of the GP, a registrant must ensure that the construction activity, which includes, but is not limited to, excavation, site development or other ground disturbance activities, and stormwater flow, discharges and control measures ("construction activity"), does not threaten the continued existence of any state or federal species listed as endangered or threatened ("listed species") or result in the destruction or adverse modification of any habitat associated with such species.

In order to prevent significant, unforeseen delays in the processing of a registration under the GP, registrants should assess compliance with section 3(*b*)(2) early in the planning stages of a project. The Department of Energy and Environmental Protection ("the Department") strongly recommends that this assessment *be initiated up to one year, or more,* prior to the projected construction initiation date, and even before the purchase of the site of the construction activity. At a minimum, registrants must assess compliance with section 3(*b*)(2) prior to submission of the Registration Form for the GP.

This Appendix describes the ways that a registrant can comply with section 3(*b*)(2) of the GP. In connection with the filing of a registration a registrant can perform a self-assessment described in Section 1, seek a limited one-year determination or a safe harbor determination from the Department's Wildlife Division under Sections 2 or 3, respectively, or stipulate in writing to the presence of listed species or any habitat associated with such species and develop a mitigation plan pursuant to Section 5 of this Appendix. While some means of compliance are more limited than others, the options set out in this Appendix are not mutually exclusive and all options remain available to a registrant. For example, a registrant may perform a self-assessment under Section 1 and seek a safe harbor determination under Section 3 of this Appendix. Provided the requirements of this Appendix are met, the choice of how to proceed is the registrant's.

Section 1. Self Assessment through Natural Diversity Database Map Review and Screening

Before submission of a registration for coverage under this GP, a registrant must review the current versions of the Department's Natural Diversity Data Base ("NDDB") maps. Except as provided for in Sections 2, 3 or 5 of this Appendix, such review must occur no more than six months before such submission. Such review provides a method for screening whether the Department is already aware of listed species that may be present on the site of the construction activity. These maps can be viewed at the following locations:

1. Online at the following links:

   CT DEEP Natural Diversity Data Base Maps
   CTECO Webpage (in the interactive Simple Map Viewer)

2. At the DEEP Public File Room at 79 Elm Street in Hartford.

Screening

The site of the construction activity must be compared to the shaded areas depicted on the NDDB map to determine if the site is entirely, partially, or within ¼ mile of a shaded area. If the site is entirely, partially or within a ¼ mile of a shaded area for a listed species a registrant can only achieve compliance with section 3(*b*)(2) of the GP by obtaining a limited one-year determination under Section 2, a safe harbor determination under Section 3, or an approved mitigation plan under Section 5 of this Appendix from the Department's Wildlife Division.

If the site of the construction activity is not entirely, partially or within ¼ mile of a shaded area, then the Department is not aware of any listed species at the site of the construction activity. Based upon this screening, and provided the registrant has no reasonably available verifiable, scientific or other credible information that the construction activity could reasonably be expected to violate section 3(b)(2) of the GP, when completing the Registration Form for this GP a registrant may check the box that indicates that the construction activity will not impact federal or state listed species.

A registrant using only self-assessment under this section may utilize the results of any such self assessment for up to, but no more than, six months from the date of such assessment. Note, however, that the NDDB maps are not the result of comprehensive state-wide field investigations, but rather serve as a screening tool. Using such maps as a screening tool does not provide a registrant with an assurance that listed species or their associated habitat may not be encountered at the site of the construction activity. Notwithstanding the NDDB screening results, if a listed species is encountered at the site of the construction activity, the registrant shall promptly contact the Department and may need to take additional action to ensure that the registrant does not violate section 3(b)(2) of the GP.

Section 2. Obtaining a Limited One-Year Determination

A registrant may seek a written determination from the Department's Wildlife Division, good for one-year, that the proposed construction activity complies with section 3(b)(2) of the GP. To obtain this limited one-year determination, a registrant must, in addition to conducting the NDDB map review in Section 1 of this Appendix, provide the Department's Wildlife Division with (1) any reasonably available verifiable, scientific or other credible information about whether the construction activity could reasonably be expected to result in a violation of section 3(b)(2) of the GP, and (2) limited information about the site of the proposed construction activity, but less information than would be necessary for a safe harbor determination under Section 3 of this Appendix. The limited information necessary for a one-year determination is on the current "Request for Natural Diversity Database (NDDB) State Listed Species Review" form on the Department's website. The form and instructions for seeking such a limited one-year determination are available at www.ct.gov/DEEP/nddbrequest.

Provided the registrant's information is accurate and the Department's Wildlife Division determines that the construction activity will not violate section 3(b)(2) of the GP, the registrant shall receive a limited one-year determination from the Department. Any such determination may indicate that the construction activity will not impact listed species or their associated habitat, or it may include specific conditions to be implemented to avoid or significantly minimize any impacts that may be encountered at the site of the construction activity. For purposes of submitting a registration for the GP, any such limited one-year determination can be relied upon by the person receiving such determination for one-year from the date of such determination. Like, however, the NDDB screening procedure in Section 1 of this Appendix, a limited one-year determination does not provide a registrant with an assurance that listed species or their associated habitat may not be encountered at the site of the construction activity. If a listed species is encountered, the registrant shall promptly contact the Department

and may need to take additional action to ensure that the construction activity does not violate section 3(b)(2) of the GP.

If a registrant receives a limited one-year determination from the Department, the registrant should check the limited one-year determination box on the GP registration form and include the Department's one-year limited determination letter if requested on the GP Registration form. Checking the limited one-year determination box on the registration form and failing to provide the determination letter from the Department's Wildlife Division, if requested on the GP Registration form, will delay and may prevent processing of a registration.

If based upon the information provided by a registrant seeking a limited one-year determination the Department's Wildlife Division determines that the construction activity could impact listed species or their associated habitat, or that the Department needs additional information to make a limited one-year determination, the registrant may still achieve compliance with section 3(b)(2) of the GP through providing additional information pursuant to Section 4 or developing a mitigation plan pursuant to Section 5 of this Appendix.

A registrant may request one or more one-year extensions to a limited one-year determination under this section. If the Department's Wildlife Division has prescribed a form for requesting an extension, any such request shall be made using the prescribed form. There is a presumption that requests for a one-year extension of a limited one-year determination shall be granted. However, this presumption can be rebutted if the Department determines that a change in any of the following has occurred since an initial limited one-year determination or any extension was granted: the construction activity affecting or potentially affecting listed species or their associated habitat; the NDDB maps for the site of the construction activity; the limited information upon which a limited one-year determination or any extension was granted; or other information indicative of a change in circumstance affecting listed species or their associated habitat. Any one-year extension granted under this paragraph shall run from the date the Department's Wildlife Division issues its determination to grant an extension and shall be treated as a limited one-year determination as provided for in this section. Any letter granting a one-year extension shall be included with a registration along with the original limited one-year determination as provided for in this section.

Section 3. Obtaining a Safe Harbor Determination

A registrant may seek a written determination from the Department's Wildlife Division, good for three years, with the potential to be extended for an additional year, that proposed construction activity complies with section 3(b)(2) of the GP. Any such determination shall constitute a "safe harbor" for purposes of section 3(b)(2) of the GP.

To obtain a safe harbor determination, a registrant must, in addition to conducting the NDDB review in section 1 of this Appendix, provide the Department's Wildlife Division with any reasonably available verifiable, scientific or other credible information about whether the construction activity could reasonably be expected to result in a violation of section 3(b)(2) of the GP and specific information about the site of the construction activity. The specific information necessary for a safe harbor determination is listed in Attachment A to this Appendix. This information must be sufficient to allow the Wildlife Division to adequately assess the site for potential risks to listed species and their associated habitat. While the Department recognizes certain information is necessary to make a safe harbor determination, it also recognizes that a registrant may need to obtain a safe harbor determination early in its project's approval process in order to make prudent business decisions about purchasing a site or proceeding to final project designs. The form and instructions for seeking a safe harbor determination are available at www.ct.gov/DEEP/nddbrequest.

Provided the registrant's information is accurate and the Department's Wildlife Division determines that the construction activity will not violate section 3(b)(2) of the GP, the registrant shall receive a safe harbor determination from the Department. A safe harbor determination may indicate that the construction activity will not impact listed species or their associated habitat, or it may include specific conditions to be implemented to avoid or significantly minimize any impacts that may be encountered at the site of the construction activity. The Department shall honor the safe harbor determination for three years from the date it is issued, meaning that unlike the NDDB review in Section 1 or the limited one-year determination in Section 2 of this Appendix, if the Department makes a safe harbor determination and a registrant remains in compliance with any conditions in any such determination, irrespective of what may be found at the site of the construction activity, a registrant shall be considered in compliance with section 3(b)(2) of the GP. However, a safe harbor determination shall not be effective if a construction activity may threaten the continued existence of any federally listed species or its critical habitat under federal law. If a federally listed species or its critical habitat is encountered on the site of the construction activity, the registrant shall promptly contact the Department and may need to take additional action to ensure that the construction activity does not violate federal law or section 3(b)(2) of the GP.

If a registrant receives a safe harbor determination from the Department, the registrant should check the safe harbor determination box on the GP registration form and include the Department's safe harbor determination if requested on the GP Registration form. Checking the safe harbor box on the registration form and failing to provide the safe harbor determination letter from the Department's Wildlife Division, if requested on the GP Registration form, will delay and may prevent processing of a registration.

If based upon the information provided by a registrant seeking a safe harbor determination the Department's Wildlife Division determines that the construction activity could impact listed species or their associated habitat, or that the Department needs additional information to make a safe harbor determination, the registrant may still achieve compliance with section 3(b)(2) of the GP through providing additional information pursuant to Section 4 or developing a mitigation plan pursuant to Section 5 of this Appendix.

If a registrant receives a safe harbor determination from the Department's Wildlife Division, anytime during the third year of such safe harbor, a registrant may request a one-year extension of that safe harbor. If the Department's Wildlife Division has prescribed a form for requesting an extension, any such request shall be made using the prescribed form. There is a presumption that a request for a one-year extension of a safe harbor shall be granted. However, this presumption can be rebutted if the Department determines that a change in any of the following has occurred since the safe harbor was granted: the construction activity affecting or potentially affecting listed species or their associated habitat; the NDDB maps for the site of the construction activity; the information upon which the safe harbor was granted; or other information indicative of a change in circumstance affecting listed species or their associated habitat. A registrant may seek only one extension, for one-year, to a safe harbor determination. Any one-year extension granted under this paragraph shall run from the date of the Department's Wildlife Division issues its determination to grant an extension and shall be honored by the Department in the same manner as a safe harbor determination noted above. Any letter granting a one-year extension shall be included with a registration along with the original limited safe harbor determination as provided for in this section.

Section 4. Providing Additional Information

For the Department's Wildlife Division to make a limited one-year determination under Section 2 or a safe harbor determination under section 3 of this Appendix, limited additional information may be required to determine if the construction activity would impact listed species or their associated habitat. If the species in question is a state listed endangered or threatened species under section 26-306 of the general statutes, a registrant shall, in consultation with the Department's Wildlife Division, provide the limited additional

information requested by the Department's Wildlife Division. Such information may include, but is not limited to, a survey of specific listed species in question. If the species in question is a federally listed threatened or endangered species, in addition to the Department's Wildlife Division, a registrant shall also consult with the U.S. Fish and Wildlife Service and shall provide any additional information requested by that agency. A registrant that initially sought or obtained a limited one-year determination may, after providing the additional information required under this section request a safe harbor determination under Section 3 of this Appendix.

At any time, as an alternative to proceeding under Section 2, 3 or 4 of this Appendix, a registrant may stipulate, in writing, to the presence of one or more listed species or their associated habitat. A registrant choosing this alternative shall proceed to develop a mitigation plan under Section 5 of this Appendix.

If based upon any additional information provided to the Department's Wildlife Division, and as applicable, the U.S. Fish & Wildlife Service, the Department's Wildlife division determines that construction activity will be in compliance with section 3(b)(2) of the GP, a registrant shall receive a limited one-year determination under Section 2 or a safe harbor determination under Section 3 of this Appendix, as applicable.

If the Department's Wildlife Division determines that additional information is necessary to determine if the construction activity has the potential to impact listed species or their associated habitat, and a registrant chooses to not provide such information, a registrant shall proceed with the self assessment through an NDDB review under Section 1 of this Appendix, or stipulate to the existence of a listed species or associated habitat and develop a mitigation plan under Section 5 or such registrant shall not be eligible to register under the GP.

Section 5. Developing a Mitigation Plan

The Department's Wildlife Division may determine that the construction activity has the potential to adversely impact listed species or their associated habitat. However, it may be possible to modify the construction activity or undertake certain on-site measures to avoid or significantly minimize such impacts. If the species or associated habitat in question is a state listed endangered or threatened species under section 26-306 of the general statutes, a registrant shall consult with the Department's Wildlife Division to determine if an acceptable mitigation plan can be developed so impacts can be avoided or minimized such that a registrant remains in compliance with section 3(b)(2). If the species in question is a federally listed threatened or endangered species, any such consultation shall also include the U.S. Fish and Wildlife Service.

If a registrant in consultation with the Department's Wildlife Division, and as applicable, the U.S. Fish & Wildlife Service, develops a mitigation plan that is approved by the Department's Wildlife Division, or as applicable, the U.S. Fish & Wildlife Service, the registrant shall receive a limited one-year determination under Section 2 or a safe harbor determination under Section 3 of this Appendix. In this situation, in addition to checking the one-year determination box or the safe harbor determination box, as applicable, on the registration form, the registrant shall also check the box on the registration form indicating that it has an approved mitigation plan and provide a status update on the registration form as to whether it has completed or is still in the process of implementing the approved mitigation plan.

If an approved mitigation plan has not been fully implemented by the time a registration is submitted, completing all remaining tasks in the plan shall become an enforceable condition of any registration issued to the registrant.

If the Department determines that the construction activity has the potential to adversely impact listed species or their associated habitat and the registrant and the Department, and as applicable, the U.S. Fish & Wildlife Service, are not able to agree on an acceptable mitigation plan that is approved by the Department, and as applicable, the U.S. Fish & Wildlife Service, any such registrant shall not be eligible to register under the GP.

APPENDIX A
ATTACHMENT A

Specific Information Needed to Apply for a Safe Harbor Determination

A Safe Harbor Determination will be made upon the submission of a detailed report that fully addresses the matters noted below. For the Department's Wildlife Division to make a safe harbor determination, the report should synthesize and analyze this information, not simply compile information. Those providing synthesis and analysis need appropriate qualifications and experience. A request for a safe harbor determination shall include:

1) Habitat Information, including GIS mapping overlays, identifying:

- wetlands, including wetland cover types;
- plant community types;
- topography;
- soils;
- bedrock geology;
- floodplains, if any;
- land use history; and
- water quality classifications/criteria.

2) Photographs - The report should also include photographs of the site, including all reasonably available aerial or satellite photographs and an analysis of such photographs.

3) Inspection - The report should include a visual inspection(s) of the site, preferably when the ground is visible. This inspection can also be helpful in confirming or further evaluating the items noted above.

4) Biological Surveys - The report should include all biological surveys of the site where construction activity will take place that are reasonably available to a registrant. A registrant shall notify the Department's Wildlife Division of biological studies of the site where construction activity will take place that a registrant is aware of but are not reasonably available to the registrant.

5) Based on items #1 through 4 above, the report shall include a Natural Resources Inventory of the site of the construction activity. This inventory should also include a review of reasonably available scientific literature and any recommendations for minimizing adverse impacts from the proposed construction activity on listed species or their associated habitat.

6) In addition, to the extent the following is available at the time a safe harbor determination is requested, a request for a safe harbor determination shall include and assess:

- Information on Site Disturbance Estimates/Site Alteration information

- Vehicular Use

- Construction Activity Phasing Schedules, if any; and

- Alternation of Drainage Patterns

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

APPENDIX B

Connecticut Department of Energy & Environmental Protection
Inland Water Resources Division Fact Sheet
Considering Low Impact Development Principles in Site Design

In order to reduce the impact of development and address stormwater quality issues, the Department strongly encourages the use of Low Impact Development (LID) measures. LID is a site design strategy intended to maintain or replicate predevelopment hydrology through the use of small-scale controls, integrated throughout the site, to manage stormwater runoff as close to its source as possible. Infiltration of stormwater through LID helps to remove sediments, nutrients, heavy metals, and other types of pollutants from runoff.

Key Strategies for LID

Key strategies for effective LID include: infiltrating, filtering, and storing as much stormwater as feasible, managing stormwater close to where the rain/snow falls, managing stormwater at multiple locations throughout the landscape, conserving and restoring natural vegetation and soils, preserving open space and minimizing land disturbance, designing the site to minimize impervious surfaces, and providing for maintenance and education. Water quality and quantity benefits are maximized when multiple techniques are grouped together. In areas of compacted and/or possibly contaminated soils, soil suitability should be further investigated prior to selecting optimum treatment and/or remediation measures. Where soil conditions permit, the DEEP encourages the utilization of one, or a combination of, the following measures:

- the use of pervious pavement or grid pavers (which are very compatible for parking lot and fire lane applications), or impervious pavement without curbs or with notched curbs to direct runoff to properly designed and installed infiltration areas;
- the use of vegetated swales, tree box filters, and/or infiltration islands to infiltrate and treat stormwater runoff (from building roofs, roads, and parking lots);
- the minimization of access road widths and parking lot areas to the maximum extent possible to reduce the area of impervious surface;
- the use of dry wells to manage runoff from building roofs;
- incorporation of proper physical barriers or operational procedures for special activity areas where pollutants could potentially be released (e.g. loading docks, maintenance and service areas, dumpsters, etc.);
- the installation of rainwater harvesting systems to capture stormwater from building roofs for the purpose of reuse for irrigation (i.e. - rain barrels for residential use and cisterns for larger developments);
- the use of residential rain gardens to manage runoff from roofs and driveways;
- the use of vegetated roofs (green roofs) to detain, absorb, and reduce the volume of roof runoff; and
- providing for pollution prevention measures to reduce the introduction of pollutants to the environment.

The 2004 Stormwater Quality Manual LID Appendix and the 2002 Erosion and Sediment Control Guidelines LID Appendix both provide guidance on implementing LID measures. A guide to LID resources can also be found in the DEEP Low Impact Development Resources Factsheet (PDF).

LID in Urban Areas

If the proposed site is located in a highly urbanized area, it is likely underlain by urban land complex soils. The Natural Resources Conservation Service (NRCS) Soil Web Survey (http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm) provides information on soil textures, parent materials, slopes, height of seasonal high water table, depth to restrictive layer, and permeability. In highly developed areas, infiltration may be limited due to the high percentage of impervious cover. However, infiltration practices may be suitable at urban sites depending on:

- Potential contamination of soils in historically industrialized areas. The siting of areas for infiltration must consider any existing soil or groundwater contamination.

- Site specific soil conditions. NRCS mapping consists of a minimum 3 acres map unit and soils may vary substantially within each mapping unit. Test pits should be dug in areas
- planned for infiltration practices to verify soil suitability and/or limitations.

- Investigation of areas of compacted soils and the utilization of proper construction staging. Planning should insure that areas to be used for infiltration are not compacted during the construction process by vehicles or machinery.

Even if infiltration is limited at a site, it is still possible to implement LID practices. Specifically, potential exists for the installation of green roofs on buildings and/or the use of cisterns to capture and reuse rainwater.

LID in Areas with a High Seasonal Water Table or Hardpan Layer

- The impact of stormwater runoff to any streams and/or wetlands near the site should be considered. Water quality treatment is influenced by hydraulic conductivity and time of travel. If stormwater infiltration is limited by an impermeable layer close to the surface, the water may run laterally through the ground and discharge to the stream or wetlands, providing limited water quality treatment. However, a longer time of travel may provide sufficient treatment. Proper soil testing for infiltration potential will increase the likelihood of successful BMP design.

- In areas with a high seasonal water table, bioretention areas/rain gardens should be planted with water tolerant/wetland plants. The presence of a high seasonal water table suggests that water may drain slowly or not at all during certain parts of the year. Planting native wetland vegetation will help to ensure plant survival and increase the effectiveness of bioretention practices. Information on native plantings that are both drought tolerant and tolerant of wet conditions can be found in The UConn Cooperative Extension System's guide to building a rain garden at http://nemo.uconn.edu/publications/rain_garden_broch.pdf. Native plant lists for Connecticut can also be found at http://www.fhwa.dot.gov/environment/rdsduse/ct.htm.

LID Guidance for Federal Projects

- LID techniques have been utilized by Department of Defense (DoD) agencies during the last several years. The effectiveness of these projects in managing runoff as well as reducing construction and maintenance costs has created significant interest in LID. The DoD has created a Unified Facilities Criteria document, Low Impact Development that provides guidelines for integrating LID planning and design into a facility's regulatory and resource protection programs. It is available on-line at: http://www.wbdg.org/ccb/DOD/UFC/ufc_3_210_10.pdf.

- Section 438 of the Energy Independence and Security Act (EISA) of 2007 requires federal agencies to reduce stormwater runoff from federal development projects to protect water resources. In December 2009, the EPA developed a technical guidance document on implementing the stormwater runoff requirements for federal projects under Section 438 of EISA. The document contains guidance on how compliance with Section 438 can be achieved, measured and evaluated and can be found at: http://www.epa.gov/owow/NPS/lid/section438/pdf/final_sec438_eisa.pdf.

For more information contact the CT DEEP Watershed Management/Low Impact Development Program:

Name	Area	Telephone
MaryAnn Nusom Haverstock	Program Oversight/ Low Impact Development	(860) 424-3347
Chris Malik	Watershed Manager	(860) 424-3959
Susan Peterson	Watershed Manager	(860) 424-3854
Eric Thomas	Watershed Manager	(860) 424-3548

List of Runoff Reduction/LID Practices

Re-Forestation
Disconnection of Rooftop Runoff
Disconnection of Non-Rooftop Runoff
Sheetflow to Conservation Areas
Green Roof
Permeable Pavement
Rainwater Harvesting
Submerged Gravel Wetlands
Micro-Infiltration
Rain Gardens
Bioretention
Landscape Infiltration
Grass Swales
Bio-swales
Wet Swales
Stormwater Ponds
Stormwater Wetlands
Stormwater Filtering Systems
Stormwater Infiltration

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

APPENDIX C

AQUIFER PROTECTION AREAS AND OTHER GROUNDWATER DRINKING SUPPLY AREAS GUIDANCE INFORMATION

The Pollution Control Plan ("the Plan") should consider measures to reduce or mitigate potential impacts to both ground water (aquifers) and surface waters, taking into consideration both quantity and quality of the runoff. The emphasis should be to minimize, to the extent possible, changes between pre-development and post-development runoff rates and volumes.

The basic stormwater principals for Aquifer Protection Areas (and other groundwater drinking supply areas) are to prevent inadvertent pollution discharges/releases to the ground, while encouraging recharge of stormwater where it does not endanger groundwater quality. Measures include:

- prevent illicit discharges to storm water, including fuel/chemical pollution releases to the ground;
- minimize impervious coverage and disconnect large impervious areas with natural or landscape areas;
- direct paved surface runoff to aboveground type land treatment structures – sheet flow, surface swales, depressed grass islands, detention/retention and infiltration basins, and wet basins. These provide an opportunity for volatilization of volatile organic compounds to the extent possible before the stormwater can infiltrate into the ground;
- provide necessary impervious pavement in high potential pollutant release areas. These "storm water hot spots" include certain land use types or storage and loading areas, fueling areas, intensive parking areas and roadways (see table below);
- only use subsurface recharge structures such as dry wells, galleries, or leaching trenches, to directly infiltrate clean runoff such as rooftops, or other clean surfaces. These structures do not adequately allow for attenuation of salts, solvents, fuels or other soluble compounds in groundwater that may be contained in runoff; and
- restrict pavement deicing chemicals, or use an environmentally suitable substitute such as sand only, or alternative de-icing agents such as calcium chloride or calcium magnesium.

Infiltration of stormwater should be **restricted** under the following site conditions:

- ***Land Uses or Activities with Potential for Higher Pollutant Loads:*** Infiltration of stormwater from these land uses or activities (refer to Table 7-5 below), also referred to as stormwater "hotspots," can contaminate public and private groundwater supplies. Infiltration of stormwater from these land uses or activities may be allowed by the review authority with appropriate pretreatment. Pretreatment could consist of one or a combination of the primary or secondary treatment practices described in the Stormwater Quality Manual provided that the treatment practice is designed to remove the stormwater contaminants of concern.

- ***Subsurface Contamination:*** Infiltration of stormwater in areas with soil or groundwater contamination such as brownfield sites and urban redevelopment areas can mobilize contaminants.

- ***Groundwater Supply and Wellhead Areas:*** Infiltration of stormwater can potentially contaminate groundwater drinking water supplies in immediate public drinking water wellhead areas.

Land Uses or Activities with Potential for Higher Pollutant Loads
Table 7-5 of the 2004 Stormwater Quality Manual

Land Use/Activities	
• Industrial facilities subject to the DEEP Industrial Stormwater General Permit or the U.S. EPA National Pollution Discharge Elimination System (NPDES) Stormwater Permit Program • Vehicle salvage yards and recycling facilities • Vehicle fueling facilities (gas stations and other facilities with on-site vehicle fueling) • Vehicle service, maintenance, and equipment cleaning facilities • Fleet storage areas (cars, buses, trucks, public works) • Commercial parking lots with high intensity use (shopping malls, fast food restaurants, convenience stores, supermarkets, etc.) • Public works storage areas	• Road salt storage facilities (if exposed to rainfall) • Commercial nurseries • Flat metal rooftops of industrial facilities • Facilities with outdoor storage and loading/unloading of hazardous substances or materials, regardless of the primary land use of the facility or development • Facilities subject to chemical inventory reporting under Section 312 of the Superfund Amendments and Reauthorization Act of 1986 (SARA), if materials or containers are exposed to rainfall • Marinas (service and maintenance) • Other land uses and activities as designated by the review authority

For further information regarding the design of stormwater collection systems in Aquifer Protection Areas, contact the Aquifer Protection Area Program at (860) 424-3020 or visit www.ct.gov/deep/aquiferprotection.

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

APPENDIX D

Coastal Management Act Determination Form

For sites within the Coastal Boundary, please attach this form and written approval from the local governing authority (or verification of exemption) to the Registration Form for the Discharge of Stormwater and Dewatering Wastewaters From Construction Activities.

SITE INFORMATION

Future Permittee _____

Mailing Address _____

Business Phone _____ ext.: _____ Fax: _____

Contact Person _____ Title: _____

Site Name _____

Site Address/ Location _____

Site Latitude and Longitude _____

Receiving Water (name, basin) _____

Project Description _____

_____

STATEMENT OF REVIEW:

The above referenced project is consistent with the goals and policies in section 22a-92 of the Connecticut General Statutes and will not cause adverse impacts to coastal resources as defined in section 22a-93(15) of the Connecticut General Statutes.

Date of Coastal Site Plan Approval: _____

☐ Copy of written approval attached, or

☐ Verification of exemption attached

APPENDIX E
(Exhibit 3 of District/DEEP Memorandum of Agreement)

Conservation Districts of Connecticut
Regional Delineations and Contact Information

Northwest Conservation District
1185 New Litchfield Street
Torrington, CT 06790
Ph: 860-626-7222
Fax: 860-626-7222
Email: ncd@conservect.org

Eastern Connecticut Conservation District
238 West Town Street
Norwich, CT 06360-2111
Ph**:** 860-887-4163 x 400 Fax**:** 860-887-4082
Email: kate.johnson.eccd@comcast.net

Connecticut River Coastal Conservation District, Inc.
deKoven House Community Center
27 Washington Street
Middletown, CT 06457
Ph: 860-346-3282 Fax: 860-346-3284
Email: ctrivercoastal@conservect.org

Southwest Conservation District
51 Mill Pond Road
Hamden, CT 06514
Ph: 203-287-8179 Fax: 203-288-5077
Email: swcd43@sbcglobal.net

North Central Conservation District
24 Hyde Avenue
Vernon, CT 06066
Ph: 860-875-3881 Fax: 860-870-8973
Email: tollandc@snet.net

NORTHWEST	SOUTHWEST	NORTH CENTRAL	CT RIVER COASTAL	EASTERN
Barkhamsted	Ansonia	Avon	Berlin	Andover
Bethel	Beacon Falls	Bloomfield	Chester	Ashford
Bethlehem	Bethany	Bolton	Clinton	Bozrah
Bridgewater	Branford	Bristol	Colchester	Brooklyn
Brookfield	Bridgeport	Burlington	Cromwell	Canterbury
Canaan	Cheshire	Canton	Deep River	Chaplin
Colebrook	Darien	Coventry	Durham	Columbia
Cornwall	Derby	East Granby	East Haddam	Eastford
Danbury	East Haven	East Hartford	East Hampton	East Lyme
Goshen	Easton	East Windsor	Essex	Franklin
Hartland	Fairfield	Ellington	Haddam	Griswold
Harwinton	Greenwich	Enfield	Hebron	Groton
Kent	Guilford	Farmington	Killingworth	Hampton
Litchfield	Hamden	Glastonbury	Lyme	Killingly
Morris	Meriden	Granby	Madison	Lebanon
New Fairfield	Middlebury	Hartford	Marlborough	Ledyard
New Hartford	Milford	Manchester	Middlefield	Lisbon
New Milford	Monroe	Plainville	Middletown	Mansfield
Newtown	Naugatuck	Simsbury	Newington	Montville
Norfolk	New Canaan	Somers	New Britain	New
North Canaan	New Haven	South Windsor	Old Lyme	London
Plymouth	North Branford	Stafford	Old Saybrook	North
Roxbury	North Haven	Suffield	Portland	Stonington
Salisbury	Norwalk	Tolland	Rocky Hill	Norwich
Sharon	Orange	Vernon	Salem	Plainfield
Sherman	Oxford	West Hartford	Westbrook	Pomfret
Southbury	Prospect	Wethersfield		Preston
Thomaston	Redding	Willington		Putnam
Torrington	Ridgefield	Windsor		Scotland
Warren	Seymour	Windsor Locks		Sprague
Washington	Shelton			Sterling
Watertown	Southington			Stonington
Winchester	Stamford			Thompson
Woodbury	Stratford			Union
	Trumbull			Voluntown
	Wallingford			Waterford
	Waterbury			Windham
	West Haven			Woodstock
	Weston			
	Westport			
	Wilton			
	Wolcott			
	Woodbridge			

APPENDIX F

Memorandum of Agreement
Between
The Connecticut Department of Energy & Environmental Protection
and the
Conservation Districts of Connecticut

WHEREAS, the Commissioner of the Department of Energy and Environmental Protection ("Department" or "DEEP ") is authorized by section 22a-6(2)(3) and (4) of the Connecticut General Statutes ("CGS") to enter into this Agreement; and

WHEREAS, the five Conservation Districts of Connecticut (collectively, the "Districts"), are not-for-profit corporations duly authorized, organized and existing under the laws of the State of Connecticut and are authorized by section 22a-315 of the CGS and section 22a-315-14 of the Regulations of Connecticut State Agencies to enter into this Agreement; and

WHEREAS, section 22a-430b of the Connecticut General Statutes requires the Department to regulate stormwater discharges from construction activities under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities ("the Construction General Permit" or "CGP"), which has been or shall be issued on October 1, 2013. The Construction General Permit requires the implementation of erosion and sedimentation controls to control the discharge of sediment from construction and post-construction discharges; and

WHEREAS, Construction General Permits require the preparation and implementation of a Stormwater Pollution Control Plan ("Plan" or "SWPCP") to prevent erosion and the discharge of sediment to the waters of the state; and

WHEREAS, pursuant to section 22a-315 of the CGS, soil and water conservation districts and boards were established to advise the Commissioner on matters of soil and water conservation and erosion and sedimentation control and to assist the Commissioner in implementing programs related to soil and water conservation and erosion and sediment control; and

WHEREAS, pursuant to section 22a-315 of the CGS, the soil and water conservation districts and boards may receive funds from private sources for services provided to promote soil and water conservation and to assist the Commissioner in the implementation of related programs; and

WHEREAS, section 22a-326 of the CGS declares the policy of the state "to strengthen and extend its erosion and sediment control activities and programs and to establish and implement, through the Council on Soil and Water Conservation, soil and water conservation districts, the municipalities and the Commissioner of Energy and Environmental Protection, a state-wide coordinated erosion and sediment control program which shall reduce the danger from storm water runoff, minimize nonpoint sediment pollution from land being developed and conserve and protect the land, water, air and other environmental resources of the state;" and

WHEREAS, the Districts have understanding and experience in reviewing erosion and sediment control plans because of their longstanding participation in the municipal approval process, as required by section 22a-329 of the CGS; and

WHEREAS, DEEP and the Districts are jointly dedicated to protecting the waters of the state by controlling the discharge of sediment and the pollution resulting from stormwater runoff.

NOW, THEREFORE, in consideration of the mutual covenants and conditions hereinafter stated, the Parties agree as follows:

I. RESPONSIBILITIES OF THE CONSERVATION DISTRICTS.

For locally approvable projects, as defined in the Construction General Permit, with five (5) or more acres of soil disturbance, the appropriate District (as specified in Appendix E of the Construction General Permit, appended hereto as Exhibit 3) shall review Stormwater Pollution Control Plans submitted to the District in accordance with Section 3(*b*)(10) of the CGP, shall determine whether each such SWPCP is consistent with the requirements of the CGP, and shall advise the Commissioner in writing of its determination regarding the SWPCP's consistency.

A. Components of the SWPCP Review by the Districts

1. Requirements for Conducting a Review:

(a) SWPCP review shall be conducted by a District representative having one or more of the following minimum qualifications: (i) a bachelor's degree in hydrology, engineering (agricultural, civil, environmental, or chemical), landscape architecture, geology, soil science, environmental science, natural resources management, or a related field and two years of professional and field experience, or (ii) the EnviroCert International, Inc. designation as a Certified Professional in Erosion and Sediment Control, or a Certified Professional in Storm Water Quality.

(b) All SWPCP reviews undertaken by a District shall be conducted in accordance with the guidelines and procedures established by DEEP in consultation with the Districts, as further described below, and shall include at least one inspection, and no more than 3 inspections, of the project site.

(c) The District shall begin a SWPCP review upon the receipt of the all of following: the developer's request for review, two copies of the proposed SWPCP, the payment of required fee in the amount specified in Exhibit 1 and the written permission of the developer to enter onto and inspect the project site. Once the District is in receipt of all the documents and the fee as delineated above, the developer's SWPCP shall be considered submitted to the District.

2. Determinations of Consistency by the District after Review of the SWPCP and Subsequent Procedures

(a) If the District determines the developer's SWPCP is:

(i) Consistent with the requirements of the Construction General Permit, the District shall issue an affirmative determination notice to both the developer or such developer's designee and to DEEP in order to advise them of the adequacy of the SWPCP. The District shall also provide a copy of the SWPCP to DEEP if requested by the Commissioner.

(ii) Not consistent with the requirements of the Construction General Permit, the District shall provide a written notice of such inconsistency to the developer or such developer's designee; such notice shall include a list of the SWPCP's deficiencies and any appropriate explanatory comments.

(b) If the developer's SWPCP is found to be inconsistent with the CGP, the developer may revise the SWPCP (the "Revised SWPCP") to address any deficiencies noted by the District and resubmit its Revised SWPCP to the District for review.

(c) If the District receives a Revised SWPCP in accordance with subsection (b) above, the District shall perform a review of the Revised SWPCP. If the Revised SWPCP is deemed:

(i) Consistent with the requirements of the Construction General Permit, the District shall (1) issue an affirmative determination notice to both the project developer or such project developer's designee and to DEEP to advise them of the adequacy of the SWPCP and (2) provide a copy of the SWPCP to the DEEP if requested by the Commissioner; or

(ii) Not consistent with the requirements of the CGP after this review, the District shall provide a written notice of such inconsistency to the developer or such developer's designee. This notice shall include a list of all remaining SWPCP deficiencies and any explanatory comments as appropriate.

(d) In the event the District determines after review of the Revised SWPCP in accordance with subsection (c), above, that the Revised SWPCP remains inconsistent with the requirements of the Construction General Permit, and the developer resubmits its Revised SWPCP *within 180 calendar days* of the District's original determination of inconsistency, the resubmitted Revised SWPCP shall be considered a Resubmission. As such, the resubmitted Revised SWPCP shall be reviewed by the District in accordance with the timeframes set forth in Section I.B., and other applicable sections of this document, and the fee shall be in accordance with Section II, below, and the Resubmission Fee in Exhibit 1.

(e) In the event the District determines after review of the Revised SWPCP in accordance with subsection (c), above, that the Revised SWPCP remains inconsistent with the requirements of the Construction General Permit, and the developer resubmits its Revised SWPCP *more than 180 calendar days after* the District's original determination of inconsistency, the resubmitted Revised SWPCP shall be considered a new submission. The newly submitted Revised SWPCP shall be reviewed by the District in accordance with the timeframes set forth in Section I.B., and other applicable sections of this document, and the fee shall be in accordance with Section II, below, and the SWPCP Review Fee in Exhibit 1.

(f) Revisions to a SWPCP subsequent to the District's prior approval of developer's SWPCP

(i) In the event the developer revises a SWPCP after the District has determined that the developer's SWPCP, prior to this revision, was consistent with the requirements of the Construction General Permit, and the developer submits the revised SWPCP to the District for review *within 180 calendar days* of the District's original determination of consistency, the SWPCP shall be considered a Post-Approval Resubmission. As a Post-Approval Resubmission, the SWPCP shall be reviewed by the District in accordance with the timeframes set forth in Section I.B., and other applicable sections of this document, and the fee shall be in accordance with Section II, below, and the Post-Approval Resubmission Fee in Exhibit 1.

(ii) In the event the developer revises a SWPCP after the District has determined that the developer's SWPCP, prior to this revision, was consistent with the requirements of the Construction General Permit, and the developer submits the revised SWPCP to the District for review *more than 180 calendar days after* the District's original determination of consistency, the SWPCP shall be considered a new submission. The newly submitted SWPCP shall be reviewed by the District in accordance with the timeframes set forth in Section I.B., and other applicable sections of this document, and the fee shall be in accordance with Section II, below, and the SWPCP Review Fee in Exhibit 1.

B. Plan Review Timeframes

1. The District shall review a new submission of a SWPCP submitted by a developer or such developer's designee and provide review comments within thirty (30) calendar days of the date of a complete submission as specified in Section I.A.1.(c).

2. If the District identifies deficiencies in the SWPCP, the District shall allow the developer or such developer's designee the opportunity to revise their SWPCP and resubmit it to the District within fifteen (15) calendar days after the date of mailing or delivery of the District's written comments to the developer or such developer's designee.

3. The District shall review any SWPCP revised in accordance with subsection I.B.2., above, and provide a written determination of the SWPCP's consistency or inconsistency within fifteen (15) calendar days after the submission of the revised SWPCP.

4. At the request of the District or the developer and with the agreement of both the District and the developer, the deadlines stated in subsections 1. – 3., above, may be extended. However, any such extensions shall be limited to no more than double the original amount of time allowed above for the relevant action.

5. Express review of a SWPCP may be requested by a developer. However, the Districts shall have complete discretion to accept or decline such request for an express review based on the District's circumstances, including, but not limited to: their existing workload, vacation schedules and staffing. If a District grants an express review, the timeframe shall be reduced to no more than one third of the timeframes noted in subsection 1. – 3., above, and the fee shall be in accordance with the Express Reviews fee in Exhibit 1.

6. In the event a District does not complete the review of the SWPCP within sixty (60) days (or within the time allowed under any authorized extension pursuant to subsection B.4, above, but in no circumstance later than 120 days) of the date the SWPCP was initially submitted to the District, and provided such delay is not the result of the developer's or such developer's designee's failure to address SWPCP deficiencies as noted in subsection B.2, above, the District shall:

(a) not later than three (3) days after the District's deadline, notify the DEEP that the developer shall be initiating the registration process for the Construction General Permit in accordance with section I.B of this Agreement, for completion of the SWPCP review, and;

(b) provide to the DEEP, upon request, the District's complete file, including supporting documentation the developer's SWPCP consistency determination, including, but not limited to, the SWPCP, any other documentation submitted to the District by or on behalf of a developer, and any analysis already performed by the District; and

(c) not later than seven (7) days after the District's deadline, in accordance with section I.B of this Agreement, for completion of the SWPCP review, transfer to the DEEP, up to a maximum of $4,500, the fees that were originally submitted by the developer.

C. Inspections of the Project Site

1. Prior to the commencement of project construction and during the course of the SWPCP review process, the District shall conduct at least one inspection of the project site.

2. Once the construction of the project has begun, a District shall make at least one, but not more than three, inspection(s) of the project site to verify that the developer's SWPCP is being

implemented as approved by the District. A District shall report the results of the inspection(s) to the developer or such developer's designee and to DEEP in a manner prescribed by the Commissioner.

3. Upon notification from the developer or developer's designee, in accordance with Section 6(a)(1) of the CGP, that construction of the stormwater collection and management system is complete, the District shall conduct one inspection of the project site to verify that the post-construction stormwater management measures were completed in accordance with the approved SWPCP. The District shall report the results of this inspection to DEEP in a manner prescribed by the Commissioner.

D. Audits

The District agrees that all records pertaining to this Agreement shall be maintained for a period of not less than five (5) years. Such records shall be made available to the DEEP and to the state auditors upon request. For the purposes of this Agreement, "Records" are all working papers and such information and materials as may have been accumulated by the District in performing the Agreement, including, but not limited to, documents, data, analysis, plans, books, computations, drawings, specifications, notes, reports, records, estimates, summaries and correspondence, kept or stored in any form.

II. FEE SCHEDULE.

A. A District may assess fees for the services it renders in conjunction with its SWPCP reviews. Such fees shall be paid as follows:

1. All fees, except those described in subsection II.A.2, below, shall be submitted by the developer to the District with the developer's request for review. These fees are non refundable.

2. The fee for Post-Approval Resubmission, as designated in Exhibit 1, shall be submitted by the developer to the District upon completion of the District's review, prior to release of the determination notice, and is non refundable.

B. The Fee Schedule shall be reviewed annually by the Parties. The Fee Schedule may be adjusted as warranted, without a formal amendment to this Agreement, by mutual agreement between the Districts and the Commissioner.

III. RESPONSIBILITIES OF DEEP.

A. In accordance with the Construction General Permit requirements for SWPCP reviews by a third party, DEEP shall conduct outreach to inform the development community that a District may review SWPCPs for consistency with the requirements of the Construction General Permit. DEEP shall also inform the development community that a registration form for authorization under the Construction General Permit may only be submitted to DEEP if: the District, or other third party in accordance with Section 3(b)(11) of the CGP, determines that the SWPCP is consistent with the requirements of the CGP, or in the event the time schedule is exceeded for a District review as described in section I.B.6, above.

B. In order to institute standard SWPCP review guidelines and procedures, DEEP shall coordinate with the Districts to prepare a SWPCP checklist. The standard review guidelines and procedures established shall be consistent with the requirements of the Construction General Permit, the 2002 CT Guidelines for Soil Erosion and Sedimentation Control, and the 2004 Stormwater Quality Manual. The Commissioner shall have final approval of the review guidelines and procedures.

C. DEEP shall provide initial training regarding SWPCP requirements for District staff involved in SWPCP reviews. The frequency of subsequent training shall be determined by the Commissioner.

D. DEEP shall retain final decision making authority regarding the determination that a SWPCP is or is not consistent with the requirements of the Construction General Permit and shall oversee the permitting process for Construction General Permit coverage.

E. Once a SWPCP has been approved, DEEP shall oversee any subsequent compliance and/or enforcement matters related to a developer's adherence to the requirements of the Construction General Permit.

F. DEEP shall have the discretion to review any of the Districts' records pertaining to any aspect this Agreement.

IV. POINTS OF CONTACT.

The following shall be points of contact for this Agreement unless otherwise agreed to by all Parties, notwithstanding section VI. All notices, demands, requests, consents, approvals or other communications required or permitted to be given or which are given with respect to this Agreement (for the purpose of this section collectively called "Notices") shall be deemed to have been effected at such time as the notice is placed in the U.S. mail, first class and postage prepaid, return receipt requested, or, placed with a recognized, overnight express delivery service that provides for a return receipt. All such Notices shall be in writing and shall be addressed as follows:

A. DEEP
Director
Water Permitting & Enforcement Division
Bureau of Material Management & Compliance Assurance
Department of Energy & Environmental Protection
79 Elm St.
Hartford, CT 06106
Phone: 860-424-3018
Fax: 860-424-4074

B. Conservation District
Board Chairperson
Address & Phone of appropriate District:

Northwest Conservation District
1185 New Litchfield Street
Torrington, CT 06790
Ph: 860-626-7222
Fax: 860-626-7222
Email: ncd@conservect.org

Eastern Connecticut Conservation District
238 West Town Street
Norwich, CT 06360-2111
Ph**:** 860-887-4163 x 400 Fax**:** 860-887-4082
Email: kate.johnson.eccd@comcast.net

Connecticut River Coastal Conservation District, Inc.
deKoven House Community Center
27 Washington Street
Middletown, CT 06457
Ph: 860-346-3282 Fax 860-346-3284
Email: ctrivercoastal@conservect.org

Southwest Conservation District
51 Mill Pond Road
Hamden, CT 06514
Ph: 203-287-8179 Fax: 203-288-5077
Email: swcd43@sbcglobal.net

North Central Conservation District
24 Hyde Avenue
Vernon, CT 06066
Ph: 860-875-3881 Fax: 860-870-8973
Email: tollandc@snet.net

V. EXECUTIVE ORDERS AND ANTI-DISCRIMINATION. The Districts shall comply with the additional terms and conditions hereto attached as Exhibit 2.

VI. AMENDMENTS. Either the DEEP or the Districts may recommend revisions to this Agreement as circumstances may warrant; however, any revisions must be upon mutual agreement of DEEP and all five Conservation Districts. Unless otherwise stated in this Agreement, formal written amendment is required for changes to any of the terms and conditions specifically stated in the Agreement, including Exhibit 2 of the Agreement, any prior amendments to the Agreement, and any other Agreement revisions determined material by the Department.

VII. SEVERABILITY. The provisions of this Agreement are severable. If any part of it is found unenforceable, all other provisions shall remain fully valid and enforceable, unless the unenforceable provision is an essential element of the bargain.

VIII. SOVEREIGN IMMUNITY. The Parties acknowledge and agree that nothing in the Agreement shall be construed as a modification, compromise or waiver by the State of any rights or defenses of any immunities provided by federal law or the laws of the State of Connecticut to the State or any of the State's, which they may have had, now have or shall have with respect to all matters arising out of the Agreement. To the extent that this section conflicts with any other section, this section shall govern.

IX. FORUM AND CHOICE OF LAW. The Agreement shall be deemed to have been made in the City of Hartford, State of Connecticut. Both Parties agree that it is fair and reasonable for the validity and construction of the Agreement to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by federal law or the laws of the State of Connecticut do not bar an action against the State or the Districts, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Districts waive any objection which they may now have or shall have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

X. TERMINATION. Notwithstanding any provisions in this Agreement, DEEP, through a duly

authorized employee, may terminate the Agreement whenever the Agency makes a written determination that such Termination is in the best interests of the State. The Agency shall notify the Districts in writing sent by certified mail, return receipt requested, which notice shall specify the effective date of Termination and the extent to which the Districts must complete its Performance under the Agreement prior to such date; or (b) The Districts may terminate the Agreement for good cause. The Districts shall notify DEEP by written notice at least one hundred eighty (180) days prior to the effective date of termination. In order for the Districts to terminate this Agreement, (1) there must be a consensus between all five Conservation Districts that each District shall be terminating this Agreement with the DEEP; (2) such proof of consensus shall be submitted to the DEEP in the form of a letter signed by the duly authorized agent for each District by certified mail, return receipt requested, at least one hundred eighty (180) days prior to the Districts' intention to cancel or terminate. Upon the Termination of this Agreement by either Party, the Districts shall deliver to the Agency copies of all Records no later than thirty (30) days after the Termination of the Agreement, or fifteen (15) days after the Non-terminating Party receives a written request from the Terminating Party for the Records. The Districts shall deliver those Records that exist in electronic, magnetic or other intangible form in a non-proprietary format, such as, but not limited to, PDF, ASCII or .TXT. Upon receipt of a written notice of Termination from the Agency, the Districts shall cease operations as the Agency directs in the notice, and take all actions that are necessary or appropriate, or that the Agency may reasonably direct, for the protection, and preservation of records. Except for any work which the Agency directs the Districts to Perform in the notice prior to the effective date of Termination, and except as otherwise provided in the notice, the Districts shall terminate or conclude all existing subcontracts and purchase orders and shall not enter into any further subcontracts, purchase orders or commitments. Upon Termination of the Agreement, all rights and obligations shall be null and void, so that no Party shall have any further rights or obligations to any other Party, except with respect to the sections which survive Termination. All representations, warranties, agreements and rights of the Parties under the Agreement shall survive such Termination to the extent not otherwise limited in the Agreement and without each one of them having to be specifically mentioned in the Agreement. Termination of the Agreement pursuant to this section shall not be deemed to be a breach of Agreement by the Agency.

XI. DURATION OF AGREEMENT. This Agreement shall be effective on July 1, 2013 or on the date of the last signature below, whichever is later, and shall continue in force unless canceled or terminated by either party in accordance with paragraph X above.

XII. VOID AB INITIO. Notwithstanding paragraphs X and XI, the Agreement shall be void *ab initio* if the Construction General Permit is reissued, revoked or modified to eliminate the need for the Districts to review the SWPCP pursuant to such general permit's terms and conditions or if the Construction General Permit expires and is not reissued.

XIII. INTERPRETATION. The Agreement contains numerous references to statutes and regulations. For purposes of interpretation, conflict resolution and otherwise, the content of those statutes and regulations shall govern over the content of the reference in the Agreement to those statutes and regulations.

XIV. ENTIRETY OF AGREEMENT. This Agreement is the entire agreement between the Parties with respect to its subject matter, and supersedes all prior agreements, proposals, offers, counteroffers and understandings of the Parties, whether written or oral. The Agreement has been entered into after full investigation, neither Party relying upon any statement or representation by the other unless such statement or representation is specifically embodied in the Agreement.

XV. PROTECTION OF STATE CONFIDENTIAL INFORMATION. *(mandatory language required for all PSAs effective 12/1/11)*

A. The Districts or District Parties, at their own expense, have a duty to and shall protect from a

Confidential Information Breach any and all Confidential Information which they come to possess or control, wherever and however stored or maintained, in a commercially reasonable manner in accordance with current industry standards.

B. Each District or District Party shall develop, implement and maintain a comprehensive data-security program for the protection of Confidential Information. The safeguards contained in such program shall be consistent with and comply with the safeguards for protection of Confidential Information, and information of a similar character, as set forth in all applicable federal and state law and written policy of the Department or State concerning the confidentiality of Confidential Information. Such data-security program shall include, but not be limited to, the following:

1. A security policy for employees related to the storage, access and transportation of data containing Confidential Information;

2. Reasonable restrictions on access to records containing Confidential Information, including access to any locked storage where such records are kept;

3. A process for reviewing policies and security measures at least annually;

4. Creating secure access controls to Confidential Information, including but not limited to passwords; and

5. Encrypting of Confidential Information that is stored on laptops, portable devices or being transmitted electronically.

C. The District and District Parties shall notify the Department and the Connecticut Office of the Attorney General as soon as practical, but no later than twenty-four (24) hours, after they become aware of or suspect that any Confidential Information which Parties have come to possess or control has been subject to a Confidential Information Breach. If a Confidential Information Breach has occurred, the District shall, within three (3) business days after the notification, present a credit monitoring and protection plan to the Commissioner of Administrative Services, the Department and the Connecticut Office of the Attorney General, for review and approval. Such credit monitoring or protection plan shall be made available by the District at its own cost and expense to all individuals affected by the Confidential Information Breach. Such credit monitoring or protection plan shall include, but is not limited to, reimbursement for the cost of placing and lifting one (1) security freeze per credit file pursuant to Connecticut General Statutes §36a-701a. Such credit monitoring or protection plans shall be approved by the State in accordance with this Section and shall cover a length of time commensurate with the circumstances of the Confidential Information Breach. The District's costs and expenses for the credit monitoring and protection plan shall not be recoverable from the Department, any State of Connecticut entity or any affected individuals.

D. The District shall incorporate the requirements of this Section in all subAgreements requiring each District Party to safeguard Confidential Information in the same manner as provided for in this Section.

E. Nothing in this Section shall supersede in any manner the District's and/ or the District Parties' obligations pursuant to HIPAA or the provisions of this Agreement concerning the obligations of the District as a Business Associate of the Department.

XVI. AMERICANS WITH DISABILITIES ACT *(Mandatory)*. The Districts shall be and remain in compliance with the Americans with Disabilities Act of 1990 ("Act"), to the extent applicable, during the term of the Agreement. The DEEP may cancel the Agreement if the District and District Parties fail to comply with the Act.

XVII. ADA PUBLICATION STATEMENT. The following statement shall be incorporated into all **publications** prepared under the terms of this Agreement:

"The Department of Energy and Environmental Protection is an affirmative action/equal opportunity employer and service provider. In conformance with the Americans with Disabilities Act, DEEP makes every effort to provide equally effective services for persons with disabilities. Individuals with disabilities who need this information in an alternative format, to allow them to benefit and/or participate in the agency's programs and services, should call DEEP's Human Resources Office at (860) 424-3006, send a fax to (860) 424-3896, or email DEEP.MedRecs@ct.gov. Persons who are hearing impaired should call the State of Connecticut relay number 711."

When advertising any **public meetings** conducted under the terms of this Agreement, the above publications language should be used as well as the following statement:

"Requests for accommodations must be made at least two weeks prior to the program date."

All **videos** produced under the terms of this Agreement must be made available with closed captioning.

XVIII. PUBLICATION OF MATERIALS. The District must obtain written approval from the State of Connecticut prior to distribution or publication of any printed material prepared under the terms of this Agreement. Unless specifically authorized in writing by the State, on a case by case basis, the District shall have no right to use, and shall not use, the name of the State of Connecticut, its officials, agencies, or employees or the seal of the State of Connecticut or its agencies: (1) in any advertising, publicity, promotion; or (2) to express or to imply any endorsement of District's products or services; or (3) to use the name of the State of Connecticut, its officials agencies, or employees or the seal of the State of Connecticut or its agencies in any other manner (whether or not similar to uses prohibited by (1) and (2) above), except only to manufacture and deliver in accordance with this Agreement such items as are hereby contracted for by the State. In no event may the Districts use the State Seal in any way without the express written consent of the Secretary of State.

XIX. CHANGES IN PRINCIPAL PROJECT STAFF. Any changes in the principal project staff must be requested in writing and approved in writing by the Commissioner at the Commissioner's sole discretion. In the event of any unapproved change in principal project staff, the Commissioner may, in the Commissioner's sole discretion, terminate this Agreement.

XX. FURTHER ASSURANCES. The Parties shall provide such information, execute and deliver any instruments and documents and take such other actions as may be necessary or reasonably requested by the other Party which are not inconsistent with the provisions of this Agreement and which do not involve the vesting of rights or assumption of obligations other than those provided for in the Agreement, in order to give full effect to the Agreement and to carry out the intent of the Agreement.

XXI. ASSIGNMENT. The Districts shall not assign any of their rights or obligations under the Agreement, voluntarily or otherwise, in any manner without the prior written consent of the Agency. The Agency may void any purported assignment in violation of this section and declare the District in breach of this Agreement. Any termination by the Agency for a breach is without prejudice to the Agency's or the State's rights or possible Claims.

XXII. EXHIBITS. All exhibits referred to in, and attached to, this Agreement are incorporated in this Agreement by such reference and shall be deemed to be a part of it as if they had been fully set forth in it.

XXIII. FORCE MAJEUR. Events that materially affect the cost of the Goods or Services or the time schedule within which to Perform and are outside the control of the party asserting that such an event has

occurred, including, but not limited to, labor troubles unrelated to District(s), failure of or inadequate permanent power, unavoidable casualties, fire not caused by a District, extraordinary weather conditions, disasters, riots, acts of God, insurrection or war.

XXIV. INDEMNIFICATION. The Districts shall indemnify, defend and hold harmless the State and its officers, representatives, agents, servants, employees, successors and assigns from and against any and all (1) Claims arising, directly or indirectly, in connection with the Agreement, including the acts of commission or omission (collectively, the "Acts") of the District or District Parties; and (2) liabilities, damages, losses, costs and expenses, including but not limited to, attorneys' and other professionals' fees, arising, directly or indirectly, in connection with Claims, Acts or the Agreement. The Districts obligations under this section to indemnify, defend and hold harmless against Claims includes Claims concerning confidentiality of any part of or all of the Districts' Records, any intellectual property rights, other proprietary rights of any person or entity, copyrighted or uncopyrighted compositions, secret processes, patented or unpatented inventions, articles or appliances furnished or used in the Performance. The Districts shall not be responsible for indemnifying or holding the State harmless from any liability arising due to the negligence of the State or any other person or entity acting under the direct control or supervision of the State. The Districts shall reimburse the State for any and all damages to the real or personal property of the State caused by the Acts of the Districts or any District Parties. The State shall give the Districts reasonable notice of any such Claims. The Districts shall carry and maintain at all times during the term of the Agreement, and during the time that any provisions survive the term of the Agreement, sufficient general liability insurance to satisfy its obligations under this Agreement. The Districts shall name the State as an additional insured on the policy and shall provide a copy of the policy to the Agency prior to the effective date of the Agreement. The Districts shall not begin Performance until the delivery of the policy to the Agency. The Agency shall be entitled to recover under the insurance policy even if a body of competent jurisdiction determines that the Agency or the State is contributorily negligent. This section shall survive the Termination of the Agreement and shall not be limited by reason of any insurance coverage.

XXV. DISTRICT PARTIES. A District's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the District is in privity of oral or written contract and the District intends for such other person or entity to Perform under the Agreement in any capacity

XXVI. CAMPAIGN CONTRIBUTION RESTRICTION. For all State contracts as defined in P.A. 07-1 having a value in a calendar year of $50,000 or more or a combination or series of such agreements or contracts having a value of $100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See SEEC Form 11.

Authorizing Signatures

For DEEP: _____ 8/21/13
Commissioner — Date

For Northwest Conservation District: _____ 6/5/13
Signature — Date

Chairman
Title

For Eastern Connecticut Conservation District: _____ 6/12/13
Signature — Date

Chair
Title

For Connecticut River Coastal Conservation District, Inc.: _____ 5/22/13
Signature — Date

Chair
Title

For Southwest Conservation District: _____ 5/13/13
Signature — Date

Vice-Chairperson SWCD
Title

For North Central Conservation District: _____ 5/23/13
Signature — Date

Chairman
Title

EXHIBIT 1

Connecticut Conservation District
Stormwater Pollution Control Plan Review Fee Schedule

Single Family Residential Developments Disturbing 5 or more Acres

Number of Lots	Standard Fee
1	$1,500
2	$1,665
3	$1,830
4	$1,995
5	$2,160
6	$2,325
7	$2,490
8	$2,655
9	$2,820
10	$2,985
11	$3,150
12	$3,315
13	$3,480
14	$3,645
15	$3,810
16	$3,975
17	$4,140
18	$4,305
19	$4,470
20	$4,635
21	$4,800
22	$4,965
23	$5,130
24	$5,295
25	$5,460

Number of Lots	Standard Fee
26	$5,625
27	$5,790
28	$5,955
29	$6,120
30	$6,285
31	$6,450
32	$6,615
33	$6,780
34	$6,945
35	$7,110
36	$7,275
37	$7,440
38	$7,605
39	$7,770
40	$7,935
41	$8,100
42	$8,265
43	$8,430
44	$8,595
45	$8,760
46	$8,925
47	$9,090
48	$9,255
49	$9,420
50	$9,585

Over 50 lots:
$9,585 + $20 x number of lots over 50

SW PCP Review: Standard Fee (as shown above)

Resubmission: Standard Fee minus 50%

Post-Approval Resubmission: $85 per hour, up to a maximum of the Standard Fee minus 50%

Express Reviews: The specified fee for an SW PCP Review, a Resubmission, or a Post-Approval Resubmission; plus 50% of the applicable fee and/or limit

Policies:

1. Payment due upon submission of SW PCP, with the exception of Post-Approval Resubmissions.
2. Payment for Post-Approval Resubmission review is due upon completion of review.
3. Written permission to enter onto and inspect the site: Due upon submission of SW PCP.

EXHIBIT 1

Connecticut Conservation District
Stormwater Pollution Control Plan Review Fee Schedule

Commercial and Multi Family Developments

Number of Disturbed Acres	Standard Fee
5	$2,200
6	$2,365
7	$2,530
8	$2,695
9	$2,860
10	$3,025
11	$3,190
12	$3,355
13	$3,520
14	$3,685
15	$3,850
16	$4,015
17	$4,180
18	$4,345
19	$4,510
20	$4,675
21	$4,840
22	$5,005
23	$5,170
24	$5,335
25	$5,500
26	$5,665
27	$5,830

Number of Disturbed Acres	Standard Fee
28	$5,995
29	$6,160
30	$6,325
31	$6,490
32	$6,655
33	$6,820
34	$6,985
35	$7,150
36	$7,315
37	$7,480
38	$7,645
39	$7,810
40	$7,975
41	$8,140
42	$8,305
43	$8,470
44	$8,635
45	$8,800
46	$8,965
47	$9,130
48	$9,295
49	$9,460
50	$9,625

Over 50 acres:
$9,625 + $25 x number of disturbed acres over 50

SW PCP Review: Standard Fee (as shown above)

Resubmission: Standard Fee minus 50%

Post-Approval Resubmission: $85 per hour, up to a maximum of the Standard Fee minus 50%

Express Reviews: The specified fee for an SW PCP Review, a Resubmission, or a Post-Approval Resubmission; plus 50% of the applicable fee and/or limit

Policies:

1. Payment due upon submission of SW PCP, with the exception of Post-Approval Resubmissions.
2. Payment for Post-Approval Resubmission review is due upon completion of review.
3. Written permission to enter onto and inspect the site: Due upon submission of SW PCP.

EXHIBIT 2

EXECUTIVE ORDERS

The Agreement is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the Contract as if they had been fully set forth in it. At the Districts' request, the Client Agency shall provide a copy of these orders to the Districts. The Agreement may also be subject to Executive Order No. 7C of Governor M. Jodi Rell, promulgated July 13, 2006, concerning contracting reforms and Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services, in accordance with their respective terms and conditions.

NONDISCRIMINATION

(a) For purposes of this Section, the following terms are defined as follows:

i. "Commission" means the Commission on Human Rights and Opportunities;
ii. "Contract" and "contract" include any extension or modification of this Agreement or contract;
iii. "Districts" and "districts" include the Districts and any successors or assigns of the Districts or districts;
iv. "Gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.
v. "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;
vi. "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
vii. "marital status" means being single, married as recognized by the State of Connecticut, widowed, separated or divorced;
viii. "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
ix. "minority business enterprise" means any small contractor, District or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and
x. "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each District is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

(b) (1) The Districts agree and warrant that in the performance of the Agreement such Districts will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Districts that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Districts further agree to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Districts that such disability prevents performance of the work involved; (2) the Districts agree, in all solicitations or advertisements for employees placed by or on behalf of the Districts, to state that it is

an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Districts agree to provide each labor union or representative of workers with which the Districts have a collective bargaining Agreement or other contract or understanding and each vendor with which the Districts have a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Districts' commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Districts agree to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Districts agree to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Districts as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Districts agree and warrant that they will make good faith efforts to employ minority business enterprises as Districts and suppliers of materials on such public works projects.

(c) Determination of the Districts' good faith efforts shall include, but shall not be limited to, the following factors: The Districts' employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(d) The Districts shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

(e) The Districts shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on the Districts, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Districts shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Districts become involved in, or is threatened with, litigation with the Districts or vendor as a result of such direction by the Commission, the Districts may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

(f) The Districts agree to comply with the regulations referred to in this Section as they exist on the date of this Agreement and as they may be adopted or amended from time to time during the term of this Agreement and any amendments thereto.

(g) (1) The Districts agree and warrant that in the performance of the Agreement such Districts will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Districts agree to provide each labor union or representative of workers with which such Districts have a collective bargaining Agreement or other contract or understanding and each vendor with which such Districts have a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Districts' commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Districts agree to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Districts agree to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Districts which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.

(h) The Districts shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on the Districts, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Districts shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Districts become involved in, or is threatened with, litigation with the Districts or vendor as a result of such direction by the Commission, the Districts may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to the Connecticut Department of Energy and Environmental Protection (DEEP)."

Note: *Place on official Letterhead. Need to document registered name with CT Secretary of State C.O.N.C.O.R.D.*

CERTIFICATION

I, xxxxxxxxxxxxxxx, Chair of the xxxxxxxxxxxxxxx an entity lawfully organized and existing under the laws of Connecticut, do hereby certify that the following is a true and correct copy of a resolution adopted on the >>>>day of >>>>, 2011, by the governing body of the xxxxxx in accordance with all of its documents of governance and management and the laws of Connecticut and further certify that such resolution has not been modified, rescinded or revoked, and is a present in full force and effect.

RESOLVED: That the xxxxxxxxxxxx hereby adopts as its policy to support the nondiscrimination agreements and warranties required under Conn. Gen. Stat. § 4a-60(a)(1) and § 4a-60a(a)(1), as amended in State of Connecticut Public Act 07-245 and sections 9(a)(1) and 10(a)(1) of Public Act 07-142, as those statutes may be amended from time to time.

IN WITNESS WHEREOF, the undersigned has executed this certificate this >>>day of >>>>>, 2013.

_____

Signature

_____

Date

CONSERVATION DISTRICT PLAN REVIEW CERTIFICATION

Registrations submitted to DEEP for which a Conservation District has performed the Plan review pursuant to Section 3(*b*)(10) of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities shall include the following certification:

"I hereby certify that I am an employee of the [INSERT NAME OF DISTRICT] Conservation District and that I meet the qualifications to review Stormwater Pollution Control Plans as specified in the Memorandum of Agreement between the Connecticut Department of Energy & Environmental Protection and the Connecticut Conservation Districts. I am making this certification in connection with a registration under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner by [INSERT NAME OF REGISTRANT] for an activity located at [INSERT ADDRESS OF PROJECT OR ACTIVITY]. I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify, based on my review of the requirements of such general permit and on the standard of care for such projects, that the Plan is in compliance with the requirements of the general permit. I understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Registrations submitted to DEEP for which the District review was begun but ***could not be completed*** within the time limits specified in the Memorandum of Agreement shall include the following statement:

"I hereby certify that I am an employee of the [INSERT NAME OF DISTRICT] Conservation District and that I meet the qualifications to review Stormwater Pollution Control Plans as specified in the Memorandum of Agreement between the Connecticut Department of Energy & Environmental Protection and the Connecticut Conservation Districts. I am making this statement in connection with a registration under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner by [INSERT NAME OF REGISTRANT] for an activity located at [INSERT ADDRESS OF PROJECT OR ACTIVITY]. I hereby state that the review of the Stormwater Pollution Control Plan (Plan) for such registration was not completed within the time frames specified in the Memorandum of Agreement. Consequently, I cannot certify that the Plan is in compliance with the requirements of the general permit."

General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities

APPENDIX G

Historic Preservation Review

Pursuant to Chapter 184a, Section 10-387 of the Connecticut General Statutes, the Department of Energy & Environmental Protection (DEEP) shall review, in consultation with the Connecticut Commission on Culture and Tourism, its policies and practices for consistency with the preservation and study of CT's archaeological and historical sites. Pursuant to this requirement, DEEP has outlined the following process for assessing the potential for and the presence of historic and/or archaeological resources at a proposed development site. DEEP advises a review for the resources identified below ***be initiated up to one year*** prior to registration for this permit *(or prior to property purchase if possible)* and in conjunction with the local project approval process. However, a review conducted for an Army Corps of Engineers Section 404 wetland permit would meet this requirement.

Step 1: Determine if the proposed site is within an area of significance by consulting the following resources:

1. CT Register of Historic Places found at the link below:
   http://www.nationalregisterofhistoricplaces.com/CT/state.html#pickem

2. The municipality of the proposed development site for its designations of local historic districts, including but not limited to, local Historic District and/or Property Statutes.

Step 2: Assess site characteristics to determine the presence of a potential archaeological site, sacred site, and/ or sacred object as described below:

Definitions:

1. "Archaeological site" means a location where there exists material evidence that is not less than fifty years old of the past life and culture of human beings in the state.

2. "Sacred site" or "sacred land" means any space, including an archaeological site, of ritual or traditional significance in the culture and religion of Native Americans that is listed or eligible for listing on the National Register of Historic Places (16 USC 470a, as amended) or the state register of historic places defined in section 10-410, including, but not limited to, marked and unmarked human burials, burial areas and cemeteries, monumental geological or natural features with sacred meaning or a meaning central to a group's oral traditions; sites of ceremonial structures, including sweat lodges; rock art sites, and sites of great historical significance to a tribe native to this state.

3. "Sacred object" means any archaeological artifact or other object associated with a sacred site.

Site Prescreening Criteria:

1. Does the proposed development site include lands within 300 feet of surface water features, such as streams, brooks, lakes, or marshes?
If "yes", proceed to Criterion 2. If the answer to Criterion 1 is "no", then there is a low potential for prehistoric period archaeological resources - Proceed to Criterion 3.

2. Does the area of anticipated construction or ground disturbance include soils classified by the Natural Resource Conservation Service as "Sandy Loam/ Loamy sand" or "Sandy Gravel Loam" not including "Fine Sandy Loam/ Loamy sand" with slopes less than or equal to 15%? (Soil mapping information is available for free from: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)

If the answer to Criterion 2 is no, then there is a low potential for prehistoric period archaeological resources - Proceed to Criterion 3. If yes, the project site may contain significant prehistoric period archaeological resources

– *assess all other criteria and proceed to Step 3.*

3. Are there buildings or structures over 150 years in age with the project site?
If no, proceed to Criterion 4. If yes, the project site may contain significant historic period archaeological resources – assess all other criteria and proceed to Step 3.

4. Are there buildings or structures shown within or immediately adjacent to the project site on the 1850's Connecticut County maps?
Historic County maps are here:
Fairfield - http://www.flickr.com/photos/uconnlibrariesmagic/3387034755/
Hartford - http://www.flickr.com/photos/uconnlibrariesmagic/3386955421/
Litchfield - http://www.flickr.com/photos/uconnlibrariesmagic/3387765290/
Middlesex - http://www.flickr.com/photos/uconnlibrariesmagic/3386956185/
New Haven - http://www.flickr.com/photos/uconnlibrariesmagic/3386956345/
New London - http://www.flickr.com/photos/uconnlibrariesmagic/3387766080/
Tolland - http://www.flickr.com/photos/uconnlibrariesmagic/3386957013/
Windham - http://www.flickr.com/photos/uconnlibrariesmagic/3387766950/

To look for buildings and structures click on the appropriate county map link. From the "Actions" drop-down menu choose "View all sizes". On the "Photo/All sizes" page, choose "Original" to view the county map at an enlarged scale.

If no, there is a low potential for significant historic period archaeological resources. If yes, the site may contain significant historic period archaeological resources- assess all other criteria and proceed to Step 3.

Step 3: If you answered yes to Criterion 2, 3, or 4, please contact Daniel Forrest (860-256-2761 or daniel.forrest@ct.gov) or the current environmental review coordinator at the State Historic Preservation Office, Department of Economic and Community Development for additional guidance.

Step 4: Report in the Registration Form for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities that a review has been conducted and the results of the review (i.e. the proposed site does not have the potential for historic/ archaeological resources, or that such potential exists and is being or has been reviewed by the Connecticut Commission on Culture and Tourism).

Please note that DEEP will refer all proposed sites with a historic/ archaeological resource potential (as identified in Steps 1 & 2 above) to the State Historic Preservation Office at the Department of Economic and Community Development..

Appendix H
Wild & Scenic Rivers Guidance

Overview: Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (WSRA) charges administration of rivers in the National Wild and Scenic Rivers System (National System) to four federal land management agencies (Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, and U.S. Forest Service). However, to protect and enhance river values as directed in the WSRA, it is essential to use the authorities of a number of other federal agencies in administering the water column, river bed/bank, and upland river corridor.

Congress declared a policy to protect selected rivers in the nation through the WSRA. The river-administering agencies are to protect the river's identified values, free-flowing condition, and associated water quality. Specifically, each component is to be "administered in such manner as to protect and enhance the (outstandingly remarkable) values (**ORVs**) which caused it to be included in said system. . . ."

The WSRA also directs other federal agencies to protect river values. It explicitly recognizes the Federal Energy Regulatory Commission, Environmental Protection Agency, Army Corps of Engineers and any other federal department or agency with lands on or adjacent to designated (or congressionally authorized study) rivers or that permit or assist in the construction of water resources projects.

Pertinent Sections of the Wild and Scenic Rivers Act

The full Wild and Scenic Rivers Act can be found at the website: www.rivers.gov
Pertinent Sections related to the mandate to protect river values through coordinated federal actions is found in several sections of the WSRA:

Section 1(b)	Section 7(a)	Section 10(a)
Section 12(a)	Section 12(c)	

Designated Rivers under the Wild and Scenic Rivers Act and Contact Information

The full listing of designated rivers can be found on the website www.rivers.gov
As of the date of this publication, there are two designated rivers in Connecticut, both of which are managed under the Partnership Wild and Scenic Rivers Program, through a Coordinating Committee consisting of representatives from local communities and organizations, state government and the National Park Service. More information about these rivers, their watersheds, approved management plans, the Wild and Scenic Coordinating Committees and specific contact information can be found on the websites.

1. West Branch of the Farmington River: www.farmingtonriver.org
2. Eightmile River: www.eightmileriver.org

Connecticut Department of
Energy & Environmental Protection
Bureau of Materials Management & Compliance Assurance
Water Permitting & Enforcement Division

General Permit Registration Form for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, effective 10/1/13 (non-electronic form)

Prior to completing this form, you **must** read the instructions for the subject general permit available at **DEEP-WPED-INST-015**.
This form must be filled out electronically before being printed.
You must submit the registration fee along with this form.

The status of your registration can be checked on the DEEP's ezFile Portal. Please note that DEEP will no longer mail certificates of registration.

CPPU USE ONLY

App #:_____

Doc #:_____

Check #:_____

Program: Stormwater

Part I: Registration Type

Select the appropriate boxes identifying the registration type and registration deadline.

Registration Type			Registration Timeline	
☒	**New Registration** (Refer to Section 2 of the permit for definitions of Locally Exempt and Locally Approvable Projects)	☒ Locally Approvable Projects ***Size of soil disturbance*:**	**New registration - Sixty (60) days prior to the initiation of the construction activity for:** Sites with a total soil disturbance area of 5 or more acres	
		☐ Locally Exempt Projects ***Size of soil disturbance*:**	☐	**New registration - Sixty (60) days prior to the initiation of the construction activity for:** Sites with a total disturbance area of one (1) to twenty (20) acres except those with discharges to impaired waters or tidal wetlands
			☐	**New registration - Ninety (90) days prior to the initiation of the construction activity for:** (i) Sites with a total soil disturbance area greater than twenty (20) acres, or (ii) Sites discharging to a tidal wetland (that is not fresh-tidal and is located within 500 feet), or (iii) Sites discharging to an impaired water listed in the "Impaired Waters Table for Construction Stormwater Discharges"

Part II: Fee Information

1. New Registrations
   a. Locally approvable projects (registration only):
      ☒ $625 [#1855]
   b. Locally exempt projects (registration and Plan):
      ☐ $3,000 total soil disturbance area ≥ one (1) and < twenty (20) acres. [#1856]
      ☐ $4,000 total soil disturbance ≥ twenty (20) acres and < fifty (50) acres. [#1857]
      ☐ $5,000 total soil disturbance ≥ fifty (50) acres. [#1858]

The fees for municipalities shall be half of those indicated in subsections 1.a., 1.b., and 2 above pursuant to section 22a-6(b) of the Connecticut General Statutes. State and Federal agencies shall pay the full fees specified in this subsection. The registration will not be processed without the fee. The fee shall be non-refundable and shall be paid by certified check or money order payable to the Department of Energy and Environmental Protection.

Part III: Registrant Information

- If a registrant is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of the State. If applicable, the registrant's name shall be stated **exactly** as it is registered with the Secretary of the State. This information can be accessed at **CONCORD.**
- If a registrant is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).

1. Registrant /Client Name:

Registrant Type ⬇ Limited Liability Company

Secretary of the State business ID #: 0603556
PSEG Power Connecticut LLC
Mailing Address: 80 Park Plaza T18H
City/Town: Newark State: NJ Zip Code: 07102-4194
Business Phone: (973) 430-7911 ext.:
Example:(xxx) xxx-xxxx
Contact Person: David Hinchey Title: Manager Environmental Permits
E-Mail: david.hincheyjr@pseg.com
Additional Phone Number (if applicable): ext.

2. List billing contact, if different than the registrant:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Title:

Part III: Registrant Information (continued)

3. List primary contact for departmental correspondence and inquiries, if different than the registrant:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext.:

   Site Phone: Emergency Phone:

   Contact Person: Title:

   Association (e.g. developer, general or site contractor, etc.):

4. List owner of the property on which the activity will take place, if different from registrant:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext.:

   Contact Person:

5. List developer, if different from registrant or primary contact:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext.:

   Contact Person: Title:

6. List general contractor, if different from registrant or primary contact:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext.:

   Site Phone: Off Hours Phone:

   Contact Person: Title:

7. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the registration and/or Stormwater Pollution Control Plan. ☒ Please select if additional sheets are necessary, and label and attach them to this sheet.

   Name: Black & Veatch

   Mailing Address: 11401 Lamar Ave

   City/Town: Overland Park State: KS Zip Code: 66211

   Business Phone: (913) 458-8780 ext.:

   Contact Person: Blia Her, PE Title:

   Service Provided: SWPCP Preparation Email: herb@bv.com

8. List Reviewing Qualified Professional (for locally approvable projects only). This information must match the information provided in Part IX of this registration.

   Name: TBD Contact Person:

   Mailing Address: Email:

   City/Town: State: Zip Code:

   Business Phone: ext.:

Part III: Registrant Information (continued)

3. List primary contact for departmental correspondence and inquiries, if different than the registrant:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext.:

   Site Phone: Emergency Phone:

   Contact Person: Title:

   Association (e.g. developer, general or site contractor, etc.):

4. List owner of the property on which the activity will take place, if different from registrant:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext.:

   Contact Person:

5. List developer, if different from registrant or primary contact:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext.:

   Contact Person: Title:

6. List general contractor, if different from registrant or primary contact:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext.:

   Site Phone: Off Hours Phone:

   Contact Person: Title:

7. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the registration and/or Stormwater Pollution Control Plan. ☒ Please select if additional sheets are necessary, and label and attach them to this sheet.

   Name: AKRF Inc.

   Mailing Address: 307 Fellowship Road

   City/Town: Mount Laurel State: NJ Zip Code: 08054

   Business Phone: (856) 359-7612 ext.:

   Contact Person: Kevin Maher Title: Senior Vice President

   Service Provided: SWPCP Preparation Email: kmaher@akrf.com

8. List Reviewing Qualified Professional (for locally approvable projects only). This information must match the information provided in Part IX of this registration.

   Name: Contact Person:

   Mailing Address: Email:

   City/Town: State: Zip Code:

   Business Phone: ext.:

Part IV: Site Information

1. Site Name: Bridgeport Harbor Station Unit 5
   Street Address or Description of Location: 1 Atlantic Street
   (if linear, project location should be the project begining point)
   City/Town: Bridgeport State: CT Zip Code: 06604
   (use only one zip code)

   Longitude: 41.167117 Latitude: -73.180901

   Brief Description of construction activity: Construct 485 MW CC Power Plant

   Project Start Date (must be on or after the authorization date of this registration) : January 2017
   Anticipated Completion Date: June 2019 *month/ yr)*
   (month/ yr)
   Normal working hours: 7:00 AM to 6:00 PM

2. MINING: Is the activity on the site in question part of mining operations (i.e. sand and gravel)? ☐ Yes ☒ No

   If yes, mining is not authorized by this general permit. You must submit the Registration Form for the General Permit for the Discharge of Stormwater Associated with Industrial Activity.

3. COMBINED OR SANITARY SEWER: Does all of the stormwater from the proposed activity discharge to a combined or sanitary sewer (i.e. a sewage treatment plant)? ☐ Yes ☒ No

   If yes, this activity is not regulated by this permit. Contact the Water Permitting & Enforcement Division at 860-424-3018.

4. INDIAN LANDS: Is or will the facility be located on federally recognized Indian lands ☐ Yes ☒ No

5. COASTAL BOUNDARY: Is the activity which is the subject of this registration located within the coastal boundary as delineated on DEEP approved coastal boundary maps ☒ Yes ☐ No

   The coastal boundaries fall within the following towns: Branford, Bridgeport, Chester, Clinton, Darien, Deep River, East Haven, East Lyme, Essex, Fairfield, Greenwich, Groton (City and Town), Old Lyme, Guilford, Hamden, Ledyard, Lyme, Madison, Milford, Montville, New London, New Haven, North Haven, Norwalk, Norwich, Old Saybrook, Orange, Preston, Shelton, Stamford, Stonington (Borough and Town), Stratford, Waterford, West Haven, Westbrook and Westport.

   If “yes”, and this registration is for a new authorization or a modification of an existing authorization where the physical footprint of the subject activity is modified, you must provide documentation the DEEP Office of Long Island Sound Programs or the local governing authority has issued a coastal site plan approval or determined the project is exempt from coastal site plan review. Provide this documentation with your registration as Attachment B. See guidance in Appendix D of the general permit. Information on the coastal boundary is available at the local town hall or at www.cteco.uconn.edu/map_catalog.asp. Additional DEEP Maps and Publications are available by contacting DEEP staff at 860-424-3555.

Part IV: Site Information (continued)

6. ENDANGERED OR THREATENED SPECIES:

In order to be eligible to register for this General Permit, each registrant must perform a self-assessment, obtain a limited one-year determination, or obtain a safe-harbor determination regarding threatened and endangered species. This may include the need to develop and implement a mitigation plan. While each alternative has different limitations, the alternatives are not mutually exclusive; a registrant may register for this General Permit using more than one alternative. See Appendix A of the General Permit. Each registrant must complete this section AND Attachment C to this Registration form and a registrant who does not or cannot do so is not eligible to register under this General Permit.

Each registrant must perform a review of the Department's Natural Diversity Database maps to determine if the site of the construction activity is located within or in proximity (within ¼ mile) to a shaded area.

a. Verify that I have completed Attachment C to this Registration Form. ☒ Yes

b. Provide the date the NDDB maps were reviewed: Mapping Dated: 2015 Date of map should be **one** year or less than the submittal date of this application. Print a copy of the NDDB map you viewed since it must be submitted with this registration as part of Attacment C.

c. For a registrant using a limited one-year determination or safe harbor determination to register for this General Permit, provide the Department's Wildlife Divison NDDB identification number for any such determination: _____ (The number is on the determination issued by the Department's Wildlife Divison).

For more information on threatened and endangered species requirements, refer to Appendix A and Section 3(b)(2) of this General Permit, visit the DEEP website at www.ct.gov/deep/nddbrequest or call the NDDB at 860-424-3011.

7. WILD AND SCENIC RIVERS: Is the proposed project within the watershed of a designated Wild and Scenic River? (See Appendix H for guidance) ☐ Yes ☒ No

8. AQUIFER PROTECTION AREAS: Is the site located within a mapped aquifer protection area www.ct.gov/deep/aquiferprotection as defined in section 22a-354h of the CT General Statutes? (For additional guidance, please refer to Appendix C of the General Permit) ☐ Yes ☒ No

9. CT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL: Is the activity in accordance with CT Guidelines for Erosion and Sediment Control and local erosion & sediment control ordinances, where applicable? ☒ Yes ☐ No

10. HISTORIC AND/OR ARCHAEOLOGICAL RESOURCES:
Verify that the site of the proposed activity been reviewed (using the process outlined in Appendix G of this permit) for historic and/or archaeological resources: ☒ Yes

a. The review indicates the proposed site does not have the potential for historic/ archaeological resources, OR ☒ Yes ☐ No

b. The review indicated historic and/ or archaeological resource potential exists and the proposed activity is being or has been reviewed by the Offices of Culture and Tourism, OR ☐ Yes ☐ No

c. The proposed activity has been reviewed and authorized under an Army Corps of Engineers Section 404 wetland permit. ☐ Yes ☐ No

11. CONSERVATION OR PRESERVATION RESTRICTION:
Is the property subject to a conservation or preservation restriction? ☐ Yes ☒ No

If Yes, proof of written notice of this registration to the holder of such restriction or a letter from the holder of such restriction verifying that this registration is in compliance with the terms of the restriction, must be submitted as Attachment D.

Part V: Stormwater Discharge Information

Table 1

Outfall #	a) Type	b) Pipe Material	c) Pipe Size	d) Note: To find lat/long, go to: CT ECO. A decimal format is required here. Directions on how to use CT ECO to find lat./long. and conversions can be found in Part V, Section d of the DEEP-WPED-INST-015 .		e) What method was used to obtain your latitude/longitude information?
				Longitude	Latitude	
101	Select One: pipe	Select One: RCP	Select One: 54"	-73.180790	41.165954	Google Earth
	Select One:	Select One:	Select One:	- .	.	Select One:
	Select One:	Select One:	Select One:	- .	.	Select One:
	Select One:	Select One:	Select One:	- .	.	Select One:
	Select One:	Select One:	Select One:	- .	.	Select One:

Table 2

Outfall #	a) For temporary and permanent outfalls, provide a start date. For temporary discharges, also provide a date the discharge will cease.	b) For the drainage area associated with each outfall: Effective Impervious Area Before Construction	c) For the drainage area associated with each outfall: Effective Impervious Area After Construction	d) To what system or receiving water does your stormwater runoff discharge? either "storm sewer or wetlands" or "waterbody" (If you select "storm sewer or wetland" proceed to Part VI of the form. If you select "waterbody" proceed to next question)	e) For each outfall, does it discharge to any of the following towns: *Branford, Kent, Manchester, Meriden, North Branford, Norwalk, or Wilton?* (If no, proceed to Part VI of the form. If yes, proceed to next question.)	f) For each outfall, does it discharge to a "freshwater" or "salt water" ? (If you select "freshwater" proceed to Table 3. If you selected "salt water", proceed to Part VI of the form.)
101	1/2016 6/2019 mm/dd-mm/dd	sq feet	sq feet	Select one:	☐ Yes ☒ No	salt water
	- mm/dd-mm/dd	sq feet	sq feet	Select one:	☐ Yes ☐ No	Select one:
	- mm/dd-mm/dd	sq feet	sq feet	Select one:	☐ Yes ☐ No	Select one:
	- mm/dd-mm/dd	sq feet	sq feet	Select one:	☐ Yes ☐ No	Select one:
	- mm/dd-mm/dd	sq feet	sq feet	Select one:	☐ Yes ☐ No	Select one:
		total sq feet	**total sq feet**			

Part V: Stormwater Discharge Information (continued)

Table 3 Provide the following information about the receiving water(s)/wetland(s) that receive stormwater runoff from your site:			
Outfall #	a) What is your 305b ID # (water body ID #)? (Section 3.b, of the DEEP-WPED-INST-015, explains how to find this information)	b) Is your receiving water identified as a impaired water in the "Impaired Waters Table for Construction Stormwater Discharges"? If yes, proceed to next question. If no, proceed to Part VI: Pollution Control Plan.	c) Has any Total Maximum Daily Load (TMDL) been approved for the impaired water?
101	CT-W1_001-SB	☐ Y ☒ N	☒ Y ☐ N
		☐ Y ☐ N	☐ Y ☐ N
		☐ Y ☐ N	☐ Y ☐ N
		☐ Y ☐ N	☐ Y ☐ N
		☐ Y ☐ N	☐ Y ☐ N

Part V: Stormwater Discharge Information (continued)

Impaired waters: If you answered "yes" to Table 3, question b.,**verify** that the project's Pollution Control Plan (Plan) addresses the control measures below in Question 1 or 2, as appropriate.

1. If the impaired water does not have a TMDL, confirm compliance by selecting 1.a. or 1.b. below:

a. No more than 3 acres is disturbed at any time; ☐ Yes

OR

b. Stormwater runoff from a 2 yr, 24 rain event is **retained.** ☐ Yes

2. If the impaired water has a TMDL, confirm compliance by selecting 2.a. and 2.b. below and either question 2.c.1. or 2.c.2. below:

a. The Plan documents there is sufficient remaining Waste Load Allocations (WLA)in the TMDL for the proposed discharge, ☐ Yes

AND

b. Control measures shall be implemented to assure the WLA will not be exceeded, ☐ Yes

AND

c. 1. Stormwater discharges will be monitored for the indicator pollutant identified in theTMDL, ☐ Yes

OR

2. The Plan documents specific requirements for stormwater discharges specified in the TMDL. ☐ Yes

Part VI: Pollution Control Plan (select one of the following three categories)

☐ I am registering a Locally Exempt project and submitting the required electronic Plan (in Adobe™ PDF or similar publically available format) pursuant to Section 3(*c*)(2)(E) of this permit. (If you do not have the capability to submit the Plan electronically please call 860-418-5982).

- ☐ Plan is attached to this registration form
- ☐ Plan is available at the following Internet Address (URL):

☐ I am registering a Locally Approvable project and have chosen not to submit the Plan with this registration pursuant to Section 3(*c*)(1) of this permit.

☒ I am registering a Locally Approvable project and have chosen to make my Plan electronically available pursuant to Section 4(*c*)(2)(N) of this permit.

- ☐ Plan is attached to this registration form
- ☒ Plan is available at the following Internet Address (URL): TBD

Part VII: Registrant Certification

The registrant *and* the individual(s) responsible for actually preparing the registration must sign this part. A registration will be considered incomplete unless all required signatures are provided.

For New Registrants:

" I hereby certify that I am making this certification in connection with a registration under such general permit,

[INSERT NAME OF REGISTRANT BELOW]

submitted to the commissioner by PSEG Power Connecticut LLC for

[INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

an activity located at 1 Atlantic Street, Bridgeport, CT and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(*b*) (8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(*b*)(8)(B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

For Re-registrants:

" I hereby certify that I am making this certification in connection with a registration under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner

[INSERT NAME OF REGISTRANT BELOW]

by for an activity located at

[INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that all designs and plans for such activity meet the current terms and conditions of the general permit in accordance with Section 5(b)(5)(C) of such general permit and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(*b*)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature of Registrant (Must be an original signature, not a copy or fax)	Date
David Hinchey Jr.	Manager Environmental Permits
Name of Registrant (print or type)	Title (if applicable)
Signature of Preparer (if different than above) (Must be an original signature, not a copy or fax)	Date
Name of Preparer (print or type)	Title (if applicable)

Part VIII: Professional Engineer (or Landscape Architect, where appropriate) Design Certification (for publically approvable and exempt projects)

The following certification must be signed by a Professional Engineer or Landscape Architect where appropriate.

"I hereby certify that I am a Professional Engineer licensed in the State of Connecticut. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by [INSERT NAME OF REGISTRANT BELOW]

PSEG Power Connecticut LLC for an activity located at [INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

1 Atlantic Street, Bridgeport, CT .

I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the project or activity covered by this certification. I further certify, based on such review and on the standard of care for such projects, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, the Stormwater Quality Manual, as amended, and the conditions of the general permit, and that the controls required for such Plan are appropriate for the site. I further certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate, and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement in this certification may subject me to sanction by the Department and/or be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature of Design Professional (Must be an original signature, not a copy or fax)	Date
Name of Professional (print or type)	Title
Black & Veatch 11401 Lamar Ave.	Overland Park
Mailing Address	City/Town
Kansas 66211	(913) 458-7303
State Zip Code	Business Phone
	License #
Affix P.E/L.A Stamp Here	

Part IX: Reviewing Qualified Professional Certification

The following certification must be signed by a) a Conservation District reviewer OR, b) a qualified soil erosion and sediment control and/or professional engineer

☐ **Review certification by Conservation District:**

1.) District: list of districts

Date of Affirmative Determination:

" I am making this certification in connection with a registration under General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner

[INSERT NAME OF REGISTRANT BELOW]

by _____ for an activity located at

[INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

_____.

I have personally examined and am familiar with the information that provides the basis for this certification, and I affirm, based on the review described in Section 3(*b*)(11)(C) of this general permit and on the standard of care for such projects, that the Stormwater Pollution Control Plan is adequate to assure that the activity authorized under this general permit will comply with the terms and conditions of such general permit and that all stormwater management systems: (i) have been designed to control pollution to the maximum extent achievable using measures that are technologically available and economically practicable and that conform to those in the Guidelines and the Stormwater Quality Manual; (ii) will function properly as designed; (iii) are adequate to ensure compliance with the terms and conditions of this general permit; and (iv) will protect the waters of the state from pollution."

_____

Signature of District Professional and Date (Must be an original signature, not a copy or fax)

_____

Name of District Professional and License Number (if applicable)

Or

☒ **Review certification by Qualified Professional**

Company: _____

Name: _____

License # : _____

Level of independency of professional:

Required for all projects disturbing over 1 acre:

1. I verify I am not an employee of the registrant. ☒ Yes
2. I verify I have no ownership interest of any kind in the project for which the registration is being submitted. ☒ Yes

Required for projects with 15 or more acres of site disturbance (in addition to questions 1&2):

3. I verify I did not engage in any activities associated with the preparation, planning, designing or engineering of the soil erosion and sediment control plan or stormwater management systems plan for this registrant. ☒ Yes
4. I verify I am not under the same employ as any person associated with the preparation, planning, designing or engineering of the soil erosion and sediment control plan or stormwater management systems plan for this registrant. ☒ Yes

Part IX: Reviewing Qualified Professional Certification (continued)

"I hereby certify that I am a qualified professional engineer or qualified soil erosion and sediment control professional, or both, as defined in the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and as further specified in Sections 3(*b*)(11)(A) and (B) of such general permit. I am making this certification in connection with a registration under such general permit,

[INSERT NAME OF REGISTRANT BELOW]

submitted to the commissioner by PSEG Power Connecticut LLC

[INSERT ADDRESS OF PROJECT OR ACTIVITY BELOW]

for an activity located at 1 Atlantic Street, Bridgeport, CT.

I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(*b*)(11)(C) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I further certify that I have made the affirmative determination in accordance with Sections 3(*b*)(11)(D)(i) and (ii) of this general permit. I understand that this certification is part of a registration submitted in accordance with Section 22a-430b of Connecticut General Statutes and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

_____

Signature of Reviewing Qualified Professional Date: _____

(Must be an original signature, not a copy or fax)

_____

Name of Reviewing Qualified Professional License No.: _____

Affix P.E./L.A. Stamp Here

Part X: Supporting Documents

Select the applicable box below for each attachment being submitted with this registration form. When submitting any supporting documents, please label the documents as indicated below (e.g., Attachment A, etc.) and be sure to include the registrant's name as indicated on this certification form.

☒	**Attachment** B:	Select here as verification that an 8 ½" X 11" copy of the relevant portion of a USGS Quadrangle Map with a scale of 1:24,000, showing the exact location of the facility has been submitted with this registration. Indicate the quadrangle name on the map, and be sure to include the registrant's name. (To obtain a copy of the relevant USGS Quadrangle Map, call your town hall or DEEP Maps and Publications Sales at 860-424-3555)
☒	**Attachment** X:	Documentation related to *Coastal Consistency Review,* if applicable.
☒	**Attachment** F:	Threatened and Endangered Species Form and any additional information (such as a copy of a NDDB map)
☐	**Attachment D:**	Conservation or Preservation Restriction Information, if applicable.
☐	**Attachment E:**	Where applicable, non-electronic Pollution Control Plan.

Note: Please submit the fee along with a completed, printed and signed Registration Form and all additional supporting documents to:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

ATTACHMENT C: THREATENED AND ENDANGERED SPECIES

Information about compliance with the requirements of Section 3(b)(2) of this general permit, regarding threatened and endangered species, is in Appendix A of the general permit. Choose one or more (if applicable) of the following in order to be eligible to register for this General Permit. A registrant who does not or cannot do so is not eligible to register under this General Permit.

☐ Self Assessment using the NDDB maps – Select this only if:

a. The site of the construction activity is not entirely, partially or within a ¼ mile of a shaded area depicted on the Department's Natural Diversity Database maps and this determination was made not more than six months before the date of submitting this registration;

AND

b. The entity registering for this General Permit has no reasonably available verifiable scientific, or other credible information that the construction activity could reasonably be expected to have an adverse impact upon a federal or state species listed as threatened or endangered.

Attach a copy of the NDDB map used to conduct the self assessment used to register for this general permit.

Note: Both a and b as used in this section, must be true in order for a Registrant to register for this General Permit using the self-assessment option. If neither is true, a Registrant cannot use the self-assessment option to comply with Section 3(b)(2) and Appendix A of the General Permit.

☒ Limited One-Year Determination – Select this only if:

a. The entity registering for this General Permit has obtained a limited one-year determination from the Department's Wildlife Division regarding threatened and endangered species: i) within a year of the date of submitting this registration; or ii) more than 1 year before submitting this registration, but such determination has been extended by the Department within one year of the date of submitting this registration;

AND

b. The Registrant has provided to the Department's Wildlife Division any reasonably available verifiable scientific, or other credible information that the construction activity could reasonably be expected to have an adverse impact upon a federal or state species listed as threatened or endangered.

Provide the date the limited one-year determination was issued by the Department's Wildlife Division March 12, 2016;

or

Provide the date that the most recent extension to a limited one year determination was issued by the Department's Wildlife Division _____.

Note: Both a and b as used in this section, must be true in order for a Registrant to register for this General Permit using the Limited One-Year Determination option. If a Limited One-Year Determination or extension to any such determination was issued by the Department's Wildlife Division more than one year before the submission of this registration, a Registrant cannot use any such determination or extension to comply with Section 3(b)(2) and Appendix A of the General Permit.

ATTACHMENT C: THREATENED AND ENDANGERED SPECIES (continued)

☐ **Select here if the Limited One-Year Determination issued by the Department includes a Mitigation Plan.**

Provide the date the Mitigation Plan was approved: _____

Governmental Entity Approving the Plan: _____

As of the date this Registration is submitted,

Has the Mitigation Plan been fully implemented? ☐ Yes ☐ No

Date commenced: _____ Date completed: _____

Is the Mitigation Plan partially implemented? ☐ Yes ☐ No

If yes, what actions have been taken? _____

And which actions are yet to be implemented and what is the timeframe for completion of such actions: _____

Is the Mitigation Plan yet to be implemented? ☐ Yes ☐ No

If yes, specify the timeframe for implementation: _____ to _____

And summarize actions to be implemented: _____

☐ Safe Harbor Determination - Select this only if:

a. The entity registering for this General Permit has obtained a Safe Harbor Determination from the Department's Wildlife Division regarding threatened and endangered species: i) within 3 years of the date of submitting this registration; or ii) more than 3 years before submitting this registration, but within one-year of a one-year extension issued by the Department's Wildlife Division to a safe harbor determination;

AND

b. The entity registering for this General Permit has provided to the Department's Wildlife Division any reasonably available verifiable scientific, or other credible information that the construction activity could reasonably be expected to have an adverse impact upon a federal or state species listed as threatened or endangered.

Provide the date the Department's Wildlife Division issued a Safe Harbor Determination: _____

If applicable, provide the date that any one-year extension to a Safe Harbor Determination was issued by the Department's Wildlife Division: _____.

Note: Both a and b as used in this section, must be true in order for a Registrant to register for this General Permit using the Safe Harbor Determination option. If a Safe Harbor Determination was issued by the Department's Wildlife Division more than three years before the submission of this registration, and has not been extended, a Registrant cannot use any such safe harbor to comply with section 3(b)(2) and Appendix A of this General Permit. If a Safe Harbor Determination was granted and extended for one-year, more than four years before the submission of this registration, a Registrant cannot use any such Safe Harbor Determination to comply with Section 3(b)(2) and Appendix A of the general permit.

ATTACHMENT C: THREATENED AND ENDANGERED SPECIES (continued)

☐ **Select here if the safe harbor noted above includes a Mitigation Plan.**

Provide the date the Mitigation Plan was approved: _____

Governmental Entity Approving the Plan: _____

As of the date this Registration is submitted,

Has the Mitigation Plan been fully implemented? ☐ Yes ☐ No

Date commenced: _____ Date completed: _____

Is the Mitigation Plan partially implemented? ☐ Yes ☐ No

If yes, what actions have been taken? _____

And which actions are yet to be implemented and what is the timeframe for completion of such actions: _____

Is the Mitigation Plan yet to be implemented? ☐ Yes ☐ No

If yes, specify the timeframe for implementation: _____ to _____

And summarize actions to be implemented: _____

Appendix B

Project Drawings and Figures

- Figure 1: Site Location Map
- Figure 2: Site Aerial Photo
- Figure 3: Wetlands Delineation
- Figure 4: FEMA Flood Map

Drawing Package (per Section 3.5)

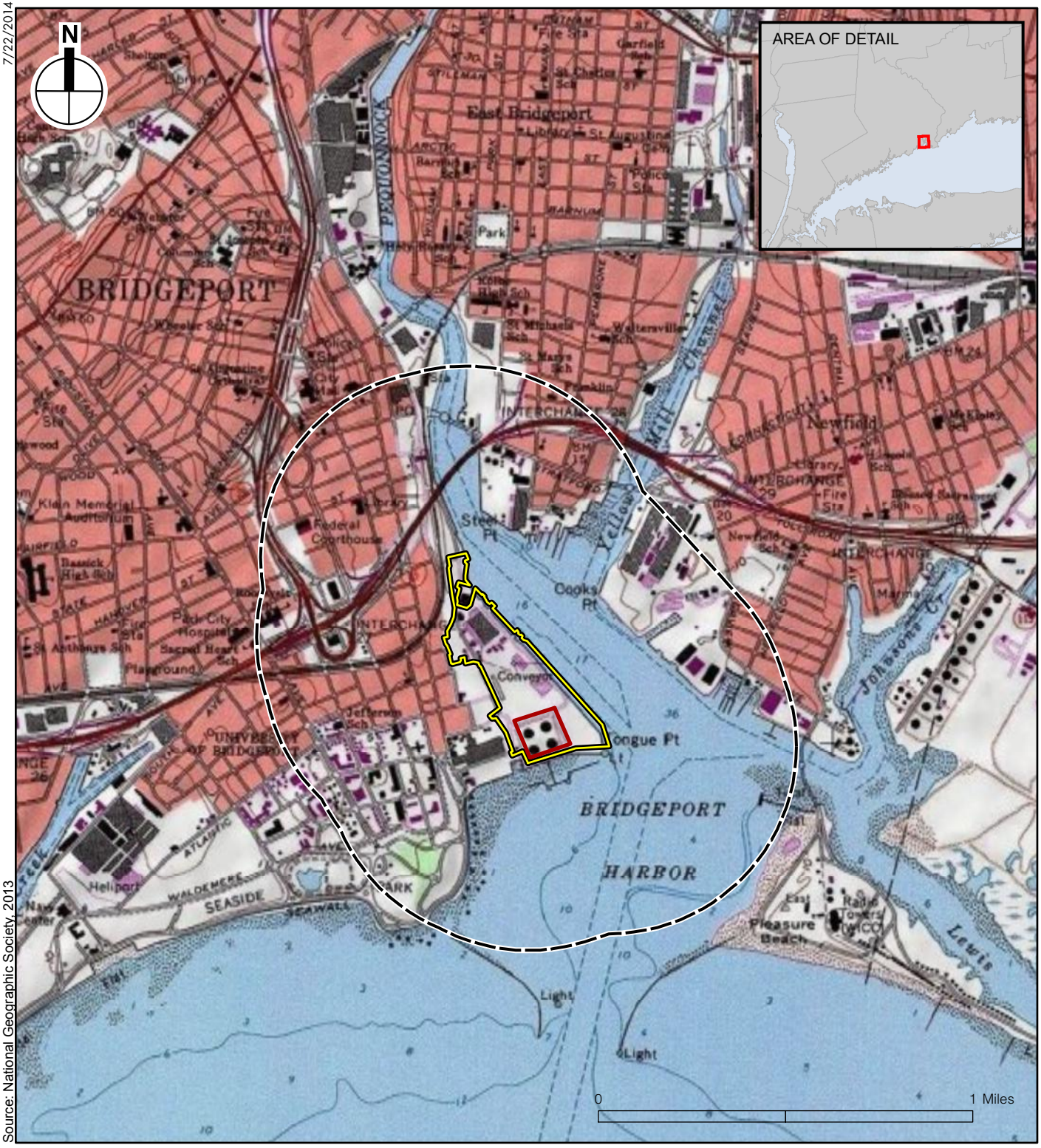
Note that these drawings are listed here, but are included elsewhere in the City Coastal Site Plan submittal and therefore, are not repeated in this Report.

Drawing Number	Description
191547-DS-3000A	COVER SHEET
191547-DS-3000AA	SITE DEVELOPMENT DRAWING LIST
191547-5GAU-G1000	OVERALL SITE PLOT PLAN
191547-5GAU-G1001	OVERALL SITE ARRANGEMENT
191547-DS-3000B to DS-S3000F	EXISTING CONDITIONS PLAN
191547-DS-1032A	UTILITY PLAN
191547-DS-1032B	UTILITY PLAN
191547-DS-1034 and DS-1034A to DS-1034B	DRAINAGE AREA PLAN
191547-DS-1036 and DS-1036A to DS-1036D	CONSTRUCTION PHASE 1
191547-DS-1037 and DS-1037A to DS-1037D	CONSTRUCTION PHASE 2
191547-DS-1038 and DS-1038A to DS-1038D	CONSTRUCTION PHASE 3
191547-DS-1039 and DS-1039A to DS-1036D	CONSTRUCTION PHASE 4
191547-DS-1040 and DS-1040A to DS-1040D	CONSTRUCTION PHASE 5
191547-DS-1041 and DS-1041A to DS-1041B	CONSTRUCTION PLAN
191547-DS-1042 and DS-1042A to DS-1042E	BARGE AREAS
191547-5STF-S3000	GRADING & DRAINAGE KEY PLAN & GENERAL NOTES & LEGEND
191547-5STF-S3001	GRADING & DRAINAGE
191547-5STF-S3002	GRADING & DRAINAGE
191547-5STF-S3003	GRADING & DRAINAGE
191547-5STF-S3004 and S3004A	GRADING & DRAINAGE
191547-5STF-S3005	GRADING & DRAINAGE

191547-5STF-S3006	GRADING & DRAINAGE
191547-5STF-S3007	GRADING & DRAINAGE
191547-5STF-S3050	GRADING SECTION & DETAILS
191547-5STE-S3100	EROSION CONTROL KEY PLAN, GENERAL NOTES & LEGEND
191547-5STE-S3101	EROSION CONTROL
191547-5STE-S3102	EROSION CONTROL
191547-5STE-S3103	EROSION CONTROL
191547-5STD-S3200	SURFACING & FENCING KEY PLAN, GENERAL NOTESS & LEGEND
191547-5STD-S3201	SURFACING & FENCING PLAN
191547-5STD-S3202	SURFACING & FENCING PLAN
191547-5STD-S3203	SURFACING & FENCING PLAN
191547-5STF-S3900A	CATCH BASIN & MANHOLE DETAILS
191547-5STF-S3900B	CATCH BASIN & MANHOLE DETAILS
191547-5STF-S3900C	CATCH BASIN & MANHOLE DETAILS
191547-5STF-S3901	RIPRAP DETAILS
191547-5STE-S3920A	EROSION CONTROL SECTION & DETAILS
191547-5STE-S3920B	EROSION CONTROL SECTION & DETAILS
191547-5STE-S3920C	EROSION CONTROL SECTION & DETAILS

Figure 1: Site Location Map

7/22/2014



Source: National Geographic Society, 2013

Approximate Area of Development

Project Site Property Boundary

1/2-Mile ***Radius***

AKRF

307 Fellowship Rd Suite 214
Mt. Laurel NJ 08054

P: (856) 797-9930
www.akrf.com

Approximate coordinates of
Project Site:
40° 10' 8" N, 73° 10' 55" W

Unit 5 Combined Cycle Project
BRIDGEPORT HARBOR GEN. STATION

USGS 7.5 Minute Topographic Map
Bridgeport Quad
Figure 1

Figure 2: Site Aerial Photo

PSEG Power Connecticut LLC
Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Figure 2 . Site Aerial Photograph

Photo Source: Google Earth, August 2012
Photo Date: September 2013

AKRF

N

Figure 3: Wetlands Delineation

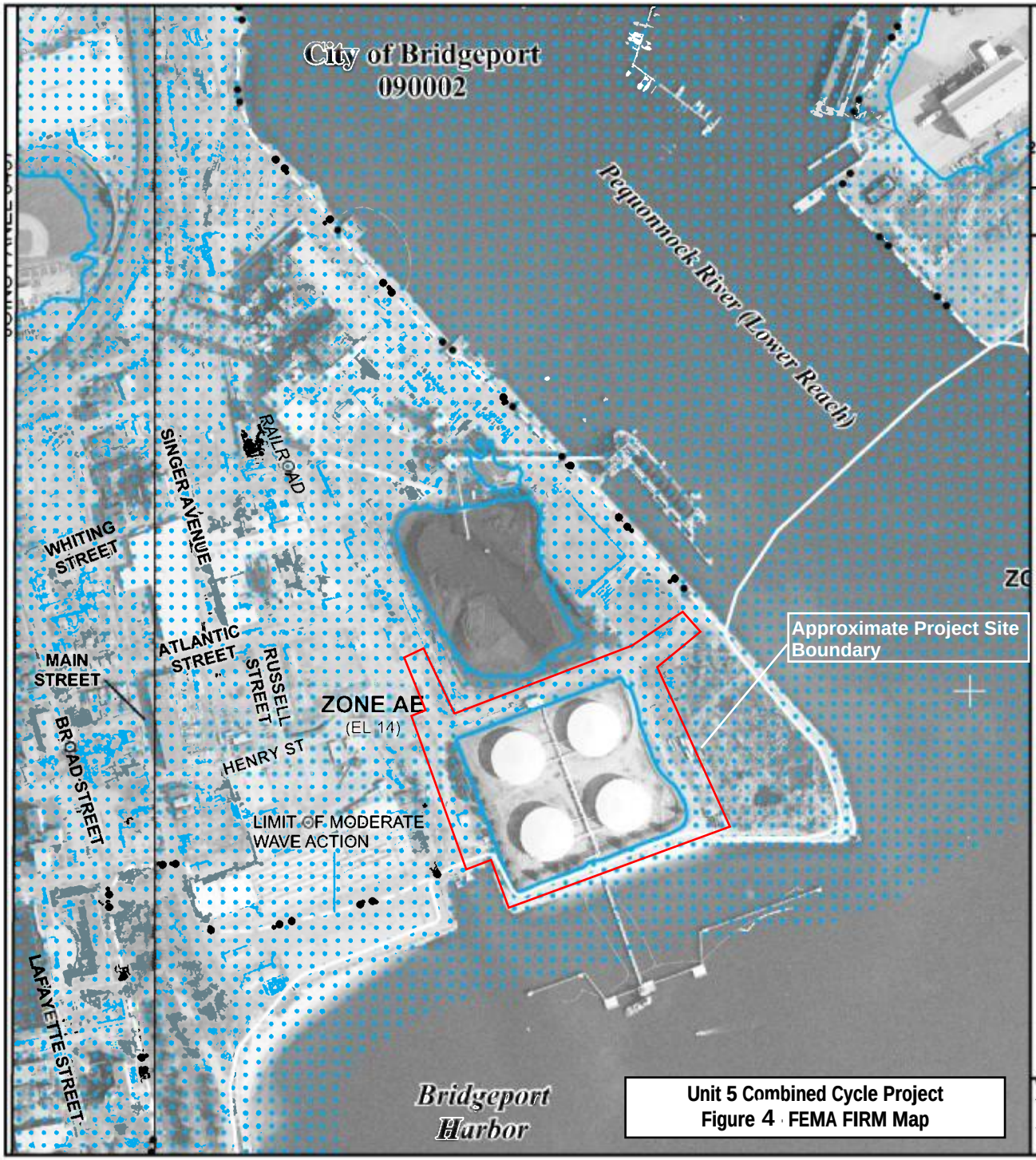
N

PSEG Power Connecticut LLC
Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Figure 3. Wetland Delineation

Photo Source: Google Earth, August 2016
Photo Date: April 2016

Figure 4: FEMA Flood Map



Unit 5 Combined Cycle Project
Figure 4 FEMA FIRM Map

MAP SCALE 1" = 500'

250 0 500 1000 FEET

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0441G

FIRM

FLOOD INSURANCE RATE MAP

FAIRFIELD COUNTY, CONNECTICUT (ALL JURISDICTIONS)

PANEL 441 OF 626

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BRIDGEPORT, CITY OF	090002	0441	G
STRATFORD, TOWN OF	090016	0441	G

-NOTE-
THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
09001C0441G

MAP REVISED
JULY 8, 2013

Federal Emergency Management Agency

Appendix C

Draft Certification Statements

- Owners Certification Statement
- Qualified Professional Certification
- Contractor/Subcontractor Identification Table
- Contractor/Subcontractor Certification Forms

PSEG
BRIDGEPORT GENERATING STATION UNIT 5
BRIDGEPORT, CONNECTICUT

Owner/Registrant

"I hereby certify that I am making this certification in connection with a registration under such general permit, submitted to the commissioner by PSEG Power Connecticut, LLC for an activity located at 1 Atlantic Street, Bridgeport, CT and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(b)(8)(B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signed:_____ Date:_____

Printed Name:_____ Telephone:_____

Title:_____

Firm:_____

Address:_____

PSEG
BRIDGEPORT GENERATING STATION UNIT 5
BRIDGEPORT, CONNECTICUT

Qualified Professional

"I hereby certify that I am making this certification in connection with a registration under such general permit, submitted to the commissioner by PSEG Power Connecticut, LLC for an activity located at 1 Atlantic Street, Bridgeport, CT and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(b)(8)(B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signed:_____ Date:_____

Printed Name:_____ Telephone:_____

Title:_____

Firm:_____

Address:_____
_____
_____
_____

PSEG
BHS Unit 5
BRIDGEPORT, CONNECTICUT

General Contractor/ Sub Contractor	Point of Contact	Phone
General Contractor/ Sub Contractor	Point of Contact	Phone

PSEG
BRIDGEPORT GENERATING STATION UNIT 5
BRIDGEPORT, CONNECTICUT

GENERAL CONTRACTOR

"I certify under penalty of law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including but not limited to the requirements of the Stormwater Pollution Control Plan prepared for the site."

Signed:_____ Date:_____

Printed Name:_____ Telephone:_____

Title:_____

Firm:_____

Address:_____
_____
_____
_____

PSEG
BRIDGEPORT GENERATING STATION UNIT 5
BRIDGEPORT, CONNECTICUT

SUBCONTRACTOR

"I certify under penalty of law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including but not limited to the requirements of the Stormwater Pollution Control Plan prepared for the site."

Signed:_____ Date:_____

Printed Name:_____ Telephone:_____

Title:_____

Firm:_____

Address:_____
_____
_____
_____

Appendix D

Inspection Report Form

INSPECTION REPORT FORM

PSEG
BRIDGEPORT GENERATING STATION UNIT 5
BRIDGEPORT, CONNECTICUT

Date of Inspection_____
Inspector's Name_____
Employed By_____

Circle Type of Inspection: Monthly / Weekly / Within 24 hrs of Storm

Stabilization Practices[1]

Major Observations or Deficiencies	Actions Taken	Date Completed

Structural Practices[2]

Major Observations or Deficiencies	Actions Taken	Date Completed

_____ _____
Signature of Inspector **Date**

_____ _____
Signature of Owner **Date**

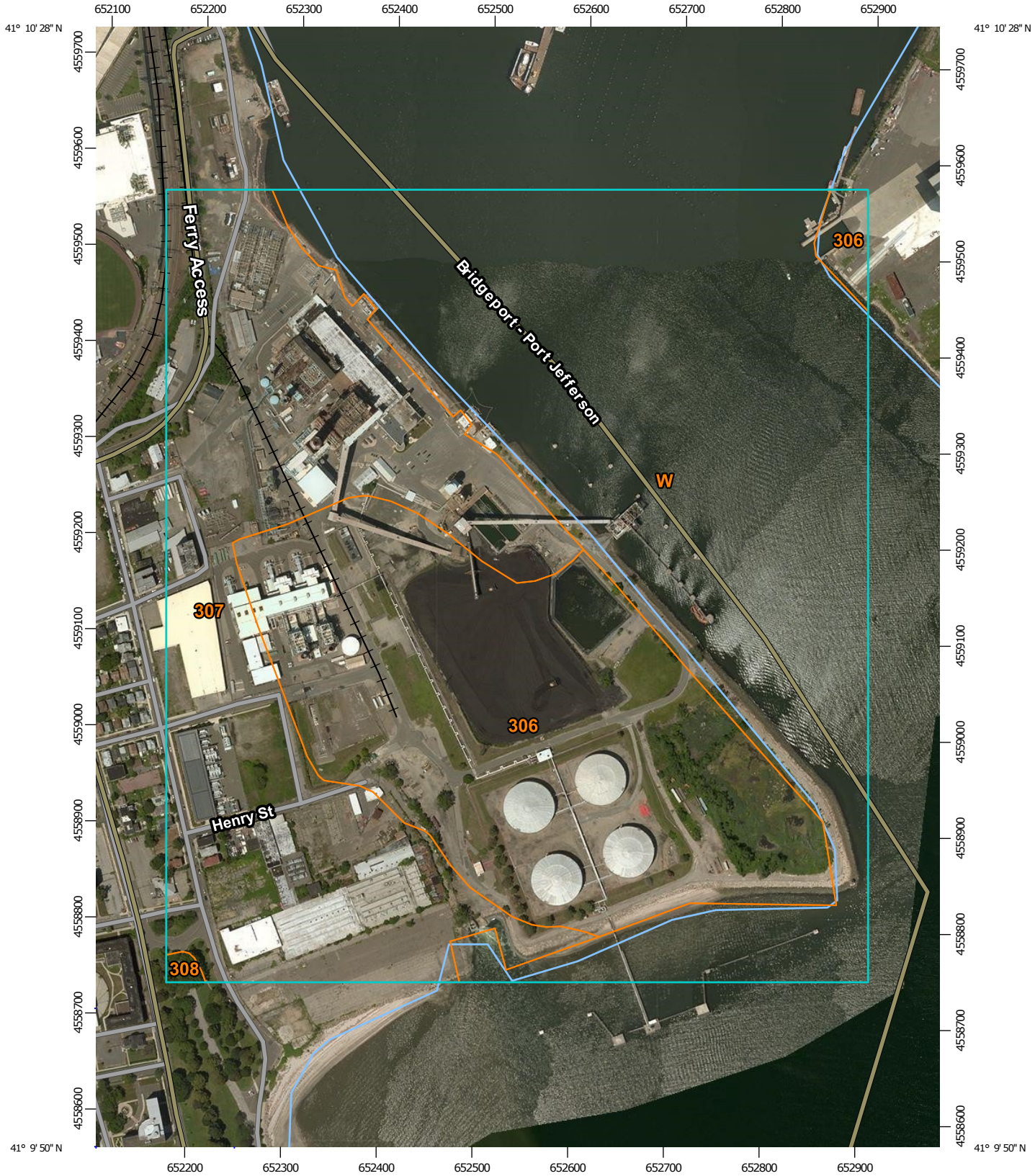
[1] Stabilization practices to be inspected include: grading, disturbed area, temporary vegetative cover, permanent vegetative cover.

[2] Structural practices to be inspected include: filtration barriers, half-pipe slope diversion drainage swales, fiber filtration tubes, erosion control blankets, down chutes, check dams, inlet sedimentation controls and detention basin.

Appendix E

USGS Web Soil Survey Reports

Soil Map—State of Connecticut
(Bridgeport Harbor Station - Unit 5 Project)



Map Scale: 1:5,680 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 14, Sep 22, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

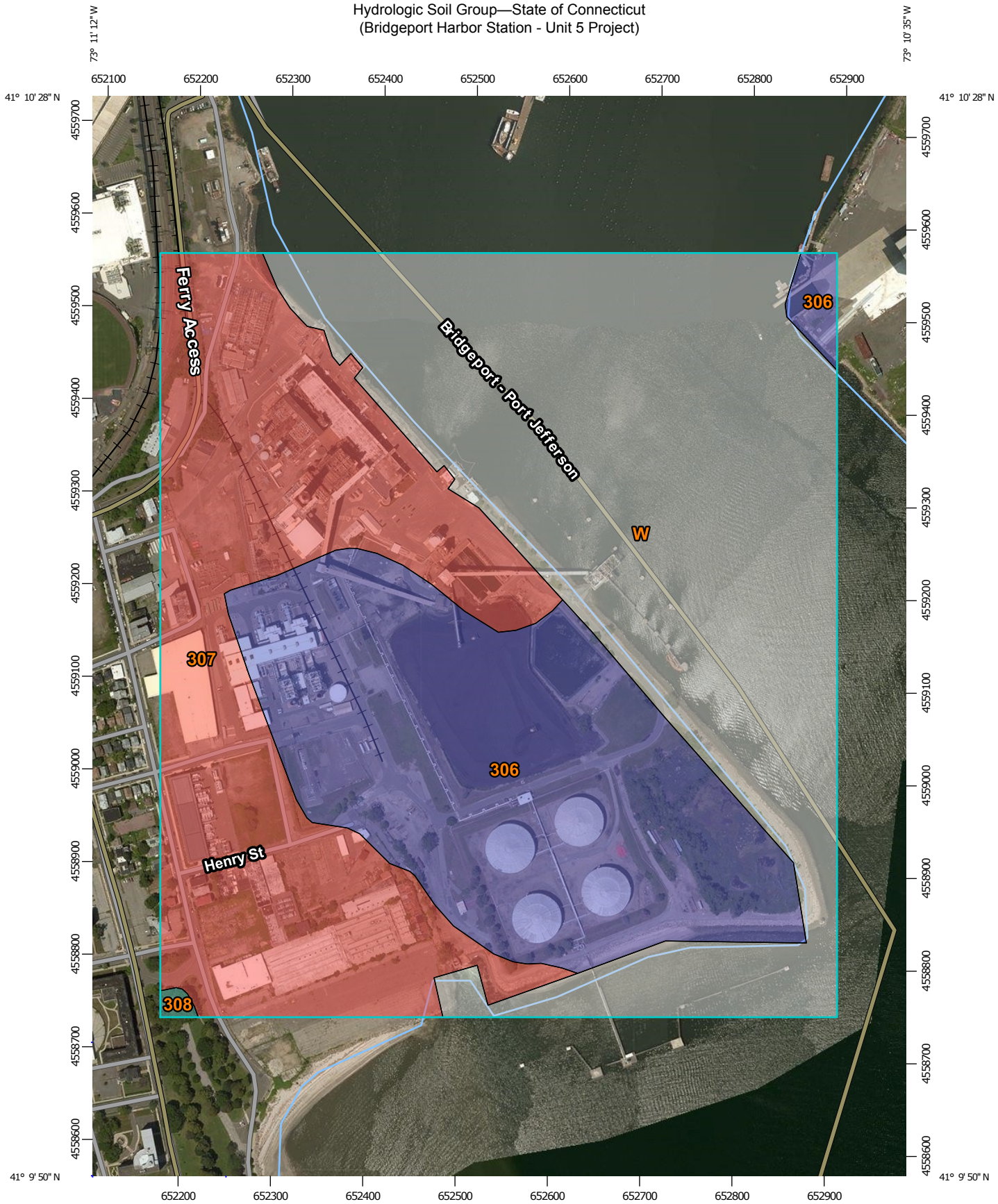
Date(s) aerial images were photographed: Mar 28, 2011—Jul 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
306	Udorthents-Urban land complex	42.4	28.2%
307	Urban land	45.3	30.2%
308	Udorthents, smoothed	0.3	0.2%
W	Water	62.1	41.4%
Totals for Area of Interest		**150.0**	**100.0%**

Hydrologic Soil Group—State of Connecticut
(Bridgeport Harbor Station - Unit 5 Project)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 14, Sep 22, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 28, 2011—Jul 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — State of Connecticut (CT600)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
306	Udorthents-Urban land complex	B	42.4	28.2%
307	Urban land	D	45.3	30.2%
308	Udorthents, smoothed	C	0.3	0.2%
W	Water		62.1	41.4%
Totals for Area of Interest			**150.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix F

Threatened and Endangered Species Review

- Request for Natural Diversity Data Base (NDDB) State Listed Species Review
- CT DEEP Response Letter
- IPAC Report

USFWS IPAC Report

U.S. Fish and Wildlife Service

Trust Resources List

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

New England Ecological Services Field Office
70 COMMERCIAL STREET, SUITE 300
CONCORD, NH 3301
(603) 223-2541
http://www.fws.gov/newengland

Project Location Map:

U.S. Fish and Wildlife Service

Trust Resources List

Project Counties:

Fairfield, CT

Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):

MULTIPOLYGON (((-73.1839593 41.1732141, -73.180054 41.1706944, -73.1761058 41.1669146, -73.1774791 41.1654931, -73.1852038 41.1634577, -73.1873925 41.1707913, -73.1839593 41.1732141)))

Project Type:

Power Generation

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of **1** threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

Species that should be considered in an effects analysis for your project:

Birds	Status		Has Critical Habitat	Contact
Roseate tern (*Sterna dougallii dougallii*) Population: northeast U.S. nesting pop.	Endangered	species info		New England Ecological Services Field Office

Critical habitats within your project area:

There are no critical habitats within your project area.

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are no refuges found within the vicinity of your project.

U.S. Fish and Wildlife Service

Trust Resources List

FWS Migratory Birds (USFWS Migratory Bird Program).

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html.

Migratory birds of concern that may be affected by your project:

There are **18** birds on your Migratory birds of concern list. The Division of Migratory Bird Management is in the process of populating migratory bird data with an estimated completion time of Fall 2014; therefore, the list below may not include all the migratory birds of concern in your project area at this time. While this information is being populated, please contact the Field Office for information about migratory birds in your project area.

Species Name	Bird of Conservation Concern (BCC)	Species Profile	Seasonal Occurrence in Project Area
American Oystercatcher (*Haematopus palliatus*)	Yes	species info	Year-round
American bittern (*Botaurus lentiginosus*)	Yes	species info	Breeding
Bald eagle (*Haliaeetus leucocephalus*)	Yes	species info	Year-round
Black rail (*Laterallus jamaicensis*)	Yes	species info	Breeding
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	Yes	species info	Breeding

Trust Resources List

Blue-winged Warbler (*Vermivora pinus*)	Yes	species info	Breeding
Canada Warbler (*Wilsonia canadensis*)	Yes	species info	Breeding
Horned Grebe (*Podiceps auritus*)	No	species info	Wintering
Least Bittern (*Ixobrychus exilis*)	Yes	species info	Breeding
Least tern (*Sterna antillarum*)	Yes	species info	Breeding
Pied-billed Grebe (*Podilymbus podiceps*)	Yes	species info	Year-round
Purple Sandpiper (*Calidris maritima*)	Yes	species info	Wintering
Rusty Blackbird (*Euphagus carolinus*)	Yes	species info	Wintering
Saltmarsh Sparrow (*Ammodramus caudacutus*)	Yes	species info	Breeding
Seaside Sparrow (*Ammodramus maritimus*)	Yes	species info	Year-round
Snowy Egret (*Egretta thula*)	Yes	species info	Breeding
Wood Thrush (*Hylocichla mustelina*)	Yes	species info	Breeding
Worm eating Warbler (*Helmitheros vermivorum*)	Yes	species info	Breeding

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the

Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

Data Limitations, Exclusions and Precautions
The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Exclusions - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

The following wetland types intersect your project area in one or more locations:

Wetland Types	NWI Classification Code	Total Acres
Estuarine and Marine Deepwater	E1UBL	915401.4107
Estuarine and Marine Wetland	E2US2P	6.5666

Trust Resources List

Estuarine and Marine Wetland	E2US2N	0.7542
Freshwater Emergent Wetland	PEM1Eh	2.4565
Freshwater Pond	PUBHx	1.38

Appendix G

Cultural Resources Review

AKRF

Environmental and Planning Consultants

307 Fellowship Road
Suite 214
Mt. Laurel, NJ 08054
tel: 856 797-9930
fax: 856 797-9932
www.akrf.com

Via Federal Express

December 3, 2014

NJ14518

Connecticut State Historic Preservation Office
One Constitution Plaza
Hartford, CT 06103

Re: PSEG Power Connecticut LLC
Bridgeport Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Dear SHPO Reviewer,

PSEG Power Connecticut LLC or an affiliated special purpose entity (PSEG) is proposing to install and operate a combined cycle electric generating facility at the site of its existing Bridgeport Harbor Generating Station located at 1 Atlantic Street in Bridgeport, Connecticut (Project). AKRF, Inc., as the applicant's environmental consultant, would like to request the input of the Connecticut State Historic Preservation Office (SHPO) regarding cultural resources. The requested information is in support of the project's environmental review.

The proposed Unit 5 Combined Cycle Project will be installed on approximately 16 acres of previously disturbed land at the Bridgeport Harbor Generating Station. In support of the SHPO's review of the Project, we have enclosed a completed Project Review Cover Form that provides the following information regarding the Project and project site:

- Project overview narrative;
- Project figures, including a USGS-based site location map, aerial photographs, preliminary project plans, and site photographs;
- Historic maps; and
- Soil map.

If you have any questions concerning this request or require additional information to complete your review, please contact me at 856.359.7612 or at kmaher@akrf.com.

Sincerely,

Kevin Maher, AICP
Senior Vice President

cc: J. Nicholas, PSEG
D. Hinchey, PSEG
A. Alvarez, PSEG
B. Silvestri, PSEG
R. Rauffer, PSEG
S. Sousa, PSEG
S. Humes, Holland & Knight
F. DeRosa, Brown Rudnick LLP
M. McDonald, AKRF, Inc.

Department of Economic and Community Development | Connecticut still revolutionary

State Historic Preservation Office

One Constitution Plaza | Hartford, CT 06103 | 860.256.2800 | Cultureandtourism.org

PROJECT REVIEW COVER FORM

1. This information relates to a previously submitted project. ☐ You do not need to complete the rest of the form if you have been previously issued a SHPO Project Number. Please attach information to this form and submit.

SHPO Project Number _____
(Not all previously submitted projects will have project numbers)

Project Address _____
(Street Address and City or Town)

2. This is a new Project. [X] If you have checked this box, it is necessary to complete ALL entries on this form .

Project Name PSEG Power Connecticut LLC - Bridgeport Unit 5 Combined Cycle Project

Project Location Bridgeport Harbor Generating Station - 1 Atlantic Street, Bridgeport CT, 06604-5513
Include street number, street name, and or Route Number. If no street address exists give closest intersection.

City or Town Bridgeport CT, 06604-5513
In addition to the village or hamlet name (if appropriate), the municipality must be included here.

County Fairfield
If the undertaking includes multiple addresses, please attach a list to this form.

Date of Construction (for existing structures) The Bridgeport Harbor Station has operated at this location since 1957.

PROJECT DESCRIPTION SUMMARY (include full description in attachment):

PSEG Power Connecticut LLC or an affiliated special purpose entity (PSEG) is proposing to install and operate a combined cycle facility at the site of its existing Bridgeport Harbor Station (BHS) located at 1 Atlantic Street in Bridgeport, Connecticut (the "Facility" or "Project").The proposed combined cycle Project will be sited on approximately 16 acres of previously disturbed and developed land within the approximately 84-acre station site that comprises PSEG Power Connecticut LLC's existing Bridgeport Harbor Generating Station. The Bridgeport Harbor Station has operated at this location since 1957. A full description of proposed project activities and preliminary review of potential impacts to archaeological and historic resources is provided in Attachment 1.

TYPE OF REVIEW REQUESTED

a. Does this undertaking involve funding or permit approval from a State or Federal Agency?

[X] Yes [ ] No

Agency Name/Contact	Type of Permit/Approval	State	Federal
CT DEEP	PSD Air Permit and Title V Permit Modification	[X]	[ ]
CT DEEP	Certificate of Permission/Structures and Fill Permit (potential)	[X]	[ ]
CT Siting Council	Petition for Declaratory Ruling Approval	[X]	[ ]
US Army Corp	Programmatic General Permit Approval (potential)		

	Yes	No
b. Have you consulted the SHPO and UCONN Dodd Center files to determine the presence or absence of previously identified cultural resources within or adjacent to the project area?	[ ]	[X]
If yes: Was the project site wholly or partially located within an identified archeologically sensitive area?	[ ]	[ ]
Does the project site involve or is it substantially contiguous to a property listed or recommended for listing in the CT State or National Registers of Historic Places?	[ ]	[ ]
Does the project involve the rehabilitation, renovation, relocation, demolition or addition to any building or structure that is 50 years old or older?	[ ]	[ ]

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PROJECT REVIEW COVER FORM

The Historic Preservation Review Process in Connecticut Cultural Resource Review under the National Historic Preservation Act – Section 106 http://www.achp.gov/106summary.html involves providing technical guidance and professional advice on the potential impact of publicly funded, assisted, licensed or permitted projects on the state's historic, architectural and archaeological resources. This responsibility of the State Historic Preservation Office (SHPO) is discharged in two steps: (1) identification of significant historic, architectural and archaeological resources; and (2) advisory assistance to promote compatibility between new development and preservation of the state's cultural heritage.

Project review is conducted in two stages. First, the SHPO assesses affected properties to determine whether or not they are listed or eligible for listing in the Connecticut State or National Registers of Historic Places. If so, it is deemed "historic" and worthy of protection and the second stage of review is undertaken. The project is reviewed to evaluate its impact on the properties significant materials and character. Where adverse effects are identified, alternatives are explored to avoid, or reduce project impacts; where this is unsuccessful, mitigation measures are developed and formal agreement documents are prepared stipulating these measures. For more information and guidance, please see our website at: http://www.cultureandtourism.org/cct/cwp/view.asp?a=3933&q=293820

ALL PROJECTS SUBMITTED FOR REVIEW MUST INCLUDE THE FOLLOWING MATERIALS*:

[X] **PROJECT DESCRIPTION** Please attach a full description of the work that will be undertaken as a result of this project. Portions of environmental statements or project applications may be included. The project boundary of the project should be clearly defined**

[X] **PROJECT MAP** This should include the precise location of the project – preferably a clear color image showing the nearest streets or roadways as well as all portions of the project. Tax maps, Sanborn maps and USGS quadrangle maps are all acceptable, but Bing and Google Earth are also accepted if the information provided is clear and well labeled. The project boundary should be clearly defined on the map and affected legal parcels should be identified.

[X] **PHOTOGRAPHS** Clear, current images of the property should be submitted. Black and white photocopies will not be accepted. Include images of the areas where the proposed work will take place. May require: exterior elevations, detailed photos of elements to be repaired/replaced (windows, doors, porches, etc.) All photos should be clearly labeled.

For Existing Structures	Yes	N/A	Comments
Property Card	☐	☐	
For New Construction	**Yes**	**N/A**	**Comments**
Project plans or limits of construction (if available)	☒	☐	See Figures 4a through 4c of Attachment 1
If project is located in a Historic District include renderings or elevation drawings of the proposed structure	☐	☒	
Soils Maps http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm	☒	☐	See Appendix B of Attachment 1
Historic Maps http://magic.lib.uconn.edu/	☒	☐	See Appendix A of Attachment 1
For non-building-related projects (dams, culverts, bridge repair, etc)	**Yes**	**N/S**	**Comments**
Property Card	☐	☐	
Soils Map (see above)	☐	☐	
Historic Maps (see above)	☐	☐	

STAFF REVIEW AREA	Above	Date	Below	Date
Indicate date of Review and Initials of Reviewer				

PROJECT CONTACT

Name Kevin J. Maher, AICP Title Senior Vice President

Firm/Agency AKRF, Inc.

Address 307 Fellowship Road, Suite 214

City Mount Laurel State New Jersey Zip 08054

Phone 856.359.7612 Cell 732.778.3731 Fax 856.797.9932

Email kmaher@akrf.com

*Note that he SHPO's ability to complete a timely project review depends largely on the quality of the materials submitted.

** Please be sure to include the project name and location on *each page* of your submission.

Department of Economic and Community Development

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State Historic Preservation Office

One Constitution Plaza | Hartford, CT 06103 | 860.256.2800 | Cultureandtourism.org

PROJECT REVIEW COVER FORM

SHPO USE ONLY

Based on our review of the information provided to the State Historic Preservation Office, it is our opinion that:

☐ No historic properties will be affected by this project. No further review is requested.

☐ This project will cause no adverse effects to the following historic properties. No further review is requested:

☐ This project will cause no adverse effects to the following historic properties, conditional upon the stipulations included in the attached letter:

☐ Additional information is required to complete our review of this project. Please see the attached letter with our requests and recommendations.

☐ This project will adversely affect historic properties as it is currently designed or proposed. Please see the attached letter for further details and guidance.

Daniel T. Forrest — Date
Deputy State Historic Preservation Officer

PSEG Power Connecticut, LLC

Bridgeport Unit 5 Combined Cycle Project

Attachment 1

Project Overview

Description of the Proposed Project

PSEG Power Connecticut LLC or an affiliated special purpose entity (PSEG) is proposing to install and operate a combined cycle facility at the site of its existing Bridgeport Harbor Station (BHS) located at 1 Atlantic Street in Bridgeport, Connecticut (the "Facility" or "Project"). Figure 1 shows the boundary of the existing Bridgeport Harbor Station and the approximate location of the proposed combined cycle area of development on the United States Geological Service (USGS) 7.5-minute map (Bridgeport, Connecticut Quadrangle) for the surrounding area. Figure 2 is an aerial site location map. Figured 3a and 3b provide a detailed site aerial of the proposed Project site illustrating existing site conditions and the location of the proposed development.

The existing Bridgeport Harbor Station encompasses approximately 84 acres of land near the confluence of the Pequonnock River and Long Island Sound in downtown Bridgeport, Connecticut. Approximately 22 acres of the site are below the mean water line. Two generating units currently operate at the BHS site with a net capacity of 400 MW (summer rating). The plant generates enough power to supply half a million residential customers. BHS's two operating units include the coal / oil fired Unit 3 and an oil-fired combustion turbine peaking unit, supplying power to ISO-New England, which oversees the region's power grid.

The proposed combined cycle facility at the BHS will help meet the region's growing demand for electricity. The new facility will consist of one gas turbine and one steam turbine (i.e., 1x1 configuration) that will be dual fuel capable, utilizing both natural gas and ultra-low sulfur distillate fuel ("ULSD"). Natural gas would be utilized as the primary fuel with provisions to use ULSD for up to 60 days per year as a back-up fuel. The use of ULSD as a back-up fuel will assist in ensuring fuel diversity and increase operational reliability of the facility, particularly during the winter months when natural gas supplies may be unavailable at the site. A preliminary site development plan and preliminary elevation drawings for the proposed combined cycle facility and related improvements are provided as Figure 4a through 4c.

The new generating equipment will be installed on approximately 16 acres of previously disturbed land at the existing Bridgeport Harbor Generating Station. The new combined cycle plant will be sited in an area where four above-ground fuel oil storage tanks are currently located. These existing oil storage tanks, which were installed in 1968, will be removed in advance of the proposed

Project. As the development will occur within a previously disturbed industrial site, environmental impacts are minimized as compared with the development of a similar project on a greenfield site. Photographs of the proposed combined cycle site are included as Figures 5a through 5b and previous Figure 3b.

Commercial operation of the proposed combined cycle facility is targeted for June 2018. For this Project, PSEG will be participating in the ISO-New England ("ISO-NE") Forward Capacity Auction 2018-2019 that seeks additional capacity resources beginning in 2018. The construction of the Project will be contingent on PSEG successfully clearing the auction.

The facility design will be based on good engineering practice, using state-of-the-art air quality control technology and utilizing clean burning natural gas as the Facility's primary fuel source. These measures will minimize potential impacts to air quality. Additionally, the design will incorporate mitigation measures for noise and an air-cooled condenser to minimize facility operational water requirements and to eliminate surface water impacts. To provide for storm hardening for this critical waterfront energy infrastructure, the elevation of the Project site will be raised by approximately 7 to 10 feet. Grade changes will be accomplished through use of structural retaining walls and import of fill. Remedial activities will occur within the proposed areas of development in accordance with the state of Connecticut cleanup standards, known as the Remediation Standards Regulations. Primary facility structures, including the proposed turbine building, HRSG building, and air-cooled condenser are anticipated to have heights of 95, 127, and 125 feet above the proposed site design grade, respectively. The proposed exhaust stack is proposed at 300 feet above the proposed site design grade.

All construction will be in accordance with applicable local and state construction standards and conditions of the regulatory approvals to be obtained for the Project. The scope of the construction includes all site preparation, installation of subsurface utilities and foundations, installation of the new combined cycle facility equipment and required ancillary equipment, including required electrical and municipal interconnections.

Preliminary Cultural Resource Review

The project site is expected to have low sensitivity for archaeological resources because it is located on land largely reclaimed from Bridgeport Harbor in the late 19th and early 20th century and because it was extensively disturbed during the construction of the existing facility (see historic maps provided as Figures 6a and 6b and site soils information provided in Appendix A). As a consequence, the proposed new development at the existing BHS is not expected to result in potential impacts to archaeological resources.

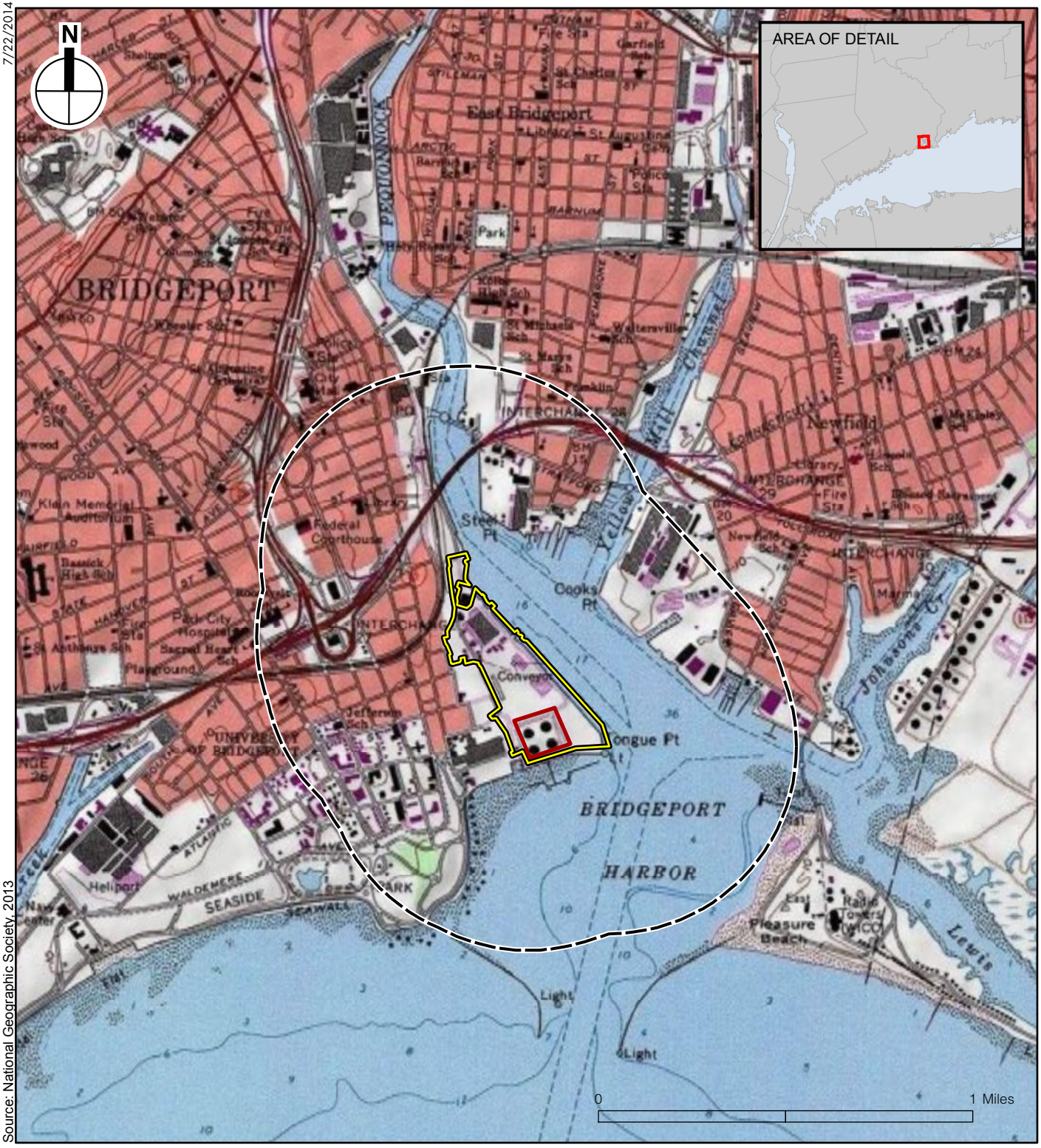
No historic properties have been identified within or immediately adjacent to the proposed development site. The State and National Register of Historic Places-listed Tongue Point Lighthouse, however, is located within 500 feet of the Project Site at the eastern end of the peninsula known as Tongue Point.

The Project is not expected to have an adverse effect on historic resources. The existing station is located within an industrial area located on the western shore of Bridgeport Harbor. The Bridgeport Harbor Station has operated at this location since 1957. The plant's Unit 1 generator became operational in 1957 as a coal burning facility. Bulk coal storage was located in approximately the same area as it is today. A second coal-burning unit (Unit 2) was added to the plant in 1961 and by 1968 the third BHS generating unit (Unit 3) was operational. Today, Unit 3 and a 20 MW peaking turbine remain operational at the site. A total of 3 exhaust stacks are located at the site, the tallest of which is 498 feet above grade. Therefore, the proposed combined cycle facility and related improvements will be located on a developed property that is the location of existing generating units, including all visible appurtenances such as the existing exhaust stacks, boilers; oil tanks, and barge docks.

In light of this existing industrial development, the proposed addition of the equipment required in support of the combined cycle facility, including the proposed 300-foot exhaust stack, will result in an incremental change in the appearance of the Bridgeport Harbor Generating Station Property. The proposed 300-foot stack will be lower than the existing 498-foot stack at the site (tallest of three existing exhaust stacks at site) and the remaining facility structures will be generally consistent with the height of the other structures at the BHS site. Therefore, the potential for indirect impacts as a result of the proposed combined cycle facility and related improvements will be limited, to a large extent, by the siting of the facility at an existing site that has been used for the generation of power for many years and by the presence of several other industrial facilities in this portion of the City of Bridgeport.

Project Figures

7/22/2014



Source: National Geographic Society, 2013

Approximate Area of Development

Project Site Property Boundary

1/2-Mile ***Radius***

AKRF

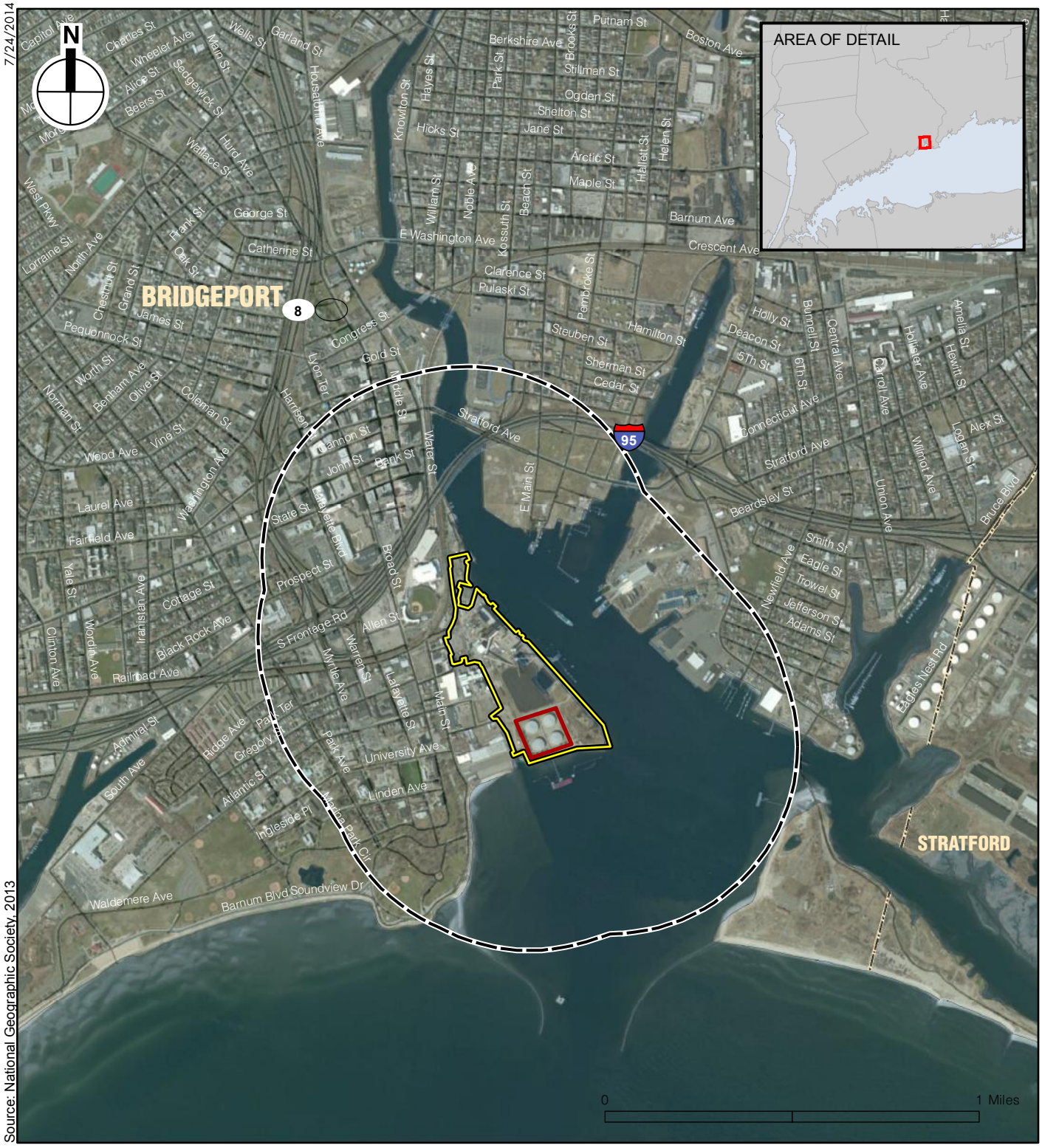
307 Fellowship Rd Suite 214
Mt. Laurel NJ 08054

P: (856) 797-9930
www.akrf.com

Approximate coordinates of
Project Site:
40° 10' 8" N, 73° 10' 55" W

Unit 5 Combined Cycle Project
BRIDGEPORT HARBOR GEN. STATION

USGS 7.5 Minute Topographic Map
Bridgeport Quad
Figure 1



Approximate Area of Development

Project Site Property Boundary

1/2-Mile ***Radius***

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307 Fellowship Rd Suite 214
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Unit 5 Combined Cycle Project
BRIDGEPORT HARBOR GEN. STATION

Site Location Aerial
Figure 2

PSEG Power Connecticut LLC
Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Figure 3a. Site Aerial Photograph

Photo Source: Google Earth, August 2012
Photo Date: September 2013

AKRF

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AKRF

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PSEG Power Connecticut LLC
Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Figure 3b. Site Aerial Photograph – Birdseye View

Photo Source: Bing Maps, August 2014
Photo Date: 2012

INDEX

ITEM	DESCRIPTION	NOTES
1	GAS TURBINE GENERATOR	
2	STEAM TURBINE GENERATOR	
3	GSU TRANSFORMER 345KV	
4	POWER DISTRIBUTION CENTER (PDC)	
5	AMMONIA TRUCK UNLOADING AND STORAGE	20,000 GALLON
6	RO/DEMINERALIZED WATER TANK	1,000,000 GALLON
7	SERVICE WATER/FIRE WATER STORAGE TANK	900,000 GALLON
8	FIRE PROTECTION AND SERVICE WATER PUMP HOUSE	3,000 sqft (75'x40')
9	DEMINERIALIZED WATER TRAILERS	6,400 sqft (75'x80')
10	345KV GIS BUILDING	BPH–EB–10
11	UNIT NO. 3 CIRC. WATER PIPE (EXISTING)	UNDERGROUND
12	12" DIA. CITY WATER PIPING (EXISTING)	12" DIA.
13	ELECTRICAL DUCT TO SINGER SWITCHGEAR 345KV	UNDERGROUND
14	EMERGENCY DIESEL GENERATOR	750KW
15	12" DIA. CITY WATER SUPPLY	12" DIA.
16	8"DIA. SANITARY SEWER (EXISTING)	
17	AUX. BOILER BUILDING	3,000 sqft (40'x75')
18	AUX. BOILER STACK	30" DIA. 143'–6" EL.
19	AUX ELECTRIC BUILDING / BATTERY ROOM	6,000 sqft (60'x100')
20	AUX. COOLING TOWER	1,125 sqft (50'x26'x23')
21	FUEL GAS PROCESSING BUILDING	3,000 sqft (85'x35')
22	AIR COOLED CONDENSERS (ACC)	20 CELLS
23	FUEL OIL FORWARDING PUMPS	2,000 sqft (50'x40')
24	ULSD TANK	5,500,000 GAL. TOTAL
25	EXCITATION TRANSFORMER	
26	STORM WATER DETENTION POND	
27	AUX. TRANSFORMER	
28	OIL/WATER SEPARATOR	
29	STATIC START ISOLATION TRANSFORMER	
30	CONTROL/SERVICE BUILDING	7,600 sqft (87'x87')
31	CEMS EQUIPMENT MODULE	225 sqft (15'x15')
32	TURBINE BUILDING (PER GE 7HA.02 REQUIREMENTS)	45,921 sqft
33	AIR COMPRESSOR BUILDING	800 sqft (20'x40')
34	NATURAL GAS PIPING	
35	NATURAL GAS METERING & REGULATING STATION	
36	TERMINAL POINT CONNECTION TO NEW 16" NG PIPING	
37	12" DIA. STORM WATER (EXISTING)	
38	NOT USED	
39	6" DIA. FUEL OIL SUPPLY PIPING TO GT	6" DIA.
40	NOT USED	
41	SINGER 345KV SWITCHGEAR (EXISTING)	
42	STACK	21' DIA. x 300 FT
43	HEAT RECOVERY STEAM GENERATOR (HRSG)	
44	EXISTING ROADWAY TO LIGHT HOUSE	
45	HYDROGEN STORAGE VESSELS	
46	MAINTENANCE BUILDING	800 sqft (20'x40')
47	WAREHOUSE	3,750 sqft (50'x75')
48	WASTE WATER TANK	30' DIA.
49	PSEG PROPERTY LINE	
50	FUEL OIL UNLOADING DOCK (EXISTING)	
51	BOILER FEED WATER PUMP BUILDING	450 sqft (30'x15')
52	FUEL OIL TRUCK UNLOADING AREA	
53	UNIT 3 FUEL OIL STORAGE TANK (200,000 GAL) WITH CONTAINMENT	EL. 15'–6"
54	UNIT 3 FUEL OIL FORWARDING PUMPS	EL. 15'–6"
55	UNIT 3 FUEL OIL SUPPLY	
56	UNIT 3 FUEL OIL TRUCK UNLOADING AREA	
57	FUEL OIL UNLOADING PIPING FROM BARGE DOCK TO OIL TANK	

NG PIPING LEGEND
——— ABOVE GROUND
– – – UNDER GROUND

NOTES:

1. STORM WATER DRAINAGE WILL BE DESIGNED IN ACCORDANCE WITH THE CITY OF BRIDGEPORT CONN. DEPT. OF PUBLIC FACILITIES STORM WATER MANAGEMENT MANUAL.
2. FINAL FINISHED GRADE (EXTERIOR) AT EL. 16'–6" (per NAVD88). TOP OF CONCRETE SLABS OF FLOOR AT EL. 18'–6".
3. TOP OF RETAINING WALL AT EL. 20'–0"
4. THE ULSD FUEL OIL PIPING WILL RUN FROM THE PROPOSED LIGHT OIL TANKS VIA FUEL OIL FORWARDING PUMPS THROUGH TRENCHES TO EXISTING PIPING AT THE UNIT 3 BOILER AREA. THE PROPOSED CONNECTION POINT IS APPROXIMATELY AT ELEV. 50' ON THE NORTHWEST CORNER OF THE BOILER.
5. WORK THIS DRAWING WITH BPH–DWG–23, 27, & 28.
6. CONTRACTOR SHALL MAINTAIN THE OPERABILITY OF THE EXISTING NO. 6 FUEL OIL PIPING UNTIL THE ACTUAL TURN OVER TO ULSD OPERATION FOR UNIT #3.
7. THE TOP OF PAD ELEVATIONS (I.E. 15'–6" NAVD88) WERE DETERMINED BY ADDING 1'–6" TO THE FEMA FLOOD PLANE OF 14' NAVD88, AS RECOMMENDED BY ASCE, WHICH IS 5'–6" HIGHER THAN THE EXISTING GROUND ELEVATIONS SHOWN ON PSEG TOPOGRAPHIC SURVEY PLAN (VT–2) OF 10'–0" APPROXIMATELY.
8. NATURAL GAS PIPE BRIDGE OVER ROADWAY.

Unit 5 Combined Cycle Project
Figure 4 - Preliminary Site Development Plan

NO	DATE	ACCT	DESCRIPTION	DWN	CKD	EXD	REV	REV	APD
5A	10/07/14		REVISED FOR NEW LOCATION OF NG M & R STATION	MC	TF	JW	–	–	RT

REVISION

RCM Technologies
Power System Services

PROJECT ENGINEERING DIVISION

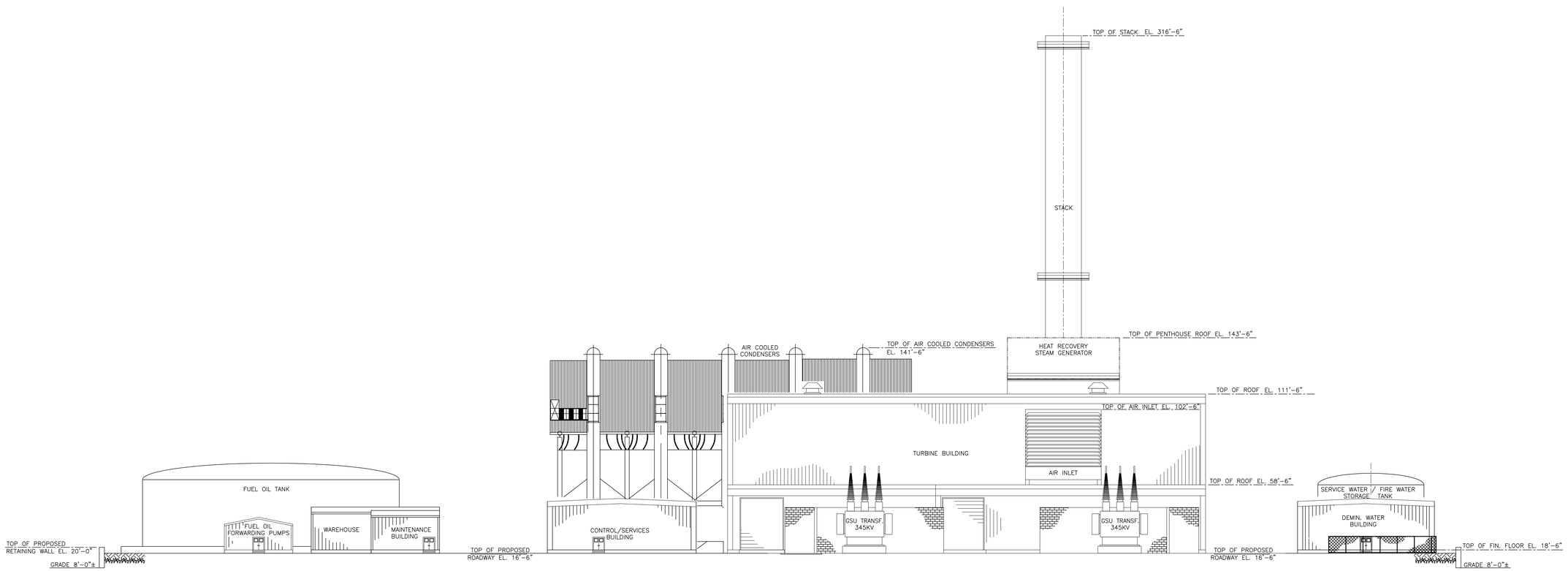
PSEG Power LLC

PSEG POWER LLC

BRIDGEPORT HARBOR GENERATING STATION
BPH UNIT #5 COMBINED CYCLE
450MW SITE LAYOUT PLAN

DWG. NO. BPH–DWG–16

REV. 5A



ELEVATION AA

LOOKING SOUTH

SCALE: 1"=25'-0"

NOTES:

1. FINAL FINISHED GRADE (EXTERIOR) AT EL. 16'-6" (per NAVD88). TOP OF CONCRETE SLABS OF FLOOR AT EL. 18'-6".
2. TOP OF RETAINING WALL AT EL. 20'-0"
3. WORK THIS DRAWING WITH BPH-DWG-16, 23, & 28.

Unit 5 Combined Cycle Project

Figure 4b - Preliminary Elevation Drawing - South Elevation

RCM Technologies
Power System Services
2500 McClellan Avenue
Pennsauken, NJ 08109
Tel: 856-356-4500
Fax: 856-356-4600

NO	DATE	DESCRIPTION	DSD	CKD	EXD	APD
0	07/30/14	PHASE III REPORT FINAL	MC	TF		

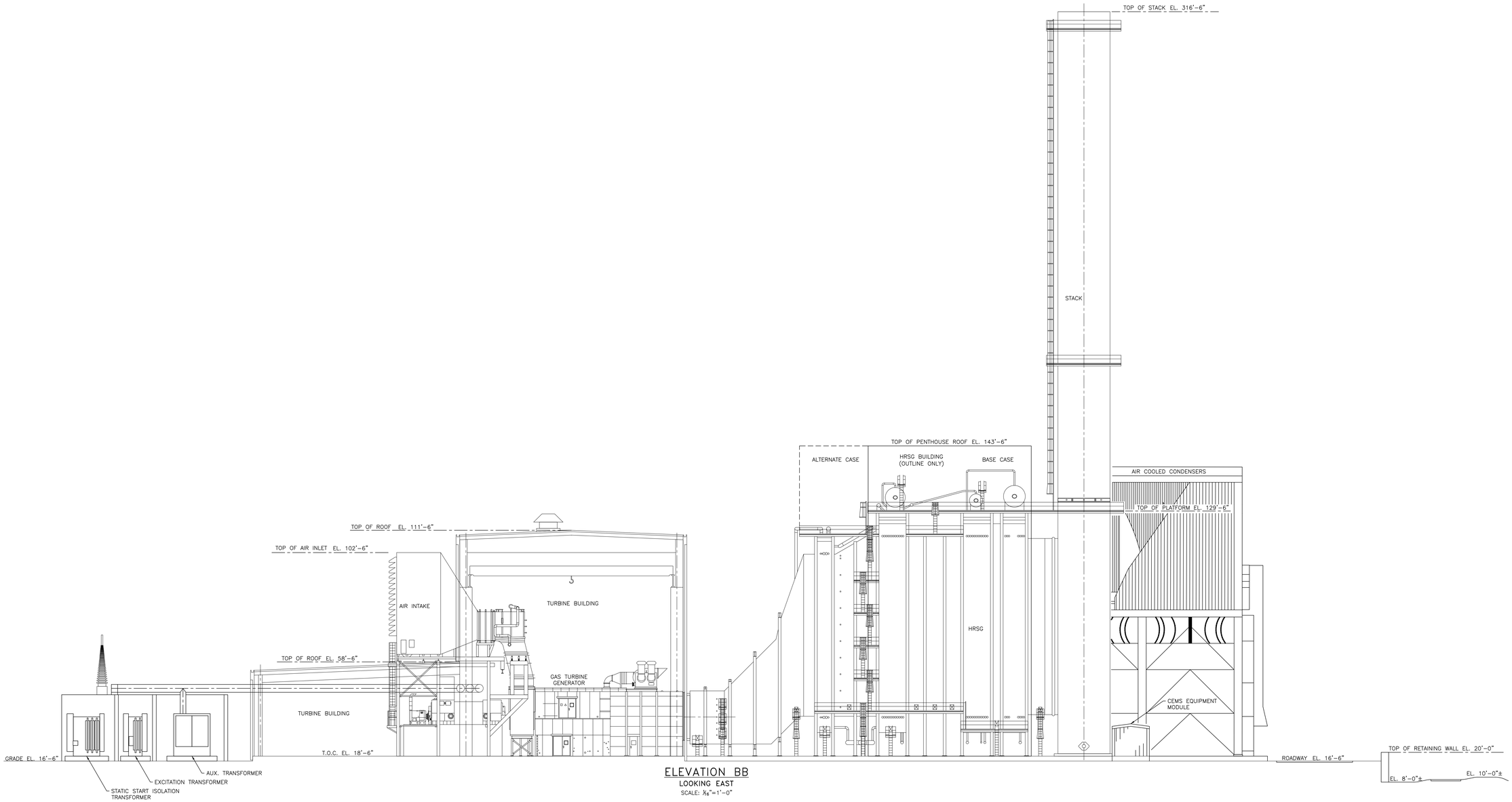
REVISION

PSEG BRIDGEPORT HARBOR
GENERATING STATION
BPH UNIT #5 COMBINED CYCLE
SOUTH ELEVATION

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-DP&C, NEWARK,N.J.

DESIGNED MC/RCMT CHECKED TF/RCMT SCALE AS NOTED
DATE EXAMINED
WBS/SO APPROVED

BPH-DWG-27 – 0



ELEVATION BB

LOOKING EAST

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

NOTES:

1. FINAL FINISHED GRADE (EXTERIOR) AT EL. 16'-6" (per NAVD88). TOP OF CONCRETE SLABS OF FLOOR AT EL. 18'-6". FEMA FLOOD ELEVATION ZONE = 14'-0" (NAVD88) PER FEMA FLOOD INSURANCE RATE MAP 9001C441G JULY 8, 2013.
2. TOP OF RETAINING WALL AT EL. 20'-0"
3. WORK THIS DRAWING WITH BPH-DWG-16, 23, & 27.

Unit 5 Combined Cycle Project
Figure 4c - Preliminary Elevation Drawing - East Elevation

NO	DATE	DESCRIPTION	DSD	CKD	EXD	APD
0	07/30/14	PHASE III REPORT FINAL	MC	TF		

REVISION

PSEG BRIDGEPORT HARBOR
GENERATING STATION
BPH UNIT #5 COMBINED CYCLE
EAST ELEVATION

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-DP&C, NEWARK,N.J.

DESIGNED MC/RCMT CHECKED TF/RCMT SCALE AS NOTED
DATE EXAMINED
WBS/SO APPROVED

BPH-DWG-28 – 0

RCM Technologies
Power System Services
2500 McClellan Avenue
Pennsauken, NJ 08109
Tel: 856-356-4500
Fax: 856-356-4600

Photo 1. View of northwestern corner of the proposed combined cycle project site looking east. The existing aboveground storage tanks and their earthen containment berm can be seen in the photograph.

Photo 2. View of western edge of proposed combined cycle project site looking north.

PSEG Power Connecticut, LLC
Bridgeport Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Figure 5a. Site Photographs

Photo Source: AKRF, Inc. October 2014

AKRF

Photo 3. View of southern edge of proposed combined cycle project site looking east.

Photo 4. View of eastern edge of proposed combined cycle project site looking north from the site's southeastern corner.

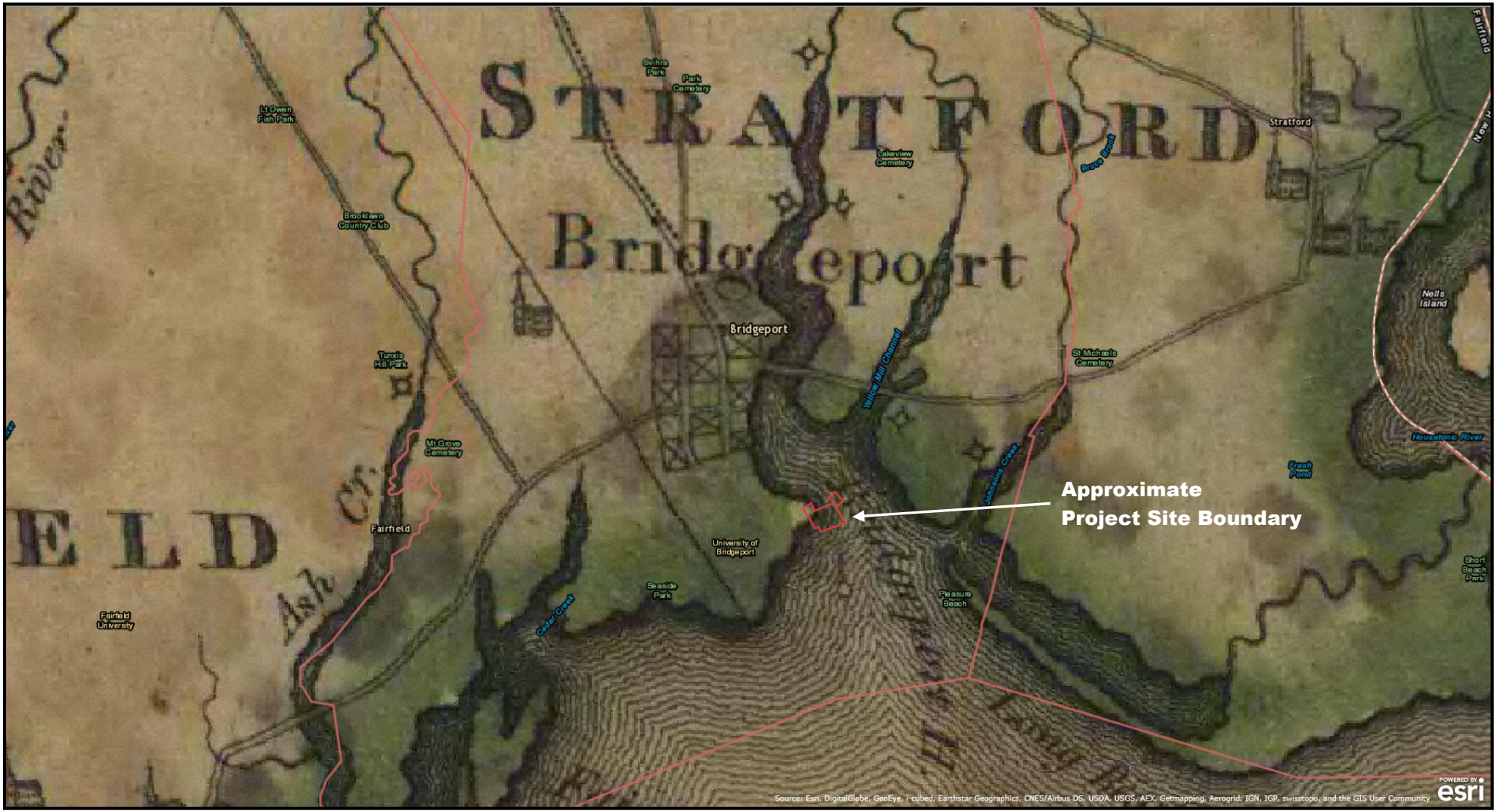
PSEG Power Connecticut, LLC
Bridgeport Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Figure 5b. Site Photographs

Photo Source: AKRF, Inc. October 2014

AKRF

Appendix A – Historic Maps



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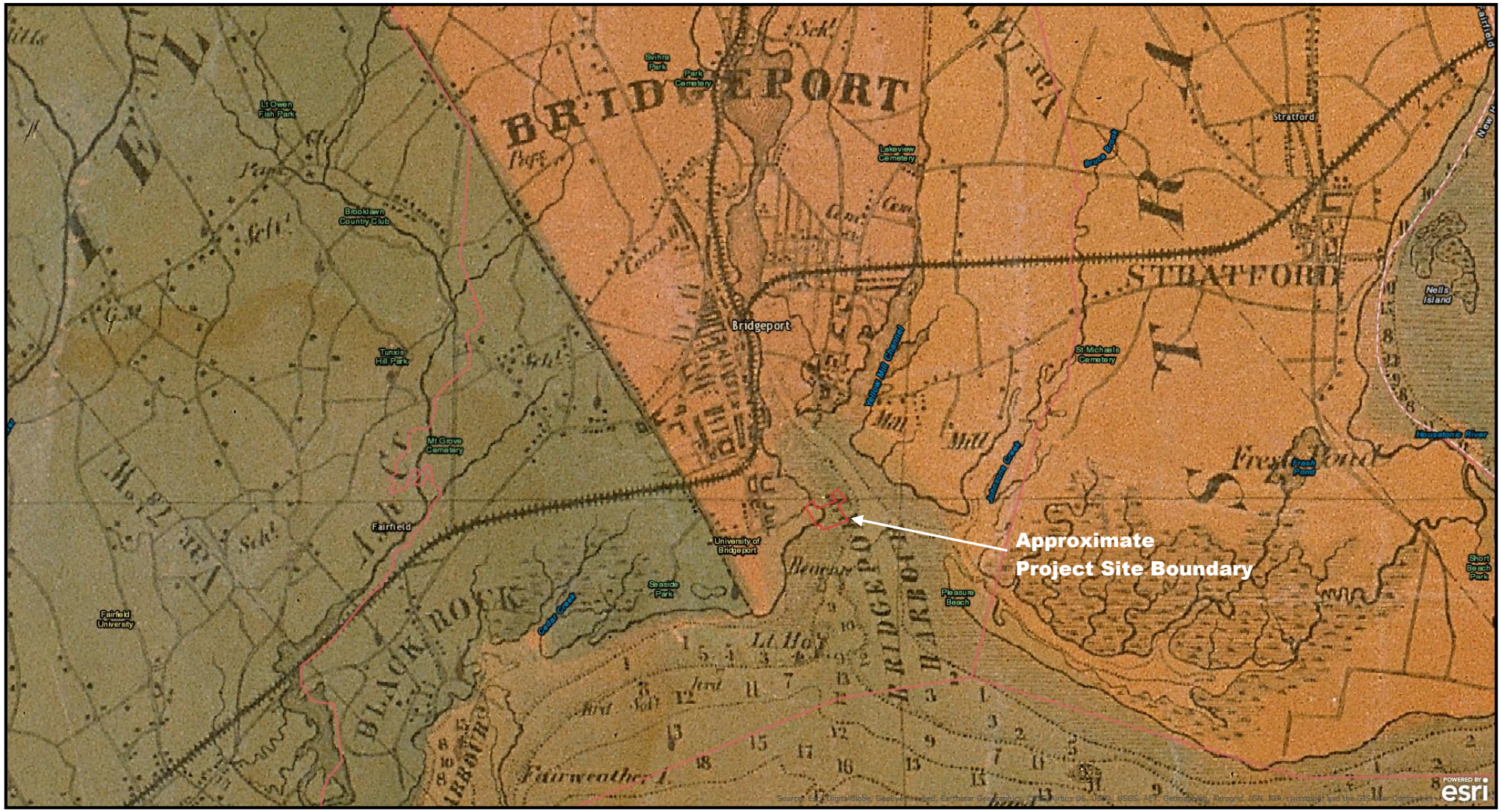
PSEG Power Connecticut, LLC
Bridgeport Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Historic Map – Connecticut 1811 Warren Map

Map Source: UCONN Magic 2.0 Maps/ESRI



AKRF

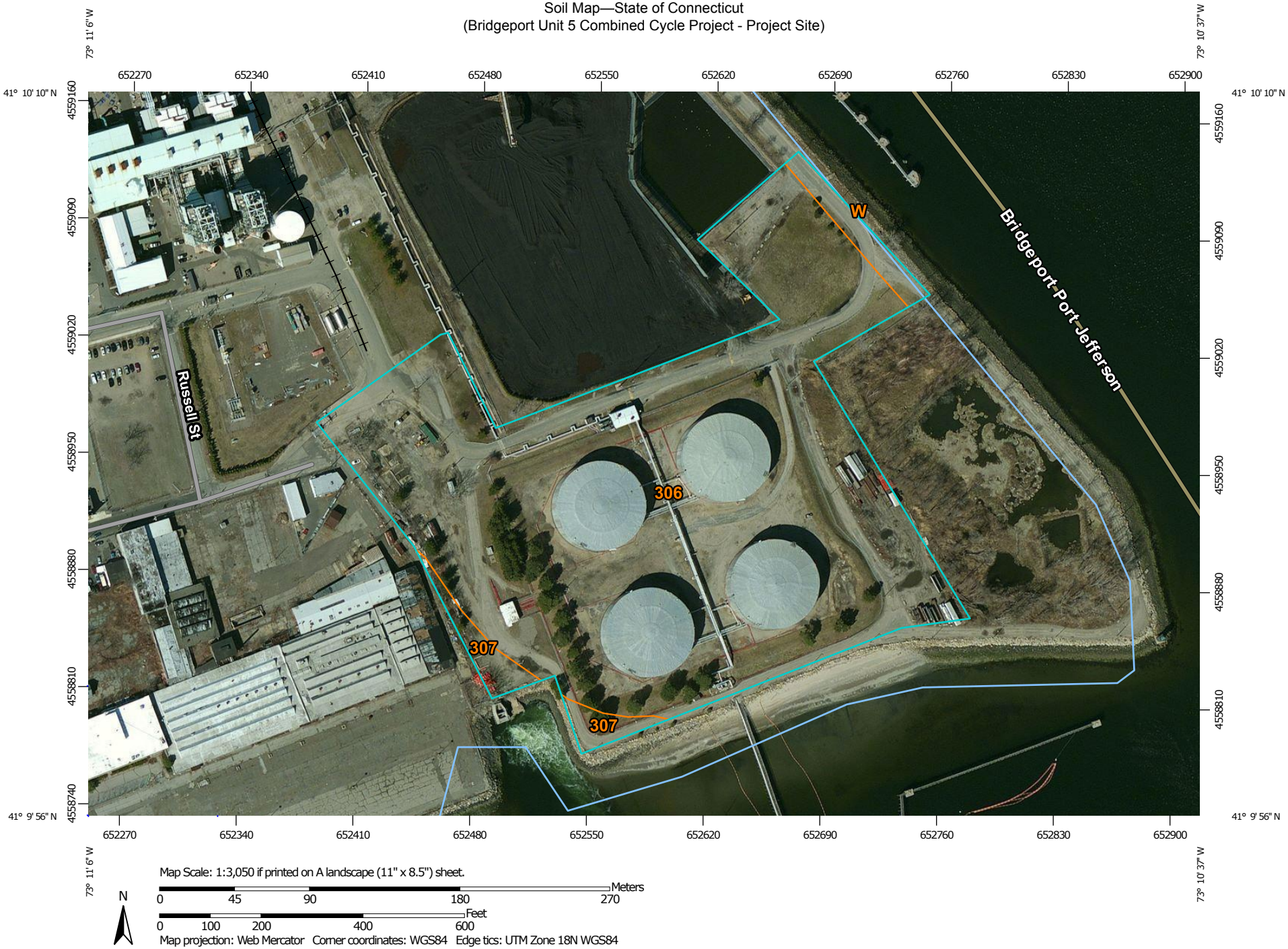
PSEG Power Connecticut, LLC
Bridgeport Unit 5 Combined Cycle Project
City of Bridgeport, Fairfield County, Connecticut

Historic Map – Connecticut 1859 Tackabury Map

Map Source: UCONN Magic 2.0 Maps/ESRI

Appendix B – Soils Map

Soil Map—State of Connecticut
(Bridgeport Unit 5 Combined Cycle Project - Project Site)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 11, Nov 19, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 28, 2011—Oct 9, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
306	Udorthents-Urban land complex	15.4	94.6%
307	Urban land	0.5	3.1%
W	Water	0.4	2.3%
Totals for Area of Interest		**16.3**	**100.0%**

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State Historic Preservation Office

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PROJECT REVIEW COVER FORM

1. **This information relates to a previously submitted project.** ☐ You do not need to complete the rest of the form if you have been previously issued a SHPO Project Number. Please attach information to this form and submit

SHPO Project Number _____
(Not all previously submitted projects will have project numbers)

Project Address _____
(Street Address and City or Town)

2. **This is a new Project.** [X] If you have checked this box, it is necessary to complete ALL entries on this form.

Project Name PSEG Power Connecticut LLC - Bridgeport Unit 5 Combined Cycle Project

Project Location Bridgeport Harbor Generating Station - 1 Atlantic Street, Bridgeport CT, 06604-5513
Include street number, street name, and or Route Number. If no street address exists give closest intersection.

City or Town Bridgeport CT, 06604-5513
In addition to the village or hamlet name (if appropriate), the municipality must be included here.

County Fairfield
If the undertaking includes multiple addresses, please attach a list to this form.

Date of Construction (for existing structures) The Bridgeport Harbor Station has operated at this location since 1957.

PROJECT DESCRIPTION SUMMARY (include full description in attachment):

PSEG Power Connecticut LLC or an affiliated special purpose entity (PSEG) is proposing to install and operate a combined cycle facility at the site of its existing Bridgeport Harbor Station (BHS) located at 1 Atlantic Street in Bridgeport, Connecticut (the "Facility" or "Project").The proposed combined cycle Project will be sited on approximately 16 acres of previously disturbed and developed land within the approximately 84-acre station site that comprises PSEG Power Connecticut LLC's existing Bridgeport Harbor Generating Station. The Bridgeport Harbor Station has operated at this location since 1957. A full description of proposed project activities and preliminary review of potential impacts to archaeological and historic resources is provided in Attachment 1.

TYPE OF REVIEW REQUESTED

a. Does this undertaking involve funding or permit approval from a State or Federal Agency?

[X] Yes [ ] No

Agency Name/Contact	Type of Permit/Approval	State	Federal
CT DEEP	PSD Air Permit and Title V Permit Modification	[X]	[ ]
CT DEEP	Certificate of Permission/Structures and Fill Permit (potential)	[X]	[ ]
CT Siting Council	Petition for Declaratory Ruling Approval	[X]	[ ]
US Army Corp	Programmatic General Permit Approval (potential)		

	Yes	No
b. Have you consulted the SHPO and UCONN Dodd Center files to determine the presence or absence of previously identified cultural resources within or adjacent to the project area?	[ ]	[X]
If yes: Was the project site wholly or partially located within an identified archeologically sensitive area?	[ ]	[ ]
Does the project site involve or is it substantially contiguous to a property listed or recommended for listing in the CT State or National Registers of Historic Places?	[ ]	[ ]
Does the project involve the rehabilitation, renovation, relocation, demolition or addition to any building or structure that is 50 years old or older?	[ ]	[ ]

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PROJECT REVIEW COVER FORM

The Historic Preservation Review Process in Connecticut Cultural Resource Review under the National Historic Preservation Act – Section 106 http://www.achp.gov/106summary.html involves providing technical guidance and professional advice on the potential impact of publicly funded, assisted, licensed or permitted projects on the state's historic, architectural and archaeological resources. This responsibility of the State Historic Preservation Office (SHPO) is discharged in two steps: (1) identification of significant historic, architectural and archaeological resources; and (2) advisory assistance to promote compatibility between new development and preservation of the state's cultural heritage.

Project review is conducted in two stages. First, the SHPO assesses affected properties to determine whether or not they are listed or eligible for listing in the Connecticut State or National Registers of Historic Places. If so, it is deemed "historic" and worthy of protection and the second stage of review is undertaken. The project is reviewed to evaluate its impact on the properties significant materials and character. Where adverse effects are identified, alternatives are explored to avoid, or reduce project impacts; where this is unsuccessful, mitigation measures are developed and formal agreement documents are prepared stipulating these measures. For more information and guidance, please see our website at: http://www.cultureandtourism.org/cct/cwp/view.asp?a=3933&q=293820

ALL PROJECTS SUBMITTED FOR REVIEW MUST INCLUDE THE FOLLOWING MATERIALS*:

[X] **PROJECT DESCRIPTION** Please attach a full description of the work that will be undertaken as a result of this project. Portions of environmental statements or project applications may be included. The project boundary of the project should be clearly defined**

[X] **PROJECT MAP** This should include the precise location of the project – preferably a clear color image showing the nearest streets or roadways as well as all portions of the project. Tax maps, Sanborn maps and USGS quadrangle maps are all acceptable, but Bing and Google Earth are also accepted if the information provided is clear and well labeled. The project boundary should be clearly defined on the map and affected legal parcels should be identified.

[X] **PHOTOGRAPHS** Clear, current images of the property should be submitted. Black and white photocopies will not be accepted. Include images of the areas where the proposed work will take place. May require: exterior elevations, detailed photos of elements to be repaired/replaced (windows, doors, porches, etc.) All photos should be clearly labeled.

For Existing Structures	Yes	N/A	Comments
Property Card	☐	☐	
For New Construction	**Yes**	**N/A**	**Comments**
Project plans or limits of construction (if available)	☒	☐	See Figures 4a through 4c of Attachment 1
If project is located in a Historic District include renderings or elevation drawings of the proposed structure	☐	☒	
Soils Maps http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm	☒	☐	See Appendix B of Attachment 1
Historic Maps http://magic.lib.uconn.edu/	☒	☐	See Appendix A of Attachment 1
For non-building-related projects (dams, culverts, bridge repair, etc)	**Yes**	**N/S**	**Comments**
Property Card	☐	☐	
Soils Map (see above)	☐	☐	
Historic Maps (see above)	☐	☐	

STAFF REVIEW AREA	Above	Date	Below	Date
Indicate date of Review and Initials of Reviewer				

PROJECT CONTACT

Name Kevin J. Maher, AICP Title Senior Vice President

Firm/Agency AKRF, Inc.

Address 307 Fellowship Road, Suite 214

City Mount Laurel State New Jersey Zip 08054

Phone 856.359.7612 Cell 732.778.3731 Fax 856.797.9932

Email kmaher@akrf.com

*Note that he SHPO's ability to complete a timely project review depends largely on the quality of the materials submitted.

** Please be sure to include the project name and location on *each page* of your submission.

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PROJECT REVIEW COVER FORM

SHPO USE ONLY

Based on our review of the information provided to the State Historic Preservation Office, it is our opinion that:

- [X] No historic properties will be affected by this project. No further review is requested.
- [ ] This project will cause no adverse effects to the following historic properties. No further review is requested:
- [ ] This project will cause no adverse effects to the following historic properties, conditional upon the stipulations included in the attached letter:
- [ ] Additional information is required to complete our review of this project. Please see the attached letter with our requests and recommendations.
- [ ] This project will adversely affect historic properties as it is currently designed or proposed. Please see the attached letter for further details and guidance.

Daniel T. Forrest — 2/5/15

Daniel T. Forrest — Date

~~Deputy~~ State Historic Preservation Officer

Jacqueline Fusco

From: Molly McDonald
Sent: Monday, March 21, 2016 4:38 PM
To: Jeffrey Pantazes; Jelena Matic
Subject: Fwd: Bridgeport Harbor Station

---------- Forwarded message ----------
From: **Labadia, Catherine** <Catherine.Labadia@ct.gov>
Date: Monday, March 21, 2016
Subject: Bridgeport Harbor Station
To: Molly McDonald <mmcdonald@akrf.com>

Hello Molly,

I finally had the opportunity to review the changes to the New Unit 3 Oil Storage Tank Project and the Unit 5 Combined Cycle Project. SHPO concurs with your opinion that these changes will not impact the neighboring historic properties. As a result, the previous findings of this office would not change and no additional cultural resources investigations are warranted. Please let me know if you require a formal response letter.

In any case, thank you for keeping SHPO apprised of the changes to the project plans and do not hesitate to contact me if you have any additional questions.

Cathy

Catherine Labadia

Deputy State Historic Preservation Officer, Staff Archaeologist

State Historic Preservation Office

Department of Economic & Community Development

1 Constitution Plaza, 2nd floor

Hartford, CT 06103

860-256-2800 (main)

860-256-2764 (direct)

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From: Molly McDonald [mailto:mmcdonald@akrf.com]
Sent: Monday, March 14, 2016 8:09 AM
To: Labadia, Catherine
Subject: Re: Bridgeport Harbor Station

Hi Cathy,

I just wanted to follow up to make sure you received my email the week before last about the updates to the Bridgeport Harbor Station projects. Please let me know if it would be helpful to have a quick telephone conversation to clarify any points or if there is any additional material you would like me to send. Thanks so much!

Molly McDonald, RPA

AKRF
917.566.0525

On Fri, Mar 4, 2016 at 3:15 PM, Molly McDonald <mmcdonald@akrf.com> wrote:

Cathy,

It was nice to chat with you earlier this week. Thank you for catching me up on the changes at CT SHPO over the last several months.

As we discussed, I'm writing now regarding two projects being undertaken by PSEG Power Connecticut LLC (PSEG) at the Bridgeport Harbor Station in Bridgeport: the Unit 5 Combined Cycle Project and the New Unit 3 Oil Storage Tank Project. Early last year, AKRF (on behalf of PSEG) submitted Environmental Review Cover Forms to your office providing information on each project, and on February 2, 2015, your office issued "no adverse effect" findings on both projects. I have attached the cover forms and effect findings for both projects for your reference.

I now want to inform your office of minor proposed changes to each of the projects. We do not anticipate that the proposed changes would result in any potential impacts on cultural resources-- either architectural or archaeological.

1. For the **New Unit 3 Oil Storage Tank Project**, PSEG is proposing to install a new Unit 3 fuel oil storage tank with an associated fuel unloading facility, demolish and remove four large existing oil tanks, remove three existing underground light fuel oil storage tanks, and remediate areas disturbed by the project. Since our original correspondence, the proposed project has been changed slightly to include the removal of three underground storage tanks that are located north of existing Unit 3. These tanks are used to store light oil and will no longer be needed.

2. For the **Unit 5 Combined Cycle Project**, PSEG is moving forward with permitting the new 485 megawatt combined cycle power plant at the BHS Site. The scope of the power plant is essentially the same as we described previously, except that PSEG is newly

proposing to renovate the existing fuel dock terminal facility on the project site, which was damaged during Superstorm Sandy on October 29, 2012. This will allow the oil dock to again be used for future oil deliveries by water. The existing oil dock was designed for oil tankers much larger than those necessary to support the new facility, so the repairs to the existing dock will involve demolishing and removing portions of the existing timber walkways, repairing existing platforms, piers, and mooring dolphins, constructing new walkways and upgrading and replacing existing fender units and mooring hardware. No new piers are necessary and the length of the walkway will be 40% smaller than with the current dock configuration.

It is our opinion that these new project elements would not directly or indirectly impact architectural resources. Further, the entire Bridgeport Harbor Station property is not considered archaeologically sensitive as it is composed of land that was constructed relatively recently. Therefore, no impacts to architectural or archaeological resources are anticipated as a result of the two projects. We do not feel that additional review or research is necessary and that the "no adverse effect" findings issued by your office in February 2015 still stand. However, we wanted to notify your office of the minor changes in the proposed projects and request your concurrence that no further consultation is necessary as a result of these changes.

Please let me know if you require any additional information or would like to discuss further. I am available anytime. Thanks again for your time and attention.

Molly McDonald, RPA
Technical Director/ Sr. Architectural Historian & Archaeologist
AKRF, Inc.
440 Park Avenue South
New York, NY 10016
mmcdonald@akrf.com
917.566.0525

Appendix H

NJCAT Certification Information

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Nonpoint Pollution Control
Division of Water Quality
401-02B
Post Office Box 420
Trenton, New Jersey 08625-0420
609-633-7021 Fax: 609-777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

May 14, 2012

Joel Garbon
Product Manager
7564 Standish Place
Suite 112
Rockville, MD 20855

Re: Final Certification
Jellyfish® Filter by Imbrium Systems

Expiration Date: December 1, 2016
TSS Removal Rate: 80%

Dear Mr. Garbon:

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Imbrium Systems. has requested a Final Certification for the Jellyfish® Filter.

This project falls under the "Transition for Manufactured Treatment Devices July 15, 2011". The Jellyfish Filter by Imbrium Systems qualified for Category C. Manufactured Treatment Devices Seeking Final Certifications - In Process which are MTDs that have commenced field testing on or before August 1, 2011.

NJDEP received the required information from signed statement sby the NJCAT Technical Director and the manufacturer listing the indicating that the requirements of the 2009 NJDEP Field Testing Protocols have been met or exceeded. NJDEP also received a signed statement from the third party testing entity, University of Florida, indicating that the testing requirements have been met or exceeded. The NJCAT letter also includes a recommended certification TSS removal rate and the required maintenance plan.

The NJDEP certifies the use of the Jellyfish Filter by Imbrium Systems at TSS removal rate of 80%, subject to the following conditions:

1. The Jellyfish Filter is designed according to the NJ Water Quality Design Storm in N.J.A.C. 7:8-5.5.
2. The peak inflow of the water quality design storm is limited to the following:

For each hi-flow cartridge, the maximum inflow is 1.48 gpm and a maximum inflow drainage area is 0.012 impervious acres, for each inch of cartridge length.

For each draindown cartridge, the maximum inflow 0.74 gpm and the maximum inflow drainage area is 0.006 impervious acres for each inch of cartridge length.

Example: For a 54-inch hi-flo cartridge length, the maximum inflow is 80 gpm and the maximum inflow drainage area is 0.65 impervious acres.

Maximum treatment flow rates for typical Jellyfish Filter models are provided in Table 1.

Maximum treatment flow rates and maximum inflow drainage areas for various cartridge lengths are provided in Table 2.

3. The bottom of the Jellyfish tentacles is a minimum of 2 feet above the bottom of the vault. The sedimentation area in the vault shall be a minimum of 4 ft^2 per cartridge.
4. The Jellyfish Filter is certified as an off-line system only.
5. The Jellyfish Filter cannot be used in series with a settling chamber (such as a hydrodynamic separator) or a media filter (such as a sand filter), to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
6. The maintenance plan for sites using this device shall incorporate, at a minimum, the maintenance requirements for the Jellyfish Filter shown in Appendix A below.

In addition to the attached, any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8, must include a detailed maintenance plan. The detailed maintenance plan must include all of the items identified in Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual.

NJDEP anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules, N.J.A.C. 7:8, are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,

Ed Frankel, P.P., Section Chief
Bureau of Nonpoint Pollution Control

C: Chron File
Richard Magee, NJCAT
Mark Pedersen, DLUR
Elizabeth Dragon, BNPC

Table 1
Maximum Treatment Flow Rates for
Standard (54" Cartridge Length) Jellyfish® Filter Models

Manhole Diameter (ft)	Model No.	Hi-Flo Cartridges (54" Length)	Draindown Cartridges (54" Length)	Maximum Treatment Flow Rate (gpm / cfs)
Catch Basin		varies	varies	varies
4	JF4-2-1	2	1	200 / 0.45
6	JF6-3-1	3	1	280 / 0.62
	JF6-4-1	4	1	360 / 0.80
	JF6-5-1	5	1	440 / 0.98
	JF6-6-1	6	1	520 / 1.16
8	JF8-6-2	6	2	560 / 1.25
	JF8-7-2	7	2	640 / 1.43
	JF8-8-2	8	2	720 / 1.60
	JF8-9-2	9	2	800 / 1.78
	JF8-10-2	10	2	880 / 1.96
10 [1]	JF10-11-3	11	3	1000 / 2.23
	JF10-12-3	12	3	1080 / 2.41
	JF10-13-3	13	3	1160 / 2.58
	JF10-14-3	14	3	1240 / 2.76
	JF10-15-3	15	3	1320 / 2.94
	JF10-16-3	16	3	1400 / 3.12
12 [2]	JF12-17-4	17	4	1520 / 3.39
	JF12-18-4	18	4	1600 / 3.57
	JF12-19-4	19	4	1680 / 3.74
	JF12-20-4	20	4	1760 / 3.92
	JF12-21-4	21	4	1840 / 4.10
	JF12-22-4	22	4	1920 / 4.28
	JF12-23-4	23	4	2000 / 4.46
	JF12-24-4	24	4	2080 / 4.63
Vault		varies	varies	varies

[1] The MTFR for a 10-ft diameter unit occurs with Model JF10-16-3. Since this leaves 4 unoccupied cartridge receptacles in the 10-ft diameter deck, the design engineer has the option to add up to 4 additional cartridges to increase the sediment capacity of the system, however may not increase the MTFR above that of the JF10-16-3.

[2] The MTFR for a 12-ft diameter unit occurs with Model JF12-24-4. Since this leaves 4 unoccupied cartridge receptacles in the 12-ft diameter deck, the design engineer has the option to add up to 4 additional cartridges to increase the sediment capacity of the system, however may not increase the MTFR above that of the JF12-24-4.

Table 2
Maximum Treatment Flow Rate and
Maximum Inflow Drainage Area
for Various Jellyfish® Cartridge Lengths

Cartridge Length (inches)	Maximum Treatment Flow Rate (gpm)	Maximum Inflow Drainage Area (impervious acres)
15	Hi-Flo 22 Draindown 11	Hi-Flo 0.18 Draindown 0.09
27	Hi-Flo 40 Draindown 20	Hi-Flo 0.32 Draindown 0.16
40	Hi-Flo 60 Draindown 30	Hi-Flo 0.48 Draindown 0.24
54	Hi-Flo 80 Draindown 40	Hi-Flo 0.65 Draindown 0.32

Appendix A

Imbrium Systems Jellyfish® Filter
Inspection and Maintenance Information

Jellyfish® Filter Inspection and Maintenance
Regular inspection and maintenance are proven, cost-effective ways to maximize water resource protection for all stormwater pollution control practices, and are required to insure proper functioning of the Jellyfish Filter. Inspection of the Jellyfish Filter is easily performed from the surface, while proper maintenance requires a combination of procedures conducted from the surface and with worker entry into the structure. The Jellyfish Filter's patented technology has no moving parts, keeping the process simple.

Please refer to the following information and guidelines before conducting inspection and maintenance activities.

When is inspection needed?

- Post-construction inspection is required prior to putting the Jellyfish Filter into service.
- A minimum of two inspections are required during the first year of operation to accurately assess the sediment and floatable pollutant accumulation, and to ensure that the automatic backwash feature is functioning properly.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections must also be performed immediately after an oil, fuel or other chemical spill.

When is maintenance service needed?

- For optimum performance, the unit must be cleaned out once the sediment depth reaches 12 inches of accumulation. Generally, the minimum cleaning frequency is once annually, although the frequency can be based on historical inspection results.
- Filter cartridges must be cleaned and re-commissioned, or replaced, every 12 months or when the automatic backwash feature no longer functions, whichever occurs first. The automatic backwash function will be disabled if the filter cartridges become saturated with sediment. This saturated condition is indicated if the backwash pool contains more than 3 inches depth of water after 12 or more hours of dry weather have elapsed since the most recent rainfall/runoff event.
- The unit must be cleaned out immediately after an oil, fuel or chemical spill.

What conditions can compromise the Jellyfish Filter's performance?

- If sediment accumulates beyond 12 inches in depth, filter cartridge life and sediment removal efficiency may be reduced.
- If filter cartridges become saturated with sediment, the system may not provide filtration treatment at the designed water quality flow rate, and unfiltered water may bypass the filter cartridges.
- If an oil spill(s) exceeds the oil capacity of the system, subsequent spills may not be captured and may cause fouling of the filter cartridges.
- If debris clogs the inlet of the system, removal efficiency of sediment, hydrocarbons, and gross pollutants may be reduced.
- If a downstream blockage occurs, a backwater condition may occur in the system and removal efficiency of sediment, hydrocarbons, and gross pollutants may be reduced.

What training is required?

The Jellyfish Filter is inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins. Since some of the maintenance procedures require manned entry into the Jellyfish structure, only professional maintenance service providers trained in confined space entry procedures should enter the vessel. Service provider companies typically have personnel who are trained and certified in confined space entry procedures according to local, state, and federal standards.

For typical inspection and maintenance activities, no specific supplemental training is required for the Jellyfish Filter. Information provided in this document or the Jellyfish Filter Owner's Manual contains sufficient guidance to maintain the system properly.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick or sampling tool
- Sediment probe
- Flashlight
- Camera
- Data log
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

How is the Jellyfish Filter inspected?

- The Jellyfish filter system can be inspected from the surface through the standard surface manhole access cover or custom doors.
- Sediment and oil depth inspections are performed with a sediment probe and oil dipstick. Sediment and oil depth are measured through the maintenance access wall.
- Visual inspection for floatable pollutant accumulation such as litter and hydrocarbons is also performed by shining a flashlight into the maintenance access wall.
- Visual inspection of the backwash pool (6-inch high kidney-shaped or oval-shaped

weir) should also be performed to check for standing water in the pool. If at least 12 hours of dry weather have elapsed since the most recent rainfall/runoff event and the backwash pool contains more than 3 inches of water, this condition indicates that the filter cartridges are saturated with sediment and should be cleaned or replaced.
- Inspections also involve a visual inspection of the internal components of the system for obvious damage.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal, if necessary
- Manhole access cover lifting tool
- Oil dipstick or sampling tool
- Sediment probe
- Flashlight
- Camera
- Data log
- Safety cones and caution tape
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required
- Replacement cartridges are required if manual cleaning and re-commissioning of existing cartridges is not possible or adequate to restore proper system function.
- Jellyfish Cartridge Backflush Pipe

How is the Jellyfish Filter maintained?

- The Jellyfish Filter can be maintained through the standard surface manhole access cover. All access covers should be removed to provide additional light and ventilation. If custom doors were installed instead of frames and covers, open all doors.
- If the filter cartridges are to be manually backflushed (see procedure below), perform the manual backflush service prior to vacuum removal of sediment, floatable, and water (i.e. perform the manual backflush with the lower chamber full of water).
- Insert the oil dipstick or sampling tool into the maintenance access wall. If oil is present, pump off the oil layer into separate containment using a small pump and tubing. Some maintenance service providers may elect to use the vacuum hose if the oil amount is small.
- Maintenance cleaning of accumulated floatable litter and sediment is performed with a vacuum hose inserted through the maintenance access wall.
- Using the vacuum hose, decant the water from the lower chamber to the sanitary sewer, if permitted by the local regulating authority, or into a separate containment tank.
- Remove the sediment from the bottom of the unit using the vacuum hose.
- For larger Jellyfish Filters, (8-ft, 10-ft, 12-ft diameter), complete sediment removal

may be facilitated by inserting a garden hose sprayer through a hole in the cartridge deck where a blank cartridge lid (no orifice in the cartridge lid) or filter cartridge has been removed. Use the garden hose sprayer to break up sediment on the bottom of vessel that is farthest from the maintenance access wall, being careful not to cut or otherwise damage the filter tentacle membranes with excessive water pressure. (Note: Use of a garden hose sprayer is recommended. Do not use a high pressure jet sprayer or power washer, as excessive water pressure may damage the filter tentacle membranes.) Rinse the loosened sediment toward the maintenance access wall for easy vacuum removal.

- To access the cartridge deck for manual cleaning or replacement of filter cartridges, descend the ladder that is built into structure's sidewall, observing all precautions for safe and proper confined space entry. Note that the cartridge deck may be slippery. Care should be taken to avoid stepping directly onto the backwash pool weir, as damage may result.
- A manual backflush of the cartridges is recommended to remove a high percentage of accumulated sediment from the filtration tentacles, restore flow capacity, and extend the service life of the cartridges. A Jellyfish Cartridge Backflush Pipe (12-inch diameter x 40-inch length aluminum pipe with flapper valve) may be purchased from Imbrium Systems that allows each cartridge to be selectively backwashed using water that is supplied from either (a) the previously decanted water stored in a vactor truck compartment; (b) clean water from a separate water truck delivered to the site; or (c) water from a nearby fire hydrant or other clean water source. NOTE: Manual backflushing of the cartridges is best performed with the lower chamber full of water (i.e. prior to vacuuming out the sediment, floatables, and water). This ensures that a uniform backflush pressure is applied across all of the filter media surface area.
- **Manual backflush procedure**: Twist the threaded cartridge lid on the cartridge receptacle counter-clockwise to remove the lid and expose the cartridge head. (**NOTE: Do not step directly onto an exposed cartridge head when a cartridge lid is removed, as excessive downward force may damage the cartridge receptacle and result in injury if the cartridge head is forced through the receptacle and into the lower chamber.**) Place the Jellyfish Cartridge Backflush Pipe over the cartridge receptacle such that the gasket on the bottom of the Backflush Pipe is seated on the rim of the cartridge receptacle. Fill the Backflush Pipe with water (approximately 16 gallons). Pull the cord to open the flapper valve and backflush the water through the cartridge. Refill the Pipe and backflush a second time. The full Pipe contents should drain down to the top of the open flapper valve (30 inches from the top of the Pipe) within approximately 15 seconds to remove a high percentage of accumulated sediment and restore the flow capacity of the cartridge. Remove the Pipe and re-install the lid hand-tight. For the most thorough backflushing, backflush the Draindown Cartridge(s) first, followed by the Hi-Flo Cartridges, then finish with a final single backflush on the Draindown Cartridge(s). (NOTE: The Hi-Flo Cartridges are those cartridges within the kidney-shaped 6-inch high backwash pool weir. The Draindown Cartridges are those cartridges outside the backwash pool weir. See the diagram below for reference.) When backflushing a cartridge, it is important to keep the lids in place on all other cartridges both as a safety precaution and so that water displaced from the lower chamber during backflushing is properly filtered when discharged to the top of the cartridge deck.

- **Optional manual rinsing procedure**: If manual backwashing using the Jellyfish Cartridge Backflush Pipe is ineffective in restoring adequate cartridge flow capacity, cartridges may be removed, manually rinsed, and re-commissioned. With the threaded cartridge lid removed, slowly and carefully remove the cartridge from the receptacle using the lifting loops in the cartridge head. (NOTE: Should a snag occur, do not force the cartridge upward as this may result in damage to the tentacles. Instead, gently rotate the cartridge with a slight sideways motion to clear the snag and remove the cartridge.) Remove the cartridge from the vessel, as rinsing is best performed outside the vessel. Immediately replace the lid on the exposed receptacle/hole as a safety precaution. Using a garden hose sprayer, direct the water spray at an angle across the tentacle membrane surface, starting at the top of the tentacle and working downward. For most effective rinsing, remove each tentacle from the cartridge head plate by unscrewing the attachment nut, and perform a 360 degree rinse of each tentacle. Re-attach the rinsed tentacles to the head plate and re-commission the cleaned cartridge. If manual rinsing cannot be performed, or if inspection upon rinsing indicates damage to the tentacles, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Imbrium Systems to order replacement tentacles.
- New cartridges are lightweight (less than 20 pounds), and can be easily lowered down to a worker on the cartridge deck. Care should be taken not to bend or otherwise damage the tentacles during the handling and installation procedures.
- For maximum safety, it is recommended that each cartridge be removed and replaced one at a time, such that there is never more than one cartridge receptacle/hole exposed.
- After vacuuming out sediment, floatables, and water, re-fill the lower chamber with water where required by the local jurisdiction.

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What is required for proper disposal?

- Disposal requirements for recovered pollutants and spent filter cartridges may vary depending on local guidelines. In most areas the sediment and spent filter cartridges, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.

What about oil spills?

- Petroleum-based pollutants captured by the Jellyfish Filter (oil/chemical/fuel spills) should be removed and disposed of by a licensed waste management company.
- Although the Jellyfish Filter captures virtually all free oil, a sheen at the outlet **does not** mean the unit isn't working. A rainbow or sheen can be visible at oil concentrations of less than 10 mg/L (ppm).

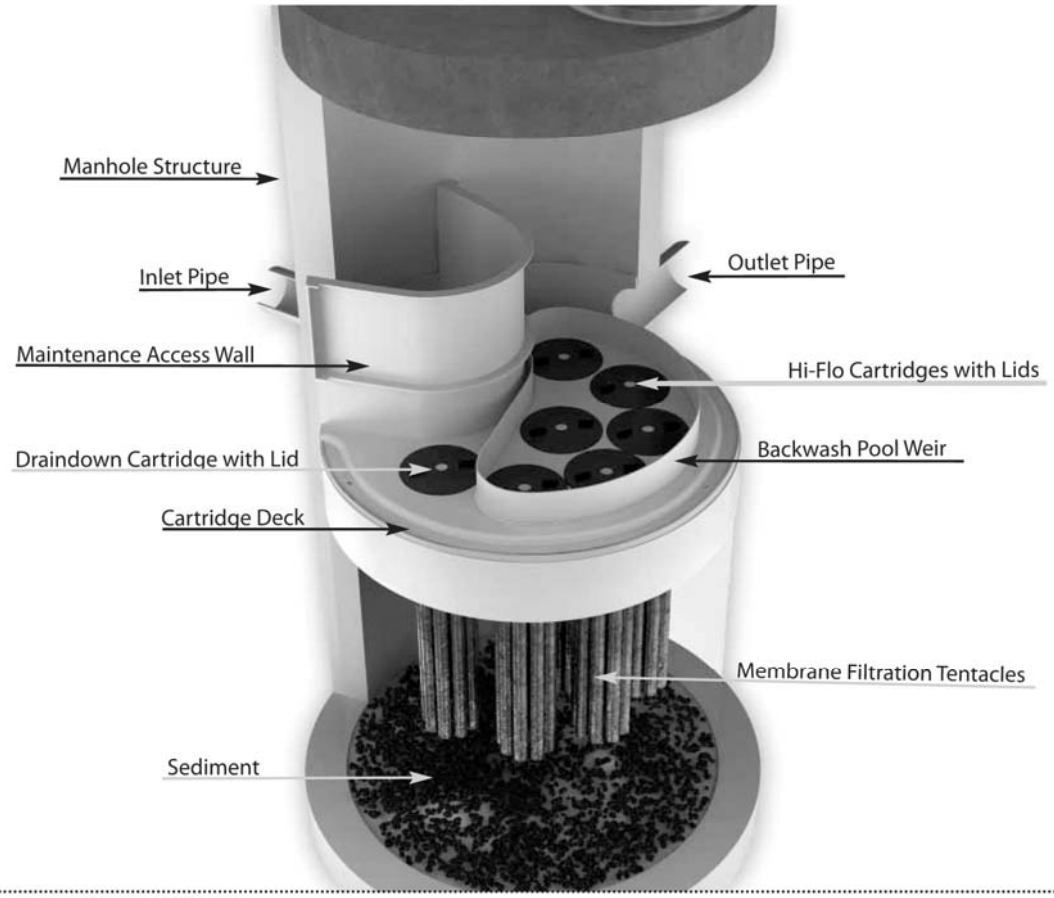
What factors affect the costs involved with inspection/maintenance?

- Inspection and maintenance costs are based on unit size, cartridge count, sediment/oil/hazardous material loads, transportation distances, tipping fees, disposal requirements and other local regulations. Maintenance costs are anticipated to be substantially lower in instances where dirty cartridges are manually cleaned and re-commissioned rather than replaced with new cartridges.

Below is a cut-away schematic of the Jellyfish Filter with key components identified (6-ft diameter manhole configuration is depicted).

FIGURE 1

Jellyfish Filter and Components

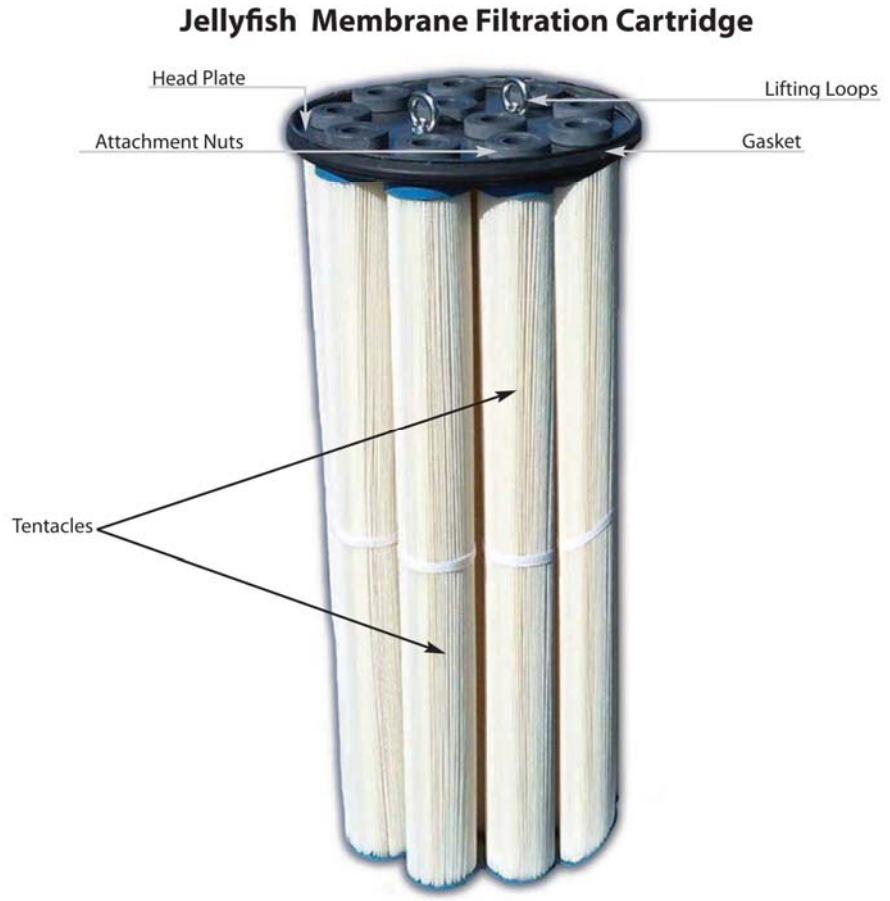


Note: Separator Skirt Not Shown

The Jellyfish Filter has no moving parts to wear out and therefore maintenance activities are generally focused on pollutant removal and filter cartridge service.

Below is a schematic of a Jellyfish Filter membrane filtration cartridge. The extraordinarily high surface area of the membrane filtration tentacles provides superior flow and sediment capacity as well as low head loss. Tentacles can be easily removed from the head plate and replaced.

FIGURE 2



The depth of sediment and oil can be measured from the surface by using a sediment probe or dipstick tube equipped with a ball check valve and inserted through the Jellyfish Filter's maintenance access wall. The large opening in the maintenance access wall provides convenient access for inspection and vacuum removal of water and pollutants.

A maintenance worker stationed on the surface uses a vacuum hose to evacuate water, sediment, and debris from the system.

The benefits of regular inspection and maintenance are many – from ensuring maximum operation efficiency, to keeping maintenance costs low, to the continued protection of natural waterways – and provide the key to the Jellyfish Filter's long and effective service life.

Ordering Replacement Parts

Jellyfish filter cartridges, replacement tentacles, cartridge lids, Jellyfish Cartridge Backflush Pipes (for manual backflushing), and other system components can be ordered by contacting:

Imbrium Systems Corporation
1-888-279-8826
www.imbriumsystems.com

(revised 3-28-12)

NJCAT TECHNOLOGY VERIFICATION

JELLYFISH® FILTER

Imbrium Systems Corporation

January 2012

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1. Introduction

1.1 New Jersey Corporation for Advance Technology (NJCAT) Program

NJCAT is a not-for-profit corporation to promote in New Jersey the retention and growth of technology-based businesses in emerging fields such as environmental and energy technologies. NJCAT provides innovators with the regulatory, commercial, technological and financial assistance required to bring their ideas to market successfully. Specifically, NJCAT functions to:

- Advance policy strategies and regulatory mechanisms to promote technology commercialization;
- Identify, evaluate, and recommend specific technologies for which the regulatory and commercialization process should be facilitated;
- Facilitate funding and commercial relationships/alliances to bring new technologies to market and new business to the state; and
- Assist in the identification of markets and applications for commercialized technologies.

The technology verification program specifically encourages collaboration between vendors and users of technology. Through this program, teams of academic and business professionals are formed to implement a comprehensive evaluation of vendor specific performance claims. Thus, suppliers have the competitive edge of an independent third party confirmation of claims.

Pursuant to N.J.S.A. 13:1D-134 et seq. (Energy and Environmental Technology Verification Program) the New Jersey Department of Environmental Protection (NJDEP) and NJCAT have established a Performance Partnership Agreement (PPA) whereby NJCAT performs the technology verification review and NJDEP certifies that the technology meets the regulatory intent and that there is a net beneficial environmental effect of the technology. In addition, NJDEP/NJCAT work in conjunction to develop expedited or more efficient timeframes for review and decision-making of permits or approvals associated with the verified/certified technology.

The PPA also requires that:

- The NJDEP shall enter into reciprocal environmental technology agreements concerning the evaluation and verification protocols with the United States Environmental Protection Agency, other local required or national environmental agencies, entities or groups in other states and New Jersey for the purpose of encouraging and permitting the reciprocal acceptance of technology data and information concerning the evaluation and verification of energy and environmental technologies; and

- The NJDEP shall work closely with the State Treasurer to include in State bid specifications, as deemed appropriate by the State Treasurer, any technology verified under the Energy and Environment Technology Verification Program.

1.2 Interim Certification

Imbrium Systems Corporation (Imbrium) is a leading provider of innovative stormwater treatment solutions, offering a variety of products, maintenance, laboratory, and engineering support to meet stormwater treatment needs. Imbrium's patented product, the Jellyfish® Filter, is a Best Management Practice (BMP) designed to meet federal, state, and local requirements for treating stormwater runoff in compliance with the 1972 Clean Water Act and NPDES Stormwater Amendments, and phosphorus TMDLs in critical or impaired watersheds. The Jellyfish® Filter is typically comprised of a manhole or vault configuration that houses a cartridge deck and multiple high surface area membrane filtration cartridges. The Jellyfish® Filter improves the quality of stormwater runoff before it enters receiving waterways through a combination of hydrodynamic separation pre-treatment followed by filtration to provide enhanced solids removal. (See Section 2 for an additional description of the technology.)

Imbrium received New Jersey Corporation for Advanced Technology (NJCAT) verification of claims for the Jellyfish® Filter in June 2008 and a Conditional Interim Certification was issued by NJDEP in February of 2009. A major condition of this Conditional Interim Certification was the execution of a field evaluation in accordance with the TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2006). Conditional Interim Certification was extended in September of 2011. A Quality Assurance Project Plan for the Field Evaluation was completed in May of 2010, resulting in the commencement of monitoring activities. The TARP Tier II Protocol is designed to evaluate Total Suspended Solids (TSS) removal on an annual basis. While other pollutant removal efficiencies may be measured during TARP Tier II testing they are not part of the protocol.

1.3 Applicant Profile

Imbrium Systems Corporation, 7564 Standish Place, Suite 112, Rockville, MD 20855, has been actively engaged in the stormwater treatment industry since the introduction of its Stormceptor® product in 1992. Originally established as the Stormceptor Group of Companies, in 2006 the company changed its name to Imbrium Systems. This name change was implemented as the company expanded research and development to deliver new technologies to the stormwater treatment industry.

Imbrium Systems is a global company with U.S. headquarters (Imbrium Systems Corporation) located in Rockville, Maryland and Canadian and International headquarters (Imbrium Systems Incorporated and Imbrium International Limited) located in Toronto, Ontario, Canada, with satellite offices located across North America.

Imbrium Systems is a wholly-owned business of Monteco Ltd. Monteco is a privately-held company headquartered in Toronto, Ontario which focuses on developing innovative clean-tech solutions for application in the air, water and energy industry sectors. Monteco supports its businesses with centralized corporate services including research & development, public relations, government affairs, marketing and communication, human resources and finance.

1.4 Key Contacts

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2. The Jellyfish® Filter

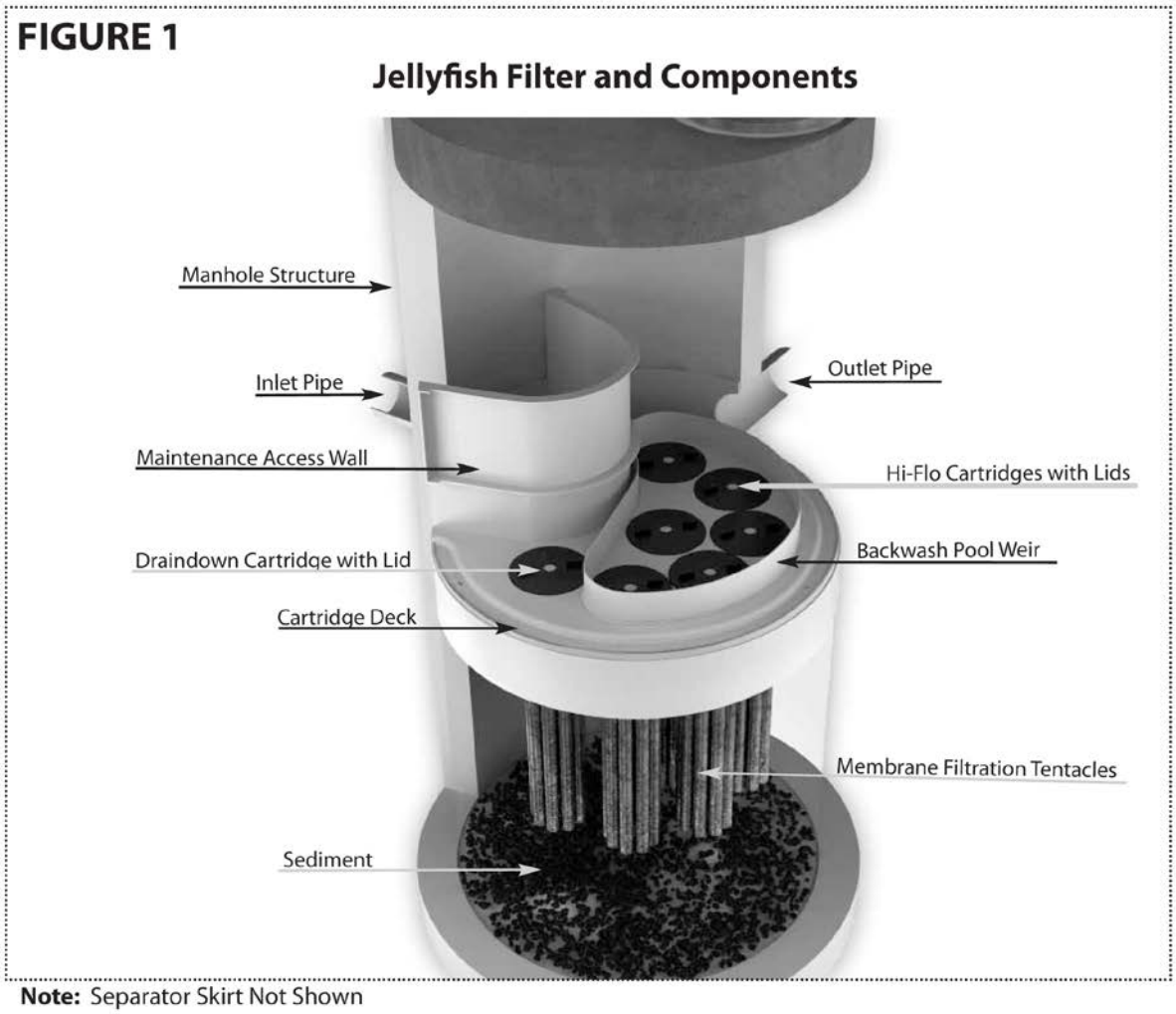
The Jellyfish® Filter is an engineered stormwater quality treatment technology that utilizes multiple lightweight membrane filtration cartridges in a compact stand-alone treatment system that removes a high level and wide variety of stormwater pollutants. The Jellyfish® Filter integrates pre-treatment and filtration with passive self-cleaning mechanisms. The system utilizes membrane filtration cartridges with very high filtration surface area and flow capacity, which provide the advantages of high sediment capacity and low filtration flux rate (flow per unit surface area) at relatively low driving head compared to conventional filter systems. Figure 1 shows the Jellyfish® Filter and its major components.

The cartridge deck contains a receptacle for each filter cartridge. The cartridge is lowered down into the receptacle such that the cartridge head plate and rim gasket rest on the lip of the receptacle. A cartridge lid is fastened onto the receptacle to anchor the cartridge. Each cartridge lid contains a flow control orifice. The orifice in the hi-flo cartridge lid is larger than the orifice in the draindown cartridge lid.

Jellyfish® Filter cartridges are designated as either hi-flo cartridges or draindown cartridges, depending on their placement position within the cartridge deck. Cartridges placed within the 6-inch (150 mm) high backwash pool weir that extends above the deck are automatically passively backwashed after each storm event and are designated as the hi-flo cartridges. Cartridges placed outside the backwash pool weir are not passively backwashed but facilitate the draindown of the backwash pool, and these are designated as the draindown cartridges. The design flow rate of a draindown cartridge is controlled by a cartridge lid orifice to one-half the design flow rate of a

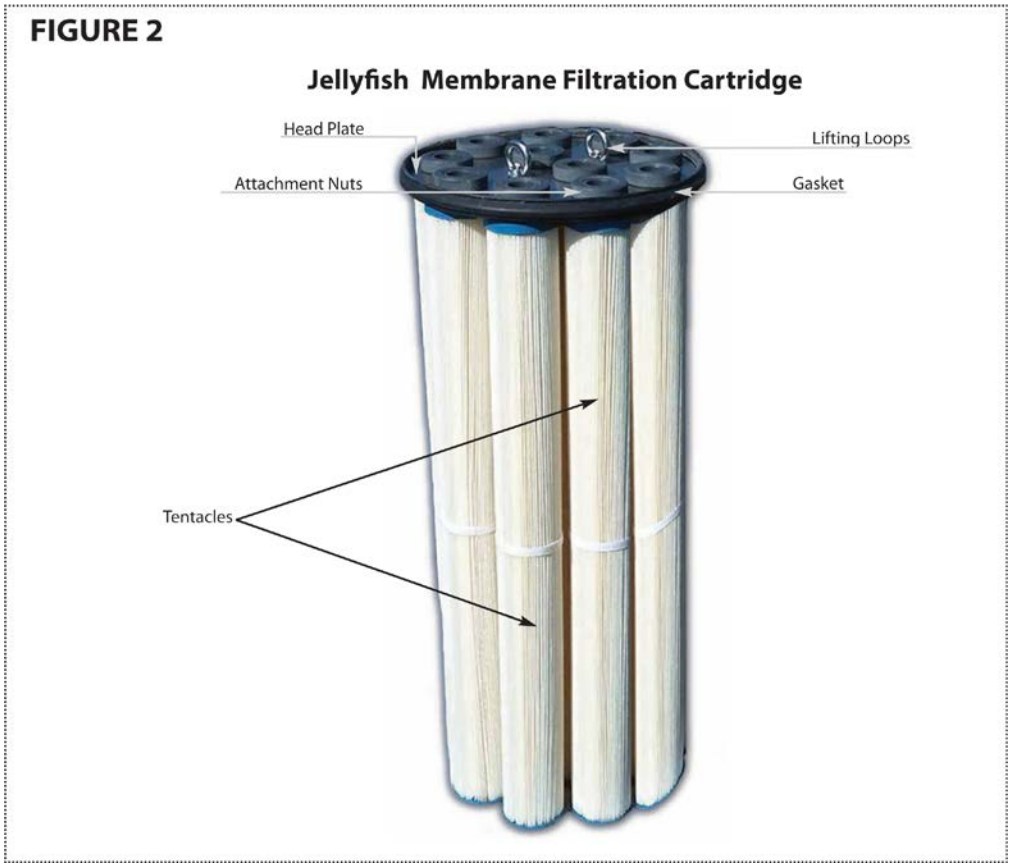
hi-flo cartridge of similar length. The lower design flow rate of the draindown cartridge reduces the likelihood of occlusion prior to scheduled maintenance.

Figure 1 Jellyfish® Filter and Components



Each cartridge consists of multiple removable filter elements ("filtration tentacles") attached to a cartridge head plate. Each filtration tentacle consists of a central perforated tube surrounded by a specialized membrane. The cylindrical filtration tentacle has a threaded pipe nipple at the top and is sealed at the bottom with an end cap. A cluster of tentacles is attached to a stainless steel head plate by inserting the top pipe nipples through the head plate holes and securing with removable nuts. A removable oil-resistant polymeric rim gasket is attached to the head plate to impart a watertight seal when the cartridge is secured into the cartridge receptacle with the cartridge lid. The cartridge length is typically either 27 inches (686 mm) or 54 inches (1372 mm), with options for custom lengths if required. A Jellyfish membrane filtration cartridge is depicted in Figure 2.

Figure 2 Jellyfish® Membrane Filtration Cartridge

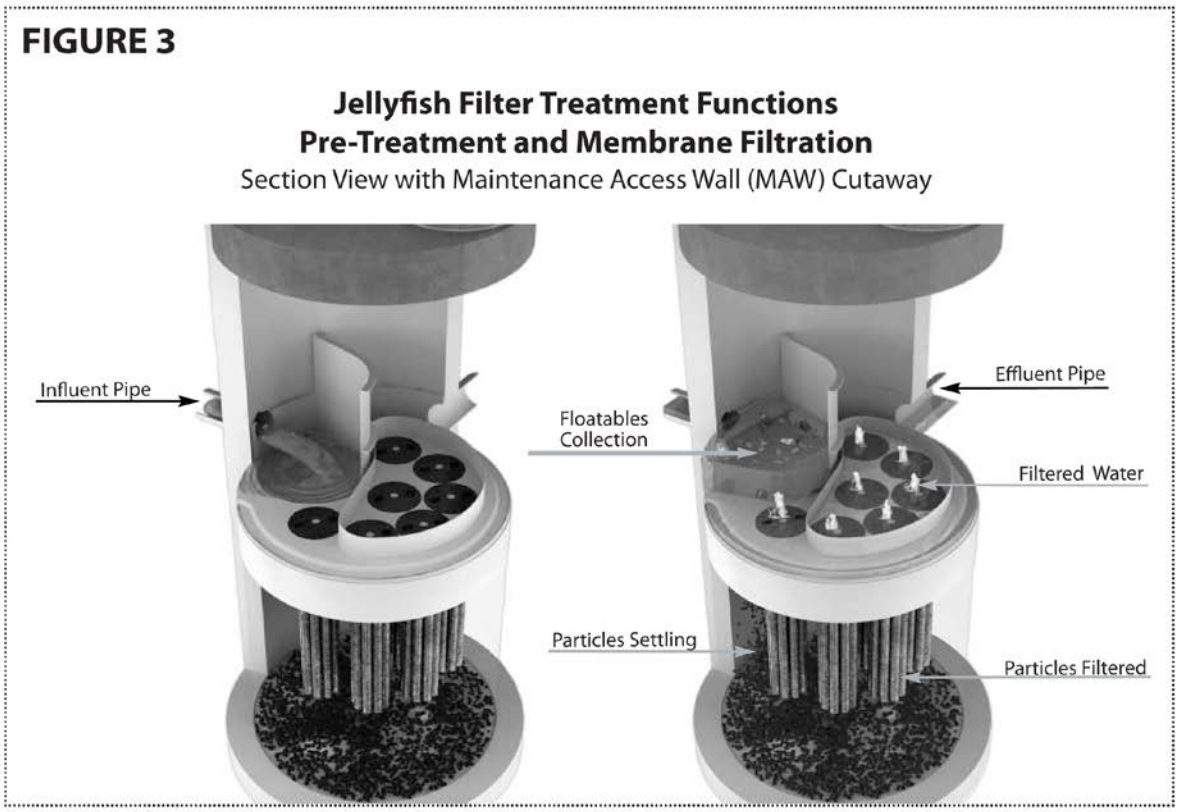


The filtration tentacle membranes provide an extremely large amount of surface area, resulting in outstanding flow capacity and suspended sediment removal capacity. A typical Jellyfish cartridge with eleven 54-inch (1372 mm) long filtration tentacles has 381 ft2 (35.4 m2) of membrane surface area. Hydraulic testing on a clean 54-inch (1372 mm) filter cartridge is discussed in **Appendix B**. In addition, the filtration tentacle membrane has anti-microbial characteristics to inhibit the growth of bio-film that might otherwise prematurely occlude the pores of the membrane and restrict hydraulic conductivity.

Inflow events with driving head ranging from less than 1 inch (25 mm) up to the maximum design driving head will cause continuous forward flow and filtration treatment through the draindown cartridges. Inflow events with driving head that exceeds the 6-inch (150 mm) height of the backwash pool weir will cause continuous forward flow and filtration treatment through the hi-flo cartridges. Typically, a minimum 18 inches (457 mm) of driving head is designed into the system but may vary from 12 to 24 inches (305 to 610 mm) depending on specific site requirements.

The Jellyfish® Filter provides both pre-treatment and membrane filtration treatment to remove pollutants from stormwater runoff. These functions are depicted in Figure 3 below.

Figure 3 Jellyfish® Filter Treatment Functions



Pre-treatment removes coarse sediment (particles generally > 50 microns), particulate-bound pollutants attached to coarse sediment (nutrients, toxic metals, hydrocarbons), free oil and floatable trash and debris. These pollutants are removed by gravity separation. Large, heavy particles fall to the sump (sedimentation) and low density pollutants rise to the surface (floatation) within the pre-treatment channel.

Membrane filtration treatment removes suspended particulates (generally < 50 microns) and particulate-bound pollutants (nutrients, toxic metals, and hydrocarbons). Laboratory and field performance testing of the Jellyfish® Filter have demonstrated capture of particulates as small as 2 microns. As a layer of sediment builds up on the external membrane surface, membrane pores are partially occluded which serves to reduce the effective pore size. This process, referred to as "filter ripening", significantly improves the removal efficiency of pollutants relative to a brand new or clean membrane. Filter ripening accounts for the ability of the Jellyfish® Filter to remove particles finer than the nominal pore size rating of the membranes.

The Jellyfish® Filter utilizes several self-cleaning processes to remove accumulated sediment from the external surfaces of the filtration membranes, including automatic passive backwash of the hi-flo cartridges, vibrational pulses, and gravity. Combined, these processes extend the cartridge service life and maintenance interval and reduce life-cycle costs.

Automatic passive backwash is performed on the hi-flo cartridge at the end of each runoff event and can also occur multiple times during a single storm event as intensity and driving head varies. During inflow, filtered water exiting the hi-flo cartridges forms a pool above the cartridge deck inside the backwash pool weir. The depth and volume of the back wash pool will vary with the available driving head, ranging from some minimal quantity up to a quantity sufficient to fill and overflow the backwash pool (typical weir height is 6 inches / 150 mm). As the inflow event subsides and forward driving head decreases, water in the backwash pool reverses flow direction and automatically passively backwashes the hi-flo cartridges, removing sediment from the membrane surfaces. Water in the lower chamber (below deck) is displaced through the draindown cartridges.

Vibrational pulses occur as a result of complex and variable pressure and flow direction conditions that arise in the space between the top surface of the cartridge head plate and the underside of the cartridge lid. During forward flow a stream of filtered water exits the top of each filtration tentacle into this space and encounters resistance from the cartridge lid and turbulent pool of water within the space. Water is forced through the cartridge lid flow control orifice with a pulsating fountain effect. The variable localized pressure causes pulses to transmit vibrations to the membranes, thereby dislodging accumulated sediment. The effect appears more pronounced at higher flow rates, and applies to both hi-flo and draindown cartridges.

Gravity continuously applies a force to accumulated sediment on the membranes, both during inflow events and inter-event dry periods. As fine particles agglomerate into larger masses on the membrane surface, adhesion to the membrane surface can lessen, and a peeling effect ensues which ultimately results in agglomerates falling away from the membrane. Complex chemical and biological effects may also play a role in this process.

Standard Models

The Jellyfish® Filter standard model numbers provide information about the manhole inside diameter (expressed in U.S. customary units) and cartridge counts for hi-flo and draindown cartridges. For example, Jellyfish Filter model number JF6-4-1 is a 6-ft diameter manhole with four hi-flo cartridges and one draindown cartridge. Standard model numbers assume the use of 54-inch (1372 mm) long cartridges. Specific designations for non-standard structures or cartridge lengths are noted in the Jellyfish Filter Owner's Manual published by Imbrium Systems and provided to system owners. For the field test that is the subject of this report a Jellyfish Filter JF4-2-1 was used, which is a 4-ft diameter manhole with two 54-inch long hi-flo cartridges and one 54-inch long draindown cartridge.

Design flow capacities and pollutant capacities for standard Jellyfish Filter manhole configurations are shown in Tables 1 and 2.

Table 1 Design Flow Capacities - Standard Jellyfish® Filter Configurations

Manhole Diameter (ft / m) [1]	Model No.	Hi-Flo Cartridges [2] 54 in / 1372 mm	Draindown Cartridges [2] 54 in / 1372 mm	Treatment Flow Rate (gpm / cfs)	Treatment Flow Rate (L/s)
Catch Basin		varies	varies	varies	varies
4 / 1.2	JF4-2-1	2	1	200 / 0.45	12.6
6 / 1.8	JF6-3-1	3	1	280 / 0.62	17.7
	JF6-4-1	4	1	360 / 0.80	22.7
	JF6-5-1	5	1	440 / 0.98	27.8
	JF6-6-1	6	1	520 / 1.16	32.8
8 / 2.4	JF8-6-2	6	2	560 / 1.25	35.3
	JF8-7-2	7	2	640 / 1.43	40.4
	JF8-8-2	8	2	720 / 1.60	45.4
	JF8-9-2	9	2	800 / 1.78	50.5
	JF8-10-2	10	2	880 / 1.96	55.5
10 / 3.0	JF10-11-3	11	3	1000 / 2.23	63.1
	JF10-12-3	12	3	1080 / 2.41	68.1
	JF10-12-4	12	4	1120 / 2.50	70.7
	JF10-13-4	13	4	1200 / 2.67	75.7
	JF10-14-4	14	4	1280 / 2.85	80.8
	JF10-15-4	15	4	1360 / 3.03	85.8
	JF10-16-4	16	4	1440 / 3.21	90.8
	JF10-17-4	17	4	1520 / 3.39	95.9
	JF10-18-4	18	4	1600 / 3.56	100.9
	JF10-19-4	19	4	1720 / 3.83	108.5
12 / 3.6	JF12-20-5	20	5	1800 / 4.01	113.6
	JF12-21-5	21	5	1880 / 4.19	118.6
	JF12-22-5	22	5	1960 / 4.37	123.7
	JF12-23-5	23	5	2040 / 4.54	128.7
	JF12-24-5	24	5	2120 / 4.72	133.8
	JF12-25-5	25	5	2200 / 4.90	138.8
	JF12-26-5	26	5	2280 / 5.08	143.8
	JF12-27-5	27	5	2360 / 5.26	148.9
Vault		varies	varies	varies	varies

[1] Smaller and larger systems may be custom designed
[2] Shorter length cartridge configurations are available

Table 2 Design Pollutant Capacities - Standard Jellyfish® Filter Configurations

Model Diameter (ft / m)	Wet Volume Below Deck (ft^3 / L)	Sediment Capacity [1] (ft^3 / L)	Oil Capacity [2] (gal / L)
Catch Basin	varies	varies	varies
JF4 4 / 1.2	82 / 2313	12 / 0.34	100 / 379
JF6 6 / 1.8	184 / 5205	28 / 0.79	224 / 848
JF8 8 / 2.4	327 / 9252	50 / 1.42	388 / 1469
JF10 10 / 3.0	511 / 14,456	78 / 2.21	608 / 2302
JF12 12 / 3.6	735 / 20,820	113 / 3.20	732 / 2771
Vault	varies	varies	varies

[1] Assumes 12 inches (305 mm) of sediment depth in sump. Systems may be designed with increased sediment capacity.
[2] Assumes 24 inches (610 mm) of pre-treatment channel depth for oil storage

3. Technology System Evaluation: Project Plan

3.1 Introduction

The TARP field test of Imbrium Systems' Jellyfish® Filter that is the primary subject of this report (Sansalone 2011) was conducted by the University of Florida Engineering School of Sustainable Infrastructure and Environment (UF-ESSIE) in Gainesville, Florida. Prior to initiating the field test at the University of Florida, the source area rainfall and pollutant characteristics and University analytical processes were reviewed with NJCAT and NJDEP and confirmed as acceptable for performing a TARP field study.

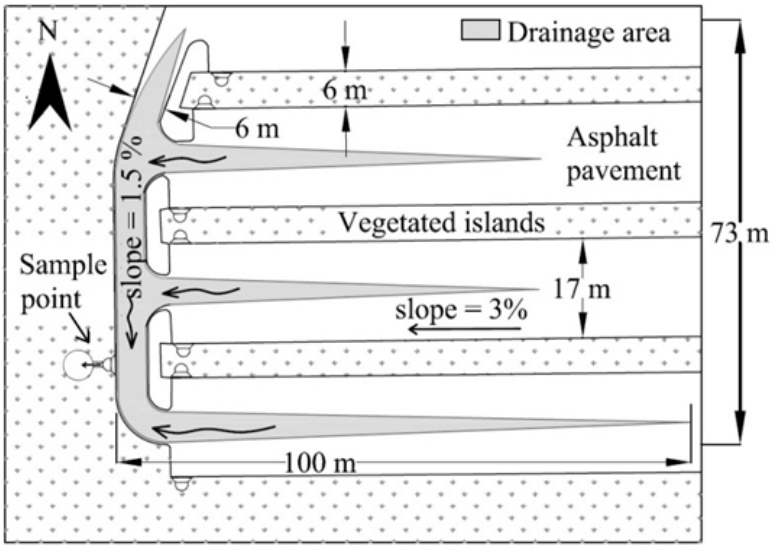
UF-ESSIE prepared a Quality Assurance Project Plan (QAPP) for the proposed field study. The QAPP was submitted to NJCAT for review and was subsequently approved. The QAPP adheres to guidelines established in EPA Requirements for Quality Assurance Project Plans (EPA QA/R-

5), the TARP Protocol for Stormwater Best Management Practice Demonstrations, and the Virginia Technology Assessment Protocol (VTAP) Guidance for Evaluating Stormwater Manufactured Treatment Devices.

3.2 Site and System Description

The Reitz Union parking lot at the University of Florida – Gainesville was the field study site. It is an asphalt-paved source area that functions as a primary parking facility for the University of Florida. The parking lot was built in the 1990s and is designed to provide adequate conveyance of runoff during wet weather events with storm runoff considered with respect to adequate surface drainage. Raised vegetated islands separate parking aisles and drain to the impervious asphalt-paved surface which drains by gravitationally-driven sheet flow to the curb and gutter leading to regularly-spaced catch-basins. The total area of the island is 24.39 % of the entire parking lot and the percentage of pavement is 75.61 %. The islands are mainly planted with magnolia trees, an occasional sycamore tree and grass. These catch-basins concentrate and collect gutter flow and provide entry of runoff into a storm sewer pipe system on the University of Florida campus. All the collected runoff discharges to Lake Alice about 2000 ft away from the parking lot. The combination of impervious asphalt pavement and raised vegetated islands, a very common design for surface parking across North America (Berretta and Sansalone 2011), provides substantial loads of nitrogen, phosphorus, metals, and particulate matter (PM) to runoff from the site.

Figure 4(a) illustrates the drainage for the contributing area and (b) provides an aerial view of the watershed.



4(b) Aerial photo of the Reitz Union surface parking facility at the University of Florida in Gainesville, illustrating the contributing drainage area and influent appurtenance (Inlet A) serving as the feed to the JF4-2-1. North is towards the top of the page. The NW intersection is Museum Road at Center Drive.

Depending on the storm event intensity and wind direction the drainage area can vary from 5,400 to 8,600 ft^2 (0.12 to 0.20 acres) of pavement. The catchment drains to inlet A as shown in Figure 4(b) and 4(a). Runoff captured by inlet A is the source of influent to the downstream Jellyfish Filter.

Data from a 2009 monitoring study (Berretta and Sansalone, 2011) at this identical test site was useful in the selection of a properly sized Jellyfish Filter for the site. The study included runoff flow rate data from 15 storm events. Two of those storms generated peak runoff flow rates that exceeded 200 gpm. Based on this actual historical data, the Jellyfish Filter model JF4-2-1 with 54-inch long filtration cartridges was installed for field testing. The JF4-2-1 is a 4-ft diameter manhole configuration with two hi-flo cartridges, each rated at 80 gpm, and a single draindown cartridge rated at 40 gpm, for a total Maximum Treatment Flow Rate (MTFR) of 200 gpm at 18 inches of driving head. The historical runoff data suggested that over the course of a minimum 20-storm monitoring campaign, several storms would generate peak flow rates that meet or

exceed the treatment unit's MTFR. This was indeed the case; two storms generated peak flow rates exceeding 200 gpm during the Jellyfish® Filter monitoring period.

Since the University required a temporary installation of the treatment unit, a fiberglass JF4-2-1 was provided and installed above-ground on a hillside just below the catchment area. The above-ground installation facilitated much easier site construction and minimal site disturbance, and provided advantages for the monitoring personnel in terms of access to sampling points and instrumentation, and direct observation of flow dynamics within the treatment unit. A profile view schematic of the site set-up is shown in Figure 5 and a corresponding photo in Figure 6. The unit was equipped with a side man-way to facilitate manual removal of accumulated PM as well as system inspection at the conclusion of the study.

The JF4-2-1 was configured with a below-deck inlet pipe and deflector plate, which are standard options for the Jellyfish Filter. The test unit contained a circular maintenance access pipe, a feature that has been replaced in later designs by a horseshoe-shaped maintenance access wall. The test unit also contained a pressure relief pipe that could potentially function as an internal bypass, however this feature was rendered nonfunctional by the installation of an external bypass. External bypass piping was configured around the unit such that influent flows attaining a water elevation exceeding 18 inches above deck elevation would be externally bypassed to the downstream drop box where effluent samples were taken. The invert of the horizontal run of bypass piping was set at 18 inches above deck elevation to insure that the design driving head of 18 inches was provided to the Jellyfish Filter. Top view photos of the JF4-2-1 cartridge deck are shown in Figures 7 and 8.

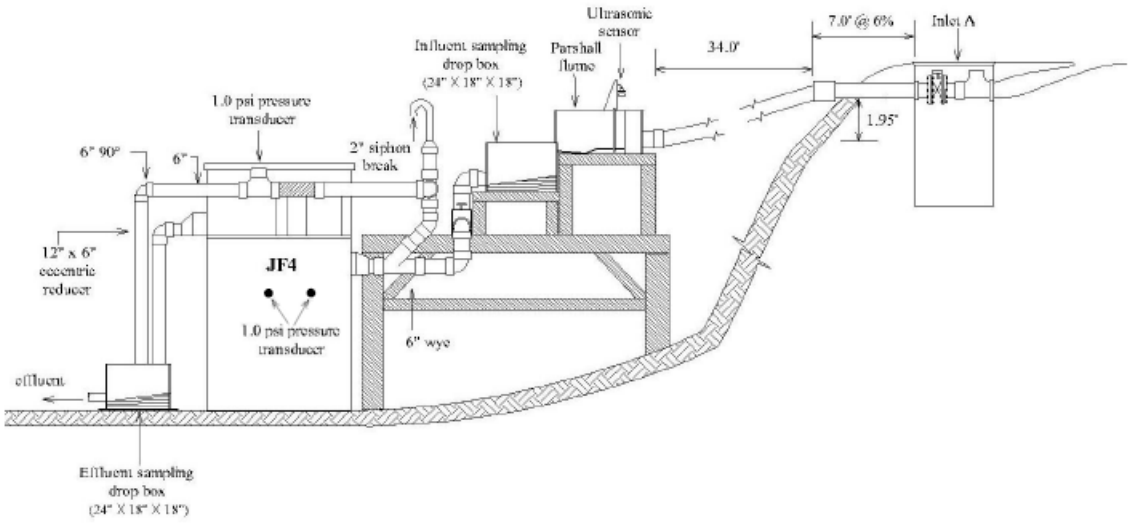


Figure 5 Profile view schematic of the field set-up for the Jellyfish® Filter JF4-2-1

Figure 6 Photo of field test set-up for the Jellyfish® Filter JF4-2-1. Below-deck inlet pipe enters the right side of the vessel and outlet pipe (invert at deck level) exits the left side of the vessel. External bypass piping has invert of horizontal section 18 inches above deck level.

Figure 7 Top view photos of the Jellyfish® Filter JF4-2-1 deck with two hi-flo cartridges and one draindown cartridge installed with cartridge lids off (upper left image) and cartridge lids on (upper right image). The backwash pool weir encloses the hi-flo cartridge. Also shown are the maintenance access pipe (large), pressure relief pipe (small), and the outlet opening (lower right in each image).

Figure 8 Top view photo of the Jellyfish® Filter JF4-2-1 during operation. Filtered water exits the cartridge lid orifice as a pulsating fountain.

3.3 Test Methods, Procedures and Equipment

Field monitoring system design for the Jellyfish® Filter JF4-2-1 included the following:

Monitoring and collection of rainfall-runoff were performed for 25 storm events. Runoff samples were collected manually on a time basis with physical, hydrologic and radar observations. Manual sampling with flow weighting was used. Samples of the whole influent and effluent flows were collected manually at 2-10 minute intervals, depending on storm duration. Manual sampling of the whole flow has a distinct advantage over auto-sampling of a small portion of the cross-section of flow, since sampling of the whole flow provides a more accurate representation of the actual pollutant load transported in the runoff. The flow rate at the time of sampling, and throughout the storm duration, was recorded automatically by the flowmeter, and therefore the flow volume is known for each time interval during the storm. Once the storm event ended, the samples taken at timed intervals across the hydrograph were transported to the laboratory and composited. Compositing was flow volume-weighted based on the volume of runoff corresponding to each respective time interval on the hydrograph. After compositing, analysis was performed.

During events, runoff was conveyed from the catchment to the treatment system after collection by catch basin inlet A. The distance from inlet A to the treatment system was 34 feet. Influent samples were collected at the influent drop box upstream of the treatment unit and effluent samples were collected at the effluent drop box downstream of the unit. The influent sample location was 4 feet upstream, and the effluent sample location was 2 feet downstream, of the unit.

Flow rate measurement utilized a 1 inch (25 mm) Parshall flume equipped with an ultrasonic sensor (model Shuttle Level Transmitter) connected to a data logger (model EasyLog EL-USB). Flow from the flume discharged into the influent drop box, creating a free well-defined discharge for representative manual sampling. The Parshall flume calibration curve is shown in Figure 9.

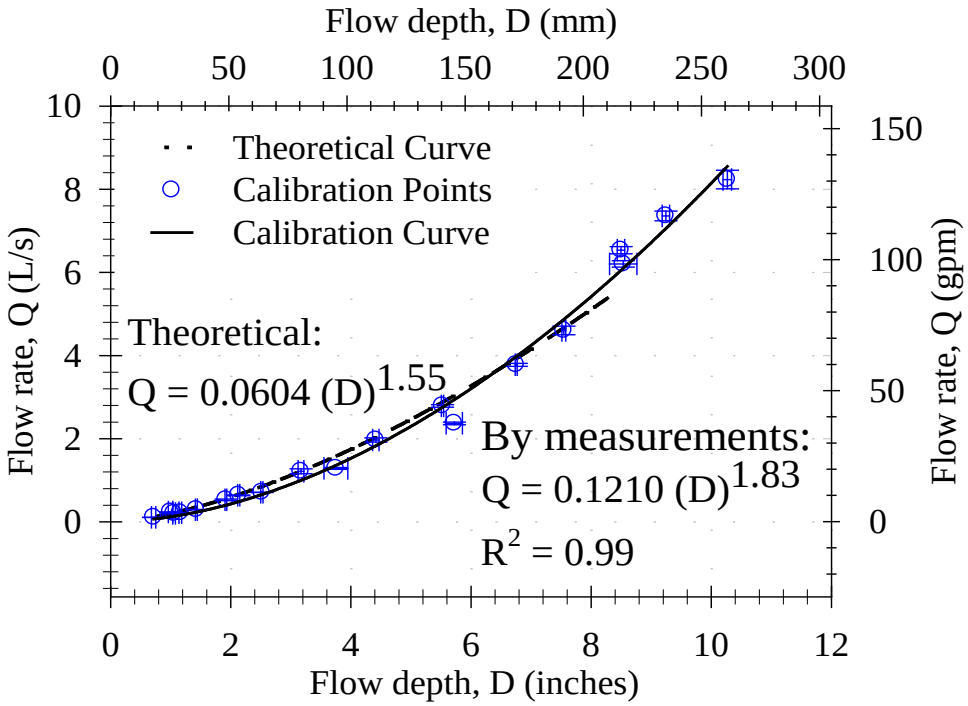


Figure 9 Parshall flume calibration curve

Rainfall measurement utilized a tipping bucket rain gauge manufactured by ISCO Inc. (0.01-inch bucket capacity) equipped with a data logger installed on the roof of the Unit Operations building located 150 meters south of the monitored site. Rainfall data were recorded every five minutes by the data logger.

Head loss measurements utilized monitoring of water pressure/elevation in the inlet and outlet pipes of the treatment unit with two 1-psi pressure transducers (model PDCR 1830 1 psig, manufactured by DRUCK Inc.) connected to a data logger (model CR1000, manufactured by Campbell Scientific Inc.).

pH, conductivity, and temperature measurement utilized a YSI 600XLM-M Multi-Parameter Water Quality Logger installed in the treatment unit's inlet for continuous automatic monitoring.

Sample analyses were performed in the University of Florida analytical labs, which is a NJDEP certified environmental laboratory. Samples were transported to the labs immediately after each storm and all time-sensitive analyses were performed within sample holding times. All samples were handled in accordance with chain-of-custody procedures and analyzed in accordance with Standard Method protocols. A summary of the analytical tests performed is given in Table 3.

Table 3 Summary of Analytical Tests

	Analysis	Test Methods
Water Chemistry Analysis	pH	S.M[1].4500-H^+ B
	Conductivity/TDS/Salinity	S.M.2510
	Oxidation-Reduction Potential	S.M.2580
	Temperature	S.M.2550
	Alkalinity	S.M.2320
Particulate Matter (PM) Analysis	Sediment PM	Sansalone and Kim., (2008)[2]
	Settleable PM	S.M.2540-F
	Suspended PM (as TSS)	S.M.2540-D
	Volatile Suspended PM (VSS)	S.M.2540-E
	Total PM (as SSC)	ASTM D-3977-97
	Turbidity	S.M.2130
	PSD	S.M.2560-D
Phosphorus Analysis	Total Phosphorus (TP)	S.M.4500-P-B Acid Hydrolysis
Nitrogen Analysis	Total Nitrogen (TN)	Persulfate Digestion Method
Metals Analysis	Total Metals (Cu, Cr, Pb, Zn)	S.M.3030 B
Oil and Grease	Total O&G	S.M. 5520
COD	Total COD	Reactor Digestion Method
	Dissolved COD	Reactor Digestion Method

[1]S.M.: Standard Method

[2]J. Sansalone and J-Y Kim, "Transport of Particulate Matter Fractions in Urban Source Area Pavement Surface Runoff", ***J. Environmental Quality***, 37:1883–1893 2008.
[2]J-Y Kim and J. Sansalone, "Event-Based Size Distributions of Particulate Matter Transported During Urban Rainfall-Runoff Events", ***Water Research***, 42(10-11), 2756-2768, May 2008.

3.4 Hydraulic Testing of the Jellyfish® Filter JF4-2-1

Extensive hydraulic testing was conducted at the University of Florida on a new clean 54-inch long Jellyfish® filtration cartridge with various orifice sizes in the cartridge lid. Hydraulic testing was also conducted on the Jellyfish® Filter JF4-2-1 with the standard 70 mm lid orifice on each of the two hi-flo cartridges and the standard 35 mm lid orifice on the single draindown cartridge, and was performed on the system with clean cartridges prior to commissioning as well as with dirty cartridges at the conclusion of the monitoring period (25 monitored storm events and 15 inches of cumulative rainfall).

3.5 Stormwater Data Collection Requirements

Of the 25 qualifying storm events sampled between May of 2010 and June of 2011: 1) the total rainfall was equal to or greater than 0.1 inch for all storm events sampled, 2) the minimum inter-event period was greater than 10 hours for all storm events sampled, 3) flow-weighted composite samples covered 100% of total storm flow for all storm events sampled, 4) the minimum influent/effluent samples collected in the storm events was 8 and the average number of influent samples collected per storm event was 11.1 and the average number of effluent samples per storm event was 10.5, 5) the total sampled rainfall was 15.01 inches, 6) three events

exceeded 75% of the design treatment capacity, while two of these events exceeded the design treatment capacity (>100%), and 7) TSS-SM and SSC data were collected for all storm events sampled. All of the events qualified to strict interpretation of the stormwater data collection requirements as per New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2006) and the NJDEP interpretation of TARP (2003). (**Tables 4** and **5)**

4. Technology System Performance

4.1 Data Quality Assessment

Data were analyzed using statistical methods in accordance with guidelines in the **TARP Protocol for Stormwater Best Management Practice Demonstrations** and the **VTAP Guidance for Evaluating Stormwater Manufactured Treatment Devices**. Data were examined by statistical and regression analysis, ANOVA statistics, non-parametric analysis, correlations, probability distributions of data, normality testing, standards, and physical data replication.

Data integrity in the laboratory was addressed in a multi-level review process for all analyses conducted. The initial step in this review process was conducted by each lab analyst as tests were conducted. Calibration values and procedures were checked against previous tests to alert the analyst in case of malfunction in equipment or test errors.

The second level of review was conducted by the lab director who collected results and entered these values into the tabular spreadsheets for each test. Each of the results was checked for accuracy of input as well as to appropriateness for the samples which were analyzed. All results were overseen or conducted personally by the lab manager. All preliminary calculations were reviewed. The final level of review was conducted by the project manager who reviewed all results generated within the laboratory.

4.2 Test Results

Hydrology

Event-based hydrologic indices including previous dry hours (PDH), event duration, peak flow rate, median flow rate, mean flow rate, total runoff volume, rainfall depth, initial pavement residence time (IPRT), and runoff coefficient were monitored for a total of 25 TARP and VTAP qualifying storm events occurring over the 13-month period spanning May 28, 2010 to June 27, 2011. Cumulative rainfall depth was 15.01 inches. Data are shown in **Tables 4** and **5**. Individual storm event summaries with hydrographs and hyetographs are detailed in **Appendix A**.

Monitored storm events across the field test program varied in duration from 26 to 691 minutes. Previous dry hours range from 10 to 910 hours. Rainfall ranged from 0.10 to 1.98 inches. IPRT ranged from 1 to 34 minutes. Runoff volume ranged from 54 to 3495 gpm. Maximum rainfall intensity ranged from 0.2 to 5.4 in/hr. Maximum runoff flow rate ranged from 7 to 226 gpm, median flow rate ranged from 0.7 to 87gpm. Two storms (July 15 and August 1) generated peak flow rates that exceeded the Maximum Treatment Flow Rate of 200 gpm for the Jellyfish Filter JF4-2-1.

Table 4 Monitored rainfall-runoff event hydrologic data

Event Date	t_{rain} (min)	d_{rain} (in)	$i_{rain-max}$ (inch/hr)	IPRT (min)	V_{inf} (gal)	V_{eff} (gal)	Runoff Reduction %	Q_p (gpm)	Q_{med} (gpm)	n_{inf}	n_{eff}	TARP& VTAP Qualified
28 May 2010	112	0.81	3.0	10	1972	974	51%	68	15.5	19	8	Yes
16 June	61	0.63	2.4	18	1323	1234	7%	85	10.3	11	10	Yes
21 June	43	0.92	4.8	6	2297	2238	3%	118	86.7	10	10	Yes
30 June	50	0.52	3.0	8	1442	1410	2%	145	52.3	11	11	Yes
15 July	28	0.38	3.6	8	953	872	8%	210	22.9	10	10	Yes
1 August	36	1.18	5.0	5	3163	3089	3%	226	75.1	10	10	Yes
6 August	104	0.14	2.0	5	368	271	27%	108	0.2	10	8	Yes
7 August	48	0.34	2.4	7	693	672	3%	131	6.8	10	10	Yes
23 August	42	0.11	0.6	20	82	51	38%	20	0.2	10	10	Yes
12 September	52	0.27	2.0	18	434	399	8%	61	1.6	10	10	Yes
26 September	78	0.14	0.2	1	298	221	26%	7	4.1	10	10	Yes
27 September	388	0.60	3.6	20	1015	996	2%	173	0.7	10	10	Yes
4 November	43	0.19	1.8	5	263	135	49%	56	1.8	10	10	Yes
16 November	34	0.13	1.0	8	81	44	46%	28	0.3	11	11	Yes
5 January 2011	125	0.84	4.2	3	1532	1309	15%	117	2.6	10	10	Yes
10 January	26	0.20	3.6	4	298	277	7%	53	0.2	8	8	Yes
25 January	389	1.74	0.7	5	3273	3268	0%	65	6.2	10	10	Yes
7 February	306	1.29	1.2	8	3495	3420	2%	35	12.1	11	11	Yes
9 March	691	1.15	0.6	10	2656	2594	2%	50	1.6	12	12	Yes
28 March	66	0.10	1.3	7	138	112	19%	16	0.9	12	10	Yes
30 March	179	0.60	3.0	34	979	973	2%	89	1.6	12	12	Yes
20 April	61	0.14	0.6	9	54	30	44%	52	0.1	12	12	Yes
14 May	295	1.98	5.4	5	2974	2830	2%	119	0.4	19	19	Yes
6 June	69	0.16	0.9	4	254	194	24%	25	0.1	10	10	Yes
27 June	50	0.45	1.7	2	894	840	6%	53	2.0	10	10	Yes
Sum		15.0			30,830	28,453						

Difference between influent and effluent volume: 30,830 – 28,453 = 2,407 gal.

PDH: Previous dry hours
t_{rain}: Event duration
d_{rain}: Rainfall depth
$i_{rain-max}$: Maximum rainfall intensity
IPRT: Initial pavement residence time
V_{runoff}: Runoff volume
Q_p: Maximum flow rate
Q_{med}: Median flow rate
n_{inf}: Number of influent samples
n_{eff}: Number of effluent samples
CRD: Cumulative rainfall depth

Table 5 Rainfall-runoff data collection requirements

Event Date	Sampling Coverage (nearest 10%)	Number of Composited samples	d_{rain} (in)	PDH (hr)	V_{runoff} (gal)	Q_p (gpm)	% of Treatment Design at Q_p	TARP& VTAP Qualified
28 May 2010	100	27(19i) (8e)	0.81	96	1972	68	34	Yes
16 June	100	21(11i) (10e)	0.63	288	1323	85	43	Yes
21 June	100	20(10i) (10e)	0.92	96	2297	118	59	Yes
30 June	100	22(11i) (11e)	0.52	288	1442	145	72	Yes
15 July	100	20(10i) (10e)	0.38	96	953	210	105	Yes
1 August	100	20(10i) (10e)	1.18	24	3163	226	113	Yes
6 August	100	18(10i) (8e)	0.14	120	368	108	54	Yes
7 August	100	20(10i) (10e)	0.34	24	693	131	65	Yes
23 August	100	20(10i) (10e)	0.11	48	82	20	10	Yes
12 September	100	20(10i) (10e)	0.27	172	434	61	30	Yes
26 September	100	20(10i) (10e)	0.14	40	298	7	4	Yes
27 September	100	20(10i) (10e)	0.60	10	1015	173	87	Yes
4 November	100	22(11i) (11e)	0.19	910	263	56	28	Yes
16 November	100	22(11i) (11e)	0.13	286	81	28	14	Yes
5 January 2011	100	20(10i) (10e)	0.84	72	1532	117	58	Yes
10 January	100	16(8i) (8e)	0.20	106	298	53	26	Yes
25 January	100	20(10i) (10e)	1.74	365	3273	65	32	Yes
7 February	100	22(11i) (11e)	1.29	12	3495	35	18	Yes
9 March	100	24(12i) (12e)	1.15	79	2656	50	25	Yes
28 March	100	22(11i) (11e)	0.10	438	138	16	8	Yes
30 March	100	24(12i) (12e)	0.60	48	979	89	44	Yes
20 April	100	24(12i) (12e)	0.14	196	54	52	26	Yes
14 May	100	38(19i) (19e)	1.98	188	2974	119	60	Yes
6 June	100	20(10i) (10e)	0.16	541	254	25	12	Yes
27 June	100	20(10i) (10e)	0.45	88	894	53	27	Yes
Sum			15.01		30,830			

("i" stands for influent, "e" stands for effluent)

Particle Size Distributions

Particle size distribution was analyzed for all 25 storm events using laser diffraction and M1e scattering theory (Dickenson and Sansalone 2009, Garofalo and Sansalone 2011). The % finer by mass, d_{10}, d_{50}, and d_{90}, are shown in **Table 6**. The d_{50} represents the particle diameter for which 50 percent of the particles by mass are smaller than or the same size as that diameter. Similarly, the d_{10} and the d_{90} represent the particle diameters for which 10 and 90 percent of the particles by mass are smaller than or the same size as those diameters. For the 25 events monitored in this study, influent runoff d_{10} ranges from 2 to 54 µm with a median of 9 µm. Effluent runoff d_{10} ranges from <1 to 2 µm with a median of 1 µm. Influent runoff d_{50} ranges from 22 to 263 µm with a median of 82 µm. Effluent runoff d_{50} ranges from 1 to 11 µm with a median of 3 µm. Influent runoff d_{90} ranges from 173 to 1016 µm with a median of 401 µm. Effluent runoff d_{90} ranges from 2 to 52 µm with a median of 12 µm.

Recognizing that intensity is only one parameter (others are deposition, volume, previous dry hours) impacting the complexity of transport, it was generally observed that larger particles were mobilized during the more intense rain events of 14 May 2011, 21 June and 1 August 2010, with peak rainfall intensities of 5.4, 4.8 and 5.0 in/hr (137.2, 121.9, and 127.0 mm/hr) and median flows of 0.4, 87 and 75 gpm (0.02, 5.4 and 4.7 L/s), respectively;. The 21 June event had the largest influent d_{10} and d_{50} values of 54 and 263 µm, respectively. The least intense events were 23 August, 26 September, 2010, 9 March and 20 April, 2011 with peak rain intensities of 0.6, 0.2, 0.6 and 0.6 in/hr (15.0, 5.1, 15.0 and 15.0 mm/hr) and median flow rates of 0.2, 4.1,1.6 and 0.1 gpm (0.01, 0.26, 0.1 and 0.006 L/s), respectively. The 20 April 2011 event had the smallest influent d_{10} and d_{50} values of 0.3 and 1 µm, respectively.

Particulate Matter Fractions and Removal Efficiency

Removal efficiencies for event-based particulate matter (PM) fractions including Turbidity, PM < 25µm, TSS, PM < 500 µm, PM < 1000 µm, PM < 2000 µm, and SSC were measured for the 25 storm events as shown in **Table 7** and **Table 8**. Detailed procedures of the physical granulometric separation are in Sansalone and Kim (2008), Kim and Sansalone (2008) and Sansalone et. al.(2009).

For the 25 qualifying storms, TSS removal efficiency ranged 71-98% with a median of 89%, and SSC removal efficiency ranged 89-100% with a median of 99%. Turbidity removal efficiency ranged 34-98% with a median of 85%. Influent runoff turbidity ranged from 5 to 171 NTU with a median of 33 NTU. Effluent runoff turbidity ranged from 1 to 14 NTU with a median of 5 NTU.

Total Phosphorus and Total Nitrogen

The event-based concentrations of Total Phosphorus (TP) and Total Nitrogen (TN) for the 25 events are presented in **Table 9**. For the 25 qualifying storms, TP removal efficiency ranged from 11-92% with a median of 59%. TN removal efficiency ranged from (-11) to 88% with a median of 51%.

Total Metals

The event-based influent and effluent concentrations and removal efficiencies of Total Chromium, Total Copper, Total Lead, and Total Zinc for the 25 events are presented in **Table 10**. For the 25 qualifying storms, Total Chromium removal efficiency ranged from (-24) to 98%

with a median of 36%. Total Copper removal efficiency ranged from 55 to 100% with a median of 90%. Total Lead removal efficiency ranged from (-27) to 100% with a median of 81%. Total Zinc removal efficiency ranged from 4 to 99% with a median of 70%.

Negative Percent Removal Rates

For treatment devices that are not designed to remove the dissolved fraction of constituents such as nutrients and metals, it is not unusual to observe a negative percent removal for such pollutants for some of the treated storms during a monitoring campaign. The JF4 is designed to remove PM and the associated particulate-bound fraction of such constituents. Within a storm flow, and within a treatment unit such as the JF4, there is a complex and dynamic combination of chemical, biological, and physical (advection and dispersion) as well as kinetics phenomena that affect the partitioning of constituents between the particulate-bound and dissolved phases. In most urban areas the source materials for nutrients are anthropogenic or biogenic PM that partition into solution as a function of time

There is a hetero-disperse distribution of PM sizes in the influent. Each of these PM size fractions has an initial concentration [mg/g] of particulate-bound nitrogen, phosphorus, or metal associated with it. This concentration varies by PM size fraction due to the varying surface area per unit mass of different PM size fractions. The kinetics of partitioning is such that there is a mass transfer of nitrogen, phosphorus, or metal from the particulate-bound phase to the dissolved phase when the flow enters a treatment unit. The process of partitioning occurs in the opposite direction as well, back to the particulate-bound phase that favors a higher concentration of constituent on the smaller PM fractions that have higher surface area per unit mass. In this way the finer suspended and colloidal PM fractions become preferentially enriched. These enriched fine PM size fractions are more readily flushed from any treatment unit by subsequent intra-event flows and subsequent storms (inter-event re-distribution keeps occurring).

Additionally, all treatment units sustain varying microbial populations, and microbial cells are both enriched with nitrogen and of a small size; by comparison in the fine suspended-size range and of a specific gravity not much greater than 1.0. High microbe concentration eluted in the effluent, relative to the influent, would therefore tend to decrease the percent removal of nitrogen and in part depend on the hydrology, inter-event microbial competition and water chemistry within the treatment unit. In comparison, phosphorus has much more rapid kinetics than TN and partitions back to PM, typically of a larger size range and of much more inorganic nature and therefore with a specific gravity in the range of 2 to 2.7. As a consequence the JF4 demonstrates a significantly higher removal for TP across the entire monitoring campaign and does not exhibit any event-based negatives. While there is phosphorus uptake by the microbial population, once phosphorus re-partitions back to the PM size distribution, TP is far more stable, less leachable, less reactive through microbial mediation, and less mobile as compared to TN in such a complex and temporally-varying environment of a treatment unit.

Table 6 Event-based particle size distributions (PSD)

Event Date	Influent PSD (µm)			Effluent PSD (µm)		
	d_{10}	d_{50}	d_{90}	d_{10}	d_{50}	d_{90}
28 May 2010	7	69	915	2	11	34
16 June	28	242	1016	1	6	16
21 June	54	263	769	1	6	34
30 June	8	75	271	1	5	17
15 July	40	225	628	2	6	17
1 August	26	213	693	2	6	17
6 August	16	231	984	1	3	18
7 August	19	186	737	1	4	12
23 August	14	190	714	2	4	40
12 September	9	89	328	1	2	8
26 September	4	35	173	1	3	52
27 September	15	136	723	1	3	11
4 November	3	68	401	1	2	9
16 November	5	51	610	1	2	12
5 January 2011	15	110	794	1	3	12
10 January	8	117	227	1	2	6
25 January	7	63	308	0	1	2
7 February	7	68	369	1	3	18
9 March	6	57	278	1	3	7
28 March	4	32	200	1	3	8
30 March	6	44	176	1	3	7
20 April	2	22	310	0	1	8
14 May	10	80	705	1	3	8
6 June	10	99	345	1	2	7
27 June	10	82	310	1	6	14
Mean	13	114	519	1	4	16
Median	9	82	401	1	3	12
Std. dev.	12	74	270	0	2	12

Table 7 Removal efficiencies for particulate matter (PM) fractions

Event Date	PM < 25 µm			TSS			%Volatile		Particulate Matter, PM Fractions							SSC		
									< 500 µm			< 1000 µm		< 2000 µm				
	EMC_i [mg/L]	EMC_e [mg/L]	PR (%)	EMC_i [mg/L]	EMC_e [mg/L]	PR (%)	EMV_i (%)	EMV_e (%)	EMC_i [mg/L]	EMC_e [mg/L]	PR (%)	EMC_i [mg/L]	EMC_e [mg/L]	EMC_i [mg/L]	EMC_e [mg/L]	EMC_i [mg/L]	EMC_e [mg/L]	PR (%)
28 May 2010	43.7	11.9	87	89.3	18.7	90	49.0	59.8	261.0	11.3	96	383.4	13.3	525.0	15.4	532.3	15.4	99
16 June	40.2	19.7	53	79.3	21.7	74	34.9	73.6	240.4	13.9	94	534.9	16.0	868.2	18.1	1401.7	18.1	99
21 June	18.4	9.9	48	105.5	15.2	86	21.3	72.6	209.2	5.5	97	374.6	6.5	556.2	7.4	1162.9	7.4	99
30 June	12.2	5.8	53	25.2	7.4	71	15.9	66.9	233.8	4.0	98	289.5	4.7	345.8	5.4	444.5	5.4	99
15 July	23.7	6.9	73	91.8	8.3	92	25.3	34.1	276.6	6.4	98	451.2	7.4	640.7	8.4	812.2	8.4	99
1 August	18.5	6.9	64	130.2	15.4	89	70.5	52.7	83.9	5.5	93	120.6	6.6	161.0	7.7	245.1	7.7	97
6 August	48.0	12.1	82	77.5	15.0	86	51.3	0.3	95.3	5.4	94	145.1	6.4	203.3	7.3	308.4	7.3	98
7 August	13.1	7.0	49	45.3	12.2	74	42.3	30.8	25.0	10.8	57	37.2	12.4	50.6	13.9	117.1	13.9	89
23 August	38.3	5.0	92	74.2	8.2	93	69.1	46.9	265.1	3.5	99	392.6	4.1	532.8	4.7	555.8	4.7	100
12 September	45.2	11.6	76	91.2	15.7	84	56.3	40.7	106.0	4.6	96	143.2	5.2	183.4	5.8	261.5	5.8	98
26 September	11.2	2.2	85	16.3	4.7	79	58.5	80.0	61.3	3.8	94	84.1	4.4	107.0	5.0	117.9	5.0	97
27 September	44.5	5.0	89	51.1	3.2	94	55.1	37.9	312.2	4.7	98	484.7	5.3	669.8	6.0	765.1	6.0	99
4 November	93.6	6.7	96	39.9	4.2	95	46.2	53.0	226.5	8.3	96	294.1	9.3	367.5	10.4	477.1	10.4	99
16 November	119.6	9.2	96	261.0	11.8	98	42.6	11.4	303.5	11.9	96	409.8	12.0	524.8	12.2	543.6	12.2	99
5 January 2011	68.6	13.0	84	152.2	15.9	91	69.4	52.2	170.6	6.7	96	234.6	7.7	307.3	8.7	693.2	8.7	99
10 January	20.7	3.1	86	80.7	6.6	92	68.0	24.8	86.1	2.4	97	131.5	2.7	179.4	3.0	211.1	3.0	99
25 January	32.3	3.5	89	69.8	7.1	90	68.1	30.1	48.1	3.7	92	64.8	3.9	82.4	4.1	105.8	4.1	96
7 February	20.4	4.4	79	34.8	5.3	85	75.8	54.5	128.7	6.3	95	202.7	6.9	285.9	7.6	438.3	7.6	98
9 March	22.0	4.3	81	30.5	8.3	73	57.8	31.2	29.4	2.3	92	38.8	2.6	48.7	2.8	78.2	2.8	97
28 March	56.5	11.6	84	68.4	12.7	86	54.5	24.8	64.8	3.5	95	83.3	4.5	102.8	5.6	102.8	5.6	96
30 March	44.9	5.1	89	104.5	7.3	93	60.2	5.6	206.7	5.7	97	278.6	6.5	361.6	7.3	443.7	7.3	98
20 April	65.7	7.9	93	143.7	11.4	96	44.7	22.8	343.0	4.6	99	466.5	5.3	606.7	6.1	921.7	6.1	100
14 May	33.9	11.3	67	77.1	12.5	84	65.7	10.2	255.9	5.3	98	357.9	5.3	470.6	5.3	487.3	5.3	99
6 June	54.2	10.6	85	85.6	13.2	88	54.9	25.4	93.5	5.4	94	125.1	5.9	158.9	6.4	237.5	9.0	97
27 June	54.3	10.1	82	131.4	12.8	91	62.5	29.6	297.8	7.4	98	391.5	8.6	487.5	9.8	591.7	9.8	98
Mean	41.7	8.2	78	86.3	11.0	87	52.8	38.9	177.0	6.1	94	260.8	6.9	353.1	7.8	482.3	7.9	98
Median	40.2	7.0	84	79.3	11.8	89	55.1	34.1	206.7	5.4	96	278.6	6.4	345.8	7.3	444.5	7.3	99
Std. dev.	25.9	4.0	15	51.4	4.8	8	15.8	21.8	100.9	3.0	8	156.3	3.4	225.5	3.8	338.3	3.8	2

Table 8 Event-based values for alkalinity, COD, and turbidity

Event Date	Alkalinity [mg/L as $CaCO_3$]		Total COD [mg/L]		Turbidity (NTU)		
	EMV_i	EMV_e	EMV_i	EMV_e	EMV_i	EMV_e	PR%
28 May 2010	29.2	22.7	80.9	68.2	35.6	14.1	60%
16 June	21.5	34.5	93.3	63.7	32.7	10.7	67%
21 June	12.6	19.1	27.5	21.8	4.7	3.0	36%
30 June	9.1	24.8	14.3	20.6	9.8	6.5	34%
15 July	17.0	42.8	56.3	34.0	31.2	7.1	77%
1 August	5.9	17.0	37.8	30.1	14.8	3.9	74%
6 August	26.0	42.2	94.1	14.4	51.9	1.4	97%
7 August	14.6	29.8	20.8	41.9	15.6	3.8	76%
23 August	28.5	83.5	95.8	38.7	46.6	5.3	89%
12 September	23.3	79.6	99.3	51.8	27.9	3.6	87%
26 September	39.6	84.1	132.2	48.0	21.4	3.3	85%
27 September	27.1	42.2	51.4	53.1	14.1	5.1	64%
4 November	36.5	125.1	135.7	55.3	82.5	5.5	93%
16 November	45.2	102.9	486.1	51.6	171.0	10.8	94%
5 January 2011	18.2	41.1	40.7	51.9	65.7	10.1	85%
10 January	15.9	38.9	66.6	26.7	38.0	3.3	91%
25 January	21.3	20.2	21.5	12.4	28.2	6.8	76%
7 February	13.5	18.1	39.3	23.9	30.0	5.9	80%
9 March	23.1	36.4	34.9	24.8	19.4	2.4	88%
28 March	47.3	114.4	459.4	51.6	61.1	3.5	94%
30 March	22.3	50.2	118.1	53.6	70.7	4.6	93%
20 April	6.5	30.4	364.3	58.9	112.2	2.4	98%
14 May	3.1	6.7	58.7	57.6	19.9	5.6	72%
6 June	9.7	89.3	219.3	96.1	38.4	3.7	90%
27 June	32.0	119.2	344.6	74.2	63.8	3.4	95%
Mean	22.0	52.6	127.7	45.0	44.3	5.4	80%
Median	21.5	41.1	80.9	51.6	32.7	4.6	85%
Std. dev.	11.9	35.8	137.5	20.3	36.7	3.1	17%

Table 9 Event-based values for Total Phosphorus and Total Nitrogen

Event Date	TN			TP		
	EMV_i [µg/L]	EMV_e [µg/L]	PR (%)	EMV_i [µg/L]	EMV_e [µg/L]	PR (%)
28 May 2010	4906	3378	66	2405	762	84
16 June	3110	1610	51	3256	876	74
21 June	4818	1885	62	5883	472	92
30 June	1885	1751	9	1216	619	50
15 July	2716	2202	26	3548	731	81
1 August	2033	1234	41	2342	920	62
6 August	5503	1566	79	2040	920	67
7 August	1170	763	37	1407	955	35
23 August	3424	2112	62	1570	883	65
12 September	2520	2628	-4	2135	1537	34
26 September	2716	1647	55	3035	1485	64
27 September	2265	760	67	3063	1730	45
4 November	3401	1122	83	5011	2409	76
16 November	5695	1252	88	8793	2574	84
5 January 2011	1879	553	75	3947	2104	54
10 January	1238	1118	16	3853	2496	39
25 January	1399	733	48	4497	1146	75
7 February	1182	816	32	2952	1177	60
9 March	1300	1195	10	887	806	11
28 March	6511	2955	64	7056	3751	58
30 March	4024	1345	67	4364	2474	44
20 April	10479	6500	66	6504	4769	59
14 May	3940	2202	45	2994	1480	51
6 June	4305	4388	23	2769	2368	35
27 June	5564	6579	-11	3228	2758	20
Mean	3519	2092	47	3550	1688	57
Median	3110	1610	51	3063	1480	59
Std. dev.	2161	1614	27	1914	1060	21

Table 10 Event-based values for Total Metals

Event Date	Total Zinc			Total Copper			Total Lead			Total Chromium		
	EMC_i [µg/L]	EMC_e [µg/L]	PR (%)	EMC_i [µg/L]	EMC_e [µg/L]	PR (%)	EMC_i [µg/L]	EMC_e [µg/L]	PR (%)	EMC_i [µg/L]	EMC_e [µg/L]	PR (%)
28 May 2010	BDL	BDL	----	BDL	BDL	----	24.0	37.6	22	BDL	BDL	----
16 June	BDL	BDL	----	20.9	BDL	----	26.8	35.9	-27	BDL	BDL	----
21 June	1100	11	99	646.6	24.8	96	118.0	23.5	81	BDL	BDL	----
30 June	100	68	32	75.0	BDL	----	23.0	BDL	----	2.6	1.9	30
15 July	1500	BDL	----	880.4	BDL	----	114.1	BDL	----	8.2	BDL	----
1 August	100	2	98	7.2	0.3	96	8.6	3.5	60	7.1	1.8	75
6 August	1500	345	77	361.0	0.1	100	98.4	5.0	96	5.7	0.2	98
7 August	700	217	69	149.6	0.1	100	38.9	2.0	95	1.6	0.2	89
23 August	1500	375	75	5.5	0.1	99	19.1	4.4	86	42.3	44.1	35
12 September	2000	880	56	3.1	0.1	96	9.4	1.5	86	55.5	55.3	8
26 September	6400	640	90	14.6	BDL	----	3.9	4.6	12	33.9	30.7	33
27 September	1200	1116	7	56.6	4.7	92	46.9	6.1	87	104.9	99.4	8
4 November	1600	400	75	79.5	0.4	100	71.7	4.5	97	49.7	41.4	58
16 November	1500	420	72	77.8	18.2	87	13.1	4.1	83	28.7	11.8	78
5 January 2011	2600	702	73	112.1	48.5	63	75.1	91.1	-6	122.5	108.5	23
10 January	3000	2760	8	46.5	14.1	72	34.9	9.3	75	42.9	29.6	36
25 January	4400	528	88	619.0	6.9	99	150.1	93.1	38	105.9	94.6	11
7 February	1300	793	39	113.7	51.3	55	104.5	62.8	40	78.0	97.3	-24
9 March	1500	450	70	366.5	44.7	88	20.1	0.1	100	82.8	65.8	23
28 March	1100	715	35	133.2	35.4	79	24.6	4.8	85	88.6	59.7	46
30 March	7600	760	90	85.2	13.3	85	120.2	9.4	92	117.7	66.3	44
20 April	1600	1536	4	197.3	20.4	94	249.1	127.8	72	157.9	105.2	63
14 May	600	270	55	57.5	17.7	70	27.8	6.5	77	96.2	56.9	42
6 June	1300	507	61	100.6	39.8	70	71.3	76.1	19	95.0	103.1	18
27 June	600	546	9	72.7	18.1	77	120.4	3.8	97	70.3	33.6	55
Mean	1948	638	58	178.4	17.9	86	64.6	26.8	64	63.5	52.7	40
Median	1500	518	70	82.4	15.9	90	38.9	6.1	81	62.9	55.3	36
Std. dev.	1852	594	31	231.4	17.5	14	58.4	37.0	37	45.0	37.9	30

Oil and Grease

The event-based influent and effluent concentrations and removal efficiencies of Total Oil and Grease for the 25 events are presented in **Table 11**. For the 25 qualifying storms, Total Oil and Grease removal efficiency ranged from 0 to 100% with a median of 62%.

Runoff water chemistry

Event-based water chemistry indices including pH, redox potential, conductivity, total dissolved solids (TDS), dissolved oxygen (DO), alkalinity, and total chemical oxygen demand (COD) were measured for a total of 25 storm events as shown in **Tables 8** and **12**. Raw influent and treated effluent samples were analyzed. Additionally, pH, redox potential, conductivity, salinity, and TDS inside the treatment unit were also continuously monitored during each storm event.

Influent runoff pH ranges from 6.5 to 7.5 with a median of 7.1, and the effluent pH ranges from 6.2 to 7.2 with a median of 6.8. Redox potential is a measure of a chemical species' tendency to acquire electrons and be reduced. Water with a high potential tends to gain electrons from new species introduced to the system and water with a low potential can lose electrons to new species; both paths are important for speciation. For the 25 events monitored in this study, influent runoff redox ranges from 285 to 443 mV with a median of 366 mV. Effluent runoff redox ranges from 291 to 488 mV with a median of 364 mV.

Electrical conductivity is a measure of the ability of water to transmit an electric current. Influent runoff conductivity ranges from 18.9 to 186.7 µS/cm with a median of 56.6 µS/cm. Conductivity is nearly doubled during treatment due to contact with stored high conductivity runoff in the JF4-2-1. Effluent runoff conductivity ranges from 41.2 to 422.6 µS/cm with a median of 97.8 µS/cm. Given that TDS is highly correlated to conductivity, TDS follows the same pattern. Influent runoff TDS ranges from 9.3 to 91.3 mg/L with a median of 29.8 mg/L. Effluent runoff TDS ranges from 20.1 to 206.9 mg/L with a median of 48.5 mg/L.

Influent runoff alkalinity ranges from 3.1 to 47.3 mg/L as $CaCO_3$ with a median of 21.5 mg/L. An increase in alkalinity is observed during treatment due to contact with stored runoff in the JF4-2-1, which has high alkalinity. Effluent runoff alkalinity ranges from 6.7 to 125.1 mg/L as $CaCO_3$ with a median of 41.1 mg/L.

Influent runoff total COD ranges from 14.3 to 486.1 mg/L with a median of 80.9 mg/L. Effluent runoff total COD ranges from 12.4 to 96.1 mg/L with a median of 51.6 mg/L. Influent runoff DO ranges from 3.3 to 8.4 mg/L with a median of 6.7 mg/L. Effluent runoff DO ranges from 2.8 to 8.4 mg/L with a median of 4.7 mg/L.

Head Loss

The peak and median driving head over the Jellyfish Filter JF4-2-1 deck level for each event is tabulated in **Table 13**. As shown, the driving head increases as the flow rate increases. For the 25 qualifying events, the median value of event-based median driving head over deck level is 83 mm (3.25 inches), and the median value of event-based peak driving head over deck level is 204 mm (8.05 inches). No water was bypassed around the treatment unit during the entire monitoring period, including during the two storms events which generated peak flow rates slightly in excess of the Maximum Treatment Flow Rate of 200 gpm.

Table 11 Event-based values for Total Oil and Grease

Event Date	Total Oil and Grease		
	EMC_i [mg/L]	EMC_e [mg/L]	PR (%)
28 May 2010	0.20	0.08	62
16 June	0.93	0.43	54
21 June	0.35	0.35	0
30 June	0.64	0.62	2
15 July	1.10	0.35	68
1 August	0.96	0.55	43
6 August	1.04	0.47	55
7 August	0.73	0.55	25
23 August	0.20	0.00	100
12 September	0.61	0.00	100
26 September	0.44	0.00	100
27 September	0.99	0.08	92
4 November	0.46	0.00	100
16 November	0.93	0.00	100
5 January 2011	0.61	0.00	100
10 January	0.55	0.16	72
25 January	0.64	0.00	100
7 February	1.04	0.00	100
9 March	1.56	1.45	7
28 March	4.06	1.17	71
30 March	2.34	2.32	1
20 April	1.74	0.78	55
14 May	1.74	1.56	10
6 June	1.74	0.78	55
27 June	1.16	0.78	33
Mean	1.07	0.50	60
Median	0.93	0.35	62
Std. dev.	0.82	0.60	37

Table 12 Event-based water chemistry values (all results are not concentrations, but are values)

Event Date	pH		Redox (mV)		DO (mg/L)		Temperature (ºC)		Conductivity (µS/cm)		TDS (mg/L)	
	EMV_i	EMVe	EMV_i	EMVe	EMV_i	EMVe	EMV_i	EMVe	EMV_i	EMVe	EMV_i	EMVe
28 May 2010	7.0	7.0	391	386	6.1	6.3	23.9	24.1	60.5	69.1	29.8	33.9
16 June	7.1	6.7	368	366	4.5	3.6	25.0	25.0	49.5	81.9	24.2	40.2
21 June	7.1	6.6	383	438	6.7	4.7	23.4	24.6	24.2	43.1	11.9	21.1
30 June	6.9	6.5	376	376	5.7	4.4	25.7	25.3	23.9	57.3	11.9	28.0
15 July	7.3	6.8	355	355	7.2	5.8	27.7	26.2	32.6	96.3	15.8	43.6
1 August	6.5	6.5	366	364	7.5	7.1	25.7	25.6	18.9	42.4	9.3	20.6
6 August	7.3	6.5	386	393	6.3	4.2	27.6	26.7	69.2	87.9	33.9	43.3
7 August	7.0	6.5	386	360	7.1	4.3	25.7	26.0	34.6	71.7	16.9	35.1
23 August	7.0	6.8	340	329	6.4	4.2	26.7	25.7	74.1	177.7	36.3	88.0
12 September	7.4	6.8	407	431	6.8	5.0	27.0	26.2	62.1	174.2	30.3	85.3
26 September	6.6	6.7	422	488	3.3	2.8	24.5	24.5	107.6	182.9	52.6	89.6
27 September	7.1	6.7	443	465	6.6	5.4	23.6	23.8	54.0	98.9	26.2	48.5
4 November	7.2	7.0	366	412	6.6	4.5	22.0	21.9	103.5	298.7	50.6	127.7
16 November	7.2	6.8	352	376	7.1	4.4	22.1	22.6	174.0	225.0	85.5	110.3
5 January 2011	7.5	6.7	399	364	8.3	7.4	21.4	22.1	38.6	107.1	18.9	52.5
10 January	7.2	6.8	331	350	8.3	5.0	19.8	20.2	47.0	97.8	32.9	68.0
25 January	7.1	7.0	336	323	8.1	7.6	18.8	19.9	48.4	65.7	26.7	25.5
7 February	7.2	7.2	353	356	8.3	8.4	22.2	23.1	30.6	41.2	15.2	20.1
9 March	7.4	7.1	357	366	8.4	8.3	17.8	17.8	40.6	86.7	20.1	42.6
28 March	7.1	7.1	321	315	7.2	5.3	22.8	22.3	186.7	257.3	91.3	126.0
30 March	7.2	7.0	379	321	7.5	6.1	21.8	21.7	62.1	121.5	30.3	60.1
20 April	6.9	6.5	375	384	5.5	4.4	24.3	23.0	159.8	422.6	78.3	206.9
14 May	7.4	7.2	352	363	4.6	4.3	24.8	23.9	56.6	88.9	27.8	43.4
6 June	7.2	7.0	303	300	6.7	4.7	26.7	26.2	109.2	391.5	53.5	191.7
27 June	7.0	6.2	285	291	6.3	4.3	26.4	25.6	95.0	322.9	46.6	158.2
Mean	7.1	6.8	365	371	6.7	5.3	23.9	23.8	70.5	148.4	35.1	72.4
Median	7.1	6.8	366	364	6.7	4.7	24.3	24.1	56.6	97.8	29.8	48.5
Std. dev.	0.2	0.3	35	48	1.3	1.5	2.7	2.3	46.6	110.8	22.7	53.4

Table 13 Event-based driving head over deck level

Event Date	Median head over deck level (inch)	Median head over deck level (mm)	Peak head over deck level (inch)	Peak head over deck level (mm)
28 May 2010	1.56	40	6.22	158
16 June	4.23	108	7.79	198
21 June	6.67	170	9.89	251
30 June	2.01	51	15.55	395
15 July	5.78	147	16.89	429
1 August	8.41	214	20.92	531
6 August	5.75	146	12.04	306
7 August	4.58	116	12.23	311
23 August	1.47	37	4.58	116
12 September	2.07	53	6.17	157
26 September	1.45	37	2.48	63
27 September	1.16	30	15.70	399
4 November	3.08	78	6.72	171
16 November	1.77	45	6.82	173
5 January 2011	2.40	61	11.72	298
10 January	1.49	38	8.05	204
25 January	3.25	83	6.88	175
7 February	5.43	138	12.18	309
9 March	2.73	69	7.23	184
28 March	3.36	85	6.02	153
30 March	6.96	177	15.69	398
20 April	4.59	117	6.42	163
14 May	4.25	108	19.65	499
6 June	0.65	16	6.56	167
27 June	5.61	143	16.76	426
Mean	3.63	92	10.45	265
Median	3.25	83	8.05	204
Std. dev.	2.11	54	5.06	129

Hydraulic Testing
Hydraulic testing was conducted on the clean system with fresh filter cartridges prior to commencement of the monitoring campaign, and was repeated at the conclusion of the field study on the system with dirty cartridges. Curves of head loss versus flow rate were nearly identical for the system with fresh cartridges and dirty cartridges, indicating no loss of hydraulic capacity despite the capture of 166 pounds of dry basis PM mass by the JF4 equipped with 3 cartridges. These results suggest the combination of very high cartridge surface area, vertical configuration and self-cleaning mechanisms are effective in maintaining hydraulic capacity. The system had a volumetric capacity for PM that was not exceeded during the period of this study.

Results of hydraulic testing of the Jellyfish® Filter JF4-2-1 prior to commissioning (new filter cartridges) and at the conclusion of the monitoring period (dirty filter cartridges) are detailed in **Appendix B**.

4.3 System Maintenance and Residual Solids Assessment Results

Maintenance
No maintenance was required or carried out during the 13-month monitoring period spanning May 28, 2010 to June 27, 2011.

PM Recovery and Mass Balance
Mass balance results showed a 94.5% mass recovery rate for the 25 qualifying events providing confidence in the test methods, procedures and equipment employed during the monitoring program. The "theoretical mass" that should have been collected in the JF4-2-1 is calculated by the difference between the influent and effluent mass, which is 176 lbs. for the 25 qualifying events. The actual mass collected is calculated by summing the mass recovered from the sump and the filter cartridges, which are 158 lbs. and 8 lbs., respectively, in this project. See **Appendix B** for further discussion and details.

4.4 Summary

Between May of 2010 and June of 2011, 25 storm events were monitored and were determined to meet the storm data collection requirements as per New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2006) and the NJDEP interpretation of TARP (2003). Total rainfall depth for qualified events was 15.01 inches and three events exceeded 75% of the design treatment capacity (including two storms that generated flow rates exceeding the maximum design flow rate of 200 gpm), thus satisfying TARP Tier II and NJDEP completeness criteria.

Median SSC and TSS removal efficiency results were 99% and 89%, respectively. While not part of the TARP Tier II Protocol several other pollutant removal rates, i.e. metals, total nitrogen and total phosphorus, were measured during this field study. These results are included to document, for this specific field study, Jellyfish® performance for these parameters. Median removal efficiency was 59% for Total Phosphorus and 51% for Total Nitrogen. For Total Copper and Total Zinc, median removal efficiencies were 90% and 70%, respectively, while median removal efficiencies for Total Lead and Total Chromium were 81% and 36%.

While both median and mean statistics are presented throughout the report, results are primarily log-normally distributed and therefore the median values are utilized to assess performance (Berretta and Sansalone 2011, Kim and Sansalone 2010, Van Buren et al., 2009).

5. Performance Verification

Field testing of an Imbrium Systems' Jellyfish® Filter model JF4-2-1 with second-generation filtration cartridges was conducted in accordance with the TARP field test protocol to document Jellyfish® Filter performance with respect to suspended solids removal and quantify water treatment performance. The field monitoring was carried out on the University of Florida campus with the full-scale unit loaded by rainfall-runoff from a surface parking watershed. A total of 25 monitored storm events, with 15 inches of cumulative rainfall depth, were treated by the JF4 during this study. These 25 storms produced the total runoff through the JF4 during the 13-month monitoring period. Of the 25 storms treated, two storms generated flows exceeding the maximum design flow of 200 gpm. No maintenance was required or conducted during the 13-month monitoring period spanning May 28, 2010 to June 27, 2011. The median d_{50} for influent and effluent particle sizes were 82 and 3 μm, respectively.
Treatment results generated median SSC and TSS removal efficiency results of 99% and 89%, respectively.

At the completion of the monitoring campaign, a 94.5% mass balance was obtained on particulate matter (PM) which validates the testing methods used throughout this study. This mass balance on PM is an independent approach that validates particulate influent and effluent monitoring. The results obtained in this field study demonstrated that the Jellyfish® Filter's particulate removal performance is reasonably insensitive to incoming particle size distribution (PSD) and runoff event duration.

6. Net Environmental Benefit

The Jellyfish® Filter requires no input of raw material, has no moving parts and therefore uses no water or energy other than that provided by stormwater runoff. For the 25 storm events monitored during the 13-month monitoring period the mass of materials captured and retained by the Jellyfish® Filter was 166 lbs. This material would otherwise have been released to the environment during the 25 rain events.

7. References

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APPENDIX A

INDIVIDUAL STORM REPORTS

Table A1: JF4 Summary: 28 May 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	28 May 2010	Influent Volume:	7465 L (1972 gal)
Previous Dry Hours:	96	Event Duration:	112 min
Maximum Flow Rate:	4.30 L/s (68.2 gpm)	Number of Influent Samples:	19
Median Flow Rate:	0.98 L/s (15.5 gpm)	Number of Effluent Samples:	8
Mean Flow Rate:	1.12 L/s (17.8gpm)	Peak Rainfall Intensity:	76 mm/hr (3.0 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	21 mm (0.81 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

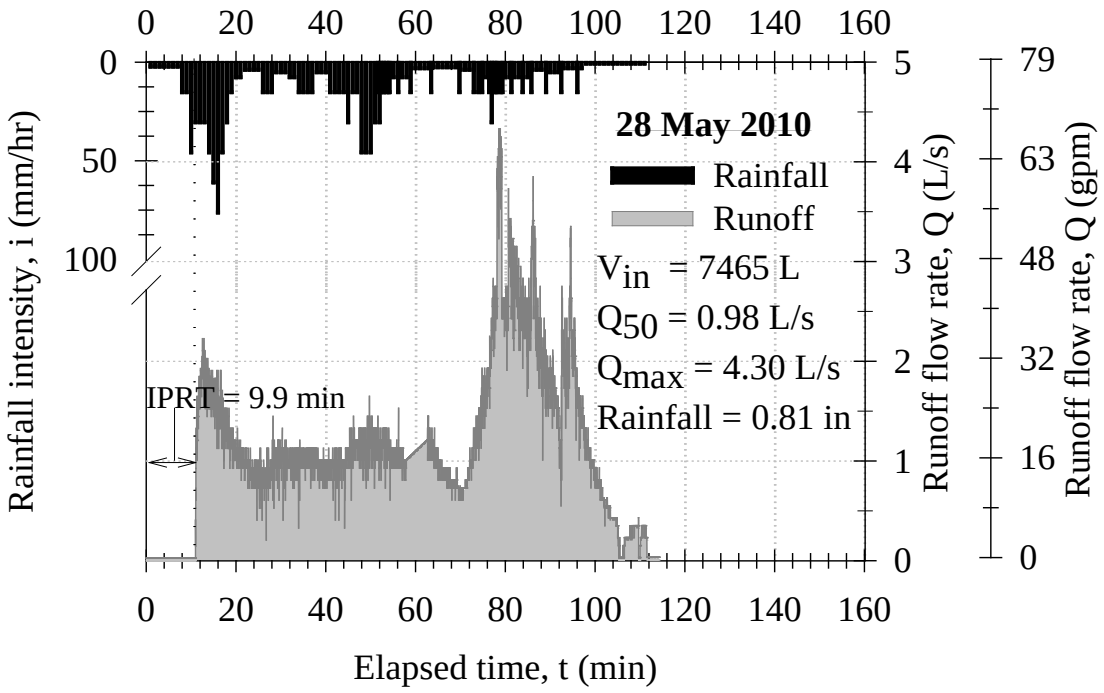


Figure A1: Hydrograph and hyetograph for 28 May 2010 event

On May 28, 2010, the Jellyfish Filter JF4-2-1 treated its first rainfall-runoff event, starting with a clean empty unit. The event occurred after 96 dry hours. The peak rainfall intensity is 3.0 in/hr and rainfall depth is 0.81 inches. The storm lasted approximately 112 minutes. The maximum, median, and mean runoff flow rates are 68 gpm, 16 gpm, and 18 gpm, respectively. The influent runoff volume is 1,972 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 19 and 8, respectively. Fewer effluent than influent samples are collected since the JF4 unit is filling up for a substantial part of the storm. The influent and effluent TSS is 89.3 mg/L and 18.7 mg/L, respectively, and the removal efficiency is 90%. The influent and effluent SSC is 532.3 mg/L and 15.4 mg/L, respectively, and the removal efficiency is 99%.

Table A2: JF4 Summary: 16 June 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	16 June 2010	Influent Volume:	5006 L (1323 gal)
Previous Dry Hours:	288	Event Duration:	61 min
Maximum Flow Rate:	5.36 L/s (85.0 gpm)	Number of Influent Samples:	11
Median Flow Rate:	0.65 L/s (10.3 gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	2.21 L/s (35.1 gpm)	Peak Rainfall Intensity:	61 mm/hr (2.4 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	16 mm (0.63 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

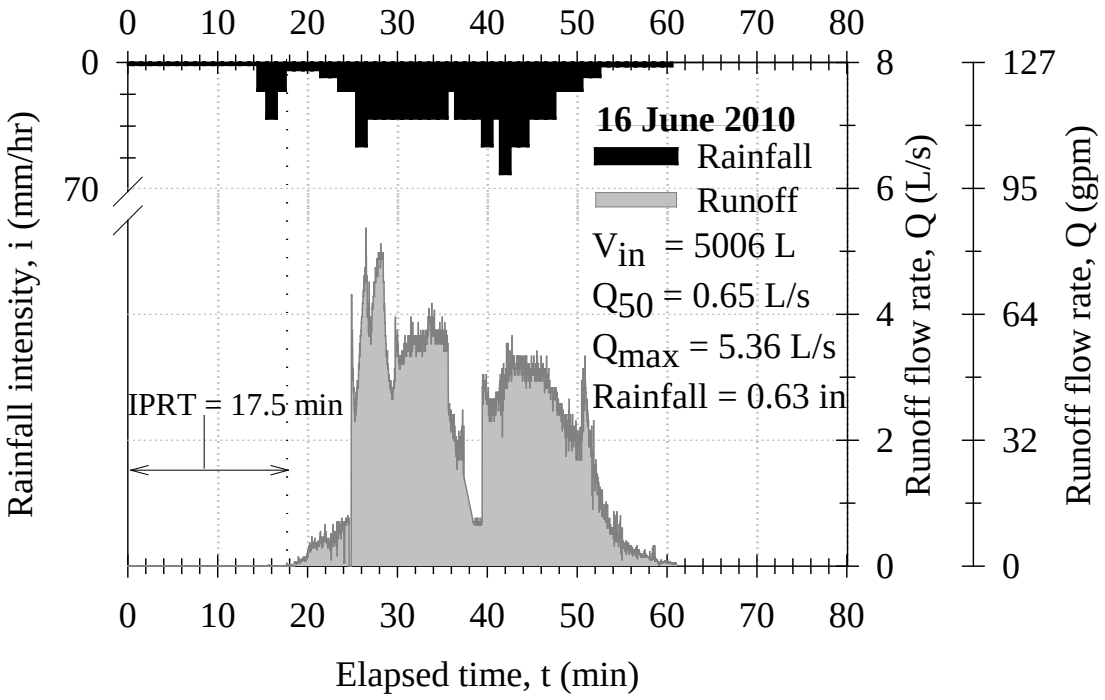


Figure A2: Hydrograph and hyetograph for 16 June 2010 event

On June 16, 2010, the JF4 unit treated its second rainfall-runoff event. The event occurred after 288 dry hours. The peak rainfall intensity is 2.4 in/hr and rainfall depth is 0.63 inches. The storm lasted approximately 61 minutes. The maximum, median, and mean runoff flow rates are 85 gpm, 10 gpm, and 35 gpm, respectively. The influent runoff volume is 1,323 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 11 and 10, respectively. The influent and effluent TSS is 79.3 mg/L and 21.7 mg/L, respectively, and the removal efficiency is 74%. The influent and effluent SSC is 1401.7 mg/L and 18.1 mg/L, respectively, and the removal efficiency is 99%.

Table A3: JF4 Summary: 21 June 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	21 June 2010	Influent Volume:	8695 L (2297 gal)
Previous Dry Hours:	96	Runoff Duration:	43 min
Maximum Flow Rate:	7.46 L/s (118.3 gpm)	Number of Influent Samples:	10
Median Flow Rate:	5.47 L/s (86.7 gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	5.09 L/s (80.7 gpm)	Peak Rainfall Intensity:	122 mm/hr (4.8 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	23 mm (0.92 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

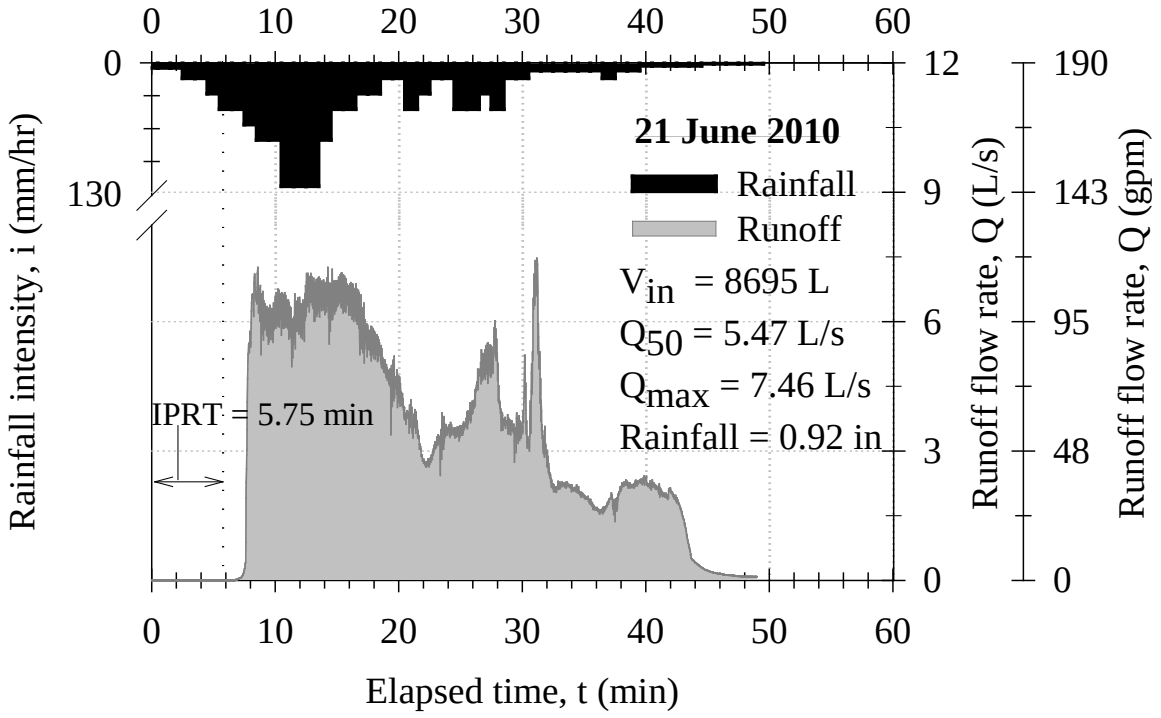


Figure A3: Hydrograph and hyetograph for 21 June 2010 event

On June 21, 2010, the JF4 unit treated its third rainfall-runoff event. The event occurred after 96 previous dry hours. The peak rainfall intensity is 4.8 in/hr and rainfall depth is 0.92 inches. The storm lasted approximately 43 minutes. The maximum, median, and mean runoff flow rates are 118 gpm, 87 gpm, and 81 gpm, respectively. The influent runoff volume is 2297 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 105.5 mg/L and 15.2 mg/L, respectively, and the removal efficiency is 86%. The influent and effluent SSC is 1162.9 mg/L and 7.4 mg/L, respectively, and the removal efficiency is 99%.

Table A4: JF4 Summary: 30 June 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	30 June 2010	Influent Volume:	5459 L (1442 gal)
Previous Dry Hours:	288	Runoff Duration:	50 min
Maximum Flow Rate:	9.13 L/s (144.8 gpm)	Number of Influent Samples:	11
Median Flow Rate:	3.30 L/s (52.3 gpm)	Number of Effluent Samples:	11
Mean Flow Rate:	3.95 L/s (62.6 gpm)	Peak Rainfall Intensity:	76 mm/hr (3.0 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	13 mm (0.52 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

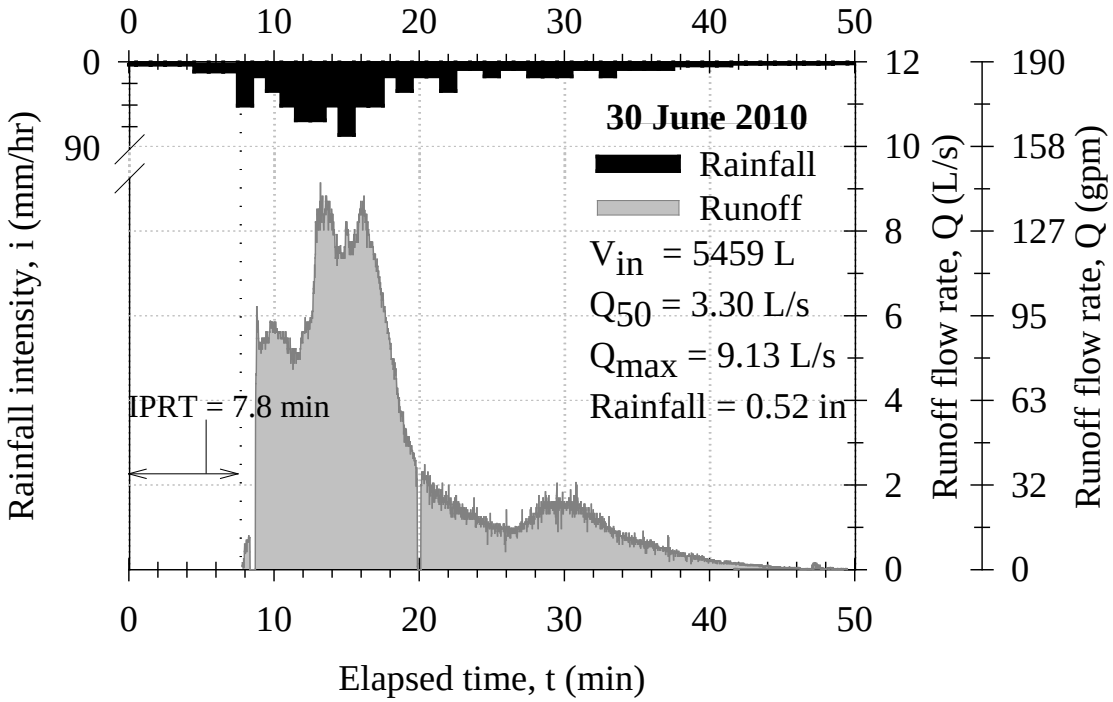


Figure A4: Hydrograph and hyetograph for 30 June 2010 event

On June 30, 2010, the JF4 unit treated its fourth rainfall-runoff event. The event occurred after 288 dry hours. The peak rainfall intensity is 3 in/hr and rainfall depth is 0.52 inches. The storm lasted approximately 50 minutes. The maximum, median, and mean runoff flow rates are 145 gpm, 52 gpm, and 63 gpm, respectively. The influent runoff volume is 1442 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 11 and 11, respectively. The influent and effluent TSS is 25.2 mg/L and 7.4 mg/L, respectively, and the removal efficiency is 71%. The influent and effluent SSC is 444.5 mg/L and 5.4 mg/L, respectively, and the removal efficiency is 99%.

Table A5: JF4 Summary: 15 July 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	15 July 2010	Influent Volume:	3608 L (953 gal)
Previous Dry Hours:	96	Runoff Duration:	28 min
Maximum Flow Rate:	13.26 L/s (210.2 gpm)	Number of Influent Samples:	10
Median Flow Rate:	1.44 L/s (22.9 gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	3.12 L/s (49.4gpm)	Peak Rainfall Intensity:	91 mm/hr (3.6 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	10 mm (0.38 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

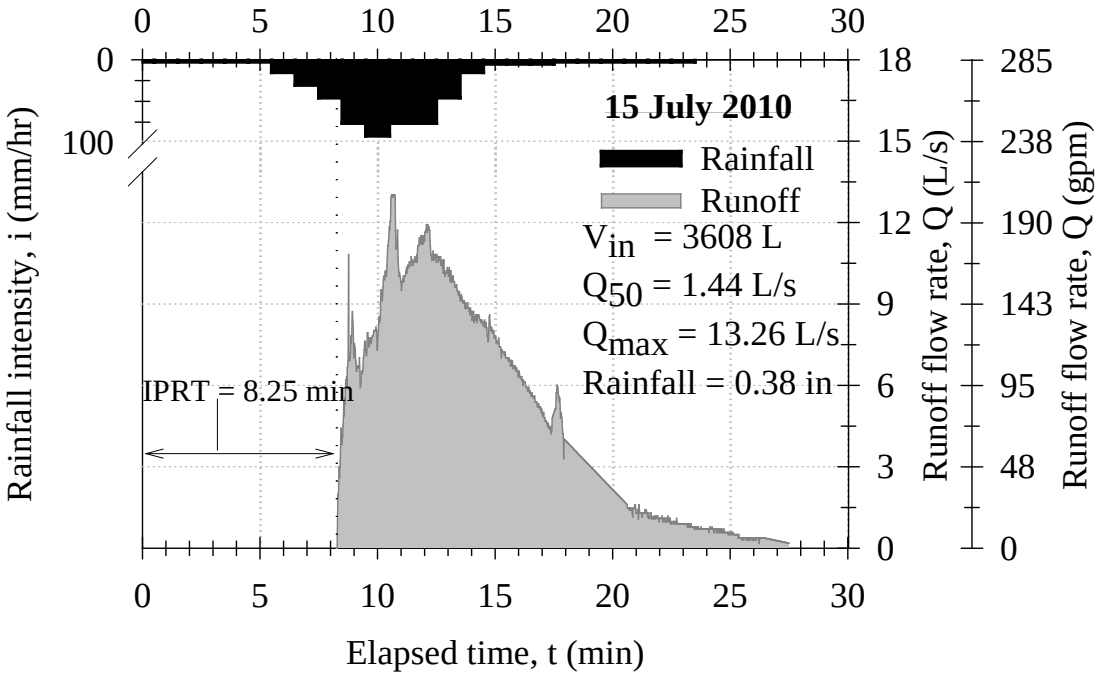


Figure A5: Hydrograph and hyetograph for 15 July 2010 event

On July 15, 2010, the JF4 unit treated its fifth rainfall-runoff event. The event occurred after 96 dry hours. The peak rainfall intensity is 3.6 in/hr and rainfall depth is 0.38 inches. The storm lasted approximately 28 minutes. The maximum, median, and mean runoff flow rates are 210 gpm, 23 gpm, and 49 gpm, respectively. The influent runoff volume is 953 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 91.8 mg/L and 8.3 mg/L, respectively, and the removal efficiency is 92%. The influent and effluent SSC is 812.2 mg/L and 8.4 mg/L, respectively, and the removal efficiency is 99%.

Table A6: JF4 Summary: 1 August 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	01 August 2010	Influent Volume:	11973 L (3163 gal)
Previous Dry Hours:	24	Event Duration:	36 min
Maximum Flow Rate:	14.25 L/s (225.9gpm)	Number of Influent Samples:	10
Median Flow Rate:	4.74 L/s (75.1gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	5.47 L/s (86.7gpm)	Peak Rainfall Intensity:	127 mm/hr (5.0 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	30 mm (1.18 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

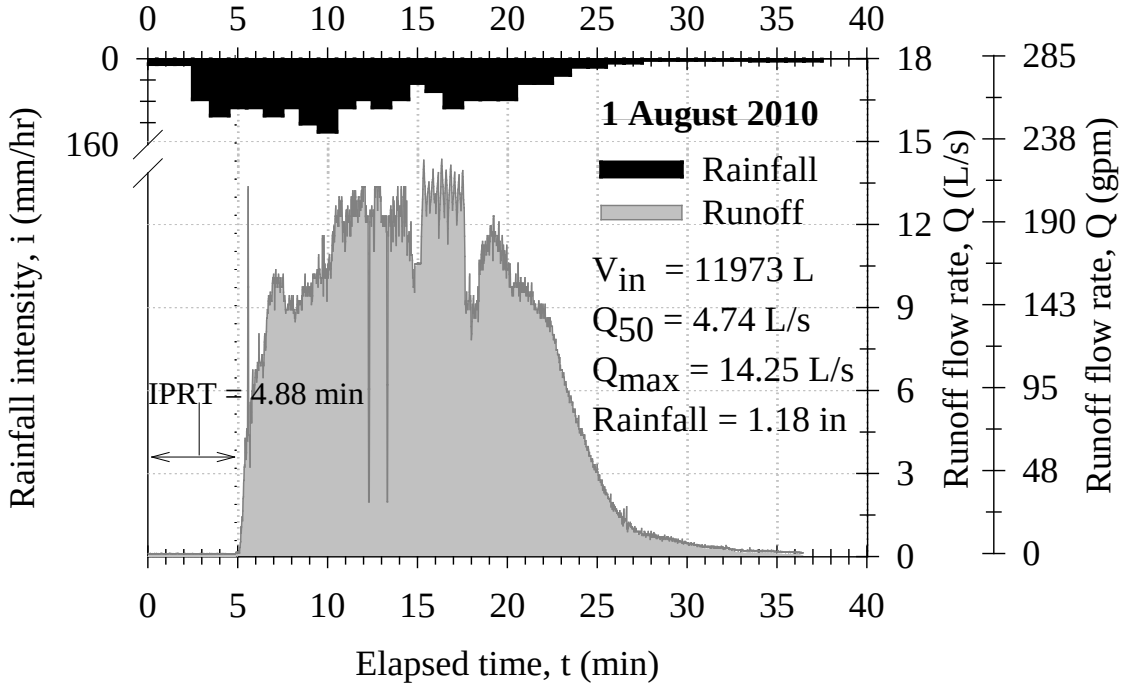


Figure A6: Hydrograph and hyetograph for 1 August 2010 event

On August 1, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 24 dry hours. The peak rainfall intensity is 5.0 in/hr and rainfall depth is 1.18 inches. The storm lasted approximately 36 minutes. The maximum, median, and mean runoff flow rates are 226gpm, 75 gpm, and 87 gpm, respectively. The influent runoff volume is 3163 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 130.2 mg/L and 15.4 mg/L, respectively, and the removal efficiency is 89%. The influent and effluent SSC is 245.1 mg/L and 7.7 mg/L, respectively, and the removal efficiency is 97%.

Table A7: JF4 Summary: 6 August 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	6 August 2010	Influent Volume:	1395 L (368 gal)
Previous Dry Hours:	120	Event Duration:	104 min
Maximum Flow Rate:	6.80 L/s (107.8gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.01 L/s (0.2gpm)	Number of Effluent Samples:	8
Mean Flow Rate:	0.27 L/s (4.3gpm)	Peak Rainfall Intensity:	51mm/hr (2.0inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	4 mm (0.14 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

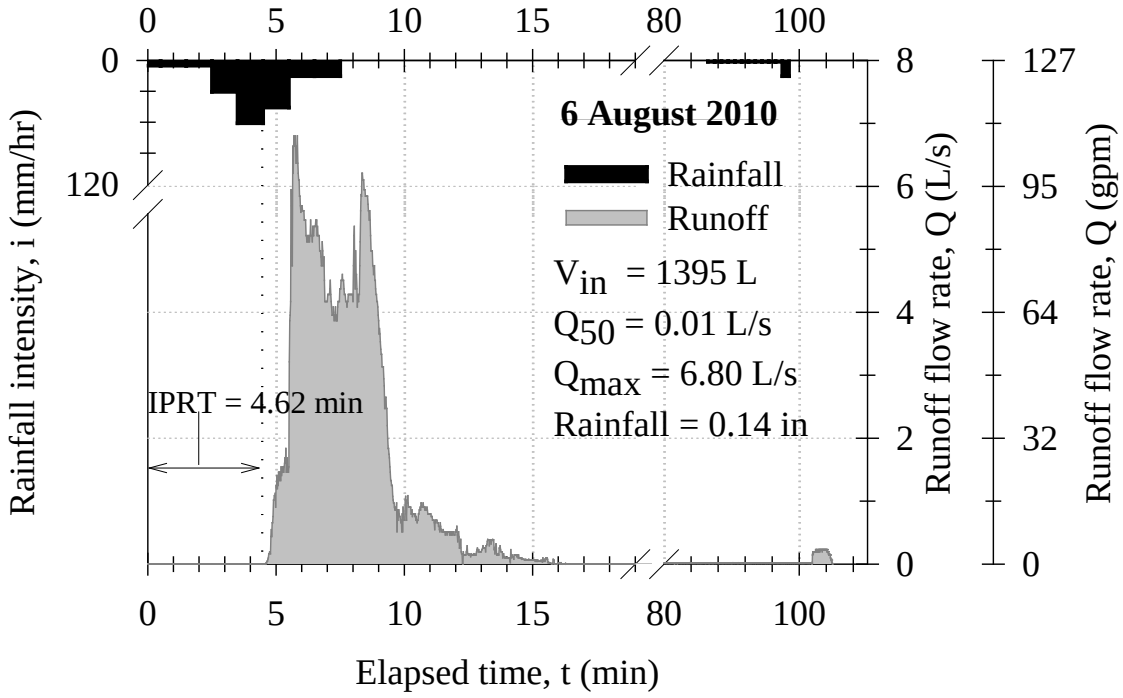


Figure A7: Hydrograph and hyetograph for 6 August 2010 event

On August 6, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 120 dry hours. The peak rainfall intensity is 2.0 in/hr and rainfall depth is 0.14 inch. The storm lasted approximately 104 minutes. The maximum, median, and mean runoff flow rates are 108 gpm, 0.2 gpm, and 4.3 gpm, respectively. The influent runoff volume is 368 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 77.5 mg/L and 15.0 mg/L, respectively, and the removal efficiency is 86%. The influent and effluent SSC is 308.4 mg/L and 7.3 mg/L, respectively, and the removal efficiency is 98%.

Table A8: JF4 Summary: 7 August 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	7August 2010	Influent Volume:	2622 L (693 gal)
Previous Dry Hours:	24	Runoff Duration:	48 min
Maximum Flow Rate:	8.24L/s (130.6gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.43 L/s (6.8gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.90 L/s (14.3gpm)	Peak Rainfall Intensity:	61 mm/hr (2.4 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	9 mm (0.34 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

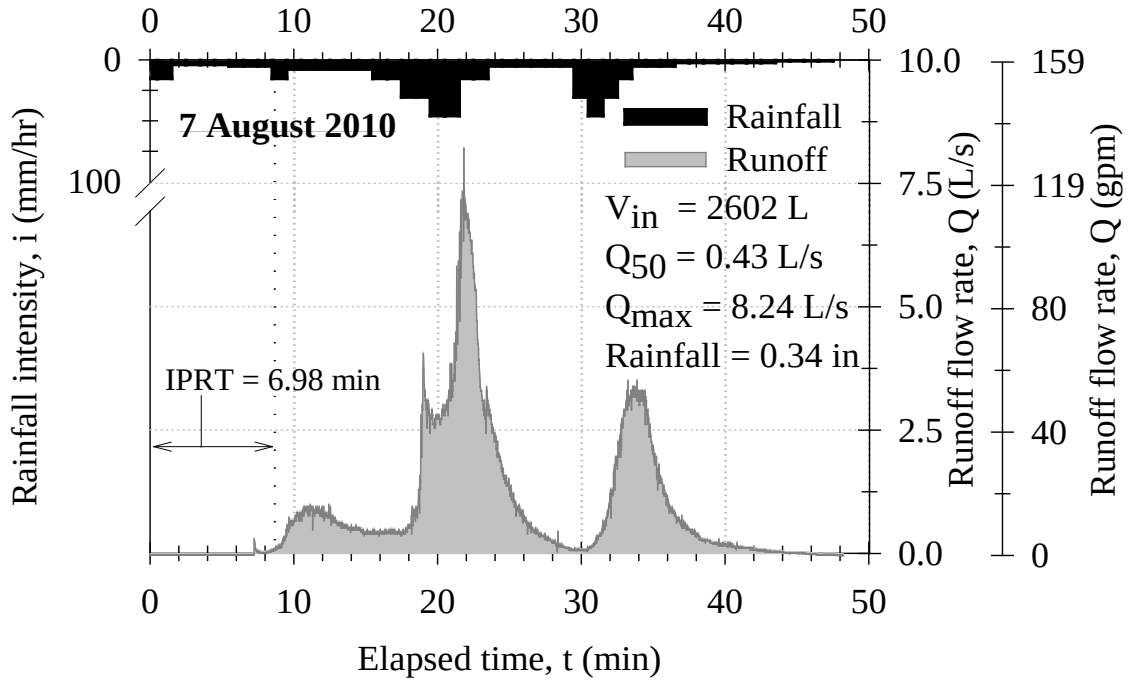


Figure A8: Hydrograph and hyetograph for 7 August 2010 event

On August 7, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 24 dry hours. The peak rainfall intensity is 2.4 in/hr and rainfall depth is 0.34 inch. The storm lasted approximately 48 minutes. The maximum, median, and mean runoff flow rates are 131gpm, 7gpm, and 14gpm, respectively. The influent runoff volume is 693 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 45.3 mg/L and 12.2 mg/L, respectively, and the removal efficiency is 74%. The influent and effluent SSC is 117.1 mg/L and 13.9 mg/L, respectively, and the removal efficiency is 89%.

Table A9: JF4 Summary: 23 August 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	23 August 2010	Influent Volume:	312 L (82 gal)
Previous Dry Hours:	48	Runoff Duration:	42 min
Maximum Flow Rate:	1.25 L/s (19.8 gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.01 L/s (0.2gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.12 L/s (2.0gpm)	Peak Rainfall Intensity:	15 mm/hr(0.6 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	3 mm (0.11 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

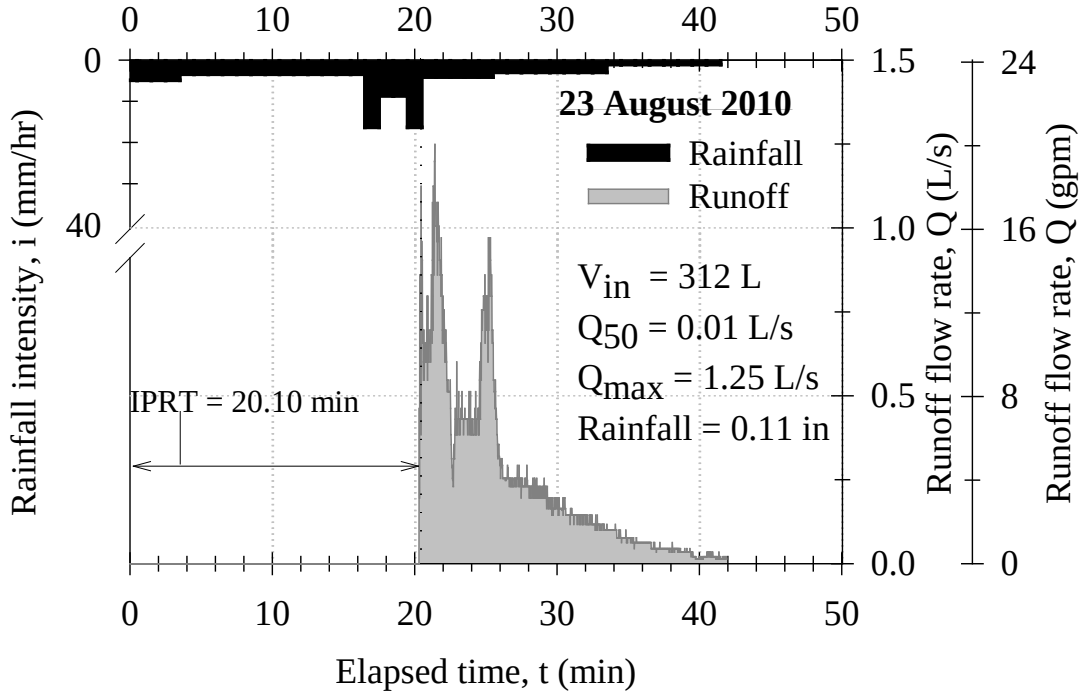


Figure A9: Hydrograph and hyetograph for 23 August 2010 event

On August 23, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 48 dry hours. The peak rainfall intensity is 0.6 in/hr and rainfall depth is 0.11 inch. The storm lasted approximately 42 minutes. The maximum, median, and mean runoff flow rates are 20 gpm, 0.2 gpm, and 2 gpm, respectively. The influent runoff volume is 82 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 74.2 mg/L and 8.2 mg/L, respectively, and the removal efficiency is 93%. The influent and effluent SSC is 555.8 mg/L and 4.7 mg/L, respectively, and the removal efficiency is 100%.

Table A10: JF4 Summary: 12 September 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	12September 2010	Influent Volume:	1643 L (434 gal)
Previous Dry Hours:	172	Runoff Duration:	52 min
Maximum Flow Rate:	3.85L/s (61.0 gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.10L/s (1.6 gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.53L/s (8.4 gpm)	Peak Rainfall Intensity:	51 mm/hr (2.0 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	7 mm (0.27 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

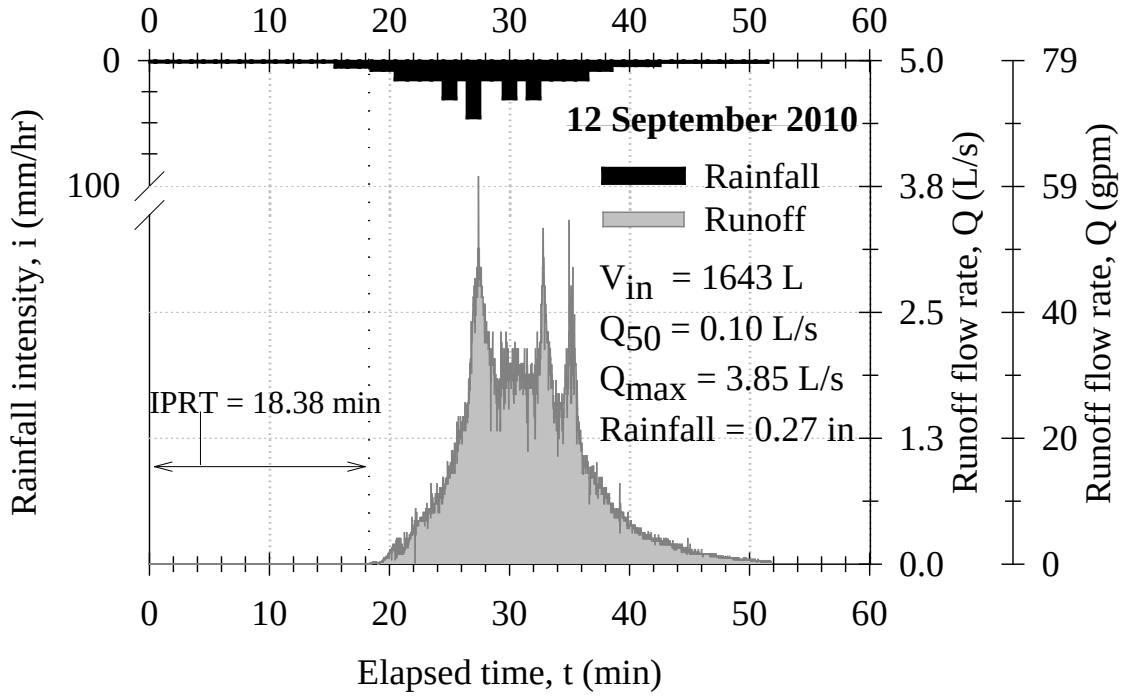


Figure A10: Hydrograph and hyetograph for 12 September 2010 event

On September 12, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 172 dry hours. The peak rainfall intensity is 2.0 in/hr and rainfall depth is 0.27 inch. The storm lasted approximately 52 minutes. The maximum, median, and mean runoff flow rates are 61gpm, 2 gpm, and 8 gpm, respectively. The influent runoff volume is 434 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 91.2 mg/L and 15.7 mg/L, respectively, and the removal efficiency is 84%. The influent and effluent SSC is 261.5 mg/L and 5.8 mg/L, respectively, and the removal efficiency is 98%.

Table A11: JF4 Summary: 26 September 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	26September 2010	Influent Volume:	1129 L (298 gal)
Previous Dry Hours:	40	Runoff Duration:	78 min
Maximum Flow Rate:	0.45 L/s (7.1 gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.26L/s (4.1 gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.24L/s (3.8 gpm)	Peak Rainfall Intensity:	5 mm/hr (0.2 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	4 mm (0.14 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

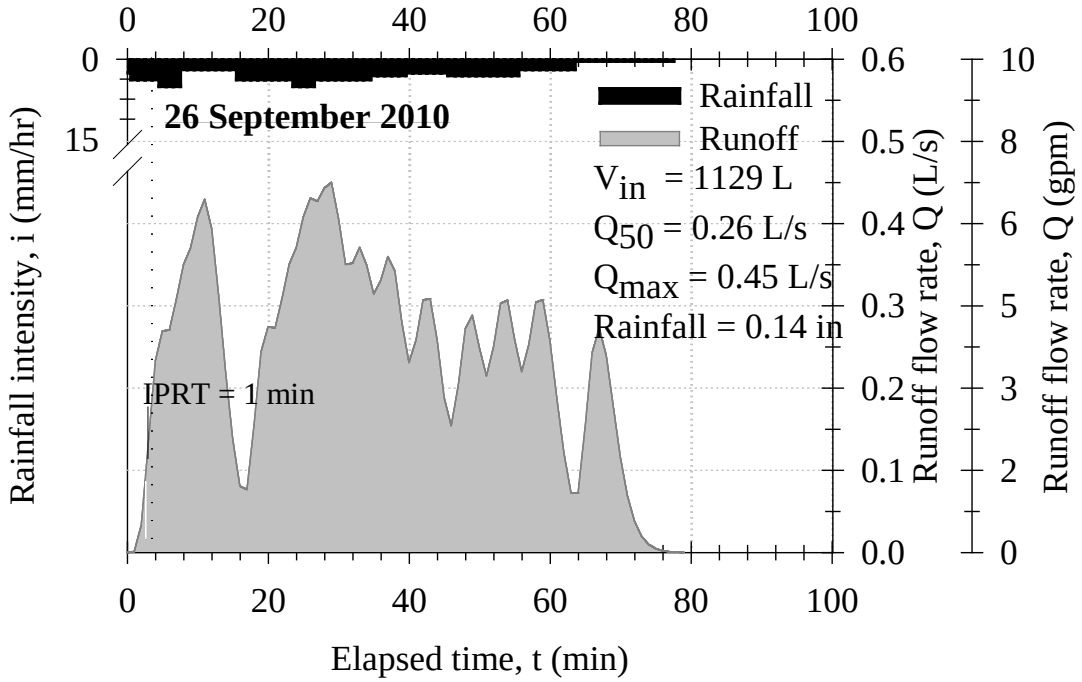


Figure A11: Hydrograph and hyetograph for 26 September 2010 event

On September 26, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 40 dry hours. The peak rainfall intensity is 0.2 in/hr and rainfall depth is 0.14 inch. The storm lasted approximately 78 minutes. The maximum, median, and mean runoff flow rates are 7 gpm, 4 gpm, and 4 gpm, respectively. The influent runoff volume is 298 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 16.3 mg/L and 4.7 mg/L, respectively, and the removal efficiency is 79%. The influent and effluent SSC is 117.9 mg/L and 5.0 mg/L, respectively, and the removal efficiency is 97%.

Table A12: JF4 Summary: 27 September 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	27September 2010	Influent Volume:	3841 L (1015 gal)
Previous Dry Hours:	10	Runoff Duration:	388 min
Maximum Flow Rate:	10.94L/s (173.4gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.04L/s (0.7gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.16L/s (2.6 gpm)	Peak Rainfall Intensity:	91 mm/hr (3.6 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	15 mm (0.6 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

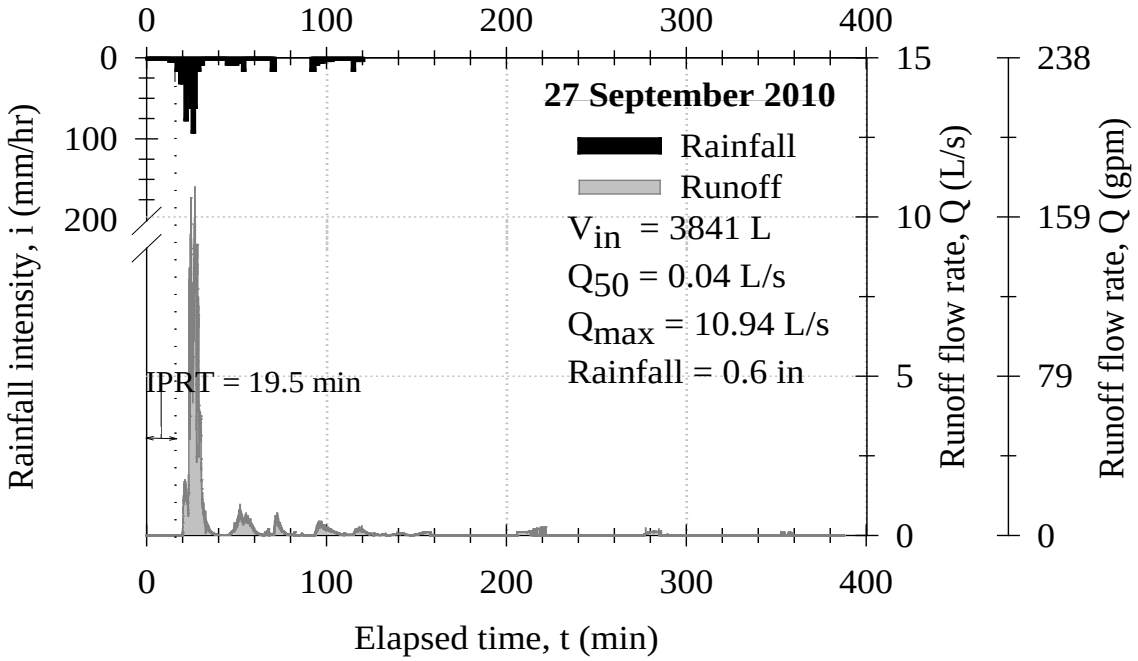


Figure A12: Hydrograph and hyetograph for 27 September 2010 event

On September 27, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 10 dry hours. The peak rainfall intensity is 3.6 in/hr and rainfall depth is 0.60 inch. The storm lasted approximately 388 minutes. The maximum, median, and mean runoff flow rates are 173gpm, 0.7gpm, and 2.6gpm, respectively. The influent runoff volume is 1015 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 51.1 mg/L and 3.2 mg/L, respectively, and the removal efficiency is 94%. The influent and effluent SSC is 765.1 mg/L and 6.0 mg/L, respectively, and the removal efficiency is 99%.

Table A13: JF4 Summary: 4 November 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	4November 2010	Influent Volume:	994 L (263 gal)
Previous Dry Hours:	910	Runoff Duration:	43 min
Maximum Flow Rate:	3.53 L/s (56.0 gpm)	Number of Influent Samples:	11
Median Flow Rate:	0.12 L/s (1.8gpm)	Number of Effluent Samples:	11
Mean Flow Rate:	0.38 L/s (6.0gpm)	Peak Rainfall Intensity:	46 mm/hr (1.8 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	5 mm (0.19 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

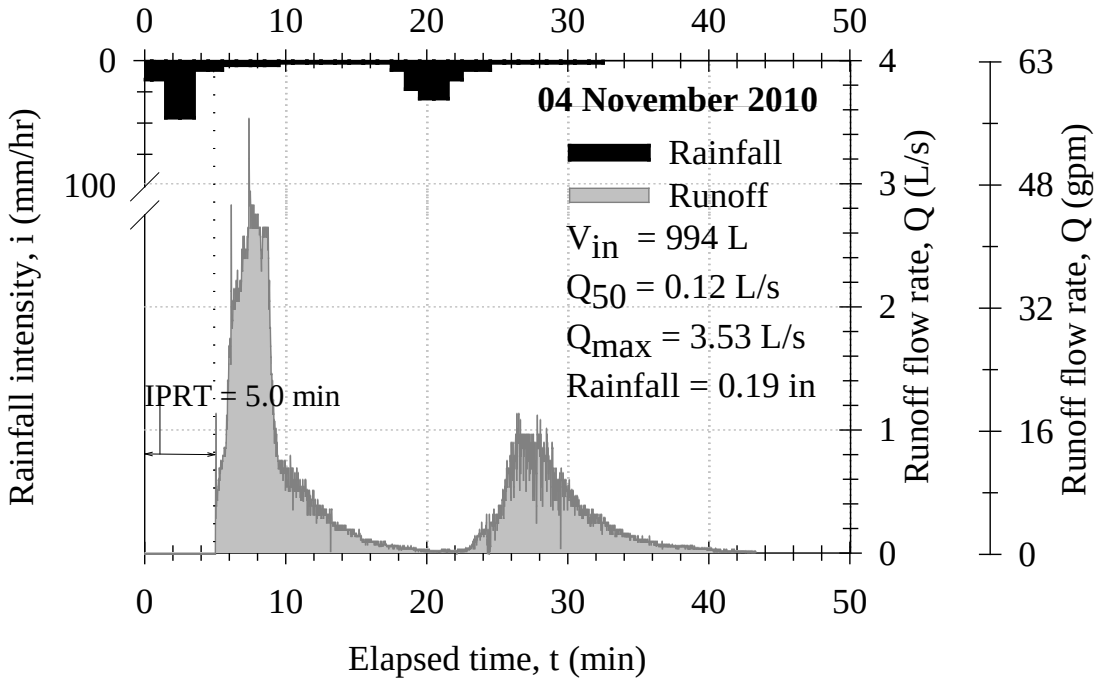


Figure A13: Hydrograph and hyetograph for 4 November 2010 event

On November 4, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 910 dry hours. The peak rainfall intensity is 1.8 in/hr and rainfall depth is 0.19 inch. The storm lasted approximately 43 minutes. The maximum, median, and mean runoff flow rates are 56 gpm, 2 gpm, and 6 gpm, respectively. The influent runoff volume is 263 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 11 and 11, respectively. The influent and effluent TSS is 39.9 mg/L and 4.2 mg/L, respectively, and the removal efficiency is 95%. The influent and effluent SSC is 477.1 mg/L and 10.4 mg/L, respectively, and the removal efficiency is 99%.

Table A14: JF4 Summary: 16 November 2010 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	16November 2010	Influent Volume:	305 L (81 gal)
Previous Dry Hours:	286	Runoff Duration:	34 min
Maximum Flow Rate:	1.75 L/s (27.7 gpm)	Number of Influent Samples:	11
Median Flow Rate:	0.02 L/s (0.3gpm)	Number of Effluent Samples:	11
Mean Flow Rate:	0.13 L/s (2.1gpm)	Peak Rainfall Intensity:	25 mm/hr (1.0 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	3 mm (0.13 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

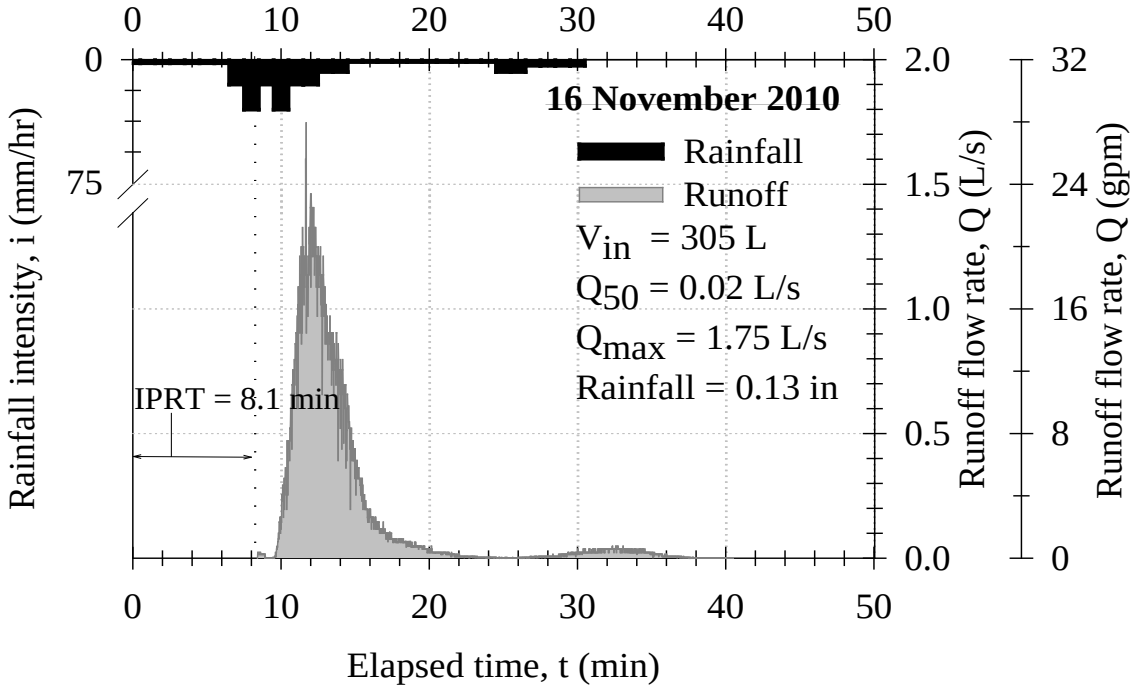


Figure A14: Hydrograph and hyetograph for 16 November 2010 event

On November 16, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 286 dry hours. The peak rainfall intensity is 1.0 in/hr and rainfall depth is 0.13 inch. The storm lasted approximately 34 minutes. The maximum, median, and mean runoff flow rates are 28 gpm, 0.3gpm, and 2 gpm, respectively. The influent runoff volume is 81 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 11 and 11, respectively. The influent and effluent TSS is 261.0 mg/L and 11.8 mg/L, respectively, and the removal efficiency is 98%. The influent and effluent SSC is 543.6 mg/L and 12.2 mg/L, respectively, and the removal efficiency is 99%.

Table A15: JF4 Summary: 5 January 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	05 January 2011	Influent Volume:	5800 L (1532 gal)
Previous Dry Hours:	72 hr	Event Duration:	125 min
Maximum Flow Rate:	7.36 L/s (116.7gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.16 L/s (2.6gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	1.14 L/s (18.1gpm)	Peak Rainfall Intensity:	107 mm/hr (4.2 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	21 mm (0.84 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

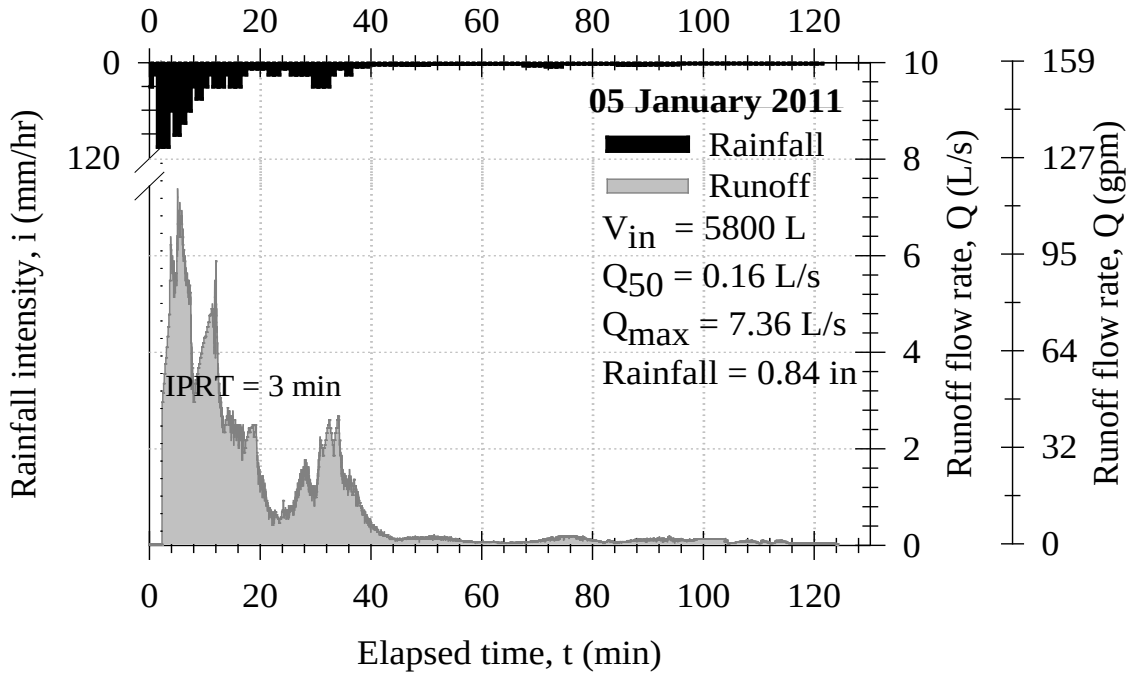


Figure A15: Hydrograph and hyetograph for 5 January 2011 event

On January 5, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 72 dry hours. The peak rainfall intensity is 4.2 in/hr and rainfall depth is 0.84 inches. The storm duration is 125 minutes. The maximum, median, and mean runoff flow rates are 117 gpm, 3 gpm, and 18 gpm, respectively. The influent runoff volume is 1532 gallons. Sampling occurred during the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. This is a The influent and effluent TSS is 152.2 mg/L and 15.9 mg/L, respectively, and the removal efficiency is 91%. The influent and effluent SSC is 693.2 mg/L and 8.7 mg/L, respectively, and the removal efficiency is 99%.

Table A16: JF4 Summary: 10 January 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	10 January 2011	Influent Volume:	1129 L (298 gal)
Previous Dry Hours:	106 hr	Event Duration:	26 min
Maximum Flow Rate:	3.32 L/s (52.6 gpm)	Number of Influent Samples:	8
Median Flow Rate:	0.01 L/s (0.2 gpm)	Number of Effluent Samples:	8
Mean Flow Rate:	0.41 L/s (6.5 gpm)	Peak Rainfall Intensity:	91 mm/hr (3.6inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	5 mm (0.20 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

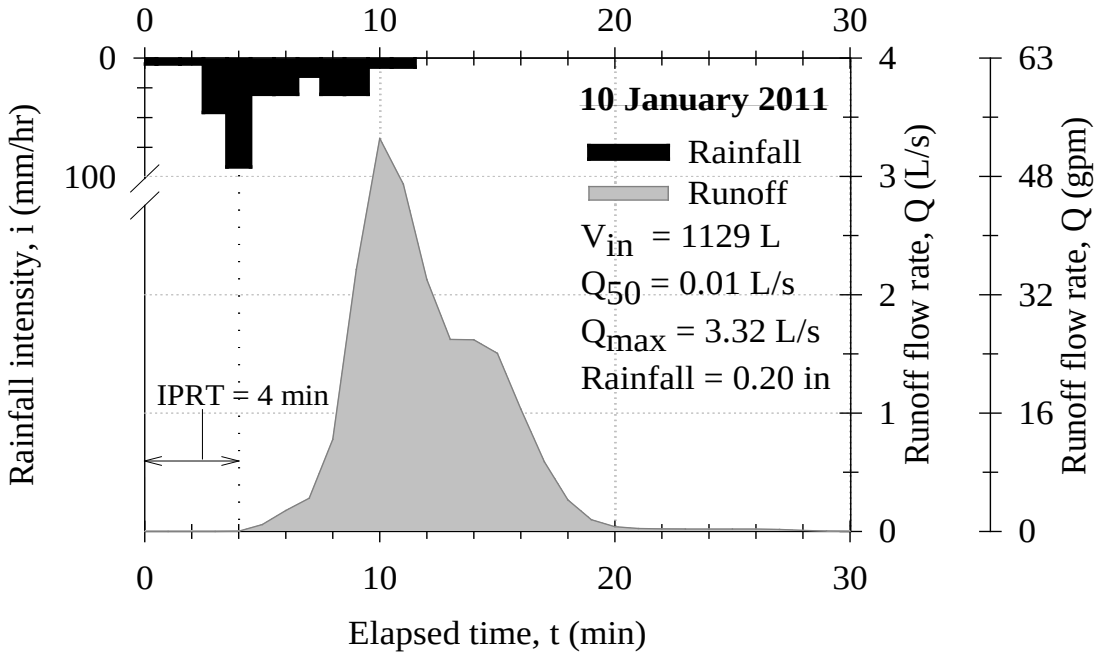


Figure A16: Hydrograph and hyetograph for 10 January 2011 event

On January 10, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 106 dry hours. The peak rainfall intensity is 3.6 in/hr and rainfall depth is 0.20 inch. The storm lasted approximately 26 minutes. The maximum, median, and mean runoff flow rates are 53 gpm, 0.2 gpm, and 7 gpm, respectively. The influent runoff volume is 298 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 8 and 8, respectively. The influent and effluent TSS is 80.7 mg/L and 6.6 mg/L, respectively, and the removal efficiency is 92%. The influent and effluent SSC is 211.1 mg/L and 3.0 mg/L, respectively, and the removal efficiency is 99%.

Table A17: JF4 Summary: 25 January 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	25 January 2011	Influent Volume:	12387 L (3273 gal)
Previous Dry Hours:	365 hr	Runoff Duration:	389 min
Maximum Flow Rate:	4.09L/s (64.8gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.39 L/s (6.2gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.53L/s (8.4gpm)	Peak Rainfall Intensity:	18mm/hr (0.7 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	44mm (1.74 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

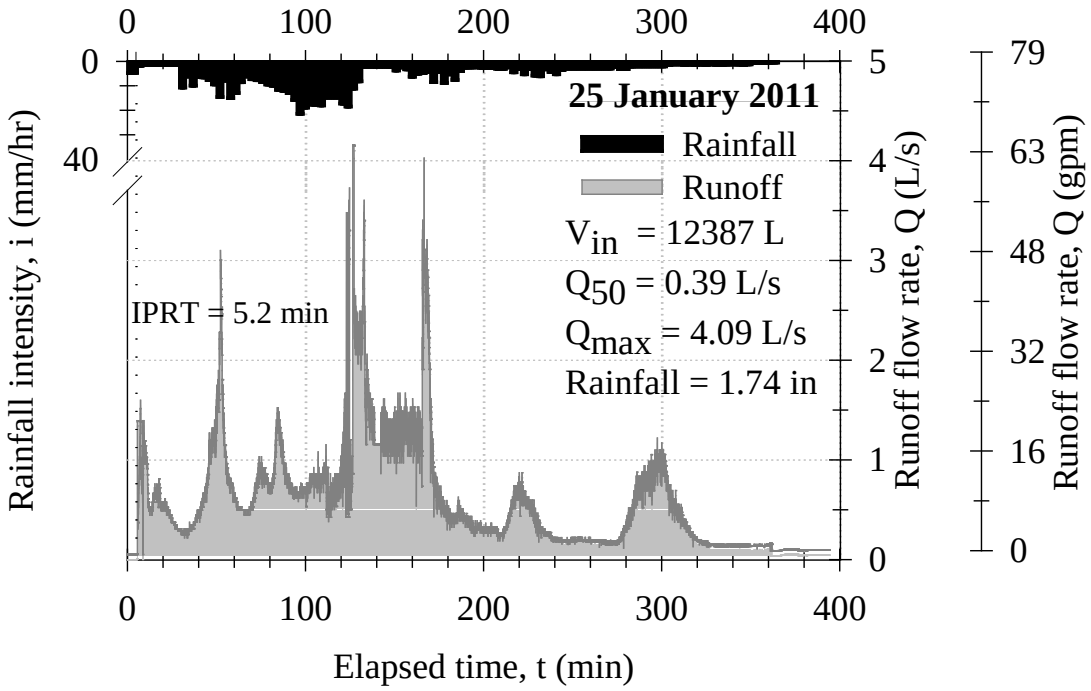


Figure A17: Hydrograph and hyetograph for 25 January 2011 event

On January 25, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 365 dry hours. The peak rainfall intensity is 0.7 in/hr and rainfall depth is 1.74 inch. The storm lasted approximately 389 minutes. The maximum, median, and mean runoff flow rates are 65 gpm, 6 gpm, and 8 gpm, respectively. The influent runoff volume is 3273 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 69.8 mg/L and 7.1 mg/L, respectively, and the removal efficiency is 90%. The influent and effluent SSC is 105.8 mg/L and 4.1 mg/L, respectively, and the removal efficiency is 96%.

Table A18: JF4 Summary: 7 February 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	07 February 2011	Influent Volume:	13229 L (3495 gal)
Previous Dry Hours:	12 hr	Runoff Duration:	306 min
Maximum Flow Rate:	2.22 L/s (35.2gpm)	Number of Influent Samples:	11
Median Flow Rate:	0.77 L/s (12.1gpm)	Number of Effluent Samples:	11
Mean Flow Rate:	0.71 L/s (11.2gpm)	Peak Rainfall Intensity:	30 mm/hr (1.2 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	32.8 mm (1.29 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

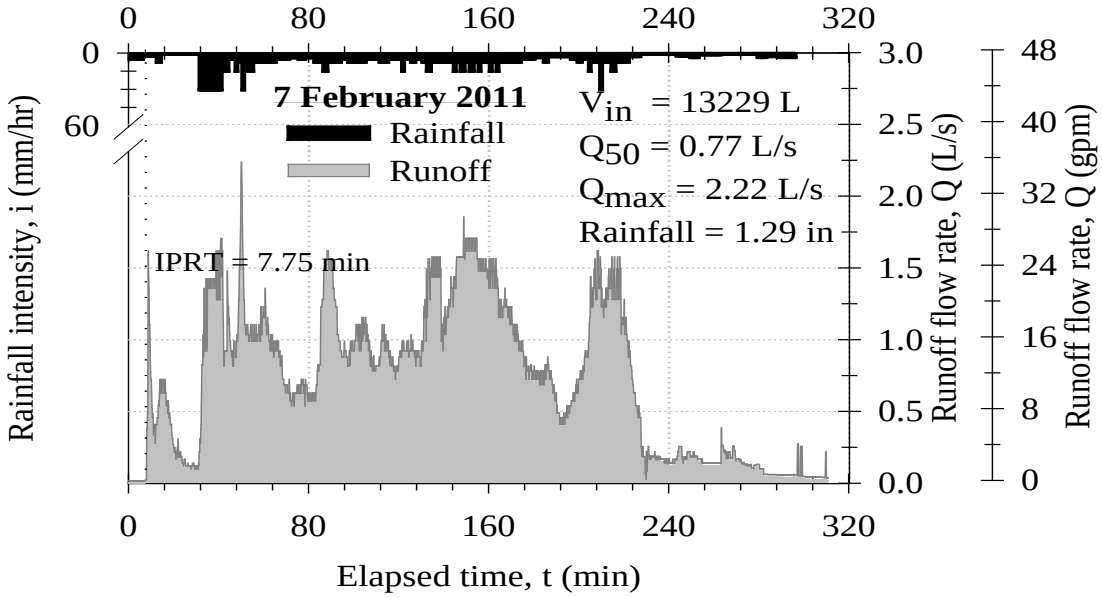


Figure A18: Hydrograph and hyetograph for 7 February 2011 event

On February 7, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 12 dry hours. The peak rainfall intensity is 1.2 in/hr and rainfall depth is 1.29 inch. The storm lasted approximately 306 minutes. The maximum, median, and mean runoff flow rates are 35 gpm, 12 gpm, and 11 gpm, respectively. The influent runoff volume is 3495 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 11 and 11, respectively. The influent and effluent TSS is 34.8 mg/L and 5.3 mg/L, respectively, and the removal efficiency is 85%. The influent and effluent SSC is 438.3 mg/L and 7.6 mg/L, respectively, and the removal efficiency is 98%.

Table A19: JF4 Summary: 9 March 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	09 March 2011	Influent Volume:	10051 L (2656gal)
Previous Dry Hours:	79 hr	Runoff Duration:	691min
Maximum Flow Rate:	3.13L/s (49.7 gpm)	Number of Influent Samples:	12
Median Flow Rate:	0.10L/s (1.6 gpm)	Number of Effluent Samples:	12
Mean Flow Rate:	0.24L/s (3.8 gpm)	Peak Rainfall Intensity:	15mm/hr (0.6 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	29.2 mm (1.15 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

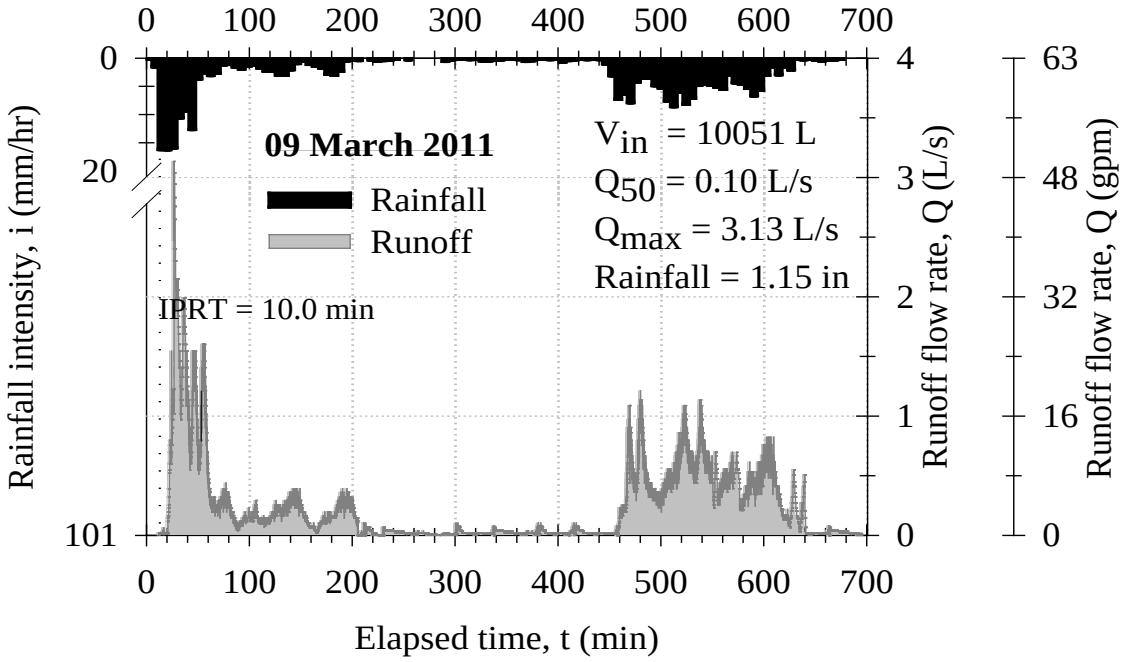


Figure A19: Hydrograph and hyetograph for 9 March 2011 event

On March 9, 2010, the JF4 unit treated a rainfall-runoff event. The event occurred after 79 dry hours. The peak rainfall intensity is 0.6 in/hr and rainfall depth is 1.15 inch. The storm lasted approximately 691 minutes. The maximum, median, and mean runoff flow rates are 50 gpm, 2 gpm, and 4 gpm, respectively. Influent volume is 2656 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 12 and 12, respectively. The influent and effluent TSS is 30.5 mg/L and 8.3 mg/L, respectively, and the removal efficiency is 73%. The influent and effluent SSC is 78.2 mg/L and 2.8 mg/L, respectively, and the removal efficiency is 97%.

Table A20: JF4 Summary: 28 March 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	28 March 2011	Influent Volume:	522 L (138 gal)
Previous Dry Hours:	438 hr	Event Duration:	66 min
Maximum Flow Rate:	1.03 L/s (16.4gpm)	Number of Influent Samples:	12
Median Flow Rate:	0.06 L/s (0.9gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.13 L/s (2.1gpm)	Peak Rainfall Intensity:	33 mm/hr (1.3 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	2.5 mm (0.10 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

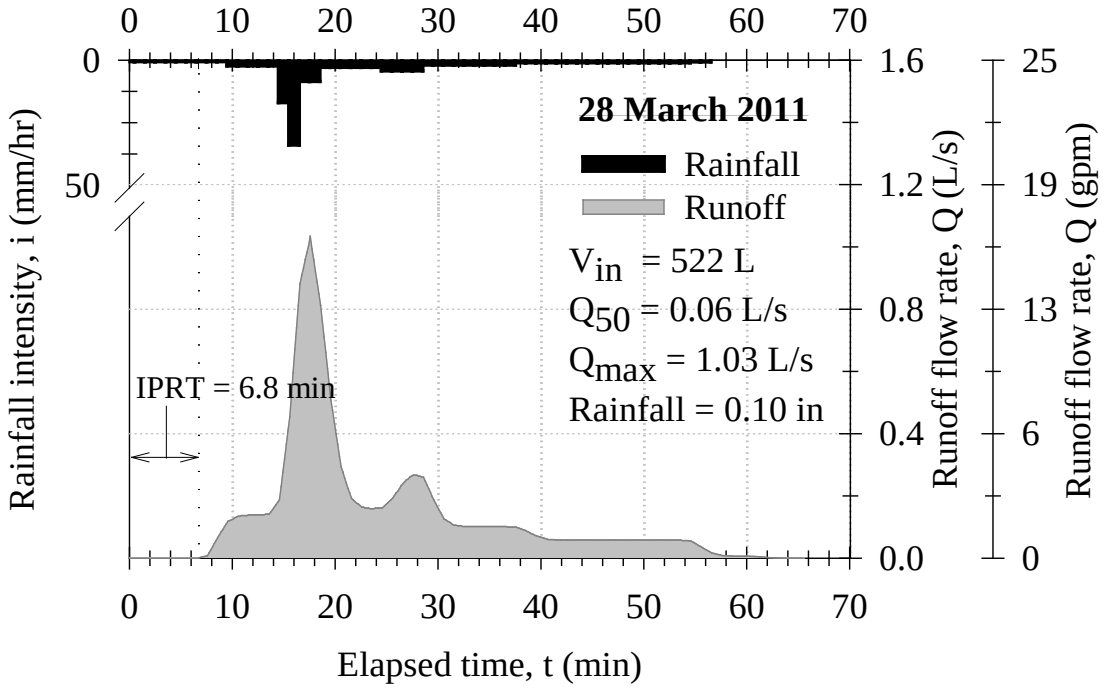


Figure A20: Hydrograph and hyetograph for 28 March 2011 event

On March 28, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 438 dry hours. The peak rainfall intensity is 1.3 in/hr and rainfall depth is 0.10 inch. The storm lasted approximately 66 minutes. The maximum, median, and mean runoff flow rates are 16 gpm, 1 gpm, and 2 gpm, respectively. The influent runoff volume is 138 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 12 and 10, respectively. The influent and effluent TSS is 68.4 mg/L and 12.7 mg/L, respectively, and the removal efficiency is 86%. The influent and effluent SSC is 102.8 mg/L and 5.6 mg/L, respectively, and the removal efficiency is 96%.

Table A21: JF4 Summary: 30 March 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	30 March 2011	Influent Volume:	3707L (979gal)
Previous Dry Hours:	48 hr	Event Duration:	179 min
Maximum Flow Rate:	5.61 L/s (89.0gpm)	Number of Influent Samples:	12
Median Flow Rate:	0.10 L/s (1.6gpm)	Number of Effluent Samples:	12
Mean Flow Rate:	0.29 L/s (4.5gpm)	Peak Rainfall Intensity:	76 mm/hr (3.0 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	15 mm (0.60 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

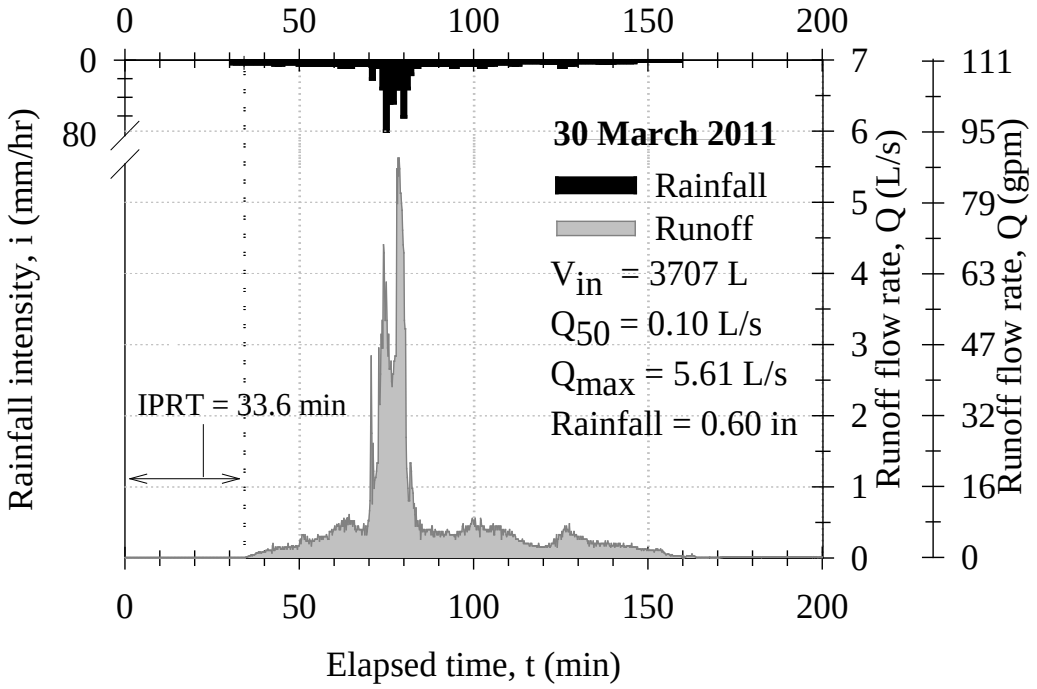


Figure A21: Hydrograph and hyetograph for 30 March 2011 event

On March 30, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 48 dry hours. The peak rainfall intensity is 3 in/hr and rainfall depth is 0.60 inch. The storm lasted approximately 179 minutes. The maximum, median, and mean runoff flow rates are 89 gpm, 2 gpm, and 5 gpm, respectively. The influent runoff volume is 979 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 12 and 12, respectively. The influent and effluent TSS is 104.5 mg/L and 7.3 mg/L, respectively, and the removal efficiency is 93%. The influent and effluent SSC is 443.7 mg/L and 7.3 mg/L, respectively, and the removal efficiency is 98%.

Table A22: JF4 Summary: 20 April 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	20 April 2011	Influent Volume:	206 L (54 gal)
Previous Dry Hours:	196 hr	Event Duration:	61 min
Maximum Flow Rate:	3.28 L/s (52.0gpm)	Number of Influent Samples:	12
Median Flow Rate:	0.01 L/s (0.1gpm)	Number of Effluent Samples:	12
Mean Flow Rate:	0.06 L/s (0.9gpm)	Peak Rainfall Intensity:	15 mm/hr (0.6 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	4 mm (0.14 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

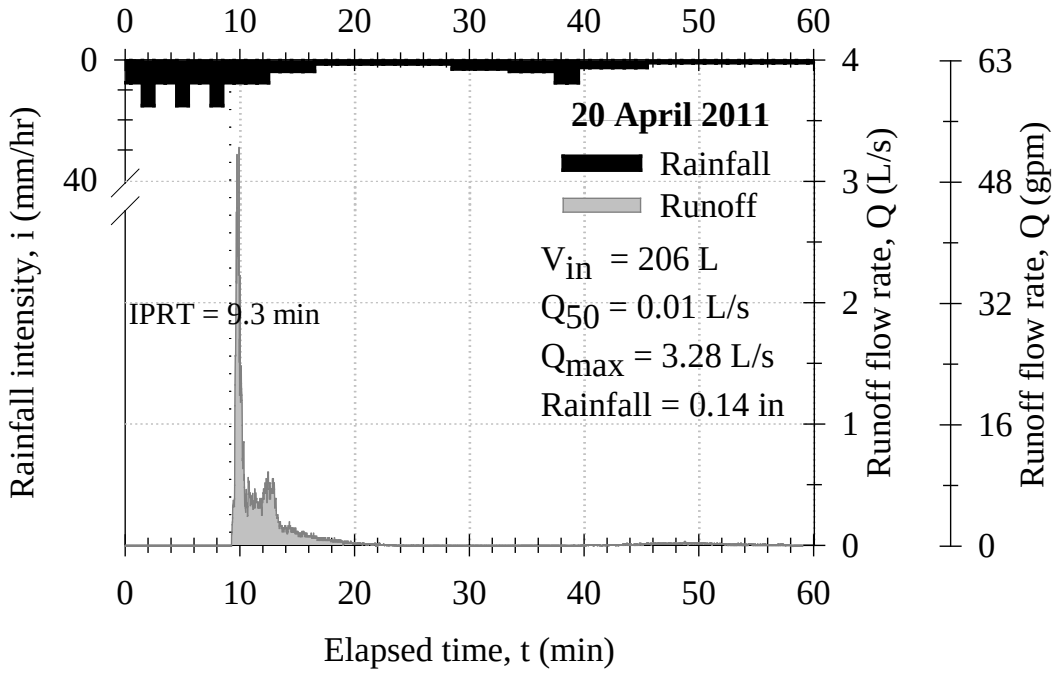


Figure A22: Hydrograph and hyetograph for 20 April 2011 event

On April 20, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 196 dry hours. The peak rainfall intensity is 0.6 in/hr and rainfall depth is 0.14 inch. The storm lasted approximately 61 minutes. The maximum, median, and mean runoff flow rates are 52 gpm, 0.1 gpm, and 0.9 gpm, respectively. The influent runoff volume is 54 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 12 and 12, respectively. The influent and effluent TSS is 143.7 mg/L and 11.4 mg/L, respectively, and the removal efficiency is 96%. The influent and effluent SSC is 921.7 mg/L and 6.1 mg/L, respectively, and the removal efficiency is 100%.

Table A23: JF4 Summary: 14 May 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	14May 2011	Influent Volume:	11256 L (2974 gal)
Previous Dry Hours:	188 hr	Event Duration:	295 min
Maximum Flow Rate:	7.53 L/s (119.3gpm)	Number of Influent Samples:	19
Median Flow Rate:	0.02 L/s (0.36gpm)	Number of Effluent Samples:	19
Mean Flow Rate:	0.63 L/s (9.98gpm)	Peak Rainfall Intensity:	137 mm/hr (5.4 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	50 mm (1.98 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

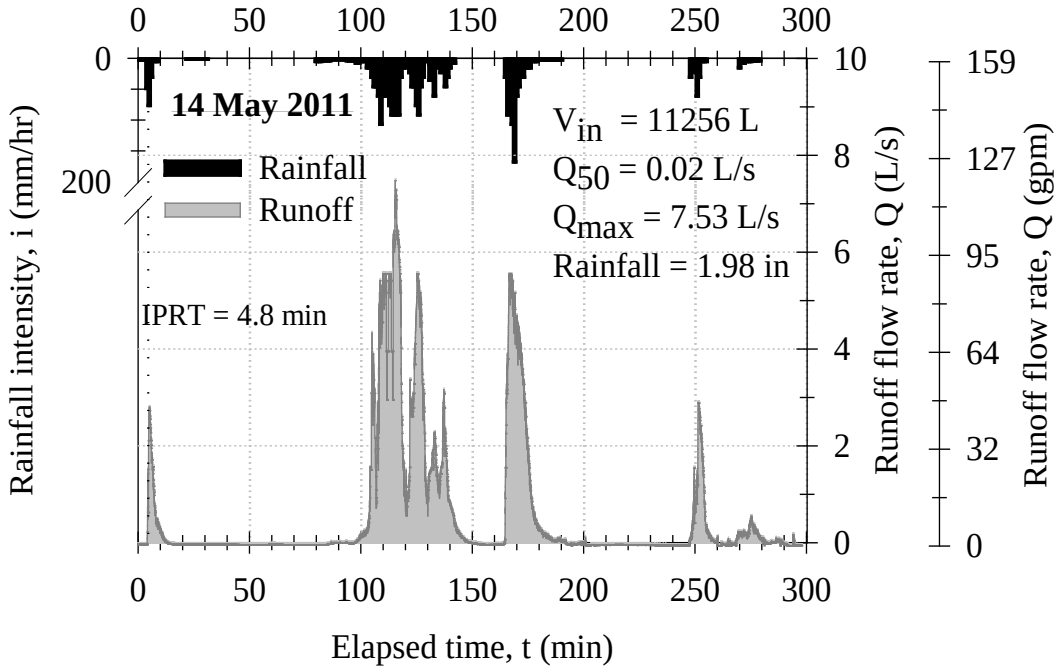


Figure A23: Hydrograph and hyetograph for 14 May 2011 event

On May 14, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 188 dry hours. The peak rainfall intensity is 5.4 in/hr and rainfall depth is 1.98 inch. The storm lasted approximately 295 minutes. The maximum, median, and mean runoff flow rates are 119.3gpm, 0.4 gpm, and 10.0gpm, respectively. The influent runoff volume is 2,974 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 19 and 19, respectively. The influent and effluent TSS is 77.1 mg/L and 12.5 mg/L, respectively, and the removal efficiency is 84%. The influent and effluent SSC is 487.3 mg/L and 5.3 mg/L, respectively, and the removal efficiency is 99%.

Table A24: JF4 Summary:6 June 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	6 June 2011	Influent Volume:	960 L (254 gal)
Previous Dry Hours:	541 hr	Event Duration:	69 min
Maximum Flow Rate:	1.55 L/s (24.5gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.01 L/s (0.1gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.23 L/s (3.7gpm)	Peak Rainfall Intensity:	23 mm/hr (0.9 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	4 mm (0.16 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

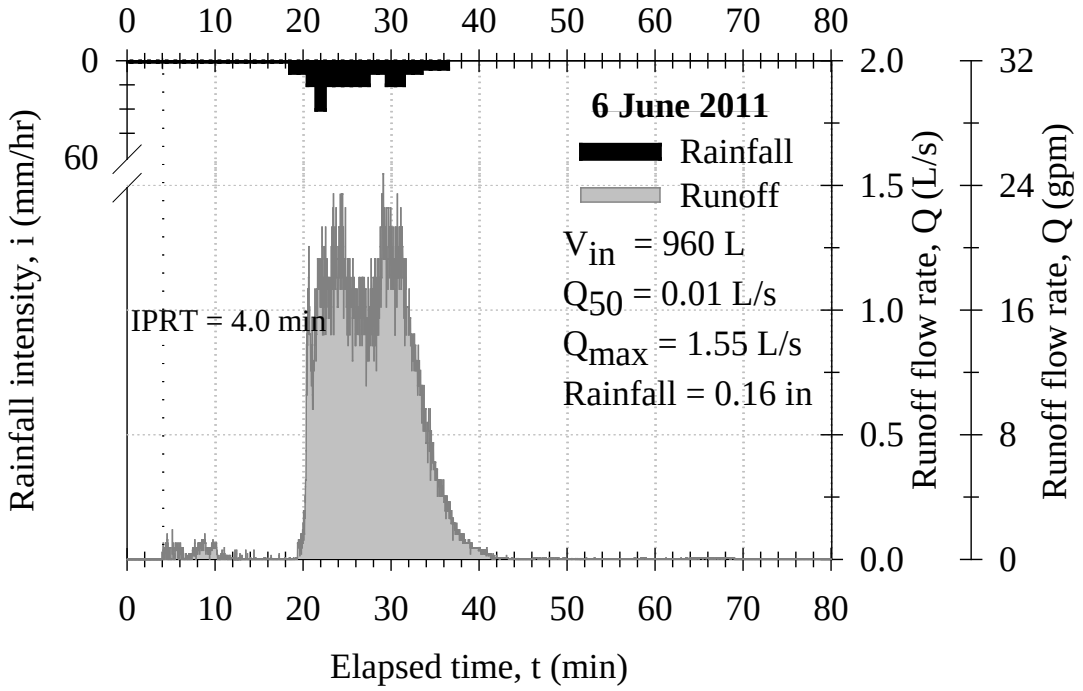


Figure A24: Hydrograph and hyetograph for 6 June 2011 event

On June 6, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 541 dry hours. The peak rainfall intensity is 0.9 in/hr and rainfall depth is 0.16 inch. The storm lasted approximately 69 minutes. The maximum, median, and mean runoff flow rates are 24.5 gpm, 0.1 gpm, and 3.7 gpm, respectively. The influent runoff volume is 254 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 85.6 mg/L and 13.2 mg/L, respectively, and the removal efficiency is 88%. The influent and effluent SSC is 237.5 mg/L and 9.0 mg/L, respectively, and the removal efficiency is 97%.

Table A25: JF4 Summary: 27 June 2011 Hydrology

Event Information		JF4 Unit Treatment Run information	
Event Date:	27 June 2011	Influent Volume:	3383 L (894 gal)
Previous Dry Hours:	88 hr	Event Duration:	50 min
Maximum Flow Rate:	3.35 L/s (53.2gpm)	Number of Influent Samples:	10
Median Flow Rate:	0.12 L/s (2.0gpm)	Number of Effluent Samples:	10
Mean Flow Rate:	0.64 L/s (10.1gpm)	Peak Rainfall Intensity:	43 mm/hr (1.7 inch/hr)
Experimental Site:	UF Engineering Surface Parking	Rainfall Depth:	11 mm (0.45 inch)
TARP Qualifying:	YES	Site Location:	Gainesville, FL

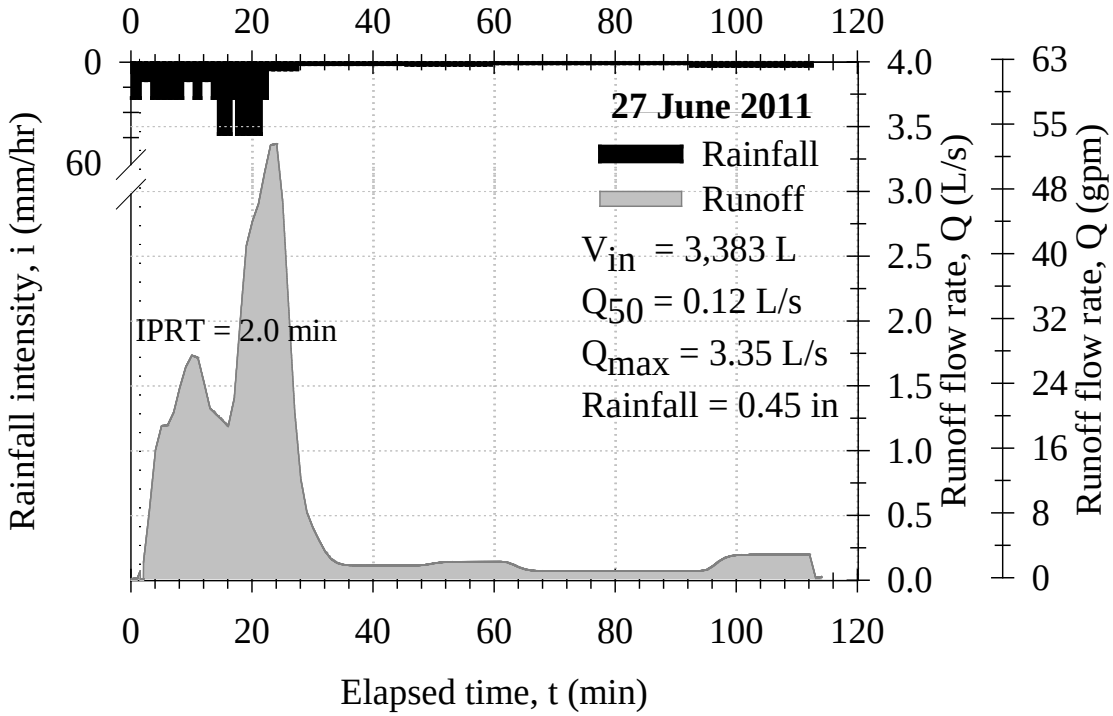


Figure A25: Hydrograph and hyetograph for 27 June 2011 event

On June 27, 2011, the JF4 unit treated a rainfall-runoff event. The event occurred after 88 dry hours. The peak rainfall intensity is 1.7 in/hr and rainfall depth is 0.45 inch. The storm lasted approximately 50 minutes. The maximum, median, and mean runoff flow rates are 53gpm, 2gpm, and 10 gpm, respectively. The influent runoff volume is 894 gallons. Sampling occurred throughout the entire duration of the storm and the number of influent and effluent samples taken is 10 and 10, respectively. The influent and effluent TSS is 131.4 mg/L and 12.8 mg/L, respectively, and the removal efficiency is 91%. The influent and effluent SSC is 591.7 mg/L and 9.8 mg/L, respectively, and the removal efficiency is 98%.

APPENDIX B

HYDRAULIC TESTING

Extensive hydraulic testing was conducted at the University of Florida on a new clean 54-inch long Jellyfish® filtration cartridge with the standard orifice sizes in the cartridge lid (35 mm orifice for the draindown cartridge and 70 mm for the hi-flo cartridge). In addition, hydraulic testing was conducted on the Jellyfish® Filter JF4-2-1 with clean cartridges prior to commissioning as well as with dirty cartridges at the conclusion of the monitoring period (25 monitored storm events and 15 inches of cumulative rainfall).

Figure B1 depicts the hydraulic response curve for a new clean 54-inch Jellyfish® filtration cartridge with a 35 mm orifice in the cartridge lid, which is the standard lid orifice for the draindown cartridge. Test results demonstrate a flow capacity of 44 gpm at 18 inches of driving head. Imbrium Systems assigns a design treatment flow rate of 40 gpm to the draindown cartridge used in the Jellyfish® Filter JF4-2-1.

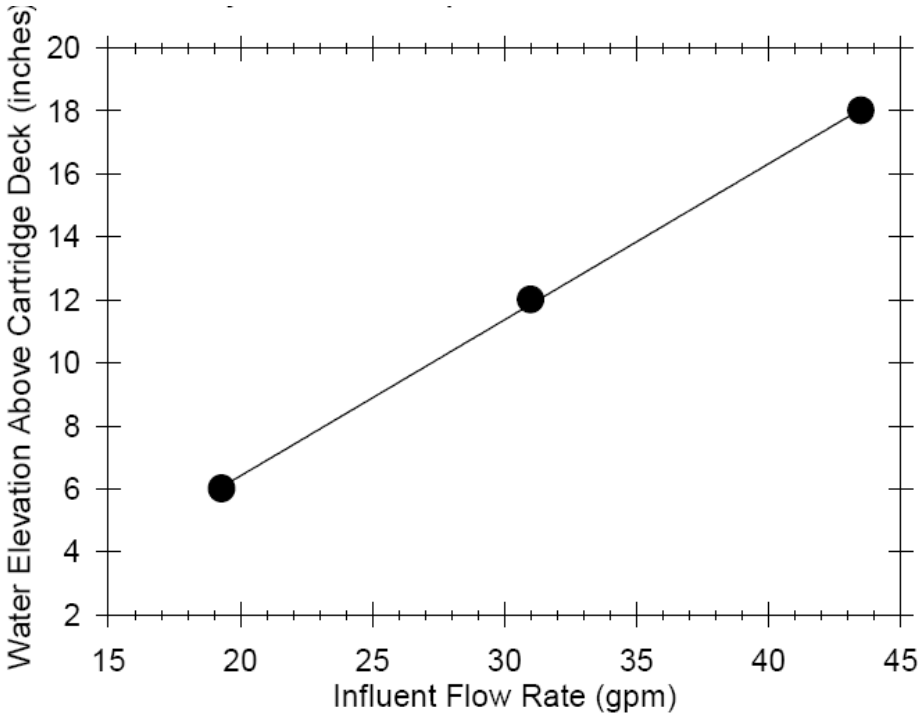


Figure B1: Hydraulic response of a clean 54-inch long Jellyfish filtration cartridge with a 35 mm lid orifice, used as the draindown cartridge in the JF4-2-1.

Figure B2 depicts the hydraulic response curve for a new clean 54-inch Jellyfish filtration cartridge with a 70 mm orifice in the cartridge lid, which is the standard lid orifice for each of the hi-flo cartridges. Test results demonstrate a flow capacity of 116 gpm at 18 inches of driving head and 88 gpm at 12 inches of driving head. Since each hi-flo cartridge is located within the 6-inch high backwash pool weir, the net available driving head for the hi-flo cartridge is 12 inches. Imbrium Systems assigns a design treatment flow rate of 80 gpm to each hi-flo cartridge used in the Jellyfish® Filter JF4-2-1.

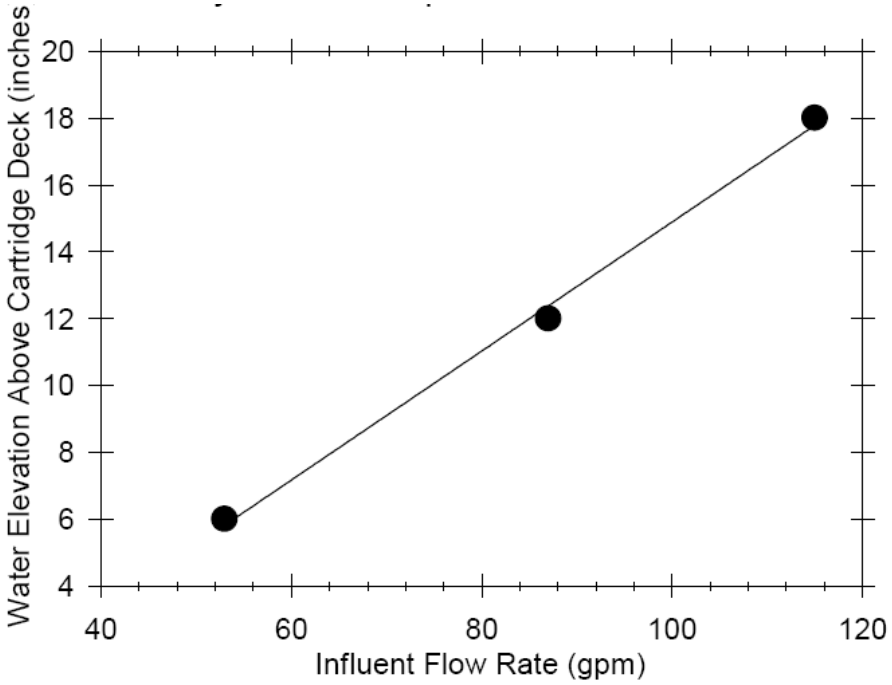


Figure B2: Hydraulic response of a clean 54-inch long Jellyfish filtration cartridge with a 70 mm lid orifice, used for each hi-flo cartridge in the JF4-2-1.

Figure B3 depicts the hydraulic response curves for the Jellyfish® Filter JF4-2-1, which uses three 54-inch long Jellyfish filtration cartridges, one deployed as the draindown cartridge and two deployed as hi-flo cartridges. Hydraulic testing was performed with clean new cartridges prior to commissioning the system for field testing, and with dirty cartridges at the conclusion of monitoring after 25 storm events and 15 inches of cumulative rainfall. Test results demonstrate a flow capacity of 200 gpm at 18 inches of driving head for the JF4-2-1 with clean cartridges, which is the design treatment flow rate of the system. The hydraulic response curves are virtually identical for the system with clean cartridges and with dirty cartridges up to 18 inches of driving head.

The divergence of the curves beyond 18 inches of driving head is attributed to a difference in the height of the pressure relief pipe during the hydraulic tests. During hydraulic testing with clean cartridges, the pressure relief pipe height was 18 inches. At driving head greater than 18 inches, the pressure relief pipe began to overflow, resulting in a relatively flat response curve from that point forward as flow rate increased. The pressure relief pipe height was subsequently increased to 24 inches prior to commissioning the system in order to eliminate any possibility of internal bypassing of water during the monitoring period, An external bypass was installed around the treatment unit and configured to begin bypassing influent if driving head exceeded 18 inches during a storm event. Hydraulic testing was performed on the JF4-2-1 with the dirty cartridges after the external bypass was disassembled and with the 24-inch high pressure relief pipe intact, resulting in a response curve with gradually increasing slope as flow rate increased with driving head between 18 and 24 inches.

After completing hydraulic testing on the JF4-2-1 with dirty cartridges, the draindown time of water within the 6-inch high backwash pool weir was measured and ranged from 101-120 seconds. The backwash pool is designed as a passive self-cleaning mechanism, and provides a reverse flow of water through the hi-flo cartridges when influent flow ceases. Water below the cartridge deck is displaced through the draindown cartridge and discharged to the top of the cartridge deck and subsequently to the

outlet pipe. The backwash pool draindown time of approximately 2 minutes indicated that the degree of PM occlusion on the dirty hi-flo and draindown cartridges did not appear to significantly impede water flow through the cartridges during passive backwash.

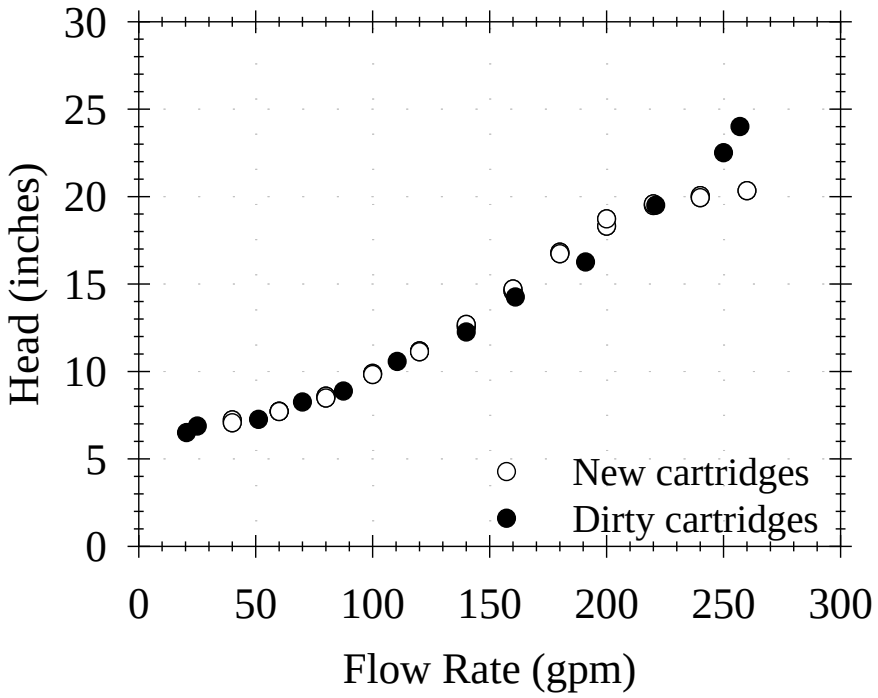


Figure B3: Hydraulic response of the Jellyfish® Filter JF4-2-1 with clean cartridges prior to commissioning and with dirty cartridges after the monitoring period (25 storm events, 15 inches of cumulative rainfall, 29,851 gallons of treated runoff, and 166 pounds of captured PM mass)

After completing hydraulic testing of the JF4-2-1 with the dirty cartridges, a manual back-flush of the dirty cartridges was performed using a Jellyfish® Cartridge Back-flush Pipe to simulate a typical annual maintenance activity. The back-flush pipe is a 40-inch tall, 12-inch diameter hollow tube fitted with a flush valve and flapper on the inside bottom, and a compressible gasket on the lower end. In order to manually back-flush a cartridge, the cartridge lid is removed and the back-flush pipe is placed over the cartridge receptacle with the compressible gasket resting squarely on the receptacle. The pipe is filled with clean water using a hose, and the weight of the water causes the compressible gasket to form a water-tight seal on the receptacle. A wire connected to the internal flapper valve is then pulled, which raises the flapper and allows the contents of the pipe to drain out and back-flush the cartridge. Since the pipe is 40 inches tall, the head of back-flush water is significantly higher than the typical 18 inches of driving head that a cartridge might experience during peak treatment forward flow. The pipe is designed to provide a significant back-flush volume and relatively high back-flush flow rate in order to effectively remove accumulated sediment from the filter surfaces. The back-flush pipe holds approximately 18 gallons of water when full, with 14 gallons of that total in the uppermost 30 inches of pipe, which is the distance from the top of the pipe to the top of the flapper valve when in the open position.

The time to drain the uppermost 30 inches of back-flush pipe volume (14 gallons) was measured for all three cartridges and determined to be approximately 8 seconds in each case, which equates to an average

back-flush flow rate of approximately 105 gpm for each cartridge. Hydraulic testing was subsequently performed on the JF4-2-1 with the manually back-flushed cartridges. As expected, the hydraulic response curve was virtually identical to the system with clean new cartridges and with dirty cartridges as determined earlier. This indicates that the degree of sediment occlusion on the dirty cartridges was not significant enough to result in an increase in hydraulic capacity after manual back-flushing. Prior to manual back-flushing of the cartridges, 158 pounds of dry basis pollutant mass was recovered from the sump. After manual back-flushing of the cartridges, a very small amount of additional pollutant mass (0.1 pounds dry basis) was recovered from the sump. This indicates that each dirty cartridge contained sufficient porosity to allow passage of a relatively high back-flush flow rate such that minimal PM was dislodged from the cartridges, despite the presence of 2.6 pounds of PM mass on each cartridge (established by later manual rinsing of each cartridge as described below).

After completing hydraulic testing of the JF4-2-1 with manually backwashed cartridges, the cartridges were removed from the system and rinsed with a garden hose sprayer as part of the PM mass recovery and to simulate a typical maintenance activity. Accumulated PM was easily removed from the cartridges with rinsing, and a pollutant mass of 2.6 pounds (dry basis) was recovered from each cartridge, for a total of approximately 8 pounds. PM mass recovered from the sump was 158 pounds, for a total dry basis PM mass recovery of 166 pounds. Data are shown in **Table B-1**. The uniform and relatively low quantity of pollutant mass found on the cartridges indicates that self-cleaning mechanisms are effective in removing accumulated PM from both the hi-flo cartridges and the draindown cartridge.

Hydraulic testing was subsequently performed on the JF4-2-1 with the manually rinsed cartridges. As expected, the hydraulic response curve was virtually identical to the system with clean new cartridges, with dirty cartridges, and with manually backwashed cartridges as determined earlier. **Figure B4.**

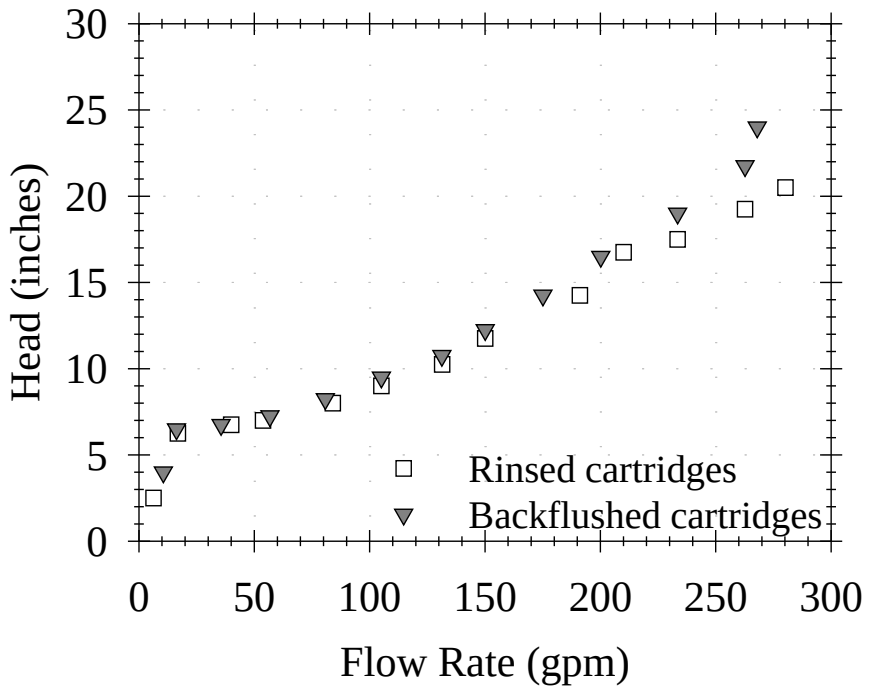


Figure B4: Hydraulic response of the JF4-2-1 with manually back-flushed cartridges and with manually rinsed cartridges

Table B-1 Mass balance results utilizing measured functional and granulometric fractions of sediment, settleable and suspended PM

Rainfall-runoff Event	Influent									Effluent							
	Vol.	Sediment PM		Settleable PM		Suspended PM		Total PM		Vol.	Sediment PM		Settleable PM		Suspended PM		Tota
		EMC	Mass	EMC	Mass	EMC	Mass	EMC	Mass		EMC	Mass	EMC	Mass	EMC	Mass	EMC
	L	mg/L	g	mg/L	g	mg/L	g	mg/L	g	L	mg/L	g	mg/L	g	mg/L	g	mg/L
28-May-10	7454	435.9	3249.6	45.4	338.6	43.7	325.9	525.1	3914.2	3682	6.2	22.9	6.9	25.2	11.9	43.8	25.0
16-Jun	4997	1333.5	6663.5	66.9	334.5	67.9	339.3	1468.3	7337.3	4665	7.1	33.2	2.0	9.4	20.1	93.6	29.2
21-Jun	8683	1781.6	15469.0	22.2	192.5	13.7	119.2	1817.5	15780.7	8460	5.6	47.6	1.8	15.1	9.9	83.7	17.3
30-Jun	5451	504.0	2747.3	20.6	112.5	19.2	104.9	543.9	2964.7	5330	8.0	42.5	1.5	8.2	5.7	30.5	15.2
15-Jul	3602	938.6	3381.1	68.2	245.6	23.7	85.3	1030.5	3712.0	3296	5.2	17.0	1.4	4.6	6.9	22.9	13.5
1-Aug	11990	243.2	2916.0	22.8	272.8	18.5	222.2	284.5	3411.0	11676	4.8	55.9	8.4	98.4	6.9	80.9	20.1
6-Aug	1395	390.3	544.4	29.5	41.2	48.0	66.9	467.8	652.5	1024	13.1	13.5	2.9	3.0	12.0	12.3	28.1
7-Aug	2620	222.5	582.9	32.3	84.5	13.1	34.3	267.9	701.8	2540	1.6	4.0	5.1	13.1	6.9	17.5	13.6
23-Aug	310	533.9	165.5	41.9	13.0	44.6	13.8	620.4	192.3	193	2.6	0.5	3.1	0.6	4.7	0.9	10.4
12-Sep	1641	165.0	270.7	68.7	112.7	67.4	110.6	301.2	494.1	1508	2.7	4.1	4.1	6.2	11.5	17.4	18.4
26-Sep	1126	224.5	252.9	0.9	1.0	2.0	2.2	227.4	256.1	835	7.9	6.6	2.2	1.8	2.0	1.7	12.1
27-Sep	3837	875.1	3357.4	50.0	192.0	44.5	170.8	969.6	3720.2	3765	3.2	11.9	2.1	7.8	5.0	18.7	10.2
4-Nov	994	486.4	483.5	38.6	38.4	92.8	92.3	617.8	614.2	510	3.7	1.9	2.9	1.5	6.5	3.3	13.1
16-Nov	306	318.4	97.5	131.9	40.4	118.2	36.2	568.6	174.1	166	18.0	3.0	2.4	0.4	8.4	1.4	28.9
5-Jan-11	5791	841.4	4872.3	49.8	288.4	40.9	236.8	932.1	5397.5	4948	3.2	15.7	2.8	14.1	12.9	63.9	18.9
10-Jan	1126	454.0	511.4	60.1	67.7	20.8	23.4	534.9	602.5	1047	1.4	1.5	3.6	3.8	3.1	3.2	8.1
25-Jan	12387	410.6	5085.8	37.7	467.3	32.4	401.8	480.7	5954.9	12353	1.1	14.0	2.1	25.4	2.0	24.6	5.2
7-Feb	13211	738.5	9756.9	16.7	221.2	23.0	304.4	778.3	10282.5	12928	2.4	31.1	0.8	10.8	4.2	54.7	7.5
9-Mar	10036	69.6	699.0	8.5	85.6	13.3	133.5	91.5	918.1	9805	0.5	5.3	0.6	5.8	0.9	9.1	2.1
28-Mar	522	65.4	34.1	13.0	6.8	36.4	19.0	114.8	59.9	423	1.9	0.8	2.1	0.9	8.0	3.4	12.0
30-Mar	3761	386.9	1455.3	54.3	204.3	34.0	127.7	475.2	1787.3	3678	0.8	3.0	1.8	6.6	4.6	16.7	7.2
20-Apr	204	1010.4	206.2	30.9	6.3	24.8	5.1	1066.1	217.6	113	1.8	0.2	2.6	0.3	7.1	0.8	11.5
14-May	10864	790.9	8591.9	59.6	647.5	44.5	483.6	895.0	9723.0	10697	2.0	21.2	1.3	14.0	11.2	119.5	14.5
6-Jun	964	307.6	296.5	30.8	29.7	53.3	51.4	391.7	377.6	733	1.1	0.8	2.5	1.8	10.4	7.6	13.9
27-Jun	3379	514.8	1739.7	67.6	228.6	47.6	161.0	630.1	2129.3	3175	4.6	14.6	2.3	7.3	8.9	28.2	15.8

Total influent PM = 81.4 kg (179 lb)
Total effluent PM = 1.4 kg (3 lb)
Mass difference between influent and effluent = 79.9 kg (176 lb)
Independent PM Recovery based on cleaning out and backwashing unit and recovering PM = 75.5 kg (166 lb)
% mass recovery = 94.5%

Notes: Sediment PM includes all biogenic material including leaves, sticks, detritus.
Settleable PM based on SM 2540F.
Suspended PM based on 60 min. quiescent settling in Imhoff cone.

References for details: Sansalone and Kim (2008), Kim and Sansalone (2008) and Sansalone et. al. (2009)

Appendix I

Stormwater Management System Backup Calculations

Calculation Number	Title
58.0821.1121.01	Containment Design for Miscellaneous Tanks, Transformers, and Chemical/Oil Unloading Areas
58.5406.1101.01	Stormwater System Design
58.5406.1101.04	Site Infiltration Trench Depth and Surface Area
58.5406.1101.05	Rip Rap Sizes for Wave Protection
58.5406.1101.07	Post-Development Runoff Rate (Later)
58.5406.1101.08	Pre-Development Runoff Rate (Later)
58.5406.1101.09	Stormwater Outfall Riprap Apron Sizing
58.5406.1101.10	Site Water Quality Flow Calculation
58.5406.1101.11	Site Water Quality Volume Calculation
58.5406.1101.13	Ditch Depth Check Calculation
58.5406.1101.14	Site Stormwater Reinforced Concrete Pipe Cover

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2014-ANE-2323-OE

Issued Date: 10/24/2016

Thomas Copus
PSEG Power Connecticut LLC
1 Atlantic Street
Bridgeport, CT 06604

**** Extension ****

A Determination was issued by the Federal Aviation Administration (FAA) concerning:

Structure:	Stack Bridgeport Unit 5 Stack
Location:	Bridgeport, CT
Latitude:	41-10-00.16N NAD 83
Longitude:	73-10-48.42W
Heights:	17 feet site elevation (SE)
	300 feet above ground level (AGL)
	317 feet above mean sea level (AMSL)

In response to your request for an extension of the effective period of the determination, the FAA has reviewed the aeronautical study in light of current aeronautical operations in the area of the structure and finds that no significant aeronautical changes have occurred which would alter the determination issued for this structure.

Accordingly, pursuant to the authority delegated to me, the effective period of the determination issued under the above cited aeronautical study number is hereby extended and will expire on 04/24/2018 unless otherwise extended, revised, or terminated by this office. You must adhere to all conditions identified in the original determination.

This extension issued in accordance with 49 U.S.C., Section 44718 and, if applicable, Title 14 of the Code of Federal Regulations, part 77, concerns the effect of the structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (404) 305-6531. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-ANE-2323-OE.

Signature Control No: 235894583-308154422 (EXT)
Darin Clipper
Specialist

Attachment(s)

Additional information for ASN 2014-ANE-2323-OE

Current FAA policy is that only one extension, and for a maximum of 18 months, will be granted. If construction has not begun within the valid period of this extension, it will be necessary to submit a new FAA Form 7460-1, Notice of Construction or Alteration, a minimum of 45 days before construction is expected to begin. If aeronautical study then indicates that further study would be necessary, the process could take an additional 90-120 days to complete.

There is no guarantee that a structure which had a previous favorable determination would continue to receive subsequent favorable determinations. Determinations are made based on current conditions, future conditions (plans on file), as well as cumulative impacts.

PSEG Power Connecticut LLC

Bridgeport Harbor Station Unit 5

1 Atlantic Street • Bridgeport, CT 06604

Spill Prevention, Control and Countermeasures Plan

September 2016

Table of Contents

List of Tables

Appendices

Reference Documents

1. U.S. Coast Guard-On-Shore Facility Emergency Response (Oil Pollution Act) Plan
2. Bridgeport Harbor Station Procedures for Loading and Unloading Operations of Hazardous substances in Bulk Quantities
3. OP-P24 – The Operations manual for the Bridgeport Harbor Station Oil Transfer Facility.
4. The Stormwater Pollution Prevention Plan for Bridgeport Harbor Station.
5. The Emergency Response Action Plan (ERAP), and
6. The Facility Response Plan for Marine Related Facilities (FRP – OPA-90)

Acronyms Used in the Report

AST	Aboveground Storage Tank
EPA	U.S. Environmental Protection Agency
CT DEEP	Connecticut Department of Energy & Environmental Protection
PE	Professional Engineer
POTW	Publicly Owned Treatment Works
SPCC	Spill Prevention, Control, and Countermeasure
STI	Steel Tank Institute
ULSD	Ultra-low Sulfur Distillate
UST	Underground Storage Tank

1. Introduction

1.1. Purpose

The purpose of this Spill Prevention, Control, and Countermeasure (SPCC) Plan (Plan) is to describe measures implemented by PSEG Power Connecticut LLC (PSEG) at Bridgeport Harbor Station Unit 5 (BHS Unit 5) to prevent oil discharges from occurring and to prepare PSEG to respond in a safe, effective, and timely manner to mitigate the impacts of a discharge. Prior to bringing oil or hazardous chemicals associated with facility operation to BHS Unit 5, this Plan will be updated to reflect as built conditions and merged with the existing BHS SPCC Plan. This Plan has been prepared to meet the requirements of Title 40, Code of Federal Regulations, Part 112 (40 CFR Part 112).

In addition to fulfilling requirements of 40 CFR Part 112, this SPCC Plan is used as a reference for oil storage information and testing records, as a tool to communicate practices on preventing and responding to discharges with employees, as a guide to facility inspections, and as a resource during emergency response.

PSEG management has determined that this facility poses a risk of substantial harm under 40 CFR Part 112, as recorded in the “Substantial Harm Determination” form included in Appendix B of this Plan. BHS maintains a separate Facility Response Plan under OPA-90; however, the station decommissioned the marine transfer area associated with the No. 6 Fuel Oil unloading/loading terminal, which has been under caretaker status since April 2012 (see Appendix H for a copy of the USCG letter documenting this). This facility will be repaired, upgraded or replaced to accommodate fuel oil delivery via barge for BHS Unit 5. Design details for this upgrade will be developed during final facility design.

This Plan provides guidance on key actions that PSEG must perform to comply with the SPCC rule:

- Complete monthly and annual site inspections as outlined in the Inspection, Tests, and Records section of this Plan (Section 4.7) using the inspection checklists included in Appendix C.
- Perform preventive maintenance of equipment, secondary containment systems, and discharge prevention systems described in this Plan, as needed, to keep them in proper operating condition.
- Conduct annual employee training as outlined in the Personnel, Training, and Spill Prevention Procedures section of this Plan (Section 4.8) and document the training on a log similar to the example form included in Appendix D.

- If either of the following occurs, submit the SPCC Plan to the EPA Region 1 Regional Administrator (RA) and the Connecticut Department of Energy & Environmental Protection (CT DEEP), along with other information as detailed in Section 6.4 of this Plan, within 60 days of such occurrence:
  - The facility discharges more than 1,000 gallons of oil into or upon the navigable waters of the U.S. or adjoining shorelines in a single spill event; or
  - The facility discharges oil in a quantity greater than 42 gallons in each of two spill events within any 12-month period.
- Review the SPCC Plan at least once every five (5) years and amend it to include more effective prevention and control technology, if such technology will significantly reduce the likelihood of a spill event and has been proven effective in the field at the time of the review. Plan amendments, other than administrative changes, must be recertified by a Professional Engineer (PE) on the certification page in Section 2.2 of this Plan.
- Amend the SPCC Plan within six (6) months whenever there is a technical change in facility design, construction, operation, or maintenance that materially affects the facility's spill potential. The amended Plan must be recertified by a Professional Engineer.
- Review the Plan on an annual basis. Update the Plan to reflect any "administrative changes" that are applicable, such as personnel changes or revisions to contact information, such as phone numbers. Administrative changes must be documented in the Plan review log of Section 2.4 of this Plan, but do not have to be certified by a PE.

1.2. Supporting Documents

Other facility environmental management plans that are relevant to oil management have been used to develop this plan and sections of those plans have been incorporated or referenced in this SPCC plan. These supporting documents include:

- OP-P24 – The Operations Manual for the Bridgeport Harbor Station Oil Transfer Facility,
- OP-P26 – The Hazardous Waste Management Operating Procedures,
- The Stormwater Pollution Prevention Plan (SWPPP) for Bridgeport Harbor Station,
- The Emergency Response Action Plan (ERAP), and

  The Facility Response Plan for Marine Related Facilities (FRP – OPA-90).

2. Plan Administration

2.1. Management Approval and Designated Person (40 CFR 112.7)

PSEG management is committed to preventing discharges of oil to navigable waters and the environment, and to maintaining the highest standards for spill prevention control and countermeasures through the implementation and regular review and amendment to this Plan. This SPCC Plan has the full approval of PSEG management, and accordingly, PSEG management has committed the necessary resources to implement the measures described in this Plan.

The Plant Manager is the Designated Person Accountable for Oil Spill Prevention at the facility and has the authority to commit the necessary resources to implement this Plan.

Authorized Facility Representative (facility response coordinator):

Signature: _____ Date: _____
TBD
Title: Plant Manager

2.2. Professional Engineer Certification (40 CFR 112.3(d))

The undersigned Registered Professional Engineer certifies that he is familiar with the requirements of Part 112 of Title 40 of the Code of Federal Regulations (40 CFR Part 112) and that he or his agent has visited and examined the facility. The undersigned Registered Professional Engineer attests that this Spill Prevention, Control, and Countermeasure Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and the requirements of 40 CFR Part 112; that procedures for required inspections and testing have been established; and that this Plan is adequate for the facility.

This certification in no way relieves the owner or operator of the facility of his/her duty to prepare and fully implement this SPCC Plan in accordance with the requirements of 40 CFR Part 112. This Plan is valid only to the extent that the facility owner or operator maintains, tests, and inspects equipment, containment, and other devices as prescribed in this Plan.

Signature	Professional Engineer Registration Number
Name	
Company	Date

2.3. Location of SPCC Plan (40 CFR 112.3(e))

In accordance with 40 CFR 112.3(e), a complete copy of this SPCC Plan is maintained at the BHS Unit 5 Control Room.

2.4. Plan Review (40 CFR 112.3 and 112.5)

2.4.1. Changes in Facility Configuration

In accordance with 40 CFR 112.5(a), PSEG periodically reviews and evaluates this SPCC Plan for any change in the facility design, construction, operation, or maintenance that materially affects the facility's potential for an oil discharge, including, but not limited to:

- commissioning of containers;
- deletion or addition of tanks or oil filled equipment;
- reconstruction, replacement, or installation of piping systems;
- construction or demolition that might alter secondary containment structures; or
- changes of product or service, revisions to standard operating procedures, modification of testing/inspection procedures, and use of new or modified industry standards or maintenance procedures.

Amendments to the Plan made to address changes of this nature are referred to as technical amendments, and must be certified by a Professional Engineer. Non-technical amendments can be done (and must be documented in this section) by the facility owner and/or operator. Non-technical amendments include the following:

- change in the name or contact information (i.e., telephone numbers) of individuals responsible for Plan implementation; or
- change in the name or contact information of spill response or cleanup contractors.

PSEG must make the needed revisions to the SPCC Plan as soon as possible, but no later than six months after the change occurs. The Plan must be implemented as soon as possible following any technical amendment, but no later than six months from the date of the amendment. The Plant Manager or designee shall notify the Environmental Compliance & Programs Manager of any amendments subsequently ordered and the latter shall revise the Plan within 30 days of such notice. Such amendments shall then be implemented as soon as possible, but no later than six months after becoming part of the Plan, unless another date is specified by the Regional Administrator (40 CFR 112.4(e)).

2.4.2. Scheduled Plan Reviews

In accordance with 40 CFR 112.5(b), PSEG must review this SPCC Plan at least once every five years. Revisions to the Plan, if needed, are made within six months of the five-year review. A registered Professional Engineer must certify any technical amendment to this Plan, as described above, in accordance with 40 CFR 112.3(d).

2.4.3. Record of Plan Reviews

Scheduled reviews and Plan amendments are recorded in the Plan Review Log (Table 2-1). This log must be completed even if no amendment is made to the Plan as a result of the review.

2.5. Facilities, Procedures, Methods, or Equipment Not Yet Fully Operational (40 CFR 112.7)

BHS Unit 5 is currently being designed, with an anticipated construction start date in early 2017. As such, this Plan is based on preliminary design data and information for BHS Unit 5 and will be amended to reflect any modifications to facilities, procedures, methods or vendor equipment selected or installed during final design and construction.

2.6. Cross Reference with SPCC Provisions (40 CFR 112.7)

This SPCC Plan does not follow the exact order presented in 40 CFR 112. Section headings identify, where appropriate, the relevant section(s) of the SPCC rule. Table 2-2 presents a cross-reference of Plan sections relative to applicable sections of 40 CFR 112.

Table 2-1:
SPCC Plan Review Log

Date	Scope	Name	Licensing State and Registration No.
September 2016	Develop Unit 5 Draft SPCC Plan	Not Applicable – Draft for review. Final plan to be merged with BHS SPCC Plan.	Not Applicable – Draft for review

Table 2-2:
SPCC Cross Reference

Provision	Plan Section	Page
112.3(d)	2.2 Professional Engineer Certification	2-4
112.3(e)	2.3 Location of SPCC Plan	2-5
112.5	2.4 Plan Review	2-5
112.7	Management Approval	2-1
112.7	2.6 Cross-Reference with SPCC Rule	Table 2-2
112.7(a)(3)	Section 3: General Facility Information Appendix A: Site Plan and Facility Diagram	3-1 Appendix A
112.7(a)(4)	4.3 Spill Reporting	4-1 Appendix F
112.7(a)(5)	Section 6: Discharge Response	6-1
112.7(b)	4.4 Potential Discharge Volumes & Direction of Flow	4-1
112.7(c)	4.5 Containment and Diversionary Structures	4-4
112.7(d)	4.6 Practicability of Secondary Containment	4-5
112.7(e)	4.7 Inspections, Tests, and Records	4-5 Appendix B
112.7(f)	4.8 Personnel, Training and Discharge Prevention Procedures	4-7
112.7(g)	4.9 Security	4-8
112.7(h)	4.10 Tank Truck Loading/Unloading	4-8
112.7(i)	4.11 Brittle Fracture Evaluation	4-10
112.7(j)	4.12 Conformance with Applicable State and Local Requirements	4-10
112.8(b)	5.1 Facility Drainage	5-1
112.8(c)(1)	5.2.1 Construction	5-1
112.8(c)(2)	5.2.2 Secondary Containment	5-1
112.8(c)(3)	5.2.3 Drainage of Diked Areas	5-4
112.8(c)(4)	5.2.4 Corrosion Protection	5-4
112.8(c)(5)	5.2.5 Partially Buried and Bunkered Storage Tanks	5-4
112.8(c)(6)	5.2.6 Inspection Appendix B - Facility Inspection Checklists	5-4 Appendix C
112.8(c)(7)	5.2.7 Heating Coils	5-6
112.8(c)(8)	5.2.8 Overfill Prevention System	5-6
112.8(c)(9)	5.2.9 Effluent Treatment Facilities	5-7
112.8(c)(10)	5.2.10 Visible Discharges	5-7
112.8(c)(11)	5.2.11 Mobile and Portable Containers	5-7
112.8(d)	5.3 Transfer Operations, Pumping and In-Plant Processes	5-7
112.20(e)	Certification of Substantial Harm Determination	Appendix B

3. General Facility Information

Name:	PSEG Power Connecticut, LLC, Bridgeport Harbor Station Unit 5
Address:	1 Atlantic Street Bridgeport, CT 06604
Type:	Electric Power Generation
Date of Initial Operations:	August 1957 for BHS site, TBD for Unit 5
Owner/Operator:	PSEG Power Connecticut, LLC 80 Park Plaza T18H Newark, NJ 07102
Primary contact:	TBD, Unit 5 Plant Manager Work: (203) XXX-XXXX

3.1. Facility Description (40 CFR 112.7(a)(3))

3.1.1. Location and Activities

BHS is located at 1 Atlantic Street in Bridgeport, CT and is owned and operated by PSEG Power Connecticut LLC (PSEG). The BHS property encompasses approximately 84 acres of land near the confluence of the Pequonnock River and Long Island Sound in Bridgeport, Connecticut. Approximately 22 acres are located between the mean high water line and the harbor, pierhead and bulkhead lines. The coordinates for the station are N 41^{o} 10' 06.22" latitude and W 73^{o} 11' 3.44" longitude. BHS Unit 5 is located on previously developed land (i.e., in the vicinity of the former BHS tank farm) located in the southern portion of the BHS site.

BHS, including Unit 5, is designed and staffed to generate electricity 24 hours per day, seven days a week.

Site access is controlled 24 hours per day, 365 days a year.

BHS includes a marine dock used for the unloading and loading of tankers and barges, which is now in Caretaker Status. This facility will be repaired, upgraded or replaced to accommodate fuel oil delivery via barge for BHS Unit 5. Design details for this upgrade will be developed during final facility design.

Based on currently available design information, the SPCC Site Plan diagram for BHS Unit 5 is provided in Appendix A.

BHS Unit 5 is located at the southern end of the BHS site over the area previously occupied by the fuel oil tank farm. The Unit 5 power block consists of one combustion turbine generator set, a heat recovery steam generator ("HRSG") and a steam turbine generator set. Ancillary equipment at the facility includes an air cooled condenser ("ACC") for steam cycle cooling, a process makeup water demineralization system, a small mechanical draft cooling tower for ancillary cooling (i.e., an auxiliary cooling tower), a 900,000 gallon service water/fire water storage tank, a 1,000,000 gallon demineralized water storage tank, a 5,500,000 gallon ultra-low sulfur distillate (ULSD) aboveground storage tank and an auxiliary boiler. BHS Unit 5 primarily uses natural gas as the fuel. However, to enhance electric system reliability, it is designed as a dual fuel facility that can also use ULSD as a backup fuel.

Electricity is also generated at BHS in one 410 megawatt (MW) coal / oil fired unit (Unit 3) and one 20 MW combustion turbine (Unit 4). Additionally, there is one 84.7 MW oil-fired unit (Unit 1) and one 170 MW oil-fired unit (Unit 2), which are retired. Oil and hazardous materials storage and handling practices associated with Unit 3 and Unit 4 are described in detail in the existing BHS SPCC plan.

3.1.1. Oil and Hazardous Material Storage

Oil storage tanks, transformers, and oil-filled equipment (>55 gallons) at BHS Unit 5 covered under the SPCC plan are listed in Tables 3-1, 3-2 and 3-3. Table 3-4 addresses hazardous material storage tanks for BHS Unit 5.

Table 3-1:
Oil Tanks

Tank Identifier	Material Stored	CHRIS Code	Quantity Stored (gallons)	Tank Type/Year
U5B-1	No. 2 Fuel Oil/Diesel	OTD	5,500,000	Steel/2018 (ULSD Backup Fuel)
U5B-2	No. 2 Fuel Oil/Diesel	OTD	1,700	Steel/2018 (Emg. Diesel Gen.)
U5B-3	No. 2 Fuel Oil/Diesel	OTD	500	Steel/2018 (Emg. Diesel Fire Pump)
U5B-4	Used Lube Oil	OLB	15 x 55	Steel Drums
USB-5	New Lube Oil	OLB	5 x 55	Steel Drums
USB-6	No. 2 Fuel Oil/Diesel	OTD	TBD	Concrete Containment (Tanker trucks)

Table 3-2:
Transformers

Tank Identifier	Material Stored	CHRIS Code	Quantity Stored (gallons)	Tank Type/Year
U5T-1	Mineral oil	OMN	15,500	Steel/2018 (CT Step-up)
U5T-2	Mineral oil	OMN	13,000	Steel/2018 (ST Step-up)

Tank Identifier	Material Stored	CHRIS Code	Quantity Stored (gallons)	Tank Type/Year
U5T-3	Mineral oil	OMN	4,307	Steel/2018 (CT Aux.)
U5T-4	Mineral oil	OMN	4,307	Steel/2018 (ST Aux.)

Table 3-3:
Oil Filled Equipment

Tank Identifier	Material Stored	CHRIS Code	Quantity Stored (gallons)	Tank Type/Year
OFE-5-1	Lube Oil	OLB	6,800	Steel/2018 (CT Lube Oil Skid)
OFE-5-2	Lube Oil	OLB	7,400	Steel/2018 (ST Lube Oil Skid)
OFE-5-3	No. 2 Fuel Oil/Diesel	OTD	TBD	N/A/2018 (Fuel oil unloading pumps)

Table 3-4:
Hazardous Materials

Tank Identifier	Material Stored	CHRIS Code	Quantity Stored (gallons)	Tank Type/Year
HM-5-1	Aqueous Ammonia	AMH	22,000	Steel/2018 (SCR Ammonia Tank)
HM-5-2	Aqueous Ammonia	AMH	6,700	Concrete Containment (Tanker trucks)
HM-5-3	Sodium Hypochlorite	SHC	4 x 400	Tote/NA (Aux. Cooling Tower)
HM-5-4	Corrosion Inhibitor		4 x 400	Tote/NA (Aux. Cooling Tower)
HM-5-5	Antiscalant		4 x 400	Tote/NA (Aux. Cooling Tower)
HM-5-6	Sulfuric Acid	SFA	4 x 400	Tote/NA (Aux. Cooling Tower)
HM-5-7	Aqueous Ammonia	AMH	3 x 400	Tote/NA (HRSG)
HM-5-8	Filming Amine		3 x 400	Tote/NA (HRSG)
HM-5-9	Phosphate		3 x 400	Tote/NA (HRSG)
HM-5-10	Sodium Bisulfite	SBS	3 x 400	Tote/NA (Demin. Water Treatment)
HM-5-11	Antiscalant		3 x 400	Tote/NA (Demin. Water Treatment)
HM-5-12	Sodium Hydroxide	SHD	3 x 400	Tote/NA (Demin. Water Treatment)
HM-5-13	Sulfuric Acid	SFA	3 x 400	Tote/NA (Demin. Water Treatment)
HM-5-14	Aqueous Ammonia	AMH	3 x 400	Tote/NA (Aux. Boiler)

Tank Identifier	Material Stored	CHRIS Code	Quantity Stored (gallons)	Tank Type/Year

3.2. Evaluation of Discharge Potential

3.2.1. Distance to Navigable Waters and Adjoining Shorelines and Flow Paths

PSEG's BHS is located along the western edge of Bridgeport Harbor near the mouth of the Pequonnock River at its confluence with the Long Island Sound. The Station has been issued a Stormwater General Permit by the CT DEEP that allows surface runoff from the facility to flow into navigable waters, as long as exposure of source materials is eliminated as defined in the Stormwater Pollution Prevention Plan (SWPPP) maintained by the station. Potential spills during land based transfer operations for ASTs are mitigated through the use of loading/unloading procedures.

3.2.2. Discharge History

There has been no single discharge of oil greater than 1,000 gallons or two discharges of oil each greater than 42 gallons within any 12-month period at BHS Unit 5. There has been no reportable discharge of oil to surface waters in the previous five years from BHS Unit 5

4. Discharge Prevention-General SPCC Provisions

The following measures are implemented to prevent oil or hazardous chemical discharges during the handling, use, or transfer of products at the BHS Unit 5. Oil-handling and hazardous materials handling employees have received training in the proper implementation of these measures.

4.1. Compliance with Applicable Requirements (40 CFR 112.7(a)(2))

This SPCC plan was written in conformance with the requirements of 40 CFR 112, as revised by the U.S. EPA on July 17, 2002, last amended October 14, 2010. This Plan does not exactly follow the format of 40 CFR 112, and therefore a table which cross-references the SPCC Rule requirements to the equivalent sections of this plan is provided in Section 2. BHS Unit 5 meets the requirements of 40 CFR 112. A discussion of alternative measures in lieu of secondary containment for oil filled equipment is included in Section 4.6.

4.2. Facility Layout Diagrams (40 CFR 112.7(a)(3))

Appendix A-1 shows the general location of BHS Unit 5 on a U.S. Geological Survey topographic map. Appendix A-2 presents the SPCC Site Plan for BHS Unit 5, including drainage and the location of storage tanks, transformers, and containers. Refer to Tables 4-1 through 4-4 for locations of containers located within buildings or enclosures.

4.3. Spill Reporting (40 CFR 112.7(a)(4))

The Incident Description Form included in Appendix F will be completed upon immediate detection of a discharge and prior to reporting a spill to the proper notification contacts.

4.4. Potential Discharge Volumes and Direction of Flow (40 CFR 112.7(b))

Tables 4-1 through 4-4 present expected volume and general direction of flow in the event of equipment failure, and means of secondary containment for different parts of the BHS Unit 5 where oil or hazardous materials are stored, used, or handled.

Table 4-1:
Oil Tanks

Tank Identifier	Material Stored	Location	Potential Spill Volume (gal)	Tank Capacity (gal)	Direction of Flow	Secondary Containment Volume (gal)
U5B-1	No. 2 Fuel Oil	Outdoors Covered Tank	5,500,000	5,500,000	Self Contained (Steel Containment Dike)	6,050,000
U5B-2	No. 2 Fuel Oil	Outdoors Emg. Diesel Generator	1,700	1,700	Self Contained (Double Walled Tank)	N/A
U5B-3	No. 2 Fuel Oil	Indoors Emg. Diesel Fire Pump Enclosure	500	500	Self Contained (Double Walled Tank)	N/A
U5B-4	Used Lube Oil	Indoors Warehouse	50	15 x 55	Self Contained Curbed Dike	TBD
USB-5	New Lube Oil	Indoors Warehouse	50	5 x 55	Self Contained Curbed Dike	TBD
USB-6	No. 2 Fuel Oil	Outdoors Fuel Unloading	16,000	16,000	Self Contained Concrete Containment	Concrete Containment (Tanker trucks)

Table 4-2:
Transformers

Tank Identifier	Material Stored	Location	Potential Spill Volume (gal)	Tank Capacity (gal)	Direction of Flow	Secondary Containment Volume (gal)
U5T-1	Mineral oil	Outdoors (North of Turbine Generator Enclosure - CT)	15,500	15,500	Steel/2018 (CT Step-up)	17,050
U5T-2	Mineral oil	Outdoors (North of Turbine Generator Enclosure - ST)	13,000	13,000	Steel/2018 (ST Step-up)	14,300
U5T-3	Mineral oil	Outdoors (North of Turbine Generator Enclosure - CT)	4,307	4,307	Steel/2018 (CT Aux.)	4,738
U5T-4	Mineral oil	Outdoors (North of Turbine Generator Enclosure - ST)	4,307	4,307	Steel/2018 (ST Aux.)	4,738

Table 4-3:
Oil Filled Equipment

Tank Identifier	Material Stored	Location	Potential Spill Volume (gal)	Tank Capacity (gal)	Direction of Flow	Secondary Containment Volume (gal)
OFE-5-1	Lube Oil CT	TBD (Turbine Enclosure?)	6,800	6,800	Building Drains to OWS	7,480
OFE-5-2	Lube Oil ST	Indoors (Turbine Enclosure)	7,400	7,400	Building Drains to OWS	8,140
OFE-5-3	No. 2 Fuel Oil/Diesel	TBD	TBD	N/A	TBD	TBD

Table 4-4:
Hazardous Materials

Tank Identifier	Material Stored	Location	Potential Spill Volume (gal)	Tank Capacity (gal)	Direction of Flow	Secondary Containment Volume (gal)
HM-5-1	Aqueous Ammonia	Outdoors (West side of Unit 5)	22,000	22,000	To secondary Containment	46,270
HM-5-2	Aqueous Ammonia	Outdoors (West side of Unit 5)	6,700	6,700	To secondary Containment	18,720
HM-5-3	Sodium Hypochlorite	Indoors (General Services Enclosure)	400	4 x 400	To secondary Containment	440
HM-5-4	Corrosion Inhibitor	Indoors (General Services Enclosure)	400	4 x 400	To secondary Containment	440
HM-5-5	Antiscalant	Indoors (General Services Enclosure)	400	4 x 400	To secondary Containment	440
HM-5-6	Sulfuric Acid	Indoors (General Services Enclosure)	400	4 x 400	To secondary Containment	440
HM-5-7	Aqueous Ammonia	Indoors (Cycle Chem Feed Enclosure)	400	3 x 400	To secondary Containment	440
HM-5-8	Filming Amine	Indoors (Cycle Chem Feed Enclosure)	400	3 x 400	To secondary Containment	440
HM-5-9	Phosphate	Indoors (Cycle Chem Feed Enclosure)	400	3 x 400	To secondary Containment	440
HM-5-10	Sodium Bisulfite	Indoors (Demin Area)	400	3 x 400	To secondary Containment	440
HM-5-11	Antiscalant	Indoors (Demin Area)	400	3 x 400	To secondary Containment	440
HM-5-12	Sodium Hydroxide	Indoors (Demin Area)	400	3 x 400	To secondary Containment	440
HM-5-13	Sulfuric Acid	Indoors (Demin Area)	400	3 x 400	To secondary Containment	440
HM-5-14	Aqueous Ammonia	Indoors (Cycle Chem Feed Enclosure)	400	3 x 400	To secondary Containment	440

4.5. Containment and Diversionary Structures (40 CFR 112.7(c))

Methods of secondary containment at this facility include a combination of structures (e.g., dike/ berm, built-in secondary containment/double walled tanks), drainage systems (e.g., oil/water separators), the use of standard operating procedures, and land-based spill response (e.g., drain covers, sorbents) to prevent oil from reaching navigable waters and adjoining shorelines:

- For above ground bulk storage containers (refer to Section 5.2.2 of this Plan):
  - **Dike**. A dike enclosure is provided around fixed aboveground bulk storage tanks, as described in Section 5.2.2 of this Plan.
  - **Double-wall tank construction**. Two diesel fuel oil tanks (Emergency Diesel Generator and Emergency Diesel Fire Pump) are double walled.
- At the unloading areas (refer to Section 4.10 of this Plan):
  - **Standard Operating Procedures.** The primary tank truck unloading areas for fuel oil and ammonia are equipped with secondary containment. The secondary tank truck unloading areas (i.e., for the emergency diesel generator and emergency diesel fire pump) are not. Standard procedures are utilized during unloading operations at each area to prevent spills of oil as discussed in Section 4.10 Procedures used to prevent spills.
- In transfer areas and other parts of the facility where a discharge could occur:
  - **Sorbent material**. Spill cleanup kits that include absorbent material, booms, and other portable barriers are located throughout the facility. The spill kits are located within close proximity to the oil product storage and handling areas for rapid deployment should a spill occur. Spill control kits contain speedi-dry, adsorbent pads, booms, socks, and plastic bags. Brooms and shovels, as well as previously mentioned spill kit equipment, are stored in the maintenance department and outside storage sheds. The Maintenance Department maintains extra stock of all spill control equipment. The response equipment inventory for the facility is listed in Appendix G of this Plan. The inventory is checked monthly to ensure that used materials are replenished.
  - **Drainage system**. BHS Unit 5 is equipped with a stormwater collection and conveyance system. Stormwater flows less than or equal to the water quality volume (i.e., the first inch of rainfall) are routed through a mechanical treatment device prior to discharge to Bridgeport Harbor. Bulk storage tanks located in the yard areas are provided with secondary containment as described in Section 5.2.2 of this Plan.
  - **Oil/water separator (OWS)**. OWSs are designed to separate and retain oil as part of the wastewater treatment system at the facility. Floor drains from potentially oily areas of the facility are routed through an oil/water separator then

to the wastewater sump and/or the HRSG blowdown sum prior to reuse as auxiliary cooling tower makeup.

The three buried OWSs have total capacities for an oil/water mixture of 10,000 gallons, 550 gallons and 3000 gallons for the north, south and east OWS, respectively. Best management practices are used to minimize the amount of solids and oil that flow into the OWSs. Oil collected in the OWSs is removed by a licensed waste hauler, when necessary. The OWSs are equipped with oil and level sensors.

4.6. Practicability of Secondary Containment (40 CFR 112.7(d))

PSEG management has determined that secondary containment is practicable at BHS Unit 5. All ASTs are provided with secondary containment. BHS has also established an inspection program for tanks, piping and oil filled equipment in order to promptly detect equipment failure, a spill or a release. The requirement for an oil spill contingency plan, as well as a written commitment of manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that may be harmful, is fulfilled by the BHS Facility Response Plan under separate cover.

4.7. Inspections, Tests and Records (40 CFR 112.7(e))

As required by the SPCC rule, PSEG performs the inspections, tests, and evaluations summarized in Table 4-5. The inspections and tests are described later in this section, and in the respective sections that describe different parts of the facility (e.g., Section 5.2.6 for bulk storage containers).

Table 4-5:
Inspection and Testing Program

Facility Component	Action	Frequency/Circumstances
Aboveground bulk storage tanks	Test container integrity. Combine visual inspection with another testing technique (non-destructive shell testing). Inspect outside of container for signs of deterioration and discharges.	Following a regular schedule as prescribed by the applicable testing standard (API 653, STI SP001, etc.), and whenever material repairs are made.
Process vessels, transformers, pumps, drums	Evaluate container integrity. Inspect outside surfaces of container for signs of deterioration and discharges.	Following a regular schedule (daily, monthly, annual, and during scheduled inspections) and whenever material repairs are made.
Container supports and foundation	Inspect container supports and foundations.	Following a regular schedule (monthly, annual, and during scheduled inspections) and whenever material repairs are made.
Liquid level sensing devices (overfill)	Test for proper operation.	Monthly

Facility Component	Action	Frequency/Circumstances
Diked area	Inspect for signs of deterioration, discharges, or accumulation of oil inside diked areas. Visually inspect content for presence of oil.	Monthly Prior to draining
All aboveground valves, piping, and appurtenances	Assess general condition of items, such as flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces.	Monthly

4.7.1. Monthly Inspection

The checklist provided in Appendix C is used for monthly inspections by PSEG personnel. The monthly inspections cover the following key elements:

- Observing the exterior of aboveground storage tanks, pipes, and other equipment for signs of deterioration, leaks, corrosion, and thinning.
- Observing the exterior of portable containers for signs of deterioration or leaks.
- Observing tank foundations and supports for signs of instability or excessive settlement.
- Observing the tank fill and discharge pipes for signs of poor connection that could cause a discharge, and tank vent for obstructions and proper operation.
- Verifying the proper functioning of overfill prevention systems.
- Checking the inventory of discharge response equipment and restocking as needed.
- Observing the effluent and measuring the quantity of accumulated oil within the oil/water separator.

All problems regarding tanks, piping, containment, or response equipment must be reported immediately to the Senior Operations Supervisor (SOS). Visible oil leaks from tank walls, piping, or other components must be repaired as soon as possible to prevent a larger spill or a discharge to navigable waters or adjoining shorelines. Pooled oil is removed immediately upon discovery.

Written monthly inspection records are signed by the SOS and maintained with this SPCC Plan for a period of three years.

4.7.2. Annual Inspection

Facility personnel perform a thorough inspection of facility equipment on an annual basis. This annual inspection complements the monthly inspection described above and is performed each year using the checklist provided in Appendix C of this Plan.

The annual inspection is preferably performed after a large storm event to also verify the imperviousness and/or proper functioning of drainage control systems.

Written annual inspection records are signed by the Plant Manager and maintained with this SPCC Plan for a period of three years.

4.7.3. Periodic Integrity Testing

Aboveground storage tanks are subject to periodic integrity testing, taking into account tank design and using such techniques as hydrostatic testing, visual inspection or a system of non-destructive shell thickness testing. Comparison records will be kept with this plan. Tank supports and foundations will be included in these inspections. The field-erected bulk storage tanks are tested in accordance with API 653.

4.8. Personnel, Training and Discharge Prevention Procedures (40 CFR 112.7(f))

The SOS is the facility designee and is responsible for oil discharge prevention, control, and response preparedness activities at this facility.

PSEG management has instructed oil-handling personnel in the operation and maintenance of oil pollution prevention equipment, discharge procedure protocols, applicable pollution control laws, rules and regulations, general facility operations, and the content of this SPCC Plan. Any new facility personnel with oil-handling responsibilities are provided with this same training prior to being involved in any oil handling or transfer operation.

Annual discharge prevention briefings are held for all facility personnel involved in oil operations. The briefings are aimed at ensuring continued understanding and adherence to the discharge prevention procedures presented in the SPCC Plan. The briefings also highlight and describe known discharge events or failures, malfunctioning components, and recently implemented precautionary measures and best management practices. Facility operators and other personnel will have the opportunity during the briefings to share recommendations concerning health, safety, and environmental issues encountered during facility operations. The Plant Operations Manager, with the assistance of Environmental, is responsible for making sure that the training is complete.

Records of the briefings and discharge prevention training are kept on the form shown in Appendix D and maintained with this SPCC Plan for a period of three years.

4.9. Security (40 CFR 112.7(g))

Landward portions of BHS are fully enclosed by a chain link fence; seaward portions are bordered by the Pequonnock River/Bridgeport Harbor. The entrance gate to the property is monitored 24 hours a day via camera, and at times a security guard is present.

All drain valves from the storage tanks are normally chained and padlocked in a closed position or blank-flanged. All loading/unloading connections are securely blanked-flanged when not in service.

Area lighting is adequate for the detection of spills by operating personnel that might occur during hours of darkness. In addition, floodlights are installed along portions of the waterfront, angled outward to illuminate the shoreline. The lighting level at the BHS Unit 5 is considered adequate to discourage acts of vandalism, which could result in spills. Additionally, operating personnel make regular inspection rounds of the facility.

4.10. Tank Truck Loading/Unloading Rack Requirements (40 CFR 112.7(h))

Primary aboveground storage tanks at the facility, including the ULSD fuel tank and the aqueous ammonia storage tank, are filled through individual fill connections within designated unloading areas equipped with secondary containment.

Due to the higher potential for discharges to occur during tank truck unloading operations, PSEG management is committed to ensuring the safe transfer of material to storage tanks. The following measures are implemented to prevent oil discharges during tank truck unloading operations.

4.10.1. Secondary Containment (40 CFR 112.7(h)(1))

The primary ULSD and ammonia unloading fill valve areas are located within secondary containment structures with capacities sufficient to retain any minor spills that may occur during the unloading processes.

In addition to standard operating procedures, drain covers are used during unloading procedures at smaller, infrequently used tank truck unloading areas (i.e., emergency diesel generator, emergency diesel fire pump). The use of portable berms is recommended during unloading activities.

4.10.2. Loading/Unloading Procedures (40 CFR 112.7(h)(2) and (3))

Specific BHS Unit 5 tank truck loading/unloading Standard Operating Procedures are included in Appendix I, and are in conformance with the minimum requirements and regulations established by the US Department of Transportation (DOT). These requirements include:

- Driver has appropriate training (i.e., DOT hazmat training);
- No smoking while loading or unloading;
- Keep fire away while loading or unloading;
- Handbrake set while loading or unloading; and,
- The loading/unloading operation is attended (i.e., attendant is awake and has an unobstructed view of the tank).

Normal delivery procedures require that facility personnel be present to ensure that oil is delivered to the correct tank and that there is enough available volume in the tank to receive the shipment.

Prior to unloading, the vendor notifies facility personnel when they arrive, and facility personnel meet the truck and escort the truck throughout the unloading procedure. Prior to connection, facility personnel check the level in the tank(s) to ensure there is enough room to receive the delivery. Facility personnel then unlock the fill caps and the vendor performs the delivery. Facility personnel then inspect this area for any signs of spills/leaks.

Additionally:

- The BHS Unit 5 personnel involved with the tank truck delivery and/or fuel handling operation will ensure that proper response and containment equipment is readily available (said equipment is kept at the facility).
- Where secondary containment is not available for tank truck off-loading, no unloading is to occur without storm drain covers being first placed by BHS Unit 5 personnel on the storm drain(s) adjacent to the tank(s). The covers are to be left in place until the operations are complete and the unloading vehicle departs from the area.
- All vehicles are inspected by BHS Unit 5 personnel and the vehicle’s driver prior to transfer and departure.
- Wheel chocks are used during the transfer process.

All facility personnel who oversee tank truck unloading operations have received DOT HM 126F training.

These and other oil transfer procedures are described in the document entitled "Bridgeport Harbor Station Procedure for Loading and Unloading Operations of Hazardous Substances in Bulk Quantities", which is presented in Appendix I.

4.11. Brittle Fracture Evaluation (40 CFR 112.7(i))

If any of the field-constructed aboveground containers at BHS Unit 5 undergo a repair, alteration, reconstruction or change in service that might affect the risk of discharge or failure due to brittle fracture or other catastrophe, or discharges oil or fails due to brittle fracture failure or other catastrophe, PSEG will evaluate the container for risk of discharge or failure due to brittle fracture or other catastrophe. Section 5 of API 653 "*Brittle Fracture Considerations"* will be followed and PSEG will take appropriate corrective actions, as necessary.

4.12. Conformance with State and Local Applicable Requirements (40 CFR 112.7(j))

PSEG complies with the requirements of the local fire regulations, 40 CFR 112.20 and 33 CFR 154.1015 (OPA-90), 33 CFR 154.310 (Marine Terminal), and State of Connecticut spill reporting regulations.

5. Discharge Prevention-SPCC Provisions for Onshore Facilities (Excluding Production Facilities)

5.1. Facility Drainage (40 CFR 112.8(b))

The BHS Unit 5 is equipped with a stormwater management system designed to satisfy applicable water quality requirements for major development, per the 2004 Connecticut Stormwater Quality Manual. The Facility's stormwater management systems combines use of cover stabilization practices, a subsurface gravity collection and conveyance system, manufactured treatment devices and discharge control practices (i.e., riprap outlet protection).

Treatment for the water quality volume (WQV)/water quality flow (WQF) for BHS Unit 5 is accomplished through installation of manufactured treatment devices and use of surface treatments that minimize the contribution of suspended solids or nutrients, such as nitrogen and phosphorus, to receiving waters.

Oil and chemical storage tanks at the facility are provided with secondary containment as described in Section 5.2.2 of this Plan in order to significantly reduce the risk of a discharge of oil via stormwater.

5.2. Bulk Storage Containers (40 CFR 112.8(c))

Table 3-1 summarizes the construction, volume, and content of bulk storage containers at BHS Unit 5.

5.2.1. Construction (40 CFR 112.8(c)(1))

All above ground bulk oil and chemical storage tanks used at this facility are constructed of steel in accordance with industry specifications as described above. The design and construction of all bulk storage containers are compatible with the characteristics of the product they contain, and with temperature and pressure conditions.

5.2.2. Secondary Containment (40 CFR 112.8(c)(2))

Tables 4-1 through 4-4 summarize the nature and volumes of the secondary containments associated with the bulk storage containers, transformers, and other oil-filled equipment at BHS Unit 5.

A 5,500,000 gallon covered AST that stores ultra-low sulfur distillate (ULSD) is located in the southeastern corner of the facility. Any release of material from the tank would be

captured within the steel secondary containment dike surrounding the tank, which is sized capture 110% of the tank contents. Any spill or release is expected to remain within the containment area.

A ULSD tanker truck unloading area is located northeast of the ULSD AST. The unloading area can accommodate two tanker trucks simultaneously. The unloading area is equipped with a concrete containment capable of capturing the contents of two 16,000 gallon tanker trucks (total storage capacity of the containment is 34,000 gallons. Any spill is expected to remain within the containment area.

A 1,700 gallon double walled AST containing diesel fuel is located adjacent to the emergency diesel generator on the northern side of the facility. Any spill is expected to remain within the tank's double walled containment. Fuel delivery/unloading procedures for this tank are described in Appendix J.

A 22,000 gallon AST that stores aqueous ammonia used as a reagent in the facility's selective catalytic reduction (SCR) system is located on the western side of the facility. Any release of material from the tank would be captured within the concrete secondary containment dike, which is sized capture 110% of the tank contents, as well as deluge water and rainfall (total storage capacity of 46,270 gallons). Any spill or release is expected to remain within the containment area.

An aqueous ammonia tanker truck unloading area is located directly east of the aqueous ammonia AST. The unloading area can accommodate one tanker truck. The unloading area is equipped with a concrete containment capable of capturing the contents of one 6,700 gallon tanker truck, deluge water plus rainfall (total storage capacity of the containment is 18,720 gallons). Any spill or release is expected to remain within the containment area.

Water conditioning chemicals for the auxiliary cooling tower will be delivered in 400 gallon totes. They are stored in the General Services Enclosure located on the northern side of the facility. Totes for individual additives are segregated within their own 8-inch curbed concrete containment.

Water conditioning chemicals for the heat recover steam generator and auxiliary boiler will be delivered in 400 gallon totes. They are stored in the Cycle Chemical Feed Enclosure located beneath the air cooled condenser. Totes for individual additives are segregated within their own vendor supplied containment.

A combustion turbine step up transformer containing 15,500 gallons of mineral oil is located on the northern side of the facility. It is equipped with a concrete secondary containment sized to capture 110% of the transformer contents, fire water and rainfall (total storage capacity of the containment is 41,230 gallons). Any spill or release is

expected to remain within the containment area. Any appreciable loss of oil from this transformer would be signaled by low level or high temperature alarms. The alarms are both visual and audible and are connected to the control room.

A combustion turbine auxiliary transformer containing 4,307 gallons of mineral oil is located on the northern side of the facility. It is equipped with a concrete secondary containment sized to capture 110% of the transformer contents, fire water and rainfall (total storage capacity of the containment is 26,230 gallons). Any spill or release is expected to remain within the containment area. Any appreciable loss of oil from this transformer would be signaled by low level or high temperature alarms. The alarms are both visual and audible and are connected to the control room.

A steam turbine step up transformer containing 13,000 gallons of mineral oil is located on the northern side of the facility. It is equipped with a concrete secondary containment sized to capture 110% of the transformer contents, fire water and rainfall (total storage capacity of the containment is 43,860 gallons). Any spill or release is expected to remain within the containment area. Any appreciable loss of oil from this transformer would be signaled by low level or high temperature alarms. The alarms are both visual and audible and are connected to the control room.

A steam turbine auxiliary transformer containing 4,307 gallons of mineral oil is located on the northern side of the facility. It is equipped with a concrete secondary containment sized to capture 110% of the transformer contents, fire water and rainfall (total storage capacity of the containment is 26,230 gallons). Any spill or release is expected to remain within the containment area. Any appreciable loss of oil from this transformer would be signaled by low level or high temperature alarms. The alarms are both visual and audible and are connected to the control room.

New and used lubricating oil is stored in 55 gallon drums located in the facility warehouse. Floor drains in this area are directed to an oil water separator capable of capturing the total contents of any drum. The oil water separator is equipped with a high level alarm and oil sensors which are connected to the control room. Effluent from the oil water separator is reused as auxiliary cooling tower makeup.

A combustion turbine lube oil reservoir containing 6,800 gallons of lubricating oil is located adjacent to the turbine enclosure. Drains within this area are directed to an oil water separator capable of capturing the total contents of the reservoir. The oil water separator is equipped with a high level alarm and oil sensors which are connected to the control room. Effluent from the oil water separator is reused as auxiliary cooling tower makeup.

A steam turbine lube oil reservoir containing 6,800 gallons of lubricating/hydraulic oil is located within the turbine enclosure. Floor drains within this area are directed to an oil

water separator capable of capturing the total contents of the reservoir. The oil water separator is equipped with a high level alarm and oil sensors which are connected to the control room. Effluent from the oil water separator is reused as auxiliary cooling tower makeup.

5.2.3. Drainage of Diked Areas (40 CFR 112.8(c)(3))

If it becomes necessary for rainwater drainage from a diked area to be discharged, drainage is accomplished by means of a manually activated valve or manually activated portable sump pump. Discharge valves are maintained in a closed and locked position when not in use. Appendix J contains the station procedures for discharging water from secondary containment structures.

5.2.4. Corrosion Protection (40 CFR 112.8(c)(4))

There are no buried metallic storage tanks which require protection from corrosion by coatings or cathodic protection at BHS Unit 5.

5.2.5. Partially Buried and Bunkered Storage Tanks (40 CFR 112.8(c)(5))

There are no partially buried or bunkered storage tanks at BHS Unit 5.

5.2.6. Inspections and Tests (40 CFR 112.8(c)(6))

Visual inspections of ASTs by facility personnel are performed according to the procedure described in this SPCC Plan. Leaks from tank seams, gaskets, rivets, and bolts are promptly corrected. Records of inspections and tests are signed by the inspector and kept at the facility for at least three years.

Fuel oil and ammonia bulk storage tanks and aboveground valves and piping at BHS Unit 5 are visually examined by operating personnel daily. The examination covers the general condition of flange joints, expansion joints, valve glands and bodies, catch pans, piping supports, and locking of valves. Per the facility's OPA-90 Manual, in addition to the regular, routine inspections performed, aboveground bulk storage tanks are inspected yearly (usually June or July). Tank structure and supports are checked and integrity testing is periodically performed in accordance with API 653. Records of the external and internal integrity tests and inspections are kept on file at BHS Unit 5.

All 55 gallon drums used for petroleum and petroleum products are visually inspected weekly during normal working hours, along with their associated catch pans. The oil/water separators are also inspected during daily rounds and maintained, as needed.

Aboveground storage tanks are subject to periodic integrity testing, taking into account tank design and using such techniques as hydrostatic testing, visual inspection or a system of non-destructive shell thickness testing. Comparison records are kept and tank supports and foundations are included in these inspections.

The recommended inspection and test methods are:

Tank Shell

External – Visual
Internal - Visual or Ultrasonic from outside

Roof Plates

External – Visual
Internal - Ultrasonic and Visual

Visual inspection internally should be capable of showing visual defects to detect evidence or corrosion or distortion. If corrosion or distortion is evident or suspect, ultrasonic testing externally from above will be employed to determine the extent.

Floor Plates

External – Ultrasonic
Internal - Visual

Ultrasonic integrity testing will be performed on the following schedule:

Location	Roof	Sides	Bottom	Settlement	Responsibility
BHS Unit 5	5 yr Interval	5 yr. Interval	Not to Exceed 20 yr. Interval	5 yr. Interval	Generation Supervisor, Fuels

The Generation Supervisor, Fuels at BHS Unit 5 is responsible for inspection testing and record-keeping.

Table 5-1 below summarizes the schedule of inspections and tests performed on bulk storage containers.

Table 5-1:
Scope and Frequency of Bulk Storage Container Inspections and Tests

Tank Identifier	Substance Stored (Oil and Hazardous Substance)	Maximum Capacity (Gallons)	Tank Type/Year	Inspection Types	Most Recent Inspection Date	Next scheduled Inspection
ABOVEGROUND STORAGE TANKS						
U5B-1	No. 2 Fuel Oil	5,500,000	Steel/2018	Per API 653	External – N/A Internal – N/A	External – TBD Internal – TBD
ADDITIONAL SPCC-LISTED ABOVEGROUND STORAGE TANKS						
U5B-2	No. 2 Fuel Oil	1,700	Steel/2018	API-653 AST Certified Inspector Recommendations	External – N/A	External – TBD
U5B-3	No. 2 Fuel Oil	500	Steel/2018	API-653 AST Certified Inspector Recommendations	External – N/A	External – TBD
HM-5-1	Aqueous Ammonia	22,000	Steel/2018	API-653 AST Certified Inspector Recommendations	External – N/A	External – TBD

Notes:

- Visual Inspections are performed on approximately a daily basis, depending upon the ability to complete the inspections and all other necessary work safely.
- API 653- American Petroleum Institute Standards for Tank Inspection, Repair, Alteration and Reconstruction for carbon and low alloy steel tanks built to API Standard 650 (49 CFR 195.432(b), which provides the minimum requirements for maintaining integrity for in service above ground storage tanks.
- Visual NDE- Nondestructive Examination or Nondestructive Testing; indicates activities using various methods to find, locate, measure, or determine integrity of a tank, without damage, that allows an inspector to evaluate if any identified characteristics or conditions constitute significant flaw that may result in tank failure.

5.2.7. Heating Coils (40 CFR 112.8(c)(7))

There are no external heating systems for the bulk storage tanks at BHS Unit 5.

5.2.8. Overfill Prevention Systems (40 CFR 112.8(c)(8))

Float devices are provided at the top of the 5,500,000 gallon ULSD fuel oil storage tank to detect high and high-high levels and indicate the following alarms/responses:

- Tank level high:
  - Alarms over Voice Reporter System
  - Amber beacons and horns at the Alarm Panel and Oil Dock.
- Tank level high-high:
  - Alarms over the Voice Reporter System
  - Red beacons and sirens at Alarm Panel and at Oil Dock
  - Alarm in control room

- Fuel oil unloading pumps (if running) will automatically trip.

Additionally, continuous level monitor devices are located at the top of the ULSD fuel oil storage tank to determine and display the oil level in the tank in the Unit 3 Control Room. The continuous level monitor devices provide high and high-high level alarms. Unloading pump status information is also available in the control room.

5.2.9. Effluent Treatment Facilities (40 CFR 112.8(c)(9))

The BHS Unit 5 facility operates under an NPDES permit for stormwater discharges associated with industrial activity issued by the CT DEEP. Bulk fuel oil unloading, bulk fuel storage, and potential transformer releases have no pathway to enter the permitted stormwater collection system under this permit. Some oil-filled equipment located indoors (i.e., within enclosures equipped with floor drains) could have a release to sumps that are routed to oil water separators. This system is automated and instrumented and would detect an oil release. The system is also operator attended 24 hours per day.

5.2.10. Visible Discharges (40 CFR 112.8(c)(10))

Visible discharges from any container or appurtenance – including seams, gaskets, piping, pumps, valves, rivets, and bolts – will be quickly corrected upon discovery.

Used oil spill equipment is disposed of according to the waste disposal method described in Section 6 of this Plan.

5.2.11. Mobile and Portable Containers (40 CFR 112.8(c)(11))

Mobile or portable oil storage tanks are not normally used at BHS Unit 5.

Drums are placed near absorbent materials and away from drains connected to the stormwater collection system.

5.3. Transfer Operations, Pumping, and In-Plant Processing (40 CFR 112.8(d))

All buried piping in the main fuel supply system at BHS Unit 5 is double walled and equipped with interstitial leak monitoring.

The pipeline at the marine transfer dock is blank-flanged as the transfer area is in Caretaker Status. This facility will be repaired, upgraded or replaced to accommodate fuel oil delivery via barge for BHS Unit 5. Design details for this upgrade will be developed during final facility design.

All aboveground valves and piping at the facility are examined during regular working hours, approximately daily by operating personnel. This examination covers the general condition of flange joints, expansion joints, valve glands and bodies, catch pans, piping

supports, and locking of valves. Pressure testing of piping would be conducted if warranted by alterations in the system.

6. Discharge Response

This section describes the response and cleanup procedures in the event of an oil discharge. The uncontrolled discharge of oil to groundwater, surface water, or soil is prohibited by state and federal laws when applicable release thresholds are exceeded. Immediate action must be taken to control, contain, and recover discharged product.

In the event of a petroleum or chemical spill/release, the highest person in seniority present assumes Response Coordinator responsibility for response activities. The following personnel are authorized to act as the Response Coordinator: Plant Manager, Operations Manager, Generation Supervisor - Fuels, and Senior Operations Supervisors. The Response Coordinators are fully authorized to expend funds as needed to contain and cleanup spills.

In general, the following steps are taken:

- Eliminate potential spark sources;
- If possible and safe to do so, identify and shut down source of the discharge to stop the flow;
- Contain the discharge with sorbents, berms, fences, trenches, sandbags, or other material;
- Contact the Control Room, who will notify and activate a Response Coordinator;
- Contact regulatory authorities and the response organization; and
- Collect and dispose of recovered products according to regulation.

For the purpose of establishing appropriate response procedures, this SPCC Plan classifies discharges as either “minor” or “major,” depending on the volume and characteristics of the material released.

A list of Emergency Contacts is provided in Appendix E. The list is also posted at prominent locations throughout the facility. A list of discharge response materials kept at the facility is included in Appendix G.

6.1. Response to a Minor Discharge

A “minor” discharge is defined as one that poses no significant harm (or threat) to human health and safety or to the environment. Minor discharges are generally those where:

- The quantity of product discharged is small (e.g., may involve less than 10 gallons of oil);
- Discharged material is easily stopped and controlled at the time of the discharge;
- Discharge is localized near the source;
- Discharged material is not likely to reach water;
- There is little risk to human health or safety; and
- There is little risk of fire or explosion.

Minor discharges can usually be cleaned up by PSEG personnel. The following guidelines apply:

- Immediately notify the Response Coordinator.
- Under the direction of the Response Coordinator, contain the discharge with discharge response materials and equipment. Place discharge debris in properly labeled waste containers.
- If the spill impacts soil or water or is otherwise reportable, the Response Coordinator or a designee will call the CT DEEP Oil and Chemical Spill Unit (860-424-3338), as well as the National Response Center (888-424-8802 or online at http://www.nrc.uscg.mil/) if oil impacts surface water or a chemical is spilled in an amount over its Reportable Quantity.
- The Response Coordinator or designee will complete the Incident Description Form (Appendix F) and attach a copy to this SPCC Plan.

6.2. Response to a Major Discharge

A “major” discharge is defined as one that cannot be safely controlled or cleaned up by facility personnel, such as when:

- The discharge is large enough to spread beyond the immediate discharge area;
- The discharged material enters water;
- The discharge requires special equipment or training to clean up;
- The discharged material poses a hazard to human health or safety; or
- There is a danger of fire or explosion.

In the event of a major discharge, the following guidelines apply:

- All workers must immediately evacuate the discharge site via the designated exit routes. Building exits are clearly marked throughout the facility.
- The Response Coordinator is notified, and initiates notification and response. Certain notifications are dependent on the circumstances and type of discharge. If oil

reaches a sanitary sewer, the publicly owned treatment works (POTW) should be notified immediately. The Facilities Engineer (or senior on-site person) must call for medical assistance if workers are injured.

- The Response Coordinator or designee must notify the Fire Department or Police Department.
- The Response Coordinator or designee must call the spill response and cleanup contractors listed in the Emergency Contacts list in Appendix E.
- The Response Coordinator or designee must immediately contact the Connecticut Department of Environmental Protection Oil and Chemical Spill Unit (860-424-3338) and the National Response Center (888-424-8802).
- The Response Coordinator or designee must record the call on the Incident Description Form in Appendix F and attach a copy to this SPCC Plan.
- The Response Coordinator coordinates cleanup and obtains assistance from a cleanup contractor or other response organization as necessary.

Additionally, initial containment of any oil discharge onto water is effected by the routine deployment of the oil containment boom. Containment of oil discharges on land are effected by existing structural dikes and by deployment of cleanup materials (speedi-dry, absorbent pads, pigs, drain covers, etc.).

In the event of a spill, any transfer/unloading operations in progress will be shut down immediately.

The nature and extent of the spill will be assessed by facility personnel. Contract support personnel will be notified and instructed to respond. While awaiting their arrival, immediate action will be initiated by facility personnel to contain and localize the spill as much as possible. Facility personnel will be available to direct emergency response traffic to the site of the spill.

Any oil spill at the BHS Unit 5 necessitates immediate internal and external notifications. Knowledge of an oil spill will be reported promptly. The expected response time for all off site station and management personnel is less than two hours. All employees with responsibilities under this plan have been trained as discussed in Section 5.

6.3. Waste Disposal (40 CFR 112.7(a)(3)(v))

In the event of a release of oil or another material to water, as much of the product as possible will be recovered for reuse, if such recovery can be performed safely and in accordance with all regulations. Specifically, in the event of an oil spill, as much of the oil as possible will be skimmed up/collected and salvaged. Oil/water mixtures from skimmers or other recovery equipment may be transferred into clearly labeled portable

tanks and allowed to gravity separate or may be treated on site with the oil water separator, as appropriate. Otherwise, oil, oily water mixtures and/or oil contaminated materials will be collected for transport by a licensed transporter to a permitted disposal facility. Any analytical testing required by the disposal facility will be performed prior to shipment as described in the following paragraphs.

In addition to released product, during the clean-up process it is expected that oil contaminated material including rags, absorbent materials, personal protective equipment (gloves, boots, tyvek suits, etc.), contaminated soil, contaminated equipment (such as tank parts, valves, shovels ,etc.) and/or other items may be generated. In addition, if chemicals are utilized to prevent the spread of contamination, absorbents, spent chemicals and decontamination solutions will need to be handled and disposed of appropriately. All such contaminated material will be placed in appropriate containers and clearly labeled for disposal.

Temporary storage containers for oil are expected to be brought on-site by spill response contractors as part of their equipment inventory. For smaller spills, material can also be placed into the usual onsite disposal containers (i.e., ring-top steel drums, for example). For medium or large spills, Bridgeport Harbor Station or its contractors will acquire frac tanks, roll-off containers, or some other larger appropriate containers to temporarily store clean-up materials on site until they can be transported to a permitted disposal facility. If additional storage equipment is needed, frac tanks, etc. can be rented from multiple vendors. Contaminated soil may be temporarily stored in a lined, covered pile if necessary and appropriate.

Specific areas to be used for interim waste storage will be identified at the time of a spill. Areas in the station normally used for temporary storage of hazardous and non-hazardous wastes would be the primary candidates for the interim storage of oil release related wastes if there is sufficient capacity. Other temporary storage areas that should be considered may include other indoor areas, or a paved or other impervious area, preferably with curbing and without storm drains. Proximity to ditches, catch basins, or other drainage courses should be factored in when considering location. Location of ignition sources (or elimination of nearby ignition sources) should also be factored in when considering contaminated material handling and temporary storage locations.

Interim storage sites should be designed to protect the environment and human health. These sites should be set up to prevent leakage, contact, and subsequent absorption of oil by the soil. This includes constructing a berm around the perimeter and installing impermeable liners in the floor of the site, if necessary. The liner should consist of plastic or other impermeable synthetic material. Underlying pavement may sometimes be substituted as well. As required, CT DEEP's Construction Stormwater and/or

Industrial Stormwater General Permit program requirements should be reviewed for applicability.

The Disposal Plan for Bridgeport Harbor Station will be executed in accordance with all applicable federal, state and/or local requirements, including and not limited to acquiring the appropriate permits to transport or dispose of recovered materials. Federal regulations have been promulgated to ensure proper handling and disposal of oil, oily wastes, and hazardous chemicals recovered during a response to a release. As the generator, PSEG will perform or ensure the proper completion of hazardous waste determinations, as needed. Sampling may be required to best determine the appropriate handling and disposal methods. PSEG will ensure that proper shipping papers (including manifests, if required) are utilized and completed per DOT and EPA regulations. PSEG will also ensure that packaging, marking, and other pre-transportation requirements as well as record-keeping and reporting requirements per DOT and EPA regulations. These regulations can be found in 49 CFR Parts 171-179 and 40 CFR Part 262. Regulations found in 40 CFR Parts 261 and 266 may also apply in certain cases.

The State of Connecticut regulates transportation and disposal of certain materials including used oil and oil-contaminated materials. Local regulations may apply as well in certain cases. All materials will be removed from Bridgeport Harbor Station by a permitted transporter to a permitted disposal facility to treat, store, dispose or recycle the material. All shipments of oil and oil contaminated debris will leave the facility as Connecticut regulated waste and abide by the applicable regulations. Additionally, PSEG will obtain or ensure the contractor has obtained any necessary permits or approvals from State and local regulators.

6.4 Discharge Notification

Any size discharge (i.e., one that creates a sheen, emulsion, or sludge) that affects or threatens to affect navigable waters or adjoining shorelines must be reported immediately to the National Response Center (1-800-424-8802). The Center is staffed 24 hours a day.

An Incident Description Form is included in Appendix F to facilitate reporting. The person reporting the discharge must provide the following information:

- Name, location, organization, and telephone number
- Name and address of the party responsible for the incident
- Date and time of the incident
- Location of the incident

- Source and cause of the release or discharge
- Types of material(s) released or discharged
- Quantity of materials released or discharged
- Danger or threat posed by the release or discharge
- Number and types of injuries (if any)
- Media affected or threatened by the discharge (i.e., water, land, air)
- Weather conditions at the incident location
- Any other information that may help emergency personnel respond to the incident

Contact information for reporting a discharge to the appropriate authorities is provided in Appendix E.

In addition to the above reporting, 40 CFR 112.4 requires that information be submitted to the United States Environmental Protection Agency (EPA) Regional Administrator and the appropriate state agency in charge of oil pollution control activities (see contact information in Appendix E) whenever the facility discharges (as defined in 40 CFR 112.1(b)) more than 1,000 gallons of oil in a single event, or discharges (as defined in 40 CFR 112.1(b)) more than 42 gallons of oil in each of two discharge incidents within a 12-month period. The following information must be submitted to the EPA Regional Administrator and to CT DEEP within 60 days:

- Name of the facility;
- Name of the owner/operator;
- Location of the facility;
- Maximum storage or handling capacity and normal daily throughput;
- Corrective action and countermeasures taken, including a description of equipment repairs and replacements;
- Description of facility, including maps, flow diagrams, and topographical maps;
- Cause of the discharge(s) to navigable waters and adjoining shorelines, including a failure analysis of the system and subsystem in which the failure occurred;
- Additional preventive measures taken or contemplated to minimize possibility of recurrence; and
- Other pertinent information requested by the Regional Administrator.

A standard form for summarizing the information needed for reporting to the EPA Regional Administrator and/or to CT DEEP is included in Appendix F of this Plan.

6.5 Cleanup Contractors and Equipment Suppliers

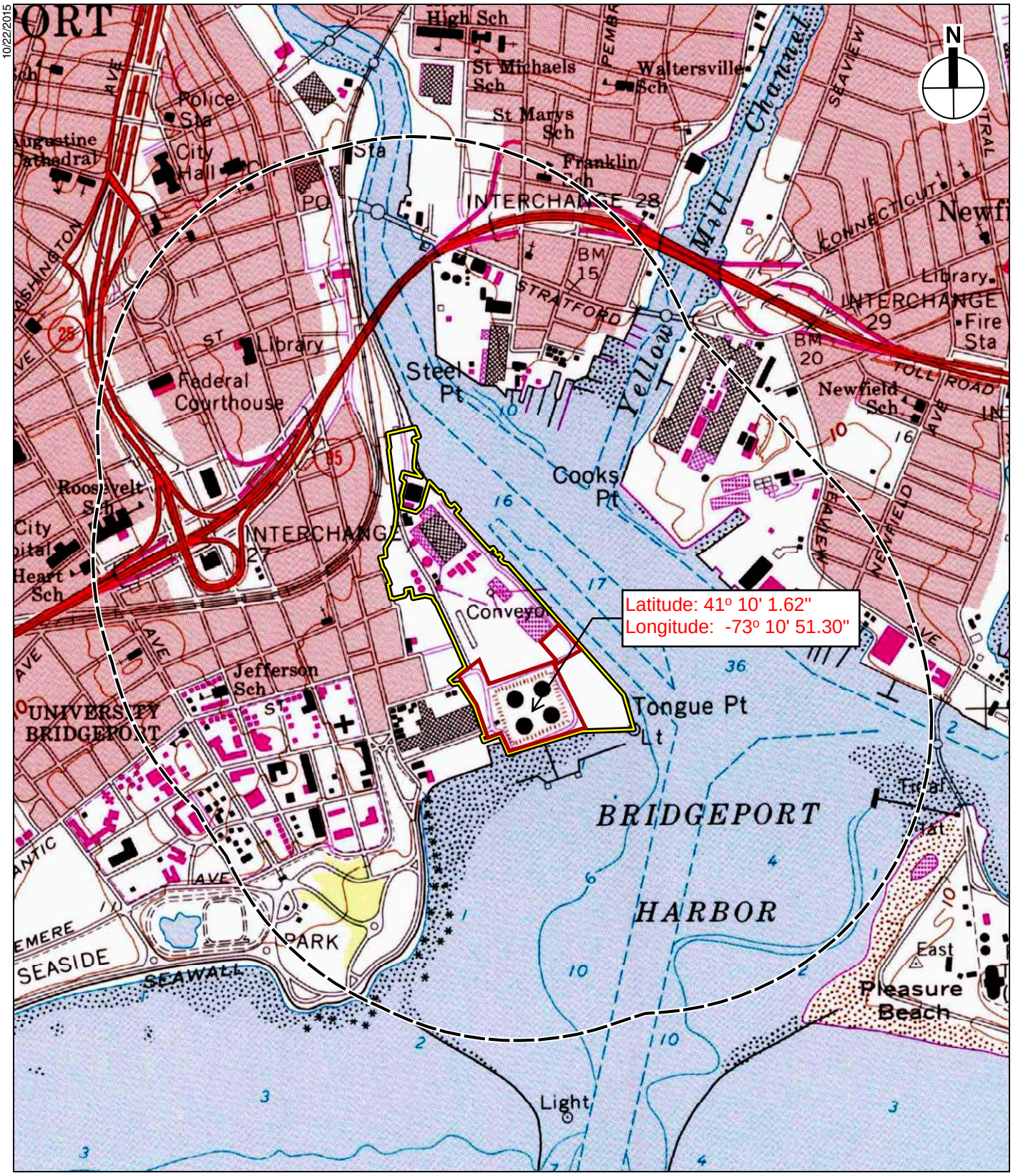
Contact information for specialized spill response and cleanup contractors are provided in Appendix E. These contractors have the necessary equipment to respond to a discharge of oil that affects Bridgeport Harbor or the Pequonnock River and adjacent wetlands, including floating booms and oil skimmers.

Spill kits are located at all transfer stations. The inventory of response supplies and equipment is provided in Appendix G of this Plan. The inventory is verified on a monthly basis.

APPENDIX A:

Figures

10/22/2015



Approximate Area of Development

Project Site Property Boundary

1/2-Mile Study Area

USGS 7.5 Minute Topographic Map
Bridgeport Quad

BRIDGEPORT HARBOR STATION - Combined Cycle Project

Figure 1

10/23/2015

Approximate Area of Development

Project Site Property Boundary

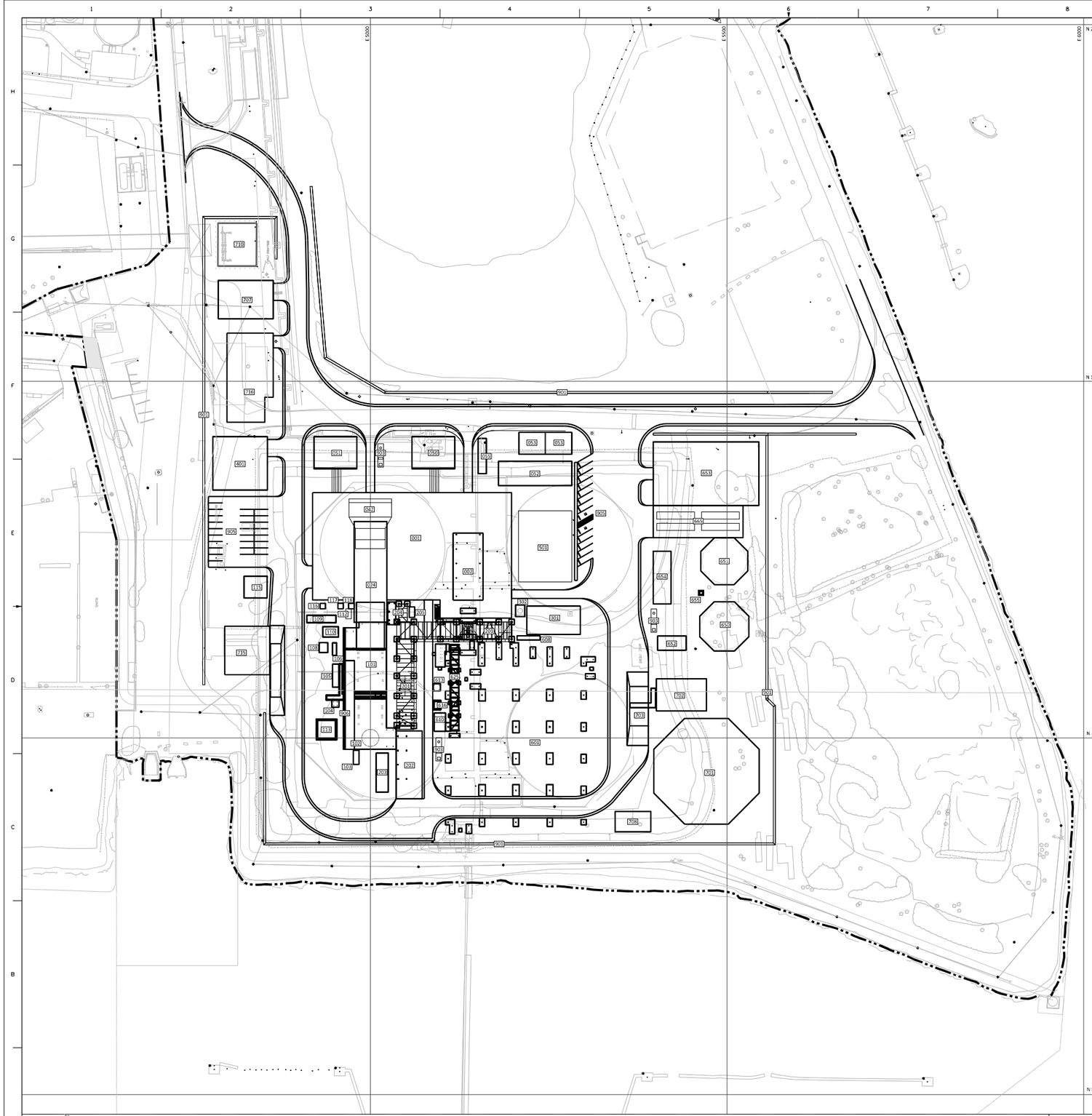
1/2-Mile Study Area

0 — 4,000 FEET

Site Location Aerial

Figure 2

BRIDGEPORT HARBOR STATION - Combined Cycle Project



FACILITIES LEGEND

ID	FACILITY	ARRANGEMENT	TIEDOWN LOCATION NORTH	TIEDOWN LOCATION EAST	REMARKS
001	TURBINE/GENERATOR ENCLOSURE (PEMB)	–	1343.79	4918.83	COLUMN ROW TBA – TB1
002	STEAM TURBINE GENERATOR	–	–	–	
024	GAS TURBINE GENERATOR	–	–	–	
042	CTG AIR INLET FILTER	–	–	–	
050	STG GSU TRANSFORMER	–	–	–	
051	CTG GSU TRANSFORMER	–	–	–	
052	MV ELECTRICAL PDC ENCLOSURE	–	–	–	
053	UNIT AUX TRANSFORMERS	–	–	–	
055	STANDBY DIESEL GENERATOR	–	–	–	
101	HEAT RECOVERY STEAM GENERATOR	–	–	–	
102	HEAT RECOVERY STEAM GENERATOR STACK		1000.00	5000.00	CL STACK
103	CEMS EQUIPMENT MODULE		–	–	
104	HRSG BLOWDOWN TANK		–	–	
105	HRSG AMMONIA FLOW CONTROL SKID	–	–	–	
106	HRSG BURNER FUEL SKID	–	–	–	
108	FUEL GAS ABSOLUTE SEPARATOR	–	–	–	
109	FUEL GAS PERFORMANCE HEATER	–	–	–	
110	STARTUP GAS HEATER	–	–	–	
112	WATER WASH/FALSE START DRAINS TANK (UG)	–	–	–	
113	HRSG BLOWDOWN SUMP	–	1012.00	4954.00	CL SUMP
115	BULK HYDROGEN SYSTEM	–	–	–	
116	FALSE START DRAINS TANK	–	–	–	
117	WATER WASH DRAINS TANK	–	–	–	
118	FUEL DRAINS TANK	–	–	–	
201	HRSG UTILITY RACK	–	–	–	
202	BOILER FEEDWATER PUMP ENCLOSURE (PEMB)	–	914.67	5386.83	COLUMN ROW BA–B1
203	HRSG ELECTRICAL PDC ENCLOSURE	–	–	–	
204	CT LUBE OIL RESERVOIR	–	–	–	
205	CT LIQUID FUEL FILTER SKID	–	–	–	
301	AUX BOILER ENCLOSURE (PEMB)	–	1145.00	5219.25	COLUMN ROW XA–X1
302	AUX BOILER STACK	–	1178.28	5209.95	CL STACK
401	WAREHOUSE/MAINTENANCE BUILDING (PEMB)	–	1353.50	4779.00	COLUMN ROW WA–W1
501	ADMIN/CONTROL/AUX ELECT BUILDING (PEMB)	–	1218.75	5207.50	COLUMN ROW CA–C1
601	AIR COOLED CONDENSER (ACC)	–	–	–	
608	CT GLYCOL PUMP & HEATER SKID	–	–	–	
610	WASTE WATER COLLECTION SUMP	–	1022.15	5097.32	CL SUMP
613	RESIN RECOVERY TANK	–	–	–	
616	SPENT SLURRY SUMP	–	1046.00	5093.10	CL SUMP
625	CONDENSATE UTILITY RACK	–	–	–	
650	SERVICE/FIRE WATER STORAGE TANK	–	–	–	
651	DEMIN WATER TANK	–	–	–	
652	FIRE PUMP HOUSE	–	–	–	
653	GENERAL SERVICES ENCLOSURE (PEMB)	–	1296.75	5396.50	CL COLUMN ROW GA–G1
654	AUX COOLING TOWER	–	–	–	
655	GENERAL SERVICES ENCLOSURE SUMP	–	742.50	4802.50	CL SUMP
665	DEMIN WATER TRAILERS/CYCLE MAKEUP TREATMENT	–	–	–	
701	ULSD TANK (ULTRA LOW SULFUR DIESEL)	–	–	–	
702	FUEL OIL FORWARDING PUMP ENCLOSURE (PEMB)	–	1037.83	5386.83	CL COLUMN ROW FA–F1
703	FUEL OIL TRUCK UNLOADING AREA	–	–	–	
707	FUEL GAS PROCESSING ENCLOSURE (PEMB)	–	–	–	
708	MANUFACTURED TREATMENT DEVICE	–	–	–	
710	FUEL GAS METERING STATION	–	–	–	
715	AQUEOUS AMMONIA STORAGE & UNLOADING AREA	–	–	–	
716	GIS ENCLOSURE	–	–	–	
901	RETAINING WALL	–	–	–	
903	OIL/WATER SEPARATOR (UNDERGROUND)	–	–	–	
905	PARKING/SIDEWALK		–	–	
906	HRSG ACOUSTIC SHROUD		–	–	

DESIGN NOTES:

1. NOTES APPLICABLE TO 5GAU-G1000 & G1001.
2. THIS DRAWING IS THE BASIS FOR THE SITE ARRANGEMENT AND IS SUBJECT TO REVISIONS AS A RESULT OF DETAILED DESIGN AND DUE TO VARIATIONS IN SUPPLIERS OF MAJOR EQUIPEMNT.
3. THE PROJECT PLANT GRID SYSTEM IS BASED ON THE CONNECTICUT STATE PLANE COORDINATE SYSTEM NAD83 (2011) FEET.TO CONVERT THE PLANT GRID TO STATE PLANE, ROTATE THE SITE CLOCKWISE ABOUT THE CENTERLINE OF THE HRSG STACK 20.73°, THEN ADD 620723.13 TO THE NORTHING AND ADD 876264.04 TO THE EASTING. PLANT GRID SYSTEM AND NOTED CONVERSION IS ONLY APPLICABLE TO THE LIMITS ON THIS DRAWING.
4. TO CONVERT FROM NAVD88 TO THE CITY OF BRIDGEPORT DATUM, ADD 14.6 TO NAVD88 ELEVATIONS TO MEET BRIDGEPORT DATUM.

OPEN
01/01/2000

ISSUED FOR PERMITTING

THE DISTRIBUTION AND USE OF THE NATIVE FORMAT CAD FILE OF THIS DRAWING IS UNCONTROLLED. THE USER SHALL VERIFY TRACEABILITY OF THIS DRAWING TO THE LATEST CONTROLLED VERSION.

50' 25' 0 50' 100'
1"=50'

Project Location:
Fairfield County, CT

BLACK & VEATCH
Building a world of difference®
Corporate Headquarters:
11401 Lamar Ave., Overland Park, KS 66211

NO	DATE	ACCT	DESCRIPTION	DWN	CKD	EXD	REV	REV	APD
Ø	08/25/16	C.81958	PERMIT ISSUE	RJL	TEB	LWJ	X	LWJ	MED

REVISION

BRIDGEPORT HARBOR UNIT 5

PLANT LAYOUT
GENERAL YARD
OVERALL SITE ARRANGEMENT

ARRANGEMENT DESIGN – CIVIL GENER

PROJECT ENGINEERING DIVISION

PSEG
Power Connecticut LLC

DRAWN (B&V)	CHECKED (B&V)	EXAMINED (B&V)
RICK LANCE	TERRY BROWN	
REVIEWED (B&V)	REVIEWED (B&V)	APPROVED (B&V)
	WEY-JEN LEE	

VENDOR NO.
191547-5GAU-G1001

PLANT NORTH 20.73 TRUE NORTH

TECHNICAL TABLES/SPECIFICATIONS:

REVISION NOTES:

Ø	ISSUED FOR PERMITTING

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT

SIGNED _____ MARK A. VANCE
DATE _____ REG. NO. 27647

DWG SCALE: 1" = 50'
SEAL:

ANSI E SIZE | CONT. _____ MECH. _____ SPON. _____ ELEC. _____ CIVIL _____ OTHER _____ | SPONSOR: | VERSION: 0

Bridgeport Harbor

Sanitary/Process Wastewater Sump

Fuel Gas Processing Enclosure

CTG Step Up Transformer

UG Oil/Water Separator

STG Step Up Transformer

Emg. (Standby) Diesel Generator

AUX Transformer

General Services Enclosure
Sodium Hypochlorite Totes
Corrosion Inhibitor Totes
Antiscalant Totes
Sulfuric Acid Totes

OIL WATER SEPARATOR DISCHARGE PIPE (TYP)

OIL SPILL PREVENTION PIPE (TYP)

707 051 903 050 053

INFILTRATION TRENCH 4 SEE NOTE 2

INFILTRATION TRENCH 3 SEE NOTE 2

INFILTRATION TRENCH 2 SEE NOTE 2

INFILTRATION TRENCH 1 SEE NOTE 2

LOD (TYP)

TOP OF SHEETPILE WALL EL 21.75 (TYP)

EXISTING OVERHEAD LINE

CONTRACTOR SHALL INSTALL CONCRETE BARRIER

CONTRACTOR SHALL INSTALL INFILTRATION TRENCH IN 10 FT INCREMENTS ALONG THE SHEETPILE WALL

MATCHLINE N 1369.00 -FOR CONTINUATION SEE DWG DS-1044B

40' 20' 0 40' 80'

1"=40'

20.73°

PLANT NORTH

TRUE NORTH

LEGENDS/SYMBOL KEYS:

050	STG GSU TRANSFORMER
051	CTG GSU TRANSFORMER
053	AUX TRANSFORMER
707	FUEL GAS PROCESSING ENCLOSURE (PEMB)
903	OILY/WATER SEPARATOR (UNDERGROUND)

DESIGN NOTES:

REFERENCES:

TECHNICAL TABLES/SPECIFICATIONS:

REVISION NOTES:

Ø	ISSUED FOR PERMITTING

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT

SIGNED: MARK A. VANCE

DATE: 08/25/16 REG NO. 27447

OPEN

08/19/2016

ISSUED FOR PERMITTING

THE DISTRIBUTION AND USE OF THE NATIVE FORMAT CAD FILE OF THIS DRAWING IS UNCONTROLLED. THE USER SHALL VERIFY TRACEABILITY OF THIS DRAWING TO THE LATEST CONTROLLED VERSION.

NO	DATE	ACCT	DESCRIPTION	DWN	CKD	EXD	REV	REV	APD
Ø	08/25/16	C.01950	IPERMIT ISSUE	TAR	BMH	JJD		LWJ	MED

REVISION

BRIDGEPORT HARBOR UNIT 5
PLANT LAYOUT
GENERAL YARD
OIL SPILL PREVENTION PIPES

PARTIAL SITE PLAN DESIGN-CIVIL GENERAL

Project Location:
Fairfield County, CT

BLACK & VEATCH
Building a world of difference®
Corporate Headquarters:
11401 Lamar Ave., Overland Park, KS 66211

PROJECT ENGINEERING DIVISION

PSEG
Power Connecticut LLC

DRAWN (B&V)	CHECKED (B&V)	EXAMINED (B&V)
TIM ROBINSON	BLIA HER	JERRY DYCK
REVIEWED (B&V)	REVIEWED (B&V)	APPROVED (B&V)
	WEY-JEN LEE	MICHAEL DRAKE

VENDOR NO.
191547-DS-1044A

ANSI D SIZE

CONT. MECH. SPON.
ELEC. CIVIL OTHER

SPONSOR:

VERSION: 0

MATCHLINE N 1369.00 -FOR CONTINUATION SEE DWG DS-1044A

Steam Turbine Generator
ST Lube Oil Skid

Demin Treatment Totes
Sodium Bisulfite
Antiscalant
Sodium Hydroxide
Sulfuric Acid

Turbine Generator Enclosure

Gas Turbine Generator

CT Lube Oil Reservoir

General Services Sump

Fire Pump House
Emg. Diesel Fire Pump

Wastewater Collection Sump

Fuel Oil Forwarding Pump House

Fuel Oil Unloading Area

UG Oil/Water Separator

ULSD Storage Tank

Stormwater Outfall

UG False Start Drains Tank

CT Glycol Pump/Heater

UG Oil/Water Separator

Boiler Feedwater Pump Enclosure

Cycle Chem Feed Enclosure (Totes)
Aqueous Ammonia
Filming Amine
Phosphate

Ammonia Unloading Area

Ammonia Storage Tank

OIL SPILL PREVENTION PIPE (TYP)

OIL WATER SEPARATOR DISCHARGE PIPE

OIL WATER SEPARATOR DISCHARGE PIPE

001 024 204 501 610 652 702 701 903 202

Bridgeport Harbor

40' 20' 0 40' 80'
1"=40'

PLANT NORTH 20.73° TRUE NORTH

TECHNICAL TABLES/SPECIFICATIONS:

REVISION NOTES:

Ø	ISSUED FOR PERMITTING

LEGENDS/SYMBOL KEYS:

001	TURBIN/GENERTOR ENCLOSURE (PEMB)
024	GAS TURBINE GENERATOR
202	BOILER FEEDWATER PUMP ENCLOSURE (PEMB)
204	CT LUBE OIL RESERVOIR
501	ADMIN/CONTROL/AUX ELECT BUILDING (PEMB)
610	WASTE WATER COLLECTION SUMP
652	FIRE PUMP HOUSE
701	ULSD TANK (ULTRA LOW SULFUR DIESEL)
702	FUEL OIL FORWARDING PUMP ENCLOSURE (PEMB)
903	OIL/WATER SEPARATOR (UNDERGROUND)

DESIGN NOTES:

REFERENCES:

OPEN
08/18/2016

ISSUED FOR PERMITTING
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NO	DATE	ACCT	DESCRIPTION	DWN	CKD	EXD	REV	REV	APD
Ø	08/25/16	C.01950	PERMIT ISSUE	TAR	BMH	JJD		LWJ	MED

REVISION

BRIDGEPORT HARBOR UNIT 5
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DRAWN (B&V)	CHECKED (B&V)	EXAMINED (B&V)
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REVIEWED (B&V)	REVIEWED (B&V)	APPROVED (B&V)
	WEY-JEN LEE	MICHAEL DRAKE

VENDOR NO.
191547-DS-1044B

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT
SIGNED: MARK A. VANCE
DATE: 08/25/16 REG NO.: 27447

ANSI D SIZE

CONT. ____ MECH. ____ SPON. ____
ELEC. ____ CIVIL ____ OTHER ____

SPONSOR:

VERSION: 0

APPENDIX B

Substantial Harm Determination

APPENDIX B
CERTIFICATION OF THE APPLICABILITY OF THE
SUBSTANTIAL HARM DETERMINATION FORM
(40 CFR 112, Appendix C)

Facility Name: PSEG Bridgeport Harbor Station – Unit 5
Facility Address: 1 Atlantic Street, Bridgeport, CT 06604

Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?

Yes [X] No [ ]

Does the facility have a total oil storage capacity greater than or equal to 1 million gallons **and** does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area?

Yes [ ] No [X]

Does the facility have a total oil storage capacity greater than or equal to 1 million gallons **and** is the facility located at a distance (as calculated using the appropriate formula in Attachment **C-111** to Appendix C of 40 CFR 112 or a comparable formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For further description of fish and wildlife and sensitive environments, see Appendices I. **II,** and to DOONOAA's "Guidance for Facility and Vessel Response Plans: Fish and Wildlife and Sensitive Environments" (see Appendix E to 40 CFR 112. Section 10, for availability) and the applicable Area Contingency Plan.

Yes [X] No [ ]

Does the facility have a total oil storage capacity greater than or equal to 1 million gallons **and** is the facility located at a distance (as calculated using the appropriate formula in Attachment C-111 to Appendix C of 40 CFR 112 or a comparable formula) such that a discharge from the facility would shut down a public drinking water intake?

Yes [ ] No [X]

Does the facility have a total oil storage capacity greater than or equal to 1 million gallons **and** has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?

Yes [ ] No [X]

Certification:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted authorization is accurate and complete.

Signature: _____ Title: Plant Manager
(please type or print)
Name: _____ Date: _____
(please type or print)

1. If a comparable formula is used, documentation of the reliability and analytical soundness of the comparable formula must be attached to this form.
2. For the purposes of 40 CFR Part 112, public drinking water intakes are analogous to public water systems as described at 40 CFR 143.2(c).

APPENDIX C

Facility Inspection Checklist

1 ANNUAL/MONTHLY TANK-PIPING SELF INSPECTION:

Facility Self-Inspection

In addition to the regular, routine inspections, aboveground storage tanks are inspected monthly and annually under the direction of the Plant Manager. Table 1 is a copy of the inspection checklist used, which covers examination of tanks, foundations, piping, dikes and secondary containment. Table 2 is a copy of the Response Equipment Checklist. This equipment is also inspected monthly and annually under the direction of the Plant Engineer - Operations. Copies of the inspection sheets for tanks and response equipment are kept on file with the Plant Engineer - Operations. Spill prevention meetings are conducted annually under the direction of the Environmental Operations Leader.

Table 1 - Tank and Containment Checklist - Oil

Tank Identifier	Substance Stored	Tanks	Foundation	Piping	2nd Containment	Comments
U5B-1	No. 2 Fuel Oil/Diesel					
U5B-2	No. 2 Fuel Oil/Diesel					
U5B-3	No. 2 Fuel Oil/Diesel					
U5B-4	Used Lube Oil					
USB-5	New Lube Oil					
U5T-1	Mineral oil					
U5T-2	Mineral oil					
U5T-3	Mineral oil					
U5T-4	Mineral oil					
OFE-5-1	Lube Oil					
OFE-5-2	Lube Oil					

Table 1 - Tank and Containment Checklist - Hazardous Materials						
Tank Identifier	**Substance Stored**	**Tanks**	**Foundation**	**Piping**	**2nd Containment**	**Comments**
HM-5-1	Aqueous Ammonia					
HM-5-2	Aqueous Ammonia					
HM-5-3	Sodium Hypochlorite					
HM-5-4	Corrosion Inhibitor					
HM-5-5	Antiscalant					
HM-5-6	Sulfuric Acid					
HM-5-7	Aqueous Ammonia					
HM-5-8	Filming Amine					
HM-5-9	Phosphate					
HM-5-10	Sodium Bisulfite					
HM-5-11	Antiscalant					
HM-5-12	Sodium Hydroxide					
HM-5-13	Sulfuric Acid					
HM-5-14	Aqueous Ammonia					

Also refer to Secondary Containment Draining Procedures.

Inspectors: _____

Date: _____

Signed: _____

Title: _____Plant Manager_____

Date: _____

Tanks, check for:

1. Drip marks
2. Discoloration of tank
3. Puddles of spilled materials
4. Corrosion
5. Cracks
6. Localized dead vegetation

Foundations, check for:

1. Cracks
2. Discoloration
3. Puddles of spilled materials
4. Settling
5. Gaps between tank and foundation
6. Damage by vegetation roots

Piping, check for:

1. Droplets of stored material
2. Discoloration
3. Corrosion
4. Bowing of pipe
5. Seepage from seals
6. Localized dead vegetation

Dikes, check for:

1. Level of precipitation
2. Operational Status of Drain Valves
3. Dike permeability
4. Debris
5. Erosion
6. Earthen Floor Permeability
7. Drainage beneath tanks

Secondary Containment, check for:

1. Cracks
2. Discoloration
3. Spilled or leaked materials
4. Corrosion
5. Valve conditions

APPENDIX D

Record of Discharge Prevention Briefings and Training

APPENDIX D
Record of Annual Discharge Prevention Briefings and Training

Briefings will be scheduled and conducted by the facility owner or operator for operating personnel at regular intervals to ensure adequate understanding of this SPCC Plan. The briefings will also highlight and describe known discharge events or failures, malfunctioning components, and recently implemented precautionary measures and best practices. Personnel will also be instructed in operation and maintenance of equipment to prevent the discharge of oil, and in applicable pollution laws, rules, and regulations. Facility operators and other personnel will have an opportunity during the briefings to share recommendations concerning health, safety, and environmental issues encountered during facility operations.

Date	Subjects Covered	Employees in Attendance	Instructor(s)

APPENDIX E

Emergency Contacts

APPENDIX E – Emergency Contacts

EMERGENCY NOTIFICATION PHONE LIST - WHOM TO NOTIFY

Date of Last Update: _____
Reporter's Name: _____
Date: _____
Facility Name: PSEG Power Connecticut LLC, Bridgeport Harbor Station
Owner Name: PSEG Power LLC
Facility Identification Number: _____
Date and Time of Each NRC Notification: _____

Organization	Phone Number
1. National Response Center (NRC):	800-424-8802 or www.nrc.uscg.mil/nrchp
2. Qualified Individual: Business Phone: After Hours: Cell Phone:	
3. Company Response Team:	NA
4. Federal On-Scene Coordinator (OSC) and/or Regional Response Center (RRC): or Captain of the Port, Long Island Sound (U.S. Coast Guard):	617-918-1236 this is EPA and 203-468-4444
5. Local Response Team (CTDEEP/Fire Department/Cooperatives): CTDEEP Oil & Chemical Spills Unit: Bridgeport Fire Department:	 860-424-3338 or 1-866-337-7745 911 or 203-576-7683
6. Fire Marshal:	203-576-8013
7. State Emergency Response Commission (SERC):	860-424-3373
8. State Police Troop G – Bridgeport:	800-575-6330 or 203-696-2500
9. Local Emergency Planning Committee (LEPC):	203-576-8376
10. Local Water Supply System: Aquarian Water Company:	 203-445-7310
11. Bridgeport Energy	203-332-8684 (intake)
12. Weather Report: NOAA Scientific Support Coordinator:	 212-668-6428
13. Local Television/Radio Station for Evacuation Notification: WCTX: WFSB TV: WTNH: WTXX: WELI Radio 960 AM: WDJC Radio 1530 AM: WEBE Radio 108 FM:	 203-784-8888 860-244-1728 203-784-8888 860-723-2151 203-281-9600 203-333-6700 203-333-9108

APPENDIX E – Emergency Contacts

14. Hospitals

Bridgeport / Yale Hospital:	**911** or 203-384-3000
St. Vincent's:	**911** or 203-576-5171

15. Spill Response Contractors

Sea Support:	203-467-1590
Connecticut Tank Removal:	888-304-8265
Tradebe Environmental Services :	888-276-0887
Tradebe (Bridgeport United Recycling):	203-334-1666
Fleet Environmental Services:	800-562-7611
Clean Harbors:	860-583-8917

16. Other Phone Numbers:

Bridgeport Police Department	**911** or 203-576-7683
Bridgeport Port Authority	203-384-9777 (Office phone)
Bridgeport Harbor Master	203-520-5821 (Anthony Palumbo)
Bridgeport Mayor's Office	203-576-7201
Occupational Safety & Health Administration (OSHA)	203-579-5581 (Bridgeport Office) 860-240-3152 (Hartford Office)
Department of Agriculture – Division of Aquaculture/Shellfish	203-874-0696
CT Fisheries Division	860-424-3474
CT Wildlife Division	860-424-3011
CT Department of Transportation (CDOT)	860-443-3856
Sikorsky Airport	203-576-8163
U.S. Fish & Wildlife	401-364-9124

Company Internal Notifications:	Working Hours	After Hours

1. Senior Operations Supervisor
   Primary Response Coordinator
   Control Room Phone (Unit 5)

2. Plant Operations Manager
   Primary Response Coordinator
   TBD
   Cell Phone

3. Generation Supervisor – Fuels
   Alternate Response Coordinator
   TBD
   Cell Phone

4. Environmental Compliance and Programs
   Manager
   TBD
   Cell Phone

   OR

   Environmental Compliance and Programs Manager
   TBD

5. Procurement Leader
   TBD
   Cell Phone

6. Business Analyst
   TBD
   Cell Phone

7. Maintenance Manager
   TBD

   Cell Phone

8. Safety & Health Specialist
   TBD

   Cell Phone

APPENDIX F

Incident Description Form

INCIDENT DESCRIPTION FORM

PSEG Fossil LLC
Bridgeport Harbor Station
One Atlantic Street
Bridgeport, CT 06604

Telephone: 203-551-6148
Latitude: North 41°, 10 min., 1 sec.
Longitude: West 73°, 10 min., 53 sec.

PART I. INCIDENT SUMMARY

Enter the following information prior to notification
Substance and estimated quantity:
Source and location of incident:
Cause of incident if known:
Date and time incident began:
Date and time incident was discovered:
Date and time investigation began:
Date and time incident ended:
Any Injuries or Fatalities? Yes ( ) No ( ) Details:
Reportable properties for wastewater:
Location and direction of spill to river:
Temperature: Precipitation:
Wind speed and direction for release to air:
Check (√) tide direction for releases to river: In ( ) Out ( )
Check (√) affected area(s): Land ( ) Water ( ) Air ( )
Were evacuations required? Yes ( ) No ( ) Details:
Designated Access Gate: _____ Assembly Area: _____ Evacuation Route: _____
Special Instructions for Outside Responders: _____

PART II. AGENCY NOTIFICATION

Agency	Date/Time Notified	Operator Name/ID	Case/Report Number
CTDEEP (1-866-337-7745)			
NRC (1-800-424-8802)			
USCG (1-800-774-8724)			
*OSHA (1-800-321-6742)			
USEPA (1-617-918-1236)			
Local OEM – City of Bridgeport (1-203-579-3822)			
Fire/Police/Other - 911			

Enter relevant questions or comments made by agencies

Enter name and number of PSEG person with incident management responsibility	
Print Name	**Signature**

** Note: Only the Manager - Fossil Safety, the Director - Outage and Projects or other designee by the Senior Vice President - Production may contact OSHA!*

PART III: FULL INCIDENT DESCRIPTION

Describe incident in detail, in chronological order, including the position titles and names of team of investigators

Describe incident response and cleanup activities including list of offsite responders who were notified

Enter 24-hour follow-up and additional information and any additional comments

List onsite/offsite consequences (i.e., injuries, evacuations, environmental impact, property damage)

Print Name	Signature

▸ ▸ ▸ ▸ ▸ ▸ **Submit Completed Form to Senior Environmental Engineer** ◂ ◂ ◂ ◂ ◂ ◂

APPENDIX G:

Discharge Response Equipment Inventory

Note: The attached discharge response equipment inventory represents discharge response equipment located at the BHS site. Additional response equipment, as required, will also located at the BHS Unit 5 development area. As such, this listing will be modified/updated during final design, as appropriate.

Table 7.3

Spill Response Equipment Bridgeport Harbor Station
Date of Last Update: _____

Item	Location	Quantity	
Containment Boom	Oil Dock Storage Unit 1-2 Screen House "Black Beach Dock" - Trailer On Shore	1000	Ft.
Sorbents		Max	Min
Sorbent Pads (18"x18")	Stockroom - Siemen's Warehouse	30	8
Speedy Dry (50 lb bags)	#2 Turbine Bay	50	25
Pigs (Boxes)	Stockroom - Siemen's Warehouse	2	1
Spill Kits	Stockroom - Siemen's Warehouse	2	1
Chemical Agents		Max	Min
Niroc (55 gal cans)	Stockroom - Siemen's Warehouse	4	1
Storage		Max	Min
55 Gallon Drums			
Ringtop	Stockroom - Siemen's Warehouse	12	6
Bunghole	Stockroom - Siemen's Warehouse	4	2
Vessel			
17 Foot 100 HP Johnson	No longer Used		
Aluminum Workboat	Boat Work is Contracted to Sea Support		
Protective Equipment			
Life Jackets	All Fuel Handler(s) Coal & Oil Docks	12	
Floatation Aides			
Life Rings	Fuel Dock		
	Barge Unloader	4	
	Screen House	2	
Equipment			
Registered Pickup Trucks	Operations/Maintenance/I&E	5	
Pickup Trucks	No Yard Trucks		
12,000 lb Forklift	Maintenance	1	
2,000 lb Forklift	Operations	1	
2,500 lb Forklift	Stockroom	1	
Cherry Picker 18 ton	Maintenance Shop	1	

Table 7.3

Item	Location	Quantity
Portable Compressor		
100 CFM	Machine Shop	
Payloader 1-1/4 Yard	Yard	1
Bobcat Loader	Yard	2
Bulldozers(2-D10)	Yard	2
Personal Protective Gear		
Sets of the following: Boots< Rubber Gloves, Tyvek Suits, Goggles, Suitable Respirators, Rain Suits, Work Gloves	Stockroom	8 Sets
Radios		
Base Stations	Unit 3 Control Room	1
	Shift Leader's Office	1
	Oil Dock	
	Barge Unloader	1
Portable	Throughout Station (Operations Personnel)	24
Page System	Throughout Property (plant/yard)	
Mobile Telephones	All Management Personnel	
Miscellaneous		
Winch 2000#	Oil Dock	
Safety Belts	Machine Shop	2
Rags (10 lb bags)	Stockroom / Machine Shop	50
Sawdust (50 lb Bags)	U3 Screenhouse / Siemen's Warehouse	25 - 250
Coal	Coal Pile	Unlimited
Sandbags	Various	100 - 250
Lubrication Oil Various	Warehouse	Varies
Hydraulic Oil	Stockroom	5-Gal Pails
Sand/Road Mix	N/A	N/A

APPENDIX H:

Correspondence

U.S. Department of Homeland Security

United States Coast Guard

Commander
U.S. Coast Guard
Sector Long Island Sound

120 Woodward Ave.
New Haven, CT 06512
Staff Symbol: sp
Phone: (203) 468-4444
FAX: (203) 468-4443

16450/P133-12

PSEG Bridgeport Harbor Station
ATTN: Mr. Michael Stagliola
1 Atlantic Street
Bridgeport, CT 06604-5513

Dear Mr. Stagliola:

We have received and reviewed your letter dated April 18, 2012, requesting "Caretaker Status" for PSEG Bridgeport Terminal. Your facility meets the definition of caretaker status found in Title 33 Code of Federal Regulations (CFR) Section 154.105. Your request is therefore approved. As such, while PSEG Bridgeport Terminal meets the definition of caretaker status under that Section, you, as the manager of the facility, are not required to meet the requirements for operation of a facility found in 33 CFR, Subpart D.

If your company desires to conduct marine transfers at PSEG Bridgeport Terminal, in the future, you will need to do the following: at least 30 days prior to any transfer operations taking place, submit two (2) copies of the facility's Operations Manual for examination in accordance with 33 CFR §154.325(c); submit an updated Response Plan for approval in accordance with 33 CFR §154.1017(b); and at least 60 days prior to any transfer operations submit an updated Facility Security Plan in accordance with 33 CFR §105.410(b).

Please direct any questions to Petty Officer Travis Halling, of my staff, at (203) 468-4405.

Sincerely,

A. M. Beach
Commander, U. S. Coast Guard
Chief, Prevention Department
By direction

APPENDIX I

Unloading Procedures

BRIDGEPORT HARBOR STATION
PROCEDURE FOR LOADING AND UNLOADING OPERATIONS OF HAZARDOUS SUBSTANCES IN BULK QUANTITIES

1 PURPOSE

1.1 This procedure has been developed to insure the health, safety and well being of personnel and for the protection of the environment.

1.2 To provide directions for safe loading and unloading operations of hazardous material in bulk quantities.

1.3 To ensure that vendors comply with established Company procedures.

2 TERMS AND DEFINITIONS

2.1 Bulk: Large quantities of substances

2.2 Hazardous Substances: Oil or petroleum containing products, chemicals such as acids, caustics, ammonium hydroxide, sodium Hypochlorite, hydrazine, glycol, fuel additives, etc.

2.3 Secondary containment: A structure, device or combination thereof, designed to prevent leaks of oil or petroleum-containing products from escaping to the environment such as the ground and water bodies.

2.4 Spill Plans: Include the Bridgeport Harbor Station (BHS) SPCC and Facility Response Plan for Marine-Related Facilities (OPA-90).

3 RESPONSIBILITIES

3.1 The Plant Manager has ownership of this procedure.

3.2 The Station Operations Manager, or designee, is responsible for assigning necessary resources to implement this procedure.

3.3 The Senior Operation Supervisor or any other qualified personnel designated by the Station Operations Manager is responsible for:

3.1.1 Executing this procedure

3.1.2 Assigning qualified personnel to conduct or assist in the loading and unloading operation.

3.1.3 Reviewing and approving completed Hazardous Substance Delivery Check List.

3.1.4 Forwarding the original completed copy or assuring electronic archiving of the Hazardous Substance Delivery Check List to the station Environmental Operations Leader or an appropriate person designated by the station.

3.1.5 Taking immediate response actions in the event of a mishap. Emergency response procedures are outline in the station's SPCC, and Facility Response Plan for Marine-Related Facilities (OPA-90).

3.4 The Senior Environmental Engineer shall:

3.4.1 Audit this program.

3.4.2 Verify that the required documents are being retained by the responsible persons.

4 PRECAUTIONS AND LIMITATIONS

4.1 Personnel involved in the handling of hazardous substances are trained in transfer operations

4.2 Personnel are required to wear appropriate Personnel Protection Equipment.

5 PREREQUISITES

5.1 Personnel involved in the handling of hazardous substances must be trained for the operation.

6 PROCEDURE

This procedure covers:

1. Unloading of tank trucks

2. Unloading of bulk containers

1. Unloading of Tank Truck

This section provides generic procedures for tank truck deliveries of hazardous substances.

This procedure address the general logistics of directing and handling the delivery process from the time the truck enters station property until it leaves the gate.

A tank truck delivery procedure requires the operator to carry out operation in seven sequential activities. These activities are listed as follows:

Activity 1: Preparing the Receiving System for Delivery

Activity 2: Preparing the Unloading Area for Delivery

Activity 3: Inspecting the Tank Truck

Activity 4: Setting Up the Tank Truck

Activity 5: Unloading the Tank Truck

Activity 6: Tank Truck Exit

Activity 7: Post Delivery

> *NOTE: All tank truck deliveries must be documented using a Tank Truck Delivery Checklist. A sample checklist is included in Attachment 1. The checklist will help assure that applicable procedures are followed. Completed checklists must be archived and maintained for a period of 3 years.*

Activity 1: Preparing the Receiving System for Delivery

Prior to accepting a tank truck delivery, the following procedures must be observed:

1. Visually inspect the receiving system, including system piping, transfer valves, pumps, flanges, and connections for leaks, discharges, and proper operation. Properly align valves.

2. Check that no repair work is being performed on the receiving system.

3. Test the receiving tank's high-liquid level alarm (if so equipped) by placing the switch in the test position.

4. Determine the amount of shipment to be unloaded into the tank.

5. Check the tank level and verify if there is sufficient capacity to receive delivery.

6. Record the delivery amount on the Checklist.

Activity 2: Preparing the Unloading Area for Delivery

The unloading area must be prepared before the arrival and positioning of the tank truck. This procedure includes provisions designed to ensure personal and environmental protection from potential hazards associated with the substance to be delivered and the unloading process.

1. Secure the storm drains in the vicinity of the loading/unloading operations.

2. Check that emergency response equipment is readily available.

3. Check that personal protective equipment (PPE) appropriate to the substance being delivered is available and in good working condition.

4. Check that eye washes or emergency showers, if available, are operable.

5. Make sure that no sources of ignition are present in the unloading area or potential vapor plume path, if appropriate.

6. For chemical deliveries, check that a supply of running water through a one-inch hose is available at the area.

Activity 3: Inspecting the Tank Truck

When feasible, tank trucks should be inspected at the main entrance gate before they are allowed on the station property. If not, tank truck inspections should be done prior to connecting transfer hoses. Deliveries shall be refused for tank trucks which fail inspection.

1. Verify that the correct substance is being delivered by comparing the order manifest, the DOT shipping documents, and placards.

2. Log the time of truck arrival on the Tank Truck Delivery Checklist (Checklist).

3. Visually inspect for leaks or discharges. Any amount of leakage is unacceptable.

4. Check hose for cracks, bulges or other defects.

5. Sample and test the product, if necessary.

Activity 4: Setting Up the Tank Truck

Once the truck passes inspection, it can now be prepared for off loading at the delivery area. The following procedures must be followed:

1. If necessary, direct the truck to the unloading area using the most direct available route.

2. Check that the truck is properly positioned for unloading.

3. Erect an exclusion barrier to keep unauthorized personnel out of the unloading area.

4. Check that the vehicle wheels are chocked.

5. Check that grounding straps are attached to truck (for petroleum deliveries only).

6. Check that all personnel involved in the unloading process are wearing PPE which is appropriate for the substance being delivered.

NOTE 1: *Minimum PPE required for station personnel includes goggles, face shield, and approved gloves. A chemical suit is also required for deliveries of acid or caustic.*

NOTE 2: *Minimum PPE required for the truck operator includes eye and hand protection*.

Activity 5: Unloading the Tank Truck

Unloading can commence once the truck has been positioned and secured, and personnel involved in the transfer are adequately protected.

NOTE: The truck operator is responsible for operating all truck equipment (such as valves and pump), supplying and connecting the transfer hose from the truck to the receiving system. Station personnel will be responsibly for opening and closing the first valve at the unloading area. The station will not supply air or any other pressurization means to any tank truck.

1. Connect the transfer hose from the truck to the receiving fill connection.

NOTE: Station personnel must be in direct contact with the truck operator at all times. Establish direct contact by one of the following: visually, by two-way radio, or by telephone.

2. If necessary, provide the truck operator with a two-way radio and yourself with a second radio. Use these radios to maintain direct contact with the truck driver.

3. Proceed to the location from where you can monitor the tank level continuously.

4. If necessary, announce over station public address system the material and location of unloading operation.

5. Instruct the truck operator to commence unloading.

6. Monitor the tank delivery system and the receiving system piping for leaks throughout the filling operation.

If leakage occurs:

a. Immediately stop unloading.

b. Isolate the delivery vehicle and storage tank.

c. Notify the SOS.

d. Commence cleanup actions appropriate to the substance.

When the delivery has been completed:

7. Isolate the tank truck and the tank.

8. Disconnect the transfer hose and drain any residual into suitable containment.

9. Bleed pressure if the truck was pressurized during the delivery.

10. Cap all receiving system and tank truck connections.

11. Record the final tank volume on the Checklist. Verify that the tank level has increased by the amount indicated by the tank gauges and/or level indicator. The amount of increase should correspond with the amount on the shipping documents.

Activity 6: Tank Truck Exit

To prepare the tank truck for departure:

1. Closely examine the lowermost truck drain and all other outlets for leakage. If necessary, have the truck operator tighten, adjust, repair or replace to prevent liquid leakage in transit.

2. Check to make sure that all manifolds are flanged or capped, and valves secured.

3. Remove barricades and wheel chocks.

4. Log the time the vehicle departs station property on the Checklist.

Activity 7: Post Delivery

1. Clean up any spillage that may have occurred using methods appropriate to the substance which was spilled.

1. Properly dispose of all wastes incurred in the delivery process.

3. Remove PPE and any containment or emergency equipment set up for the delivery process and return them to their proper storage locations.

4. Restock, PPE and /or emergency equipment (as necessary).

5. Upon completion of delivery the station person responsible for off-loading will deliver the Hazardous Substance Delivery Checklist to his/her supervisor for review and action, if necessary. An electronic version is acceptable if it contains all necessary information. The Senior Operations Supervisor shall enter pertinent comments, Sign, and Date the form at "Reviewed and Approved By" after assuring all identified deficiencies have been addressed and properly documented.

2 TANK TRUCK LOADING

TANK TRUCKS ARE NOT CURRENTLY LOADED AT BRIDGEPORT HARBOR STATION. However, in the event that such an activity could occur, this section provides generic procedures for tank truck loading of hazardous substances.

These procedures address the general logistics of directing and handling the loading process from the time the truck enters station property until it leaves the gate.

A tank truck loading operation requires the operator to carry operation in seven sequential activities. These activities are listed as follows:

Only *qualified station personnel and/or contractors* will carry out these procedures.

Activity 1: Preparing the System for Loading

Activity 2: Preparing the Loading Area

Activity 3: Inspecting the Tank Truck

Activity 4: Setting Up the Tank Truck

Activity 5: Loading the Tank Truck

Activity 6: Preparing the Tank Truck for Departure

Activity 7 : Post Loading Delivery

Activity 1: Preparing the System for Loading

Prior to accepting a tank truck for loading, the following procedures must be carried out:

1. Visually inspect the loading system, including system piping, transfer valves, pumps, flanges, and connections for leaks, discharges, and proper operation. Properly align valves.

2. Check that no repair work is being performed on the system.

Activity 2: Preparing the Area for Loading

The area must be prepared before the arrival and positioning of the tank truck. This procedure includes provisions designed to ensure personal and environmental protection from potential hazards associated with the substance to be loaded.

1. Secure the storm drains in the vicinity of the loading/unloading operations.

2. Check that emergency response equipment is readily available.

3. Check that personal protective equipment (PPE) appropriate to the substance being delivered is available and in good working condition.

4. Check that eye washes or emergency showers, if available, are operable.

5. Make sure that no sources of ignition are present in the unloading area or potential vapor plume path, if applicable.

Activity 3: Inspecting the Tank Truck

1. Visually inspect tank truck for exterior tank integrity issues; i.e., dents, tears, etc. Any amount of leakage is unacceptable.

2. Check hose for cracks, bulges or other defects.

Activity 4: Setting Up the Tank Truck

Once the truck passes inspection, it can now be prepared for loading at the delivery area. The following procedures must be followed:

1. If necessary, direct the truck to the loading area using the most direct available route.

2. Check that the truck is properly positioned for loading.

3. Erect an exclusion barrier to keep unauthorized personnel out of the loading area.

4. Check that the vehicle wheels are chocked.

5. Check that grounding straps are attached to truck (for petroleum deliveries only).

6. Check that all personnel involved in the loading process are wearing PPE which is appropriate for the substance being delivered.

Activity 5: Loading the Tank Truck

Loading can commence once the truck has been positioned and secured and personnel involved in the transfer are adequately protected.

> *NOTE: The truck operator is responsible for operating all truck equipment (such as valves and pump), supplying and connecting the transfer hose from the truck to the receiving system. Station personnel will be responsible for opening and closing the first valve at the loading area. The station will not supply air or any other pressurization means to any tank truck.*

1. Connect the transfer hose from the truck to the storage tank container.

2. Proceed to the location from where the tank level can be monitored continuously.

3. Instruct the truck operator to commence loading operation.

4. Monitor the tank loading system piping and the receiving system piping for leaks throughout the loading operation.

   If leakage occurs:

   a. Immediately stop unloading.

   b. Isolate the tank truck and storage tank.

   c. Notify the control room.

d. Commence cleanup actions appropriate to the substance.

When the loading has been completed:

5. Isolate the tank truck and the tank/container.

6. Disconnect the transfer hose and drain any residual into suitable containment.

7. Bleed pressure if the truck was pressurized during the loading.

8. Cap all tank/container and tank truck connections.

Activity 6: Preparing the Tank Truck for Exit

To prepare the tank truck for departure:

1. Closely examine the lowermost truck drain and all other outlets for leakage. If necessary, have the truck operator tighten, adjust, repair or replace to prevent liquid leakage in transit.

2. Check to make sure that all manifolds are flanged or capped, and valves secured.

3. Check to make sure that correct placard is displayed.

4. Ensure the shipping paper or manifest has been properly completed and signed by authorized personnel.

5. Remove barricades and wheel chocks.

Activity 7: Post Loading Activities

1. Clean up any spillage that may have occurred using methods appropriate to the substance which was spilled.

2. Properly dispose of all wastes incurred in the delivery process.

3. Remove PPE and any containment or emergency equipment set up for the delivery process and return them to their proper storage locations.

4. Upon completion of transfer operation the station person responsible for loading will deliver the Hazardous Substance Delivery Checklist to his/her supervisor for review and action, if necessary. An electronic version is acceptable if it contains all necessary information. The Senior Operations Supervisor shall enter pertinent

comments, Sign, and Date the form at "Reviewed and Approved By" after assuring all identified deficiencies have been addressed and properly documented.

3. INDIVIDUAL CONTAINER DELIVERY

Certain hazardous substances used at the stations are delivered in pre-packaged containers or drums. Such deliveries are received through the storeroom

Individual containers as well as boxed cases of containers must be carefully unloaded and placed in storage with strict attention paid to all safety and environmental precautions associated with the product being handled. Unloading equipment including forklifts, hand trucks, and dollies are to be used during unloading of these containers.

> *NOTE: Many of these containers are glass; special care must be exercised in receiving and handling them.*

Designated storage areas have been created for hazardous substance. The delivered containers should be either unloaded in the appropriate storage areas or taken there immediately after delivery.

Unloading Procedure

1. Ensure that containers are unloaded on an impervious area such as concrete or asphalt.

2. Check delivery papers and container packaging. Containers must be labeled and/or marked in accordance with the OSHA Hazard Communication Standard.

> ***IMPORTANT***
> *If containers are leaking, damaged, and/or not properly labeled, refuse the delivery.*

3. Carefully unload the delivered material from the delivery vehicle by means of a forklift or a hand truck. Containers are never to be rolled off the delivery vehicle or suffer any impact through being dropped or brought into collision. Small containers can be off loaded by hand.

4. Update inventory records upon completing the delivery.

Storage Requirements

1. Ensure that storage areas are consistently kept clean, uncluttered, ventilated where necessary, and adequately lit.

2. Place containers in the proper storage areas, taking care not to store incompatible materials in the same area.

3. Position containers so labels can be identified readily and there is direct access to each container. This requirement applies to all containers but is particularly important with drums.

> *NOTE: The use of aisles is recommended to facilitate access in the event of an emergency. The minimum aisle space should be 18 inches.*

5. Small containers should be placed in appropriate storage cabinets.

6. Containers must be labeled in accordance with the OSHA Hazard Communication Standard.

7. RECORD RETENTION:

The Supervisor responsible for operations or a designated alternate shall retain the above referenced checklist to document that the operation has been completed in accordance with the procedure. These records shall include documentation of any problems that may have been found, as well as the subsequent actions taken to correct the problems.

Completed “Hazardous Substance Delivery Checklist” shall be retained for a period of three years.

8. DOCUMENTATION

The original “Approved” copy of this procedure and the signed Procedure Approval Form shall be maintained at the station and distributed to responsible personnel as appropriate.

Current copies of this procedure shall be distributed to the Plant Manager, Operations Manager and Environmental Operations Leader.

9. REFERENCES

a. None

10. ATTACHMENTS

Please refer to Attachment A, below.

6. DEVELOPMENT HISTORY

	Revision 0	Date
Writer		
Reviewer(s)		
Approver(s)		
Reason Written		

	Revision 1	Date XX/XX/XXXX
Writer		
Reviewer(s)		
Approver(s)		
Reason for Change		

	Revision 2	Date XX/XX/XXXX
Writer		
Reviewer(s)		
Approver(s)		
Reason for Change		

	Revision 3	Date XX/XX/XXXX
Writer		
Reviewer(s)		
Approver(s)		
Reason for Change		

	Revision 4	Date XX/XX/XXXX
Writer		
Reviewer(s)		
Approver(s)		
Reason for Change		

Attachment A:

Sample Hazardous Substance Delivery Checklist

Chemical Shipment Name _____

Bulk? _____ Barrels? _____ Samples Required?

Circle One

Operating Instruction and applicable MSDS reviewed. ..... YES or NO

Delivery vehicle on-site arrive, inspection completed satisfactorily? ..... YES or NO

Date _____Time _____

Chemical samples taken or Certificate of Analysis Supplied by Vendor YES or NO

Method used – Analysis Sheet Supplied by Vendor _____
OR
Dip Sample & Qualitative Recognition _____

CAUTIONS:

1. Truck operators are responsible for all truck operations and safety equipment.

2. The Station will not supply any means of pressurization to any truck. Trucks requiring pressurization for off- load must supply their own from on-truck systems.

3. Station Personnel will operate station equipment.

4. Station Personnel and the truck operator must remain at the delivery site during the entire operation

Delivery Site Preparation

Proper emergency and personal protective equipment ready for use?		YES or NO
Containment type:	Permanent (Drain Closed)	YES or NO
	Portable	YES or NO
Inspect Containment	Leaks	YES or NO
	Integrity	YES or NO
	Deterioration	YES or NO

If Containment is questionable, utilize portable berm located in warehouse or line the containment with

chemical resistant plastic.

Sample Hazardous Substance Delivery Check List (Continued)

Check That the Proper Material is Being Delivered to the Proper Connection?	YES or NO
Wheel Chocks Installed?	YES or NO
Grounding Established?	YES or NO
Personnel Exclusion Area Established & Appropriated Signs Posted?	YES or NO
Spill Cleanup Equipment Available?	YES or NO

System Preparation Completed:

Proper Valve Lineup Established?	YES or NO
No Work in Progress On Fill Portion Of System?	YES or NO
No Hot Work In Area?	YES or NO
Initial Tank Level Recorded On Proper Form?	YES or NO
Check If Enough Room In Tank For Delivery?	YES or NO
Vendor's Hose Shows No Cracks & Appears To Be In Good Condition?	YES or NO

During Off-Load:

Truck Operator Completed Appropriate Pre Offload Tests?	YES or NO
App Personnel Wearing Appropriate Protective Equipment	YES or NO
Truck Operator and/or Station Personnel Monitor The Entire Off-Load?	YES or NO

Note Any Problems Encountered:

_____

_____

_____

_____

At Completion of OFF-Load:

Truck Operator Stopped Transfer and Blew Down/Drained Down Transfer System? Yes or NO

System Fill Valves Closed? Yes or NO

System Fill Caps/Blanks Installed When Hose Disconnected? Yes or NO

Any Spill Cleaned Up and All Wastes Disposed of Properly? Yes or NO

Grounding Strap Disconnected, Wheel Chocks Removed, Exclusion Barrier Removed and Truck Off Station Property At: _____
Date/Time

Final Tank Reading Taken and Recorded Plus Appropriate Inventory Records Updated? Yes or NO

Comments

_____

_____

_____

_____

NOTE: PLEASE RETURN COMPLETED FORMS TO THE SUPERVISOR.

_____ _____
Station Person Off-Loading Date/Time

_____ _____
Supervisor Date/Time

APPENDIX J

Containment Area Discharge Procedures

PROCEDURE FOR THE PROPER DRAINING OF ACCUMULATED WATER IN SELECT SECONDARY CONTAINMENT AREAS

Prior to discharge of storm water, the water within the containment must be visually checked for sheen and floating solids. **IF SHEEN IS DETECTED OR IF THE CONTAINED WATER DOES NOT APPEAR CLEAR, STOP AND FOLLOW PROCEDURE 1.** The water within the containment is then checked for pH. **IF THE pH OF THE WATER IS LESS THAN 6.0 OR GREATER THAN 9.0, STOP AND FOLLOW PROCEDURE 1**. pH values less than 6.0 or greater than 9.0 may be indicative of tank/piping leaks and/or other contamination. In the absence of sheen or other visual contaminants and with the pH between 6.0 and 9.0, follow Procedure 2.

PROCEDURE 1
PRESENCE OF SHEEN OR OTHER VISUAL CONTAMINANTS, OR OFF-SPECIFICATION pH

If sheen or other visual contaminants are detected, or if the pH of the water is below 6.0 or above 9.0, the water cannot be drained. Notify the Shift Leader and/or Environmental, who will then verify the situation. A contractor must be used to remove the contents by vac-truck and to appropriately dispose of the contents off-site. The containment must then be cleaned and the tanks inspected for drips or leaks. Diked water and cleanup material must be manifested as Connecticut Regulated Waste (or in the case of corrosive pH valves, Hazardous Waste), and the record of this cleanup/inspection must be maintained in the log in the Shift Leader's Office (a duplicate record is maintained in the Environmental office along with manifest copies).

PROCEDURE 2
ABSENCE OF SHEEN AND OTHER VISUAL CONTAMINANTS, AND pH BETWEEN 6.0 AND 9.0

In the absence of sheen and other visual contaminants, and with the pH of the water between 6.0 and 9.0, station personnel must obtain clearance from the Shift Leader for removing the locks and ultimately draining the water. The valves can then be unlocked and the water can be allowed to drain.

Station personnel must utilize the existing dike draining infrastructure for draining the water from the containment areas and cannot use auxiliary pumps without prior approval from the Operations Manager.

As a general rule, for small containment areas that drain within a few minutes, station personnel should remain at the area until drainage is complete. For larger containment areas that may take a few hours to drain, personnel can leave the vicinity provided all of the following conditions are met:

a. The absence of sheen and other visual contaminants has been verified;
b. The pH of the water has been verified to be between 6.0 and 9.0;
c. There is no other activity occurring within or immediately adjacent to the diked area being drained;
d. No activity is expected to occur within or immediately adjacent to the diked area while the drain is open; and
e. Personnel return within the hour to evaluate the draining process.

The record of the visual appearance of the water, its pH, and the date and start/stop times of the draining must be recorded, along with the full name of the person draining the secondary containment (the inspector). These records are maintained in the Shift Leader's Office.

Once draining is completed, the valves must then be reclosed, bar arrestors replaced, relocked and re-tagged with a sign-off placed into the computer system.

The frequency of inspection and draining is dependent upon the frequency and duration of rainfall, and the need to discharge accumulated water.

HYDROGEN AND NATURAL GAS

- There are various systems that contain hydrogen including Main Generators and Hydrogen Seal Oil systems. Natural Gas is present in those facilities that burn gas as a combustion fuel. These systems present fire and explosion hazards should spark-producing equipment be utilized during system maintenance.
- Spark proof tools **SHALL** be used when working on hydrogen or natural gas systems until the component being worked has been verified as being purged of the product.
- The Station Operations Manager should be consulted prior to the commencement of any work on these systems.
- Systems containing flammable gases **SHALL** be purged with an inert gas (not air) prior to commencing maintenance activities.
  - System Gas to Inert Gas to Air (purging for maintenance)
  - Air to Inert Gas to System Gas (purging for return to service)
- Systems containing flammable gases **SHALL** be isolated by one of the following methods:
  - Spool piece removal
  - Double Block and Bleed
  - Insertion of blind flange or “pancake”
- Every effort should be made to isolate systems containing flammable gases prior to any maintenance activities. **IF** isolation is not feasible, a **JHA SHALL** be written and used for repair. The Plant Manager and Fossil Safety Manager must be notified and dual concurrence of the maintenance plan must be obtained prior to commencing work.
- In the event of a gas leak without fire:

ISOLATE & VENTILATE – OPEN DOORS, WINDOWS

  - Natural Gas is non-toxic, but is an asphixiant
- In the event of a gas leak **WITH** fire:

ISOLATE or SHUT-OFF THE FUEL SOURCE

  - Let the fire burn until the fuel source is eliminated. Take steps to prevent re-ignition.
- Should a leak develop during Bulk Hydrogen Delivery operations, which cannot be immediately corrected by the carrier, leave the area and immediately contact the Control Room. Warn others to keep clear of the area until the Fire Department arrives.

Attachment 4.1
Tank Truck Delivery Checklist

		√
I. PREPARING THE RECEIVING SYSTEM FOR DELIVERY		
1.	Substance being delivered?	
2.	Check chemical delivery system for leaks, discharges and damage.	
3.	No repair work is being performed on receiving system.	
4.	Receiving system has been configured to receive delivery.	
II. CORRELATING THE MAXIMUM DELIVERY AMOUNT		
1.	Tank Operating Capacity (from tank capacity table):	
2.	Amount remaining in tank (from tank indicator):	
3.	Maximum delivery amount (subtract 2 from 1):	
III. PREPARING THE UNLOADING AREA FOR DELIVERY		
1.	Containment area is clear of debris and residual contaminants.	
2.	Close secondary containment drain lines	
3.	Spill/emergency equipment is available at delivery point.	
4.	Check proper PPE is available.	
5.	Emergency facilities (eye washes and emergency showers) are operable.	
6.	Potential vapor plume path will not cause a safety hazard.	
7.	Running water is available (not required for petroleum products).	
IV. INSPECTING THE DELIVERY TRUCK		
1.	Truck arrival date: Truck Arrival Time:	
2.	Truck was visually inspected for leaks or discharges and found OK.	
3.	Placards are displayed and DOT shipping papers are in order.	
4.	Truck equipped with proper hose and fittings.	
5.	Hose inspected for cracks, bulges, or other defects and found OK.	
6.	Truck is equipped with appropriate transfer equipment.	.
7.	Ensure Tanker Trailer is level in containment offloading area	
V. SETTING UP THE DELIVERY TRUCK		
1.	Direct communication established with truck operator.	
2.	Truck connected to proper storage tank.	
3.	Exclusion barrier erected.	
4.	Drip pans and spray shields positioned at discretion of truck operator.	

5.	Truck wheels chocked and brakes set.	
6.	Personnel wearing appropriate PPE.	
7.	Is the truck and storage tank properly grounded (required for petroleum products only).	
8.	Verify location of tanker emergency shut off device, normally located on the trailer, driver side, near the cab.	
VI. UNLOADING THE DELIVERY TRUCK		
1.	Ensure all transfer connections made by truck operator. Cam lock couplings must be fastened [strap or wire] in the closed position before Transfer begins. The vapour return line twist connect fitting must be pinned in place.	
2.	Ensure truck operator instructed to commence unloading.	
3.	Ensure direct contact maintained with truck operator throughout transfer.	
4.	Delivery system monitored continuously for leaks throughout transfer.	
VII. COMPLETING THE UNLOADING		
1.	Ensure delivery truck and storage tank are properly isolated.	
2.	Truck disconnected	
3.	Lines purged	
4.	Truck pressure has been bled by the truck operator.	
5.	All connections capped by truck operator.	
6.	Final tank volume:	
VIII. DELIVERY TRUCK EXIT		
1.	All equipment properly stored.	
2.	All manifolds flanged or capped and all valves secured.	
3.	All barricades and wheel chocks removed.	
4.	Truck departure time:	
IX. POST DELIVERY		
1.	All spillage cleaned up.	
2.	All wastes properly disposed of.	
3.	PPE/containment/emergency equipment returned to storage and restocked.	
X. COMMENTS		
Operator Signature		

PSEG POWER NEW YORK INC.

Bulk Liquid Unloading

DOCUMENT NO.

OP-ALBN-130

ISSUED:

03/05/2005

Revision	Description	Date	By	Approved
6	Clarify cam lock requirements and correct volumes	5/15/2008	AC	SMP
7	Remove High Alarm testing Requirement	2/5/2014	DH	TJL
8	Ensure Tanker Trailer is level in containment offloading area	2/25/2016	MSM	MSM

INDEX

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6	Clarify cam lock requirements and correct volumes	5/15/2008	AC	SMP
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1. . PURPOSE

This Standard Operating Procedure (SOP) provides overall guidance for receiving, handling, and unloading the bulk chemicals used at this facility. PSEG Power New York personnel must follow this and other pertinent Facility requirements while performing activities of this nature involving bulk chemical usage.

2. SYSTEM DESCRIPTION

The bulk chemical storage system on PSEG Power New York's site consists of a separate tank, valve, piping arrangement, and spill containment area for each chemical used. Each storage tank has a fill piping arrangement with an isolation and fill line drain apparatus, as well as an overflow with a demister filter unit when appropriate. Each storage and use tank is equipped with level indication; capacity of each bulk chemical storage tank is listed in the table below. In the case of the Aqueous Ammonia system a transfer pump apparatus is incorporated into the system.

Table 2.1

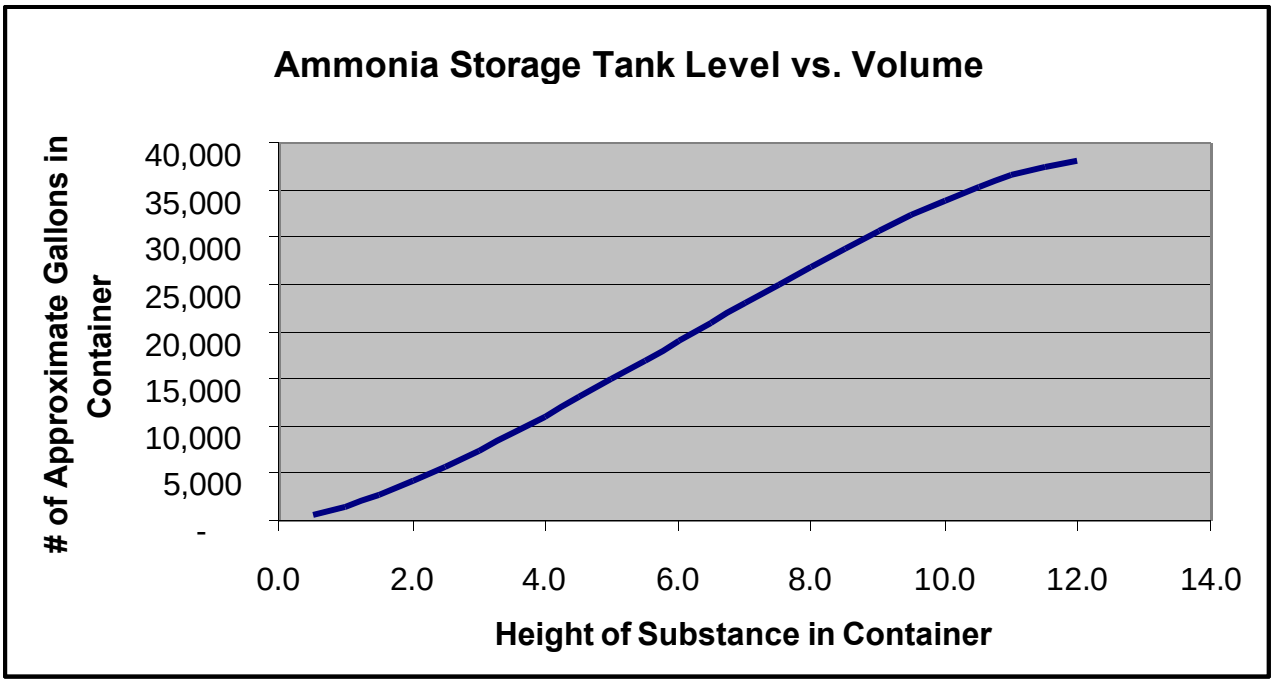
Chemical Storage Tank	Location	Tank Number	Total Capacity	Working Capacity	Fill Rate
Klaraid	Water Treatment Plant	0TW54T	7000 gallons	6500 gallons	See Table 2-2
Sodium Hypochlorite	Water Treatment Plant	0TW53T	7000 gallons	6500 gallons	See Table 2-2
Aqueous Ammonia	Ammonia Storage Area	0NH01T	36000 gallons	33000 gallons	See Table 2-3
Sodium Hypochlorite	Cooling Tower Chemical Feed	0CF03T	5500 gallon	5000 gallons	See Table 2-2
Sulfuric Acid	Cooling Tower Chemical Feed	0CF02T	7500 gallons	6500 gallons	See Table 2-2

Table 2-2

Tank Percentage Conversion Chart			
Tank Percent	0TW53T Sodium Hypochlorite, 0TW54T Klaraid	0CF03T Sodium Hypochlorite	0CF02T Sulfuric Acid
5	400	250	375
10	800	500	750
15	1200	750	1125
20	1600	1000	1500
25	2000	1250	1875
30	2400	1500	2250
35	2800	1750	2625
40	3200	2000	3000
45	3600	2250	3375
50	4000	2500	3750
55	4400	2750	4125
60	4800	3000	4500
65	5200	3250	4875
70	5600	3500	5250
75	6000	3750	5625
80	6400	4000	6000
85	6800	4250	6375
90	7200	4500	6750
95	7600	4750	7125
100	8000	5000	7500

Table 2-3

Ammonia Storage Tank Level vs. Volume Chart			
Height of Liquid (ft.-in)	**Gal in tank**	**Height of Liquid (ft.-in)**	**Gal in tank**
0'-6"	543	6'-6"	21,053
1'-0"	1,515	7'-0"	23,056
1'-6"	2,747	7'-6"	25,031
2'-0"	4,171	8'-0"	26,962
2'-6"	5,746	8'-6"	28,834
3'-0"	7,443	9'-0"	30,628
3'-6"	9,237	9'-6"	32,325
4'-0"	11,109	10'-0"	33,900
4'-6"	13,040	10'-6"	35,324
5'-0"	15,015	11'-0"	36,555
5'-6"	17,018	11'-6"	37,528
6'-0"	19,035	12'-0"	38,071



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6	Clarify cam lock requirements and correct volumes	5/15/2008	AC	SMP
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8	Ensure Tanker Trailer is level in containment offloading area	2/25/2016	MSM	MSM

3. OPERATING INSTRUCTIONS

3.1. Preparing the Receiving System for Delivery

Prior to accepting a tank truck delivery, the following procedures must be carried out:

3.1.1. Visually inspect the receiving system, including system piping, transfer valves, pumps, flanges, and connections for leaks, discharges, and proper operation. Properly align valves.

3.1.2. Check that no repair work is being performed on the receiving system.

3.1.3. Record the total maximum tank working capacity in gallons on the Tank Truck Checklist (Attachment 4.1).

3.1.4. Record the amount of product in gallons in the receiving tank on the Tank Truck Delivery Checklist (Attachment 4.1).

3.1.5. Calculate the maximum delivery amount in gallons by subtracting the volume of the product presently in the tank from the maximum working capacity in gallons of the tank. The resulting volume is the remaining capacity or the *maximum delivery amount*. Note that the maximum Working Capacity is the lesser of the capacities of the tank from Table 2-1.

3.1.6. Record the maximum delivery amount on the Checklist.

3.2. Preparing the Unloading Area for Delivery

The unloading area must be prepared before the arrival and positioning of the tank truck. This procedure includes provisions designed to ensure personal and environmental protection from potential hazards associated with the substance to be delivered and the unloading process.

3.2.1. Check the containment area to make sure that it is clear of debris and residual contaminants.

3.2.2. Close containment drain lines if applicable.

3.2.3. Check that emergency response equipment is readily available. This equipment must be upwind of the unloading area if a volatile substance is being delivered.

3.2.4. Check the MSDS and assure that personal protective equipment (PPE) appropriate to the substance being delivered is available and in good working condition.

3.2.5. Ensure that the appropriate eyewash and emergency shower is operable.

3.2.6. Ensure that any potential vapor plume path will not cause a safety hazard.

3.2.7. Check that a supply of running water is available at the area. This is not required for petroleum products.

3.2.8. Follow any specific delivery notes for the chemical being unloaded.

3.3. Inspecting the Tank Truck

When feasible, tank trucks should be inspected at the main entrance gate before they are allowed on Facility property. If not, tank truck inspections should be done prior to connecting transfer hoses. Deliveries shall be refused for tank trucks that fail inspection.

3.3.1. Verify that the correct substance is being delivered by comparing the order manifest, the DOT shipping documents, and placards.

3.3.2. Check to make sure that all correct placards are displayed.

3.3.3. Log the time of truck arrival on the Tank Truck Delivery Checklist (Attachment 4.1).

3.3.4. Visually inspect for leaks or discharges. Any amount of leakage is unacceptable.

3.3.5. Check that truck is equipped with proper hose, fittings, and transfer pump.

3.3.6. Check hose for cracks, bulges or other defects.

3.3.7. Verify actual delivery amount does not exceed maximum delivery amount.

3.3.8. Ask the truck operator if the tank truck is equipped with an emergency shut-off valve and, if equipped, to show you the location and proper operation of this device.

3.4. Setting Up the Tank Truck

Once the truck passes inspection, it can now be prepared for off loading at the delivery area. The following procedures must be followed:

3.4.1. Direct the truck to the unloading area using the most direct available route.

3.4.2. Establish direct contact with truck operator.

3.4.3. Check that the truck is properly positioned on the unloading pad.

3.4.4. Should there be a situation where there are personnel on site who should not be near the unloading area (such as during a large maintenance outage), erect an exclusion barrier to keep unauthorized personnel out of the unloading area.

3.4.5. Check that the vehicle wheels are chocked and brakes set.

3.4.6. Check that grounding straps are attached to truck (for petroleum deliveries only).

3.4.7. Position drip pans and sprays shield at the discretion of the truck operator.

3.4.8. Check the MSDS to ensure that all personnel involved in the unloading process are wearing the PPE appropriate for the substance being delivered.

CAUTION

Proper safety equipment is required when handling chemicals.

Review all associated Material Safety Data Sheets prior to handling.

3.5. Unloading the Tank Truck

Unloading can commence once the truck has been positioned and secured and personnel involved in the transfer are adequately protected. The truck operator is responsible for operating all truck equipment (such as valves and pumps), supplying and connecting the transfer hose from the truck to the receiving system and opening and closing the first valve at the unloading area. The station will not supply air or any other pressurization means to any tank truck.

3.5.1. Truck operator connects the transfer hose from the truck to the receiving fill connection.

3.5.2. Proceed to the location from where you can monitor the tank level continuously. Instruct the truck operator to commence unloading.

3.5.3. Monitor the tank level, delivery system piping, and the receiving system piping for leaks throughout the filling operation.

3.6. Completing the Unloading

3.6.1. Truck Operator isolates the tank truck and the tank.

3.6.2. Ensure Truck Operator purges unloading lines clear of product.

3.6.3. Truck operator disconnects the transfer hose and drains any residual into suitable containment.

3.6.4. Truck operator bleeds pressure if the truck was pressurized during the delivery.

3.6.5. Truck operator caps all receiving system and tank truck connections.

3.6.6. Verify that the tank level has increased by the amount indicated by the tank gauges and/or level indicator. The amount of increase should correspond with the amount on the shipping documents. Record the final tank volume on the Tank Truck Delivery Checklist (Attachment 4.1).

3.7 Tank Truck Exit

To prepare the tank truck for departure:

3.7.1. Ensure all transfer equipment used has been stored properly.

3.7.2. Check to make sure that all manifolds are flanged or capped, and valves secured.

3.7.3. Remove barricades and wheel chocks.

3.7.4. Log the time the vehicle departs Facility property on the Tank Truck Delivery Checklist (Attachment 4.1).

3.8. Post Delivery

3.8.1. Clean up any spillage that may have occurred using methods appropriate to the substance that was spilled.

3.8.2. Properly dispose of all wastes incurred in the delivery process.

3.8.3. Remove PPE and any containment or emergency equipment set up for the delivery process and return them to their proper storage locations.

3.8.4. Restock emergency equipment as necessary.

4. ATTACHMENTS

4.1. Tank Truck Deliver Checklist

Revision	Description	Date	By	Approved
6	Clarify cam lock requirements and correct volumes	5/15/2008	AC	SMP
7	Remove High Alarm testing Requirement	2/5/2014	DH	TJL
8	Ensure Tanker Trailer is level in containment offloading area	2/25/2016	MSM	MSM

Attachment 4.1
Tank Truck Delivery Checklist

		√
I. PREPARING THE RECEIVING SYSTEM FOR DELIVERY		
1.	Substance being delivered?	
2.	Check chemical delivery system for leaks, discharges and damage.	
3.	No repair work is being performed on receiving system.	
4.	Receiving system has been configured to receive delivery.	
II. CORRELATING THE MAXIMUM DELIVERY AMOUNT		
1.	Tank Operating Capacity (from tank capacity table):	
2.	Amount remaining in tank (from tank indicator):	
3.	Maximum delivery amount (subtract 2 from 1):	
III. PREPARING THE UNLOADING AREA FOR DELIVERY		
1.	Containment area is clear of debris and residual contaminants.	
2.	Close secondary containment drain lines	
3.	Spill/emergency equipment is available at delivery point.	
4.	Check proper PPE is available.	
5.	Emergency facilities (eye washes and emergency showers) are operable.	
6.	Potential vapor plume path will not cause a safety hazard.	
7.	Running water is available (not required for petroleum products).	
IV. INSPECTING THE DELIVERY TRUCK		
1.	Truck arrival date: Truck Arrival Time:	
2.	Truck was visually inspected for leaks or discharges and found OK.	
3.	Placards are displayed and DOT shipping papers are in order.	
4.	Truck equipped with proper hose and fittings.	
5.	Hose inspected for cracks, bulges, or other defects and found OK.	

Revision	Description	Date	By	Approved
6	Clarify cam lock requirements and correct volumes	5/15/2008	AC	SMP
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6.	Truck is equipped with appropriate transfer equipment.	.
7.	Ensure Tanker Trailer is level in containment offloading area	
V. SETTING UP THE DELIVERY TRUCK		
1.	Direct communication established with truck operator.	
2.	Truck connected to proper storage tank.	
3.	Exclusion barrier erected.	
4.	Drip pans and spray shields positioned at discretion of truck operator.	
5.	Truck wheels chocked and brakes set.	
6.	Personnel wearing appropriate PPE.	
7.	Is the truck and storage tank properly grounded (required for petroleum products only).	
8.	Verify location of tanker emergency shut off device, normally located on the trailer, driver side, near the cab.	
VI. UNLOADING THE DELIVERY TRUCK		
X.	Ensure all transfer connections made by truck operator. Cam lock couplings must be fastened [strap or wire] in the closed position before Transfer begins. The vapour return line twist connect fitting must be pinned in place.	
2.	Ensure truck operator instructed to commence unloading.	
3.	Ensure direct contact maintained with truck operator throughout transfer.	
4.	Delivery system monitored continuously for leaks throughout transfer.	
VII. COMPLETING THE UNLOADING		
1.	Ensure delivery truck and storage tank are properly isolated.	
2.	Truck disconnected	
3.	Lines purged	
4.	Truck pressure has been bled by the truck operator.	
5.	All connections capped by truck operator.	
6.	Final tank volume:	

Revision	Description	Date	By	Approved
6	Clarify cam lock requirements and correct volumes	5/15/2008	AC	SMP
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VIII. DELIVERY TRUCK EXIT		
1.	All equipment properly stored.	
2.	All manifolds flanged or capped and all valves secured.	
3.	All barricades and wheel chocks removed.	
4.	Truck departure time:	
IX. POST DELIVERY		
1.	All spillage cleaned up.	
2.	All wastes properly disposed of.	
3.	PPE/containment/emergency equipment returned to storage and restocked.	
X. COMMENTS		
Operator Signature		

Revision	Description	Date	By	Approved
6	Clarify cam lock requirements and correct volumes	5/15/2008	AC	SMP
7	Remove High Alarm testing Requirement	2/5/2014	DH	TJL
8	Ensure Tanker Trailer is level in containment offloading area	2/25/2016	MSM	MSM