Environmental Assessment for U.S. Army Corps Of Engineers Land Exchange of Properties at Artificial Island, Salem County, New Jersey for Properties in Oldmans Township, Salem County and Logan Township, Gloucester County, New Jersey; Development of Confined Disposal Facility

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Environmental Assessment for U.S. Army Corps Of Engineers Land Exchange of Properties at Artificial Island, Salem County, New Jersey for Properties in Oldmans Township, Salem County and Logan Township, Gloucester County, New Jersey; Development of Confined Disposal Facility

An exchange of U. S. Army Corps of Engineers (USACE) properties at Artificial Island, Salem County, New Jersey (NJ) for properties (known as Site 15G) in Oldmans Township, Salem County, NJ and Logan Township, Gloucester County, NJ, and the development of an upland confined disposal facility (CDF) at Site 15G has been evaluated in this Environmental Assessment (EA). The USACE has authority under 33 U.S.C. §558b to exchange land or other property of the Government of a rivers and harbors project for private lands or property required for such a project in any case in which it is necessary or advisable.

The properties to be exchanged at Artificial Island are currently used as an upland CDF, and include surrounding *Phragmites*-dominated salt marsh. The Site 15G properties to be acquired by the USACE were previously used as an upland CDF by the USACE beginning in the 1950's, and are located in an area that has beneficial value to the USACE for the Delaware River Channel Maintenance mission.

In compliance with the National Environmental Policy Act of 1969 (NEPA) and Council on Environmental Quality regulations, the Philadelphia District prepared a draft EA in May 2014 to evaluate the land exchange and development of an upland CDF at Site 15G. Most land exchanges are considered categorical exclusions under NEPA. In this case, due to the development of the upland CDF at Site 15G, an Environmental Assessment was determined to be appropriate.

The consideration of alternative CDF sites, and the selection and NEPA evaluation of Site 15G as a potential upland CDF was performed by the USACE during the planning for the Delaware River Main Channel Deepening Project. These evaluations were included in the 1992 Final Environmental Impact Statement, and the 1997 Supplemental Final Environmental Impact Statement for that project. In April 2009, based on lower dredged material disposal projections, the USACE determined that new upland CDFs were not required and they were removed from the scope of the channel deepening project.

The purpose of this EA is to evaluate the potential impacts of the land exchange and subsequent development of the Site 15G upland CDF. Three potential alternatives for the land exchange were considered: No Action, Proposed Action, and Proposed Action with Alternate Properties. The potential environmental consequences of the three alternatives were evaluated. The principal impacts resulting from the Proposed Action is the unavoidable impact of filling 0.82 acres of federally non-jurisdictional wetlands and open waters in a drainage ditch internal to the Site 15G berms, and the potential for water quality impacts due to CDF operations. Overall impacts on existing wildlife and other terrestrial or aquatic resources are minimal, as the Site 15G design includes provisions to address water quality impacts.

Socioeconomic impacts are also minimal. There are no cultural or historic resource impacts as the Site 15G CDF construction or operation will not disturb original

substrates. The new CDF is adjacent to the existing Pedricktown and Oldmans CDFs and New Jersey Route 130, a major highway. There would be no additional impacts beyond those that currently exist.

The EA concludes that the proposed Land Exchange and development and operation of an upland CDF, if implemented, would not likely jeopardize the continued existence of any species or the critical habitat of any fish, wildlife or plant, which is designated as endangered or threatened pursuant to the Endangered Species Act of 1973 as amended by P.L. 96-159.

The EA concludes that the proposed development and operation of an upland CDF at Site 15G can be conducted in a manner which should not violate New Jersey's Surface Water Quality Standards. Pursuant to Section 401 of the Clean Water Act, a 401 Water Quality Certificate will be obtained from the State of New Jersey prior to the execution of the proposed Land Exchange. Based on the information developed during preparation of the EA, and the application of appropriate measures to minimize project impacts, it was determined in accordance with Section 307(c) of the Coastal Zone Management Act of 1972 that the plan complies with and can be conducted in a manner that is consistent with the approved Coastal Zone Management Program of New Jersey. A Federal consistency determination for this project will be obtained prior to the Proposed Land Exchange.

Overall, the potential impacts of the development of an upland CDF at Site 15G were evaluated by the USACE in the prior NEPA evaluations noted above, and the conclusions in this EA are similar and essentially unchanged.

Because the EA concludes that the land exchange and the development of an upland CDF at Site 15G do not constitute a major federal action significantly altering the human environment, I have determined that an Environmental Impact Statement is not required.

_____ _____

Date

Michael A. Bliss, P.E.

Lieutenant Colonel, Corps of Engineers
District Engineer

1.0 SUMMARY

This Environmental Assessment (EA) evaluates the potential effects of a Proposed Land Exchange (PLE), which would exchange properties suitable for constructing a new Confined Disposal Facility (CDF) in exchange for USACE properties on Artificial Island. The PLE was initially requested by a third party, PSEG Power, LLC (PSEG), a wholesale electricity generator, for use associated with PSEG's electricity generating operations on Artificial Island. The new CDF would be at a location suitable for the routine and periodic United States Army Corps of Engineers (USACE) Delaware River Federal Navigation Project channel maintenance dredging. It will increase CDF capacity and improve the operational efficiency of dredged material disposal from the Cherry Island to Marcus Hook Ranges of the Delaware River where significant quantities of maintenance dredging are required. The USACE has determined that the proposed land exchange and development of a new upland CDF is beneficial to the government.

The proposed action includes the exchange of property in the vicinity of the Pedricktown North and South and Oldmans CDFs in New Jersey, owned by PSEG, for a portion of the USACE Artificial Island CDF. The exchange property (known as Site 15G) was operated as a CDF previously, and was evaluated by the USACE and selected as a potential upland CDF for a prior project. Site 15G is near the higher shoaling ranges of the Delaware River and an existing railroad line which is a benefit to the long term mission of the Delaware River Federal Navigation Project. The PLE provides the USACE Philadelphia District with regional CDF capacity which is required to achieve the mission goal of maintaining the required channel depths along the Delaware River.

The USACE has authority under 33 U.S.C. §558b to exchange land or other property of the Government of a rivers and harbors project for private lands or property required for such a project in any case in which it is necessary or advisable. In this instance, the USACE had agreed in a Concept Approval to an exchange of land that involves substituting another CDF of suitable capacity for a portion of the existing Artificial Island CDF. At the time the Concept Approval documentation was completed, the specifics of the PLE had not been established. The PLE details have now been determined by USACE and PSEG. The exchange of property is advisable, and will result in an overall net benefit to the Government.

Specifically, the proposed action exchanges property and disposal capacity at USACE Artificial Island (94 CDF acres plus 537 acres of adjoining degraded coastal wetlands for a total of 631 acres) for disposal capacity at Site 15G (354 acres) which is located in Oldmans Township, Salem County and Logan Township, Gloucester County, NJ. The basis for the property exchange is CDF capacity as this is the most appropriate measure of the value of the land in question. The land exchange will result in a net increase to the USACE of regional disposal capacity for the entire 102 mile Delaware River Federal Navigation Project.

The consideration of alternatives sites and selection of Site 15G was completed in the 1992 Environmental Impact Statement and the 1997 Supplemental Environmental Impact Statement associated with the Delaware River Main Channel Deepening Project (USACE 1992, 1997). The development of Site 15G was specifically evaluated in a report prepared for the USACE by Dames and Moore (USACE 1994) and was found to be environmentally acceptable as a CDF. In April 2009, based on lower dredged

material disposal projections, the USACE determined that new upland CDFs were not required and they were removed from the scope of the channel deepening project.

As part of a separate project, PSEG has filed an application with the U.S. Nuclear Regulatory Commission (USNRC) for an Early Site Permit (ESP). The land exchange described herein is independent of the USNRC approval process and ultimately, the PSEG decision as to whether to pursue construction of any new generation or pursue any other form of development. The PSEG request to the USACE for the land exchange as an independent utility is being pursued regardless of any potential new power plant or other type of development at the Artificial Island location.

Three potential alternatives for the land exchange were considered, No Action, Proposed Action, and Proposed Action with Alternate Properties. The potential environmental consequences of the three alternatives were evaluated. The principal impacts resulting from the Proposed Action is the unavoidable impact of filling 0.82 acres of federally non-jurisdictional wetlands and open waters in a drainage ditch internal to the Site 15G berms, and the potential for water quality impacts due to CDF operations. Overall impacts on existing wildlife, and other terrestrial or aquatic resources are minimal, as the Site 15G design includes provisions to address water quality impacts.

Socioeconomic impacts are minimal. There are no cultural or historic resource impacts as the Site 15G CDF construction or operation will not disturb original substrates. The new CDF is adjacent to the existing Pedricktown and Oldmans CDFs and New Jersey Route 130, a major highway. There would be no additional impacts beyond those that currently exist.

The Proposed Action is the preferred alternative given the minimal impacts associated with the land exchange and development of the Site 15G CDF. Approval of this action would not constitute a major federal action affecting the quality of the human environment.

Compliance with environmental quality protection statutes are being met with the distribution of this Draft Environmental Assessment for review and comment. Full compliance with the National Environmental Policy Act will occur after circulation of the Final Environmental Assessment report and signing of the Finding of No Significant Impact. Table 9 indicates compliance with other environmental statutes and Executive Orders.

2.0 NEEDS AND OBJECTIVES OF THE ACTION

The U.S. Army Corps of Engineers (USACE) operates a Confined Disposal Facility (CDF) on Artificial Island in Salem County, New Jersey (NJ). The Federal Government-owned parcel is approximately 871 acres of which 305 acres are configured as three separate CDF cells varying in available capacity. The existing Artificial Island CDF is used to support the USACE Philadelphia District's periodic and routine dredging operations in the Delaware River. PSEG owns the balance of the land known as Artificial Island (approximately 734 acres) which serves as the site for PSEG's Salem Generating Station and Hope Creek Nuclear Generating Station. PSEG has proposed a land exchange for 94 acres of CDF area and 537 acres of adjoining *Phragmites-dominated* coastal wetlands, in exchange for 354 acres located to the north of Artificial Island at Site 15G.

Artificial Island was initially constructed in the early 1900s and use of the three current CDF cells continues intermittently. The remainder of the USACE Artificial Island property consists of coastal saltmarsh and *Phragmites*-dominated wetlands. The Artificial Island CDF is located approximately 15 miles south of the Delaware Memorial Bridge.

Other existing and active USACE CDFs, known as the Pedricktown North and South and Oldmans, are located in Oldmans Township, Salem County, NJ. These three CDFs are situated to support the USACE Philadelphia District's ongoing Delaware River channel maintenance dredging operations for the river ranges north of the Delaware Memorial Bridge. The USACE Philadelphia District will continue to conduct channel maintenance dredging along the Delaware River. Much of the future channel maintenance dredging will occur between the C&D Canal and the range known as Marcus Hook, located adjacent to Marcus Hook, Pennsylvania. The USACE estimates that approximately 45 percent of Delaware River maintenance dredging occurs in this section of the Delaware River (USACE, 1997).

The purpose of the Proposed Land Exchange is to secure properties for the development of an upland CDF in a manner that complies with 33 U.S.C. §558b and provides a net benefit to the government. To achieve this purpose, PSEG will provide the USACE with a suitable and permitted site for constructing a new CDF to support the Corps mission. The new CDF at Site 15G is at a more proximate location for the routine and periodic channel maintenance dredging for the ranges located at high shoaling areas of the Delaware River where significant quantities of maintenance dredging are required. The proposed action includes the title transfer of PSEG-owned property in the vicinity of the Pedricktown and Oldmans CDFs. This would provide the USACE with appropriately located dredged material disposal facilities, regional capacity and access to an existing railroad line which could facilitate removal of dredge material for beneficial use projects.

Dredge disposal sites for the material dredged from proximate federal navigation projects have finite capacities and CDF development is a long-term activity. In dredging operations, transportation costs of moving material from the dredge site to a disposal area are often the most significant cost driver. The disposal area capacity at the proposed location will ease the disposal area management burden at the disposal sites at Pedricktown and Oldmans, allowing the USACE Philadelphia District Operations staff to more efficiently manage disposal at those CDFs. This exchange will improve

operations at the existing Pedricktown and Oldmans CDFs, and enable the USACE Philadelphia District to better perform the required dredging for the long term mission goal of maintaining the required channel depths along the Delaware River.

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA), as well as 33 CFR Part 230 (USACE NEPA regulations). The USACE is serving as the lead federal agency for this NEPA review.

3.0 PROJECT DESCRIPTION AND ALTERNATIVES

3.1 Project Description

On May 20, 2010, the USACE issued a Concept Approval (see Appendix A) for a potential land exchange with PSEG. The United States Government presently owns and the USACE operates a Confined Disposal Facility (CDF) on Artificial Island, Salem County, New Jersey (NJ) used to support dredging operations in the Delaware River. PSEG owns and operates the Salem Generating Station and Hope Creek Nuclear Generating Station (SGS and HCGS respectively) immediately to the south and adjacent to the USACE CDF (See Figure 1).

The objective of the proposed action is to secure properties appropriate for the construction of a new CDF to support the USACE mission in exchange for lands at Artificial Island desired by PSEG. The new CDF is located near the higher shoaling ranges of the Delaware River where planned and anticipated channel maintenance dredging quantities are significant. The proposed real estate action is to exchange disposal area capacity in one location (Artificial Island) for disposal area capacity in a more desirable location (Pedricktown/Oldmans) for the Philadelphia District's Delaware River Philadelphia to the Sea channel maintenance needs. The exchange of USACE CDF property for lands presently owned by PSEG in Oldmans Township, Salem County and Logan Township, Gloucester County, NJ (see Figure 2) achieves this objective.

Specifically, the Proposed Land Exchange would include the following elements:

- The USACE will receive a 354 acre parcel (Property 1) in Oldmans and Logan Townships for use as a permitted CDF with the capability of accommodating approximately 20 million cubic yards of dredge materials. This property is adjacent to the existing USACE Pedricktown and Oldmans CDFs and is also known as "Site 15G";
- PSEG will receive the 94 acre (Property 2) portion of the Artificial Island CDF identified as CDF cell 3 (See Figure 1);
- PSEG will receive 537acres (Property 3) of degraded coastal wetlands on Artificial Island adjacent to CDF cell 3 (See Figure 1);

The 354 acre privately owned parcel in Oldmans and Logan Townships was previously used, beginning in the 1950's, by the USACE as a dredged material disposal site. The site was thoroughly evaluated as Site 15G in a report prepared for the USACE by Dames and Moore (USACE 1994) and the USACE NEPA Delaware River Main Channel Deepening Project Supplemental Environmental Impact Statement (USACE, July 1997). As proposed herein, utilization of the 354 acre Site 15G will be limited to placement of dredged materials from maintenance dredging, as the Delaware River Main Channel Deepening Project has accounted for all disposal needs without Site 15G (USACE 2009).

The land exchange provides benefits to the USACE. The portion of the Delaware River in the vicinity of Site 15G has active maintenance dredging activities that are conducted by the USACE on a routine basis. Approximately 45 percent of Delaware River channel maintenance dredging occurs within these portions of the Delaware River. The Delaware River Ranges are generally Cherry Island, Bellevue, Marcus Hook and Chester (See Figure 3). The proximity of Site 15G to these critical high shoaling areas

in the Delaware River that are in need of ongoing annual dredging to maintain channel depth is a long term benefit to the Federal Government. Additionally, the existing railroad line near Site 15G provides benefits to the USACE associated with beneficial material disposition. The Proposed Land Exchange and development of a new CDF at 15G is for maintenance dredging disposal.

3.2 Proposed Action

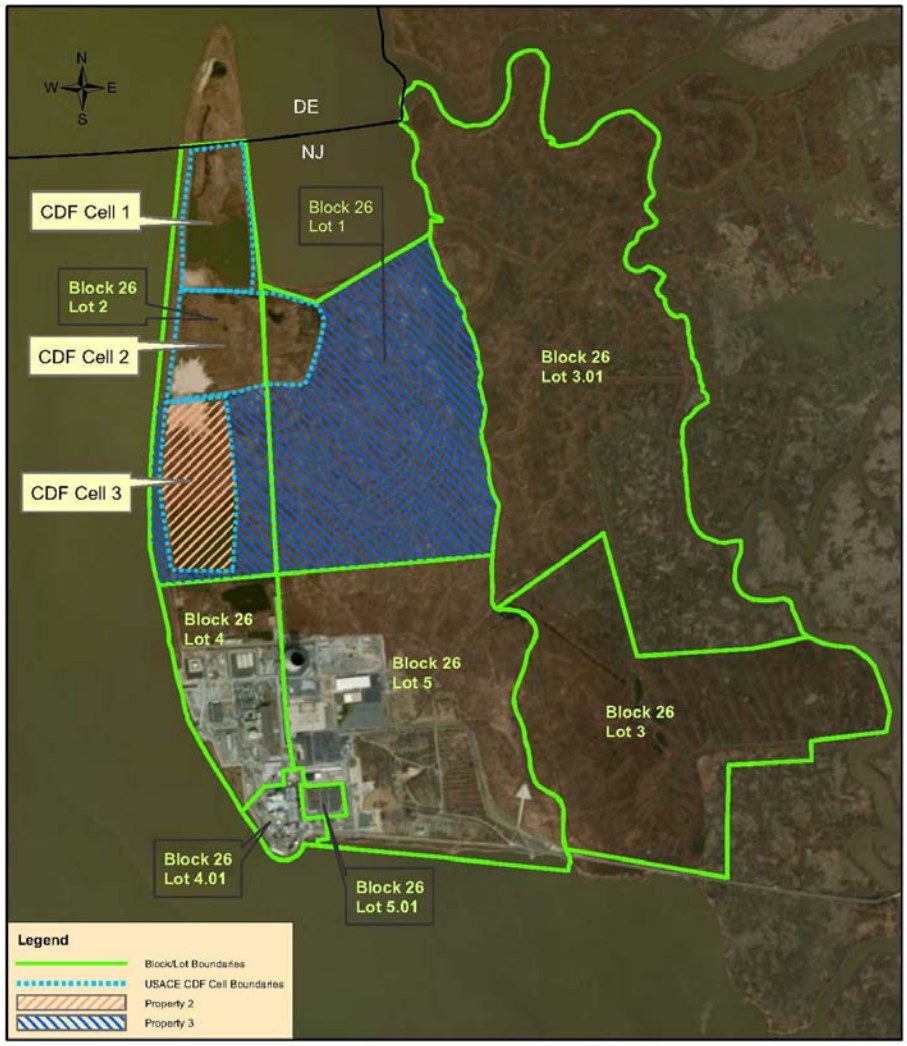
3.2.1 Properties Proposed to be Exchanged

The proposed action includes the exchange of property to provide dredged material disposal capability in a location more beneficial to the United States. The land exchange would be between the USACE and PSEG.

A summary of the various parcels of property within this Proposed Land Exchange is provided in Table 1. Exact acreage will be subject to final property surveys.

Table 1: Properties Included in Proposed Land Exchange

Property	Site	Acres	Location	Current Owner and Use	Proposed Owner and Use	Township	Lot / Block
1	Site 15G	354	Oldmans and Logan Townships, NJ	PSEG Undeveloped Vacant Land Prior CDF	USACE - CDF	Oldmans Logan	Block 3 Lots 2, 5, and 6 Block 3105 Lot 1
2	Artificial Island CDF	94	Lower Alloways Creek Township, NJ	USACE – CDF	PSEG – Undetermined Future Use	Lower Alloways Creek	Block 26 Lot 1 Lot 2 (partial) Excludes CDF cells 1 and 2
3	Artificial Island Buffers	537	Lower Alloways Creek Township, NJ	USACE Undeveloped Vacant Coastal Wetlands	PSEG – Undeveloped Vacant Coastal Wetlands	Lower Alloways Creek	Block 26 Lot 1 Lot 2 (partial) (See Figure 1)



Block and Lot	Property Owner
26, 1	USACE
26, 2	USACE
26, 3	USACE
26, 3.01	NJDEP
26, 4	PSEG
26, 4.01	PSEG
26, 5	PSEG
26, 5.01	PSEG

Figure 1 - Artificial Island Aerial Photograph

Figure 2 - Site 15G Aerial Photograph

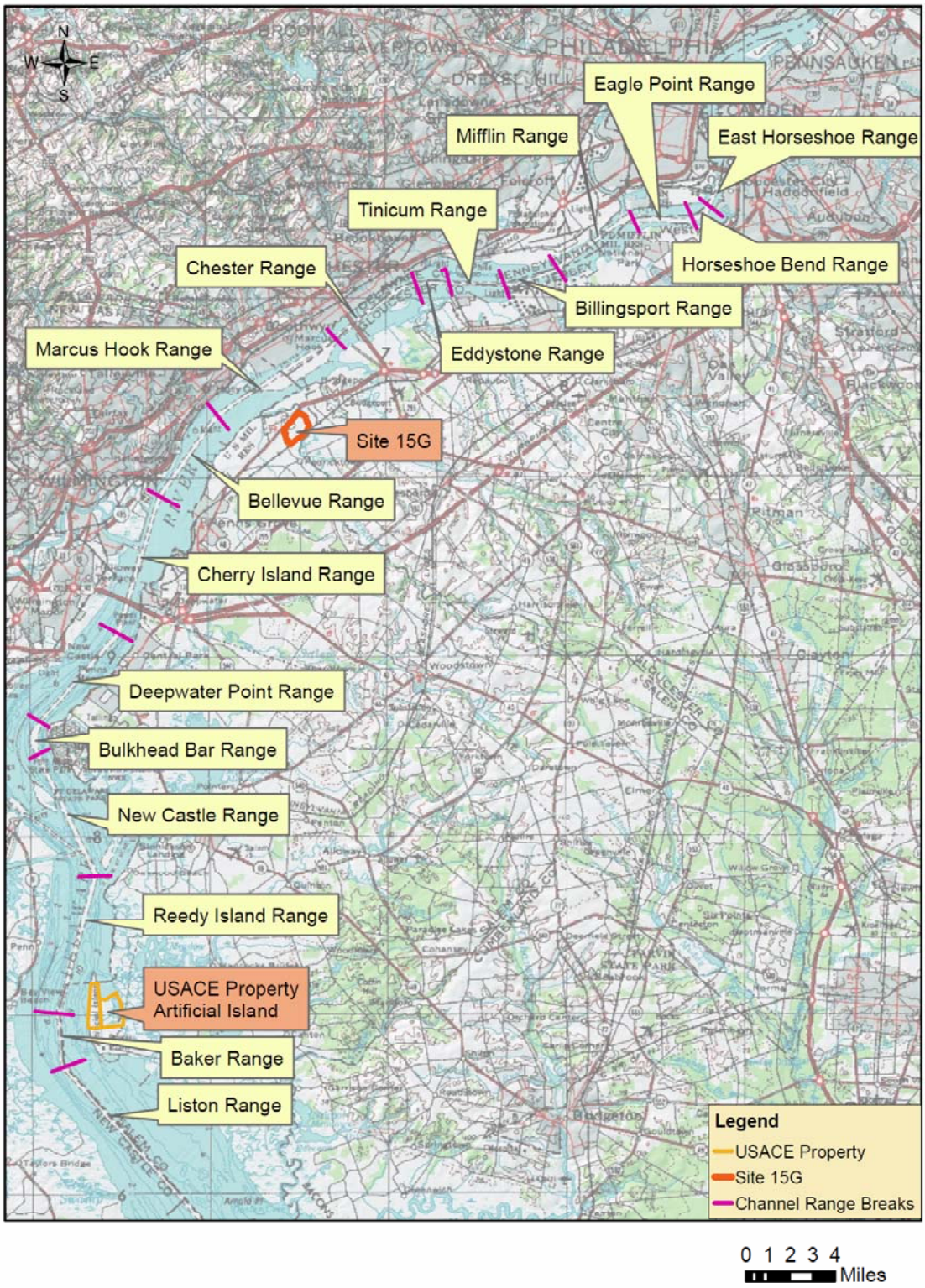


Figure 3 - Delaware River and Bay NOAA Ranges

3.2.1.1 Authorization

The USACE has authority under 33 U.S.C. §558b to exchange land or other property of the Government of a rivers and harbors project for private lands or property required for such a project in any case in which it is necessary or advisable. In this instance, the USACE has determined that the exchange is advisable, and will result in an overall net benefit to the Government.

Section 558b states:

> In any case in which it may be necessary or advisable in the execution of an authorized work of river and harbor improvement to exchange land or other property of the Government for private lands or property required for such project, the Secretary of the Army may, upon the recommendation of the Chief of Engineers, authorize such exchange upon terms and conditions deemed appropriate by him, and any conveyance of Government land or interests therein necessary to effect such exchange may be executed by the Secretary of the Army.

The Philadelphia District Commander, in consultation and with the concurrence of the Chief of the Real Estate Division in the Baltimore District and North Atlantic Division Commander is recommending that the land exchange discussed in this document is both advisable and necessary.

3.2.2 Design and Development of Type B CDF

3.2.2.1 Design

The proposed action includes the design, development and construction of a Type B upland CDF adjacent to Oldmans Creek located in Oldmans Township, Salem County, NJ and Logan Township, Gloucester County, NJ. Type B upland CDFs are constructed independent of any specific dredging project(s), but are instead intended as repositories for unspecified future maintenance dredging projects if and as needed. The proposed site location consists of 354 acres of undeveloped land. The site was constructed by the USACE for use as a CDF in the 1950s. The original containment berms constructed in the 1950's remain predominantly intact and are indicative of the prior operation of the site as a CDF. They are constructed primarily of historic dredge material. The proposed CDF will be constructed in phases, within the footprint of the existing containment berms. The new CDF will utilize approximately 306 acres of the site and have an initial design capacity of 4,000,000 cubic yards, with potential expansion to approximately 20,000,000 cubic yards.

The project has been designed in accordance with USACE Engineering Manual "Confined Disposal of Dredged Material" and USACE Engineering Manual "Dredging and Dredged Material Disposal" (EM-1110-2-5027, 1987). The CDF is designed to contain hydraulically dredged material from the Delaware River and associated tributaries, removed during the Philadelphia to the Sea maintenance dredging operations. It will be primarily used for dredged material from shoaling in the Cherry Island, Bellevue, Marcus Hook and Chester Ranges (see Figure 3). Dredge materials from these types of channel maintenance dredging operations consist mostly of water to allow for transport of solid material from the dredge location through pipes to the CDF. The proposed CDF is designed to accept dredge materials and incorporates a series of internal structural berms and other holding measures that allow for sediments

to drop out of the water column (after a minimum 48 hour detention period) prior to discharge into Oldmans Creek.

The proposed CDF (see Figure 4) will include the construction of new perimeter containment berms located inside the existing remnant containment berms of the original CDF with the use of previously deposited dredge material. The proposed CDF will be constructed in a similar manner to the original CDF and will include perimeter containment berms, an inflow pipe, and discharge pipes. An additional feature of the proposed CDF will be a series of internal baffle dikes and a forebay designed to increase the detention time of discharged hydraulic dredge material and allow for settling of solids prior to discharge.

The new containment berms are designed to extend between 15 and 20 feet above the site's average interior elevation. At this height, the CDF will have an initial capacity in excess of 4,000,000 cubic yards with the potential to increase to 20,000,000 cubic yards. The containment berms will be constructed with on-site materials.

Following the installation of all required soil erosion and sediment control best management practices, vegetation will be removed and topsoil will be stripped and stockpiled for reuse. The new containment berms will then be constructed utilizing material excavated from interior portions of the site. It is estimated that approximately 4 feet of material will be excavated from the site to allow for the construction of the new berms. Seasonal high groundwater elevation identified during multiple subsurface investigations is in excess of 6.5 feet below ground surface throughout most of the site. Once completed, the stockpiled topsoil will be added as a cap to the new containment berms as necessary and seeded to prevent erosion of the newly placed and compacted soils.

Hydraulic dredged material will be conveyed through a 30 inch diameter steel and / or High Density Polyethylene (HDPE) pipe originating in the Delaware River and reaching the CDF site by passing overland on the existing Pedricktown CDF dikes. The pipe will be conveyed under U.S. Route 130 before entering the CDF site. Discharge of remnant dredge waters from the CDF will be through a series of three parallel sluice gate structures, each with 30 inch diameter steel pipes which penetrate both the proposed and existing containment berms. The pipes will discharge directly to Oldmans Creek through rip rap protected outfalls located above the Mean High Water (MHW) elevation. The sluice gate structures will be steel structures with wood plank stop-logs that can be adjusted or removed to allow for increased or decreased discharge rates through the pipes.

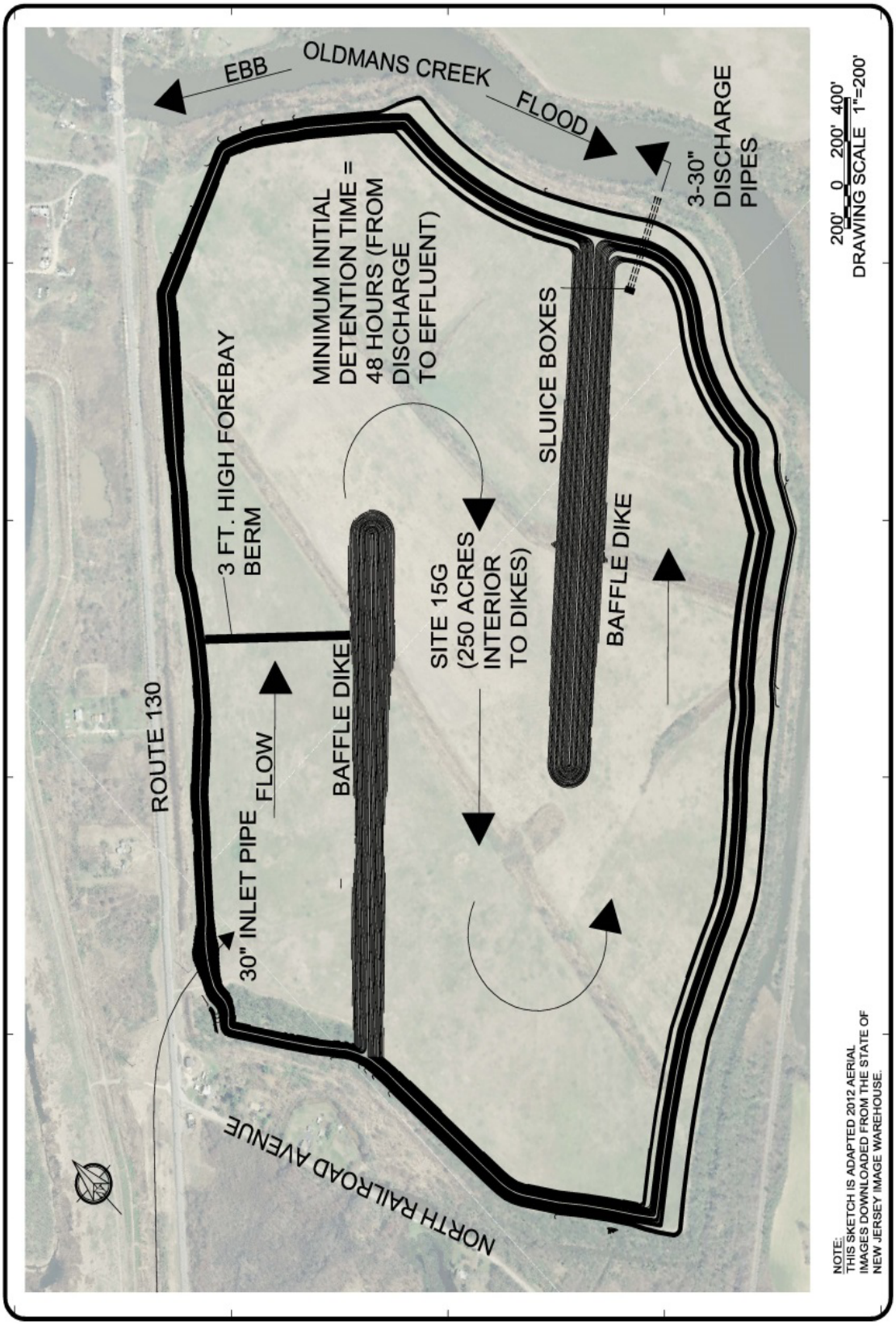


Figure 4 - Design of CDF at Site 15G

3.2.2.2 Schedule

The current schedule anticipates that USACE real estate Land Exchange Agreement approval will occur in 2014. After USACE approval of the Land Exchange Agreement, required state and local regulatory approvals will be obtained. It is anticipated that the initial construction of the CDF at 15G will commence in late 2014 or 2015. Additional construction phases will follow based on maintenance dredging needs.

3.2.2.3 Operation and Maintenance

All operations at the proposed facility will be managed by the USACE who will be the operator of the site. The land will be owned by the Federal Government. Operations and maintenance at the site will be in accordance with applicable USACE practices and regulations.

The proposed CDF will be used to contain hydraulic dredge material from dredging activities in the adjoining Ranges of the Delaware River. During a typical operation, a hydraulic dredge will be positioned in the portion of the Delaware River requiring dredging. It is anticipated that, in a given year, the volume of Delaware River sediment to be dredged could vary from 1.9 million to 2.4 million cubic yards (Duffield 2013). Maintenance dredge material from the Delaware River Ranges with high shoaling rates will be discharged by rotation to the proposed CDF and three other active CDF's operated by the USACE in the area (Pedricktown North, Pedricktown South, and Oldmans).

The USACE Engineers Manual "Confined Disposal of Dredged Material" (EM-1110-2-5027, 1987) recommends a minimum detention time of 48 hours to remove a minimum of 80% of suspended solids from the dredge disposal waters. To achieve an 80% suspended solids removal, the previously described baffle dike has been included as part of the CDF design to maximize detention time prior to discharge, and to prevent short circuiting and discharging directly back to Oldmans Creek without retention. After a minimum 48 hour detention time, discharge waters will flow through the sluice gate structure and will be monitored, as necessary to ensure the intended level of suspended solids removal is achieved (Duffield 2013). The available land within the dikes is approximately twice necessary to achieve the minimum 48 hour retention time, resulting in margin and the likelihood of additional retention time / suspended solid removal.

The presence of multiple CDFs within the Ranges of the Delaware River with the highest shoaling rates provide for periods of inactivity at the proposed new CDF. These periods of inactivity could last multiple years depending on the level of required dredging activity, which varies year-to-year. During periods of non-activity, varied discharges will continue from the CDF, consisting primarily of accumulated rainfall and runoff. Contained dredge material will be allowed to naturally vegetate to assist with the dewatering process and provide additional soil erosion and sediment control as well as dust control. Site access will be limited to authorized personnel by locked vehicle access gates. Routine mechanical maintenance of vegetation may be required depending on the length of inactivity and the requirement to maintain access for inspection and future operational use.

3.2.2.4 Economic Benefits

The land exchange facilitates beneficial acquisition. This exchange will result in acquisition of property rights that are typically difficult to obtain. Dredge disposal sites for the material dredged from federal navigation projects have limited capacities and acquisition of new CDFs is periodically required. This Proposed Land Exchange would lead to acquisition of a new CDF in a favorable and cost efficient location for the channel maintenance needs of the Delaware River.

The disposal area at Artificial Island has been used periodically and intermittently in the past, whereas the Pedricktown / Oldmans disposal areas are used annually for disposal of dredged material. The exchange will be beneficial to the U. S. Government because the new disposal area capacity gained through this exchange is located in the area of highest annual maintenance in the Delaware River which in turn allows the Philadelphia District to be better able to perform the required maintenance dredging to meet the mission goal of maintaining the navigation channel to its required depth. Disposal capacity at the proposed location will ease the disposal area management burden at the disposal sites at Pedricktown and Oldmans, allowing the USACE Operations staff to more efficiently manage disposal at those CDFs. Additionally, the existing railroad line near Site 15G provides benefits to the USACE associated with beneficial material disposition. This action will result in an overall net benefit to the government.

The United States will retain required disposal capacity at the Artificial Island CDF to meet its mission in the southern Delaware River and Delaware Bay ranges. The disposal area at Artificial Island has been used periodically in the past and the USACE will retain the remaining disposal CDF cells 1 and 2 at Artificial Island to support the less frequent dredged material disposal needs in that section of the Delaware River and Bay (see Figure 1).

The Proposed Land Exchange affords the USACE with dredge material disposal capability in a location more beneficial to the United States.

3.2.3 Real Estate Transaction

The transfer of the various property parcels noted will result in efficiencies for the high shoaling ranges and subsequent USACE management of the disposal of dredged sediments from the Delaware River. The specifics of the land exchange are noted below. There are no environmental impacts per se from the land exchange, excepting the impacts from the changes in land use. These are addressed in further detail in this Environmental Assessment.

In May of 2010, PSEG and the USACE reached an agreement in principle, which was memorialized in a Concept Approval memorandum from the USACE Director of Real Estate dated May 20, 2010, regarding a land exchange as a means by which PSEG can acquire additional acreage at Artificial Island. The agreement concluded that before any formal exchange of land could be finalized, the net benefits received by the USACE from the exchange would have to be deemed appropriate by the Army. PSEG provided specifics to the Chief of Operations, Philadelphia District USACE to allow the determination of the appropriateness in accordance with US Code - Title 33: Navigation and Navigable Waters (33 USC 558) - Sec. 558b Exchange of land or property.

The land exchange principally involves an exchange of USACE CDF acreage at Artificial Island for a property utilized by the USACE starting approximately in the 1950s

as an upland dredge disposal site. In the 1990's, the USACE considered acquiring the site and included it in an Alternate Site Analysis associated with the Delaware River Channel Deepening Project, where it was referred to as Site 15G (USACE 1997).

Following the Proposed Land Exchange, the Site 15G CDF would be available to the USACE to support Delaware River Philadelphia to the Sea channel maintenance dredging. Per the USACE 2009 Environmental Assessment, the Site 15G CDF has the capacity to accommodate up to approximately 20,000,000 CY of dredge materials.

The USACE has consistently established that the operational need for 50 years of maintenance dredging capacity needs to be accommodated for the Delaware River. The basis for the exchange and the determination that the land exchange is beneficial to the United States is based on capacity. The available capacities for the USACE-retained Artificial Island CDF cells and proposed Site 15G CDF associated with the Proposed Land Exchange provide the USACE with adequate and appropriately located dredge material disposal capacity.

Other non-CDF property is included in the Proposed Land Exchange. On Artificial Island there is a coastal wetland area surrounding the CDF cells that is proposed to be transferred to PSEG. This is designated as Property 3 which consists almost exclusively of *Phragmites*-dominated coastal wetland vegetation. Property 3 is an area that PSEG expects to be used as a buffer property in Lower Alloways Creek Township, NJ (Block 26, Lot 1 and a partial portion of Lot 2) which contains approximately 537 acres of property outside of the Artificial Island CDF cell 3. This property is bounded by existing 500 Kilovolt transmission lines to the east that roughly parallel what was the eastern shoreline of the Delaware River prior to dredging and fill activities which created Artificial Island (initially with the passage of the River and Harbors Act of 1897).

The land exchange described herein is independent of any other PSEG decisions as to the operational needs of their electric generation facilities on Artificial Island. The 537 acres of wetlands presently owned by the USACE will be used by PSEG to provide extra security and perimeter buffer between the operating plants and other lands. The PSEG request to the USACE for the land exchange has independent utility. It is being pursued regardless of the potential future uses or development at the Artificial Island location.

3.2.3.1 Alternatives

The consideration of alternatives to Site 15G was completed in the 1992 Environmental Impact Statement and the 1997 Supplemental Environmental Impact Statement associated with the Delaware River Channel Deepening Project (USACE 1992, 1997). Alternatives were comprehensively and appropriately evaluated in the NEPA analyses cited, and no further assessment of alternatives to the selection of site 15G as a CDF is necessary. In April of 2009, an Environmental Assessment was prepared to address changes to the Delaware River Main Channel Deepening Project subsequent to the 1998 Record of Decision. One of the changes evaluated in that Environmental Assessment was the elimination of new CDFs from the scope of the project due to lower dredged material disposal projections. This effectively eliminated Site 15G as a future USACE CDF, specifically for the channel deepening scope. This conclusion is unchanged. However, Site 15G will provide a beneficial location for Delaware River channel maintenance needs.

3.3 No Action Alternative

The No Action Alternative would result in no land transfer of property to and from the United States and PSEG and no future development of a newly located upland Class B CDF in the ranges of the Delaware River with high shoaling rates. CDF availability is a function of drainage time and stabilization after the last disposal evolution and varies significantly. The use of Pedricktown and Oldmans at times requires more active intervention with both earth-moving equipment and labor to prepare for disposal of dredged material, than if the Site 15G CDF was available.

In summary, the No Action Alternative will result in no changes to current dredged material disposal operations at the existing USACE Pedricktown and Oldmans CDFs. There may be potential additional costs to PSEG due to the lack of land availability to the north of the PSEG Site at Artificial Island for future operational needs.

3.4 Proposed Action with Alternate Properties

The selection of the site 15G property is consistent with prior alternative disposal site analyses performed by the USACE in preparation for and during the Delaware River Main Channel Deepening Project. An alternative evaluated in this Environmental Assessment is the acquisition and use of an alternate property for the land exchange and development of the Class B CDF.

In several prior evaluations, including the June 1984 Delaware River Dredging Disposal Study, the various NEPA evaluations of the Delaware River Channel Deepening Project including the 1992 Environmental Impact Statement (EIS), the 1997 Supplemental Environmental Impact Statement (SEIS), and the 2009 and 2011 Environmental Assessments (USACE 2009, 2011), an assessment of dredge material disposal was performed. In the 1984 Study and the 1992 EIS, significant evaluations of alternate and potential dredge disposal sites were conducted. There were approximately 100 potential sites identified and subsequently evaluated via a programmatic and analytical screening and evaluation process. The 1997 SEIS re-evaluated the potential dredge material quantities and further assessed and refined the new upland disposal site listing. The outcome of this evaluation, as documented in the 1997 SEIS was the finalization of four new upland disposal sites that were deemed to be the most appropriate and economical, available for development of a Class B CDF, and which were shown to have the least environmental impacts.

The upland disposal sites in the 1997 SEIS included Site 17G, Raccoon Island, Site 15D, and Site 15G (the property proposed for this land exchange and CDF development). Site 17G has subsequently been developed as a recreational center and golf course and as a result, is now longer a potential upland disposal site. Coastal wetlands are the predominant land cover on Raccoon Island and therefore it is less desirable as an upland disposal site than Site 15G. Finally, Site 15D is partially developed and partially coastal wetland and as such is less desirable than the larger Site 15G. In addition, the ability to acquire title, for eventual transfer to the United States was pursued unsuccessfully for the undeveloped sites noted above. As Site 15G is in private ownership with a willingness to transact the land exchange at this time, and the property was selected as one of 4 screened sites for potential upland disposal sites in the vicinity of Ranges with high shoaling rates of the Delaware River, it is the only viable alternative for this land exchange and related development of a Class B

CDF. No further evaluation of impacts or environmental affects is included in this Environmental Assessment as they were evaluated in depth in prior NEPA reviews associated with the Delaware River Main Channel Deepening Project.

4.0 AFFECTED ENVIRONMENT

4.1 Project Area

4.1.1 Location

USACE Lands at Artificial Island

The properties included in the land exchange are all located within the southern portion of the Delaware Estuary (see Figure 3). Existing USACE lands known as Artificial Island CDF (Property 2) and Artificial Island Buffers (Property 3) are located in Lower Alloways Creek, Salem County, New Jersey.

The tidal Delaware River borders the western sides of the property known as the Artificial Island CDF. Artificial Island Buffers are located to the east of the Artificial Island CDF. The CDF lands are located approximately 12 miles (mi.) south of the Delaware Memorial Bridge near river mile (RM) 52. The portion of the Delaware River flowing adjacent to the site is 2.5 mi. wide. The CDF site is 18 mi. south of Wilmington, Delaware (DE) and 30 mi. southwest of Philadelphia, Pennsylvania (PA). Other nearby communities in NJ includes the city of Salem, located 7-1/2 mi. to the northeast and town of Pennsville located 9 mi. to the north. Middletown, DE is located 7 mi. to the west. The river area adjacent to the proposed site is a Transition Zone between the Delaware Bay (to the south of the site) and the Delaware River (to the north of the site). This Transition Zone extends from Marcus Hook, PA downriver to Artificial Island (Santoro, 2004).

PSEG Lands in Oldmans and Logan Township

PSEG lands including the site known as Site 15G (Property 1) is located primarily in Oldmans Township, Salem County, NJ with a small portion of the site located in Logan Township, Gloucester County, NJ.

Site 15G is a previously developed and operated CDF. The property is bounded by U.S. Route 130 to the west, Oldmans Creek to the northeast, and tidal marsh and an active rail line to the southeast. Three residential properties occur along Railroad Avenue (County Road 602) to the southwest. Approximately 19 acres of Site 15G are bounded by a historically filled meander of Oldmans Creek identified as Block 3105, Lot 1, which are in Logan Township. The remaining 335 acres are identified as Block 3, Lots 2, 5, and 6 and are located in Oldmans Township. (Figure 5)

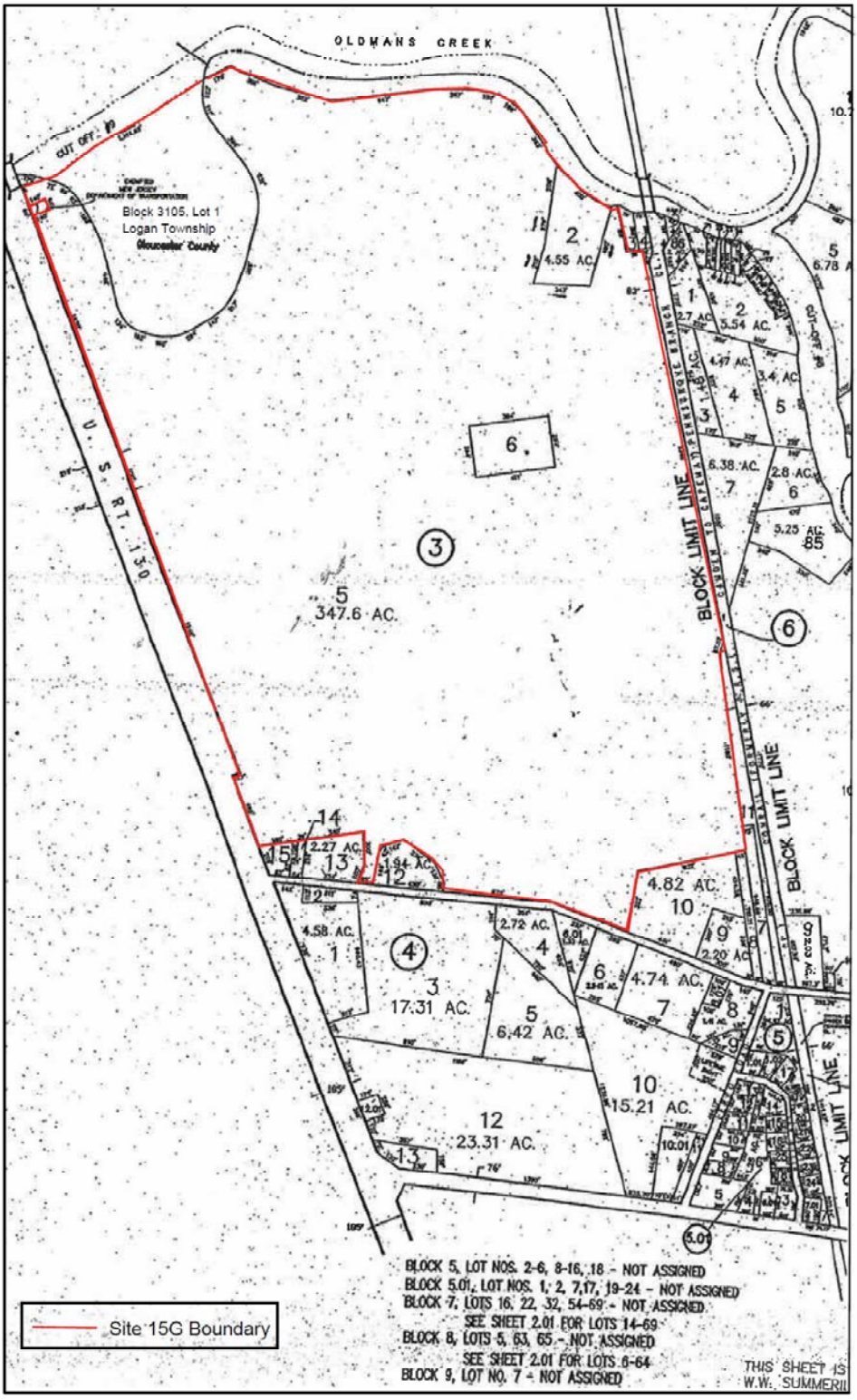


Figure 5 – Tax Map Data for Site 15G

4.1.2 Socioeconomics

USACE Lands at Artificial Island

Salem County is a largely rural area with 38 percent of its land devoted to tilled farmland and agricultural uses). The county contains a significant amount of low lying land, with 30 percent of its land covered by wetlands, and 5 percent of its land composed of open waters. Forests (17 percent) and urban areas (10 percent) comprise the remainder of Salem County. Open space lands in Salem County include national wildlife refuges, wildlife management areas, and state, county, and local parks. Approximately 25 percent of the 216,320 acres in the county are permanently protected as open space.

The three largest communities in the 10 mi. vicinity of the USACE lands at Artificial Island based on U.S. Census Bureau (USCB) 2007 population estimates are Middletown, DE (11,153), Pennsville Township, NJ (13,363), and Salem, NJ (5678). Lower Alloways Creek and Elsinboro Townships are the NJ townships nearest to the site with 2007 estimated populations of 1883 and 1054, respectively. Hancocks Bridge is nearest community and is located 5 mi. east of the site in Lower Alloways Creek Township.

Based on USCB 2000 data, the population of Salem County is older (median age 38.0) than the other surrounding counties of Gloucester, Cumberland and New Castle, Delaware, as well as the state (36.7) or national (35.3) averages. The per capita income is $20,874 which is lower than the state average. The numbers of families and individuals living below the poverty line are higher than state averages. High school graduation rates in Salem County are close to the state average, but attainment of a college degree is slightly more than half of the state average. Owner-occupied housing in Salem County is 73 percent, which is higher than the state average (65.6 percent). The amount of vacant housing in Salem County (7.1 percent) is approximately the same as the state average (7.4 percent).

An analysis of 2000 USCB data, adjusted to 2007 population estimates against the 2010 USCB data has been performed. With respect to Salem County (NJ) there is very close consistency in the numbers of minority and low-income block groups when comparison is made between 2000 and 2010 USCB data. In the case of regional and countywide statistics, there is little difference between population estimates for 2007 and actual 2010 USCB population counts. At the township/municipal level, there is also relative consistency with population growth rates bounded in the range of plus / minus 1.58 percent in the comparison between 2007 and 2010 data (PSEG 2012).

Economic and housing indicators for Elsinboro, Lower Alloways Creek and Pennsville townships are generally above Salem County averages, with Elsinboro generally scoring higher than the other townships. Families or individuals living in poverty range from 2 percent in Elsinboro Township to 4 percent in Lower Alloways Creek Township. Elsinboro has the highest owner-occupied housing, but also has more than twice the vacant housing units. Educational attainment for the three localities is similar to the county average. The number of racial minorities in all three townships is low; over 95 percent of the population in these localities is white, compared to the county average of 81.2 percent. The gender profiles are generally similar to the Salem County profile, but the median age of the Elsinboro population is 5.6 years

older than the county average, while the median age for the other two townships is 1.3 to 1.5 years over the county average.

PSEG Lands in Oldmans and Logan Township

Site 15G is partially located in Oldmans Township, Salem County and partially in Logan Township, Gloucester County. It is currently a fallow field that was previously used as a disposal site for dredge spoils and later as an agricultural field. The area around Site 15G is predominately rural, undeveloped land with surrounding land uses including agriculture, wetlands, residential and forest. There are no residences or businesses located within the site boundaries and the nearest homes are located on the west side of North Railroad Avenue. The closest industrial complex is a coatings and resins plant owned by Poly One Corporation located approximately 1.2 miles southwest of Site 15G. The adjacent land uses to the site are a mix of residential, forested, marsh, and agricultural areas. Select population and housing characteristics from the 2010 Census for Oldmans and Logan Townships are given in Table 2.

Table 2: Population and Housing Data for Oldmans and Logan Townships

Characteristic	Political Jurisdiction	
	Oldmans Township	Logan Township
Population	1773	6042
Average household size	2.7	2.9
Median household income (in 2011 dollars)	$61,125	$87,083
Percent families below poverty line	4.1	0.5
Percent individuals below poverty line	5.7	3.8
Total housing units	699	2172
Vacant housing units	47	85

Source: USCB 2010

Employment data from the 2010 Census for Oldmans and Logan Townships is shown in Table 3. It is estimated that there are more than 320 unemployed residents within these townships who are actively seeking employment.

Table 3: Employment Data for Oldmans and Logan Townships

Characteristic	Political Jurisdiction	
	Oldmans Township	Logan Township
Total civilian labor force	1086	3617
Percent unemployment	3.4	7.8
Occupations (percentages)		
Management and professional	25.4	42.2
Natural resources, construction, and maintenance	12.1	8.0
Production and transportation	18.6	17.2
Sales and office	29.8	17.3
Service	14.1	15.1

Source: USCB 2010

The construction industry is not a major employer in either township. In Oldmans Township it employs 4.3 percent of the civilian labor force, or 44 residents. The construction industry in Logan Township employs 102 residents, or approximately 3.1 percent of the labor force. In Oldmans Township, the top three industries that employ the civilian labor force are educational services and health care (19.9 percent), manufacturing (15.5 percent), and transportation, warehousing, and utilities (12.9 percent) (USCB 2010a). In Logan Township, the top three industries that employ the civilian labor force are educational services and health care (30.8 percent), manufacturing (15.0 percent), and finance and insurance and real estate (9.0 percent) (USCB 2010).

Community facilities are those features of a community that provide support to social organization and function and include such features as transportation, religious institutions, educational facilities, emergency services, libraries, recreational facilities, and cemeteries. A number of religious facilities, cemeteries, and schools are located within a two-mile radius around Site 15G. A two-mile radius was used as a distance that encompasses the major communities near the site and provides a reasonable context for assessment of impacts for this limited action. Given the small size of the site and relative impact levels, a greater distance was determined to be unnecessary. All community facilities within this two-mile area around Site 15G are located near existing community centers. Emergency facilities within Oldmans and Logan townships include a volunteer fire company (Logan Volunteer Fire Company) located along North Railroad Avenue to the south of Site 15G and Oldmans Township First Aid and Rescue. The nearest police department is located approximately four miles from the site in Logan Township, Gloucester County. Logan Township also has emergency medical services available including the Riverfront Medical Center and Premier Urgent Care.

Local transportation facilities include air, rail, and road networks. The nearest major airport is the Philadelphia International Airport located approximately 11 miles northeast of Site 15G. A small public use airport, Spitfire Aerodrome, is located approximately 3 miles southeast of the site. Transportation resources bounding the site include Crown

Point Road (U.S. Route 130) to the northwest and North Railroad Avenue to the southwest. An active rail line owned by Conrail Railroad is located southeast of the site. Passenger rail services are not available in the immediate area and the closest Amtrak stations to Site 15G are in Wilmington, Delaware (DE) and Philadelphia Pennsylvania (PA).

4.2 Land Use

USACE Lands at Artificial Island

The creation of Artificial Island began around 1900 by the USACE with the disposal of hydraulic dredge material within a diked area established around a naturally occurring sandbar that projected into the Delaware River (USACE, 2009). Over the years, the diked area was enlarged to accommodate additional dredged materials produced as a result of maintenance dredging of the Delaware River navigation channel. As this area was filled in and enlarged, it became known as Artificial Island. The elevation of the terrain across the CDF site generally ranges from 5 to 15 feet (ft.) North American Vertical Datum 1988 (NAVD).

The nearest residences to the CDF site are located 2.8 mi. west in Bayview, DE, and 3.4 mi. east-northeast of Artificial Island near Hancocks Bridge, NJ. The area within 15 mi. of the site primarily consists of open waters of the Delaware Bay and River, associated coastal and freshwater wetland systems, or is used for agriculture. The nearest heavy industries are an oil refinery 8.9 mi. to the northwest, and three manufacturing facilities between 7.6 mi. and 8.7 mi. to the northeast.

There are no major airports, accessible highways, or railroads within 7.5mi. of the CDF site, and the only current land access to the site is an access road constructed and maintained by PSEG. Philadelphia International Airport is the closest major airport and is located 30 mi. to the northeast. New Castle County Airport in DE is also a small regional airport located south of Wilmington that also offers commercial flights and operations. The closest railroad is a Southern Railroad Company of New Jersey rail line located 8 mi. to the northeast. Route 49 is the closest highway in NJ, and is located 7.5 mi. to the northeast.

PSEG Lands in Oldmans and Logan Township

The 15G property was formerly tidal marsh associated with Oldmans Creek prior to historic USACE dredged material filling activities. Following completion of these historic fill activities, the site has been utilized for a variety of agricultural uses. Recent activity has been limited to routine vegetation maintenance. The immediate surrounding land use includes residential, forested, marsh, and agricultural areas.

In the 1950s, the USACE constructed containment berms at the site and utilized the area for upland containment of dredge materials. During this period of active dredged material placement, the internal elevation of the site was raised approximately 10 to 15 feet above the historic marsh elevation. Since dredged material placement activities ceased, Site 15G has remained predominantly unutilized and undeveloped since with the exception of a brief period of limited agricultural use in the mid to late 1990s.

The proposed site is predominantly open, undeveloped land bordered by a series of containment berms constructed during previous dredge material filling activity by the USACE. The berms extend between 15 and 20 feet above U.S. Route 130. Elevations

within the site range from 10 to 15 feet (NAVD 88). While the NJDEP Land Use/Land Cover data identifies small areas of residential and other urban land use on the site, there are no residences or other structures located within the site boundaries.

The site is crossed by a large drainage ditch that runs north to south. The ditch conveys stormwater surface runoff to a tide gate structure hydraulically connected to the off-site tidal marshes. The drainage ditch and perimeter containment berms are predominantly vegetated by patches of invasive common reed (*Phragmites australis*) and various woody species. The central portions of the site include maintained herbaceous vegetation dominated by broomsedge (*Andropogon virginicus*), smartweed (*Polygunum spp.*), and common reed. Site 15G is predominantly comprised of vegetated dredge material that has been utilized for short periods of agricultural use and most recently has been mechanically maintained to limit overgrown vegetation.

4.2.1 Agriculture

USACE Lands at Artificial Island

The lands at Artificial Island were created circa 1900 by the USACE with the disposal of hydraulic dredged materials within a diked area established around a naturally occurring sandbar that projected into the river (USACE, 2009). Over the years, the diked area was enlarged to accommodate additional spoils materials produced as a result of maintenance dredging of the Delaware River navigation channel. The site has no history of agricultural activities and the soils present at the site consist solely of dredged material.

PSEG Lands in Oldmans and Logan Township

Portions of Site 15G have been used in the past to support row crops. The U.S. Department of Agriculture (USDA) defines prime farmland as soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses. Farmland of "statewide" or "unique" importance is also considered as valuable agricultural resources and is considered here along with prime farmland. Neither prime farmland nor farmland of state or unique importance occurs on Site 15G. The site is not included in the state's Farmland Preservation Program.

4.2.2 Coastal Zone Management Area

USACE Lands at Artificial Island

The lands at Artificial Island are located within New Jersey's coastal zone as defined by its Coastal Area Facility Review Act (CAFRA). The area is presently labeled as an Environmentally Sensitive Area under the CAFRA rules at N.J.A.C. 7:7E et seq. In accordance with the historical use of the site as a CDF, a formal request by PSEG has been submitted to the New Jersey Department of State to change the designation of the area from Environmentally Sensitive to Heavy Industry – Transportation – Utility (PSEG, 2012). Any activities as defined under N.J.A.C. 7:7 *et. seq*. require a CAFRA permit from the State of New Jersey.

PSEG Lands in Oldmans and Logan Township

New Jersey's Waterfront Development Regulations (N.J.A.C. 7:7 et. seq.; July 15, 2013) define the area regulated under Coastal Zone Management as areas that generally lie within 500 feet of mean high water. Oldmans Creek, located to the north

and east of Site 15G is tidal. Accordingly, portions of Site 15G lie within New Jersey's regulated coastal zone. PSEG has applied for a NJ Waterfront Development Permit (WFD) for Site 15G as they are a private entity. The NJDEP WFD permit also includes the Coastal Consistency Determination. Permitting will precede USACE taking title to Site 15G. The USACE would not need to acquire a Waterfront Development Permit under N.J.A.C. 7:7 *et. seq*. from the State of New Jersey.

An Interstate Coastal Consistency Determination is not required from Delaware under their Coastal Zone Rules as the site and the discharge from the upland CDF at Site 15G is not within Delaware's Coastal Zone jurisdiction.

4.3 Geology and Soils

USACE Lands at Artificial Island

The USACE lands at Artificial Island lie within the Outer Coastal Plain physiographic subprovince. The Middle Coastal Plain Terrace subprovince resides outside the site to the east. The Middle Coastal Plain Terraces and the Upland Sands and Gravels subprovinces lie east of the site. Western portions of the site are bordered by the Delaware River. Coastal Plain sediments ranging in age from Early Cretaceous to Holocene underlie the site. These sediments overlie a basement complex composed of fractured continental crust.

Hydraulic fill was deposited at the site as the result of channel dredging of the Delaware River (PSEG 1988). The hydraulic fill overlies alluvial soils at an average elevation of -29 ft. NAVD in the northern portion of the site, and at an average elevation of -21 ft. NAVD in the eastern portion of the site. Hydraulic fill consists typically of dark gray to dark greenish-gray, highly plastic clay and silt with trace to some organic material, and locally interbedded discontinuous layers of clayey and silty, fine to medium grained sand up to 5 ft. thick. Thickness of the hydraulic fill ranges from 24 to 44 ft., with an average thickness of 33 ft. across the northern and eastern portions of the site. Artificial and/or hydraulic fill, deposited by various means over time, comprises the surface material at the site, overlying hydraulic fill. Artificial fill consists of typically grayish-brown to brown, silt, clay, and sand with variable silt and clay content, and clayey and silty gravels.

The soils in the wetland areas to the east of the CDFs are defined as Udorthents, also comprising dredged fine material with 0 to 8 percent slopes; however, these unconsolidated soils are part of a contiguous region of tidal wetlands, and despite their apparent origin as dredge disposal material during the creation of Artificial Island, appear to be functionally similar to the frequently flooded Transquaking mucky peat of the adjacent marshes in their support of tidal, emergent wetland vegetation.

PSEG Lands in Oldmans and Logan Township

The geology of Site 15G consists of upper Cretaceous sedimentary deposits, primarily as the Potomac and Magothy Formations, that include aquifers composed of sands and gravels and confining units composed of silts and clays. A thick layer of dredged river sediments overlays these geological formations. The soils on the site, mapped in the Soil Survey of Salem County, New Jersey, are identified as "Made Land" consisting of dredged material from the Delaware River and its tributaries (SCS 1969). The Soil Survey Geographic Database classifies the soils as Udorthents, dredged fine material,

0 to 8 percent slopes (USDA 2012). This material, ranging in size from clay to cobbles, was hydraulically dredged and pumped onto the site. The larger materials, including sand, gravel, and cobbles, likely dropped out nearer the discharge point whereas smaller silt and clay sized particles, which likely remained in suspension and gradually settled out in the lower elevation areas of the containment area. Since the discharge pipe was periodically moved in order to fill the entire containment area, deposits of fine- and coarse-textured materials are highly variable across the site and are typically stratified (Dames and Moore 1994). Soil borings conducted as part of a site-wide survey (AKRF 2011) in November 2011 confirmed these mapped soil types throughout the site.

4.4 Hydrology

USACE Lands at Artificial Island

The Delaware River in the area of the USACE lands at Artificial Island is approximately 2.5 miles wide. The maximum tidal flow of the River past the site is approximately 800,000 cubic feet per second (cfs) with average flows of 400,000 cfs to 472,000 cfs. The salinity of the River varies with both the tides and season from almost freshwater to mostly saltwater. The River in the vicinity of the site has high turbidity and relatively swift current velocities. Prominent features in the area (and their approximate distances) are the Chesapeake and Delaware Canal (3 miles to the northwest), Hope Creek Jetty (1.5 miles to the southeast), and Augustine Beach, DE (about 3 miles due west).

Because the active USACE's upland CDF have been historically diked as part of CDF operations, these areas are no longer tidally influenced or directly connected to tidal waters, except by manmade water control outlet boxes and associated culverts. As a result of the construction of the USACE containment berms and the history of dredged material disposal activities in the CDF, artificially ponded areas have been created within the CDF. The ponded water present in this area is due in part to lack of operational drainage features within the CDF (e.g., internal ditches, channels, or creeks) and water level management resulting from the placement of stop logs within the outlet water control structure(s). The USACE continues to use the CDF intermittently for the disposal of dredge material, most recently in 2013. The ponded areas are artificially perched systems (PSEG 2010) that are hydrologically isolated from the adjacent Delaware River and associated coastal wetlands, and that have a hydroperiod that is primarily controlled by precipitation events. The water depth of these CDF ponds is very shallow, currently ranging from 1 to 3 ft., but can vary depending upon the frequency and location of USACE dredge material placement and stop log elevations.

PSEG Lands in Oldmans and Logan Township

The site is located approximately one mile from the Delaware River, and is bordered to the northeast by Oldmans Creek and to the east by a broad expanse of wetlands associated with Oldmans Creek. The site is located in the Oldmans Creek watershed, within New Jersey Watershed Management Area 18 (Lower Delaware). The Salem County side of Oldmans Creek is in Watershed Management Area 17 (Maurice, Salem, Cohansey). Oldmans Creek drains an area of 44 square miles and flows from the Coastal Plain to the Delaware River. The creek is 20 miles long and serves as the boundary between Gloucester and Salem Counties. Oldmans Creek discharges to the

tidal Delaware River, well into the Oligohaline (i.e., low salinity or brackish) portion of the Delaware Estuary.

Site 15G originally existed as tidal marsh associated with Oldmans Creek. A historically flowed meander of Oldmans Creek also was located within the proposed project site boundary. In the 1950s, the USACE constructed containment berms along Oldmans Creek and portions of the adjacent marsh to create an upland CDF for dredge material placement. The meander described above was filled as part of the dredge placement operations.

The site currently has a stormwater drainage ditch on the eastern third of the site that runs north to south. The ditch conveys surface water runoff and perched rain water from the site through a drainage control structure (tide gate) to the adjacent tidal marsh that is hydraulically connected to Oldmans Creek. Apart from the drainage ditch, there are no other perennial surface waters at the site.

As part of site studies, Duffield Associates (2013) estimated tidal flow near the site to be approximately 2,700 cfs. The study was an isolated estimation of flow based upon channel hydrology and flow rates. No other known tidal flow measurements are available for Oldmans Creek.

4.4.1 Floodplains

USACE Lands at Artificial Island

Current Federal Emergency Management Agency (FEMA) floodplain information indicates that the 100-year return period flood elevation at RM 52 is 9.0 (NAVD 88) (FEMA, 2013). The CDF berms protect the property to an elevation above the 100-year return elevation.

PSEG Lands in Oldmans and Logan Township

Current Federal Emergency Management Agency (FEMA) floodplain information indicates that the 100-year return period flood elevation at Site 15G is 9.0 (NAVD 88) (FEMA, 2013).

Site 15G originally existed as tidal marsh associated with Oldmans Creek. A historically flowed meander of Oldmans Creek also was located within the proposed project site boundary. In the 1950s, the USACE constructed containment berms along Oldmans Creek and portions of the adjacent marsh to create an upland CDF for dredge material placement. As part of this project, the meander in Oldmans Creek was also filled and the creek rerouted to its present day course. Once construction of the containment berms was completed, dredge material placement activities were conducted. Dredge material was placed within the containment berms until dredge activities ceased. The resulting upland CDF elevation was raised significantly above the original marsh plain elevation. Remnant containment berm elevations vary throughout the site, but generally range from 12 feet to 20 feet (NAVD 88). Elevations internal to the site also vary considerably, but range between approximately 10 feet and 15 feet (NAVD 88).

Comparing the existing site elevations to the identified tidal flood plain elevation shows that the vast majority of the site is located above the tidal flood elevation. A small percentage of the internal areas of Site 15G are below the 9-foot (NAVD 88) tidal flood plain elevation; however, no portion of the remnant perimeter containment berm is lower than the flood plain elevation. As a result, even though the site is identified as

being in the 100-year flood plain, past site activities have resulted in an effective increase in site elevations higher than the 100-year flood plain, and tidal flood waters at an elevation 9 feet (NAVD 88) would not overtop the existing berm to flood the lower interior portions of the site.

4.4.2 Groundwater

USACE Lands at Artificial Island

The USACE lands at Artificial Island are located within the NJ Coastal Plain aquifer system approximately 18 mi. south of the geological fall line. The fall line is a low east-facing cliff, with the exposed scarp generally trending parallel to the Atlantic coastline that extends from NJ to the Carolinas. The fall line separates the hard Paleozoic metamorphic rocks of the Appalachian Piedmont to the west from the sediments of the Coastal Plain (USGS 2000). The hydrogeologic units within the NJ Coastal Plain can be summarized as southeast dipping permeable fine-grained to coarse-grained materials separated by less permeable fine-grained materials, resulting in a multiple aquifer system (USGS, 2003).

The primary aquifers in the region are the shallow water-bearing zone and five aquifers: (1) the Vincentown aquifer; (2) the Mount Laurel-Wenonah aquifer; (3) the Upper Potomac-Raritan-Magothy (PRM) aquifer; (4) the Middle PRM aquifer; and (5) the Lower PRM aquifer, which collectively are known as the PRM Aquifer System. The three aquifers of the PRM Aquifer System are a significant, potable groundwater resource regionally. The nearest public supply wells that withdraw from the PRM Aquifer System are located across the Delaware River in DE, and over 5 mi. to the northeast in Salem, NJ.

New Jersey has designated two Critical Water-Supply Management Areas in the NJ Coastal Plain in response to long-term declines in groundwater levels where groundwater is a primary water supply. Both this site and the 15G Site are southwest of the management areas and are not subject to groundwater withdrawal restrictions except as defined in applicable permits. The U.S. Environmental Protection Agency (USEPA) has determined that the NJ Coastal Plain Aquifer System is a sole or principal source of drinking water (USEPA, 2009).

The site is located on Artificial Island where the shallow soils consist of fill materials or spoils (hydraulic fill) historically dredged from the adjacent Delaware River. Beneath the hydraulic fill are alluvial deposits (riverbed sands, gravels, and clays). These alluvial deposits represent the original ground surface, which was submerged as the river bed, in this area at the time the dredge spoils were initially placed. The hydraulic fill and the riverbed sands and gravels also constitute the shallow groundwater flow system that overlies either the alluvial clay or the top of the Upper Kirkwood Formation (a clay-rich, semi-confining unit at approximately -39 ft. NAVD). The shallow aquifer is recharged directly by infiltration of precipitation where not impeded. The groundwater surface is typically encountered at depths ranging from 5 to 10 ft. below ground surface. The shallow aquifers in the vicinity of the site are saline and tidally influenced.

PSEG Lands in Oldmans and Logan Township

Site 15G consists of historically deposited dredged materials that sit atop an expansive and largely impermeable meadow mat and peat layer, which in turn overlies the

regional aquifer. The site is located within the New Jersey Coastal Plain Aquifer System, which covers approximately 4,200 square miles. The system is bounded by the Delaware River on the west, Delaware Bay on the south, Atlantic Ocean on the east, and Raritan Bay on the north. The majority of the land area within the system is below an elevation of fifty feet above mean sea level and the underlying units are unconsolidated sands and clays of Cretaceous, Tertiary, and Quaternary age, which dip to the southeast and generally thicken toward the Atlantic Ocean. The older formations at or near the surface of the Delaware River reflect this topography and are progressively deeper toward the ocean. As a result, aquifers are generally thicker near the ocean and thin progressively towards the western borders of New Jersey.

The primary aquifer unit along the Delaware River near Site 15G is the Potomac-Raritan-Magothy (PRM) formation (USACE 1997). This system is one of the largest and most productive aquifers in the Coastal Plain. Aquifers in this formation are exposed at various locations at or near the surface in a narrow band along both sides of the Delaware River between Trenton and Pennsville, NJ. In many locations in or adjacent to the Delaware River, these aquifer units are mantled by sands and clays of recent alluvial deposits. There are three major aquifers within the PRM formation with the middle aquifer subdivided into two parts having an intervening confining leaky unit.

The 15G site is located in the outcrop of the middle aquifer which ranges from the surface to a depth of between 40 and 100 feet in the vicinity of the site (USGS. 1995). The top of the lower aquifer ranges between 90 and 120 feet below the surface, and the bottom of the lower aquifer ranges between 100 and 200 feet below the surface in the vicinity of the site. The upper water bearing zone of the PRM is usually artesian and is separated from the surface sediments by clay beds with a minimum ten-feet thickness in the vicinity of the dredged material disposal areas. Leaky confining units separate all of the water bearing zones.

Many municipal water wells in southern New Jersey generally withdraw their water from the PRM formation, and it is considered to be a sole source aquifer in the vicinity of the site. Several communities, industries and public water companies near Site 15G obtain their water from the middle and lower aquifers.

Groundwater flow is generally toward the main river in a typical river basin, and prior to municipal and industrial pumping, water flow in the PRM aquifer was towards the Delaware River in the vicinity of the site. However, the groundwater regime in the project area, specifically the New Jersey side of the river, has been disturbed by urbanization as has been documented in numerous reports. Large groundwater withdrawals have locally reversed the original aquifer flow patterns, resulting in recharge of the PRM aquifer by water from the Delaware River (USACE 1997). The USGS estimates (USGS. 1986) a leakage of 70 million gallons per day (MGD) from the Delaware River into the PRM aquifer system due to over-pumping of the aquifer in the project area. This is due to the fact that permeable sand and gravel in the river are in direct contact with the sediments which comprise the Potomac-Raritan-Magothy system. As a result, saline water from the river has threatened the potability of groundwater supplies derived from this aquifer system (Charles, et al. 2011).

Previous studies at Site 15G found that the surficial unconfined groundwater flow at the site is generally eastward toward Oldmans Creek and the adjacent wetlands (AKRF 2011). Oldmans Creek is a tributary of the Delaware River and tidal in the area around

the site. The adjacent wetlands are likely a discharge area for shallow groundwater and a sink for local flow.

USACE reported (USACE 1997) that thick layers of fine grained material from past dredging operations exist within the 15G site. Additionally, the site is underlain by marsh sediments and clays, all of which would greatly impede the vertical migration of recharge from the surface to the underlying aquifers. Subsequently work performed at the site (C.V.M., 1999) indicated a minimum underlying low-permeability sediment thickness of 14.5 feet with most areas having 18 or more and as much as 60 feet in some areas. Accordingly, it is anticipated that the vast majority of groundwater emanating from the site flows to perimeter drainage systems and vertical recharge of the underlying aquifer is minimal.

4.5 Wetlands

USACE Lands at Artificial Island

The active USACE's upland CDFs have been historically diked as part of Delaware River dredging operations. The areas within the dikes are no longer tidally influenced or directly connected to tidal waters, except by manmade water control outlet boxes and associated culverts. As a result of the construction of the USACE containment berms and the history of dredge disposal activities in the CDF, artificially ponded areas have been created within the CDF. The ponded water present in this area is due in part to lack of operational drainage features within the CDF (e.g., internal ditches, channels, or creeks) and water level management resulting from the placement of stop logs within the outlet water control structure(s). The USACE continues to use the CDF intermittently for the disposal of dredge material. The ponded areas are artificially hydrologically perched systems (PSEG 2010) that are hydrologically isolated from the adjacent Delaware River and associated coastal wetlands, and have a hydroperiod that is primarily controlled by precipitation events.

The water depth of these CDF ponds is very shallow, currently ranging from 1 to 3 ft., but can vary depending upon the frequency and location of USACE dredged material placement and stoplog elevation. The habitat associated with the ponds is of poor quality due to their shallow depth, varying dredge material silt / sand substrates, and lack of surface connectivity to surrounding tidal waters. Similarly, the vegetative community associated with the CDF is periodically disturbed as a result of dredged material placement. The plant community in these areas is of low habitat quality and is characterized by a monoculture of the common reed, *Phragmites australis.* Because they are part of authorized upland disposal facilities, the present configuration of the ponds and associated vegetative communities are highly transitory and/or ephemeral and are subject to ongoing changes resulting from the timing and placement of dredged material.

The USACE completed a Jurisdictional Determination for wetlands within CDF cell 3 on February 24, 2014 (CENAP-OP-R 2009-157(JD). A total of 53.22 areas of jurisdictional wetlands were identified within CDF cell 3. The wetlands comprise *Phragmites*-dominated areas located on disturbed river dredge material.

The 537 acres of wetlands outside of the existing CDFs are characterized by the U.S. Fish and Wildlife as E2EM5/1Pd (Estuarine, intertidal, emergent, *Phragmites australis* persistent,, irregularly flooded, and partially drained/ditched) estuarine and marine

wetland (USFWS, 2013). The New Jersey Department of Environmental Department of Environmental Protection identifies the same area as *Phragmites*-Dominated Coastal Wetlands. Both designations are consistent with field observations.

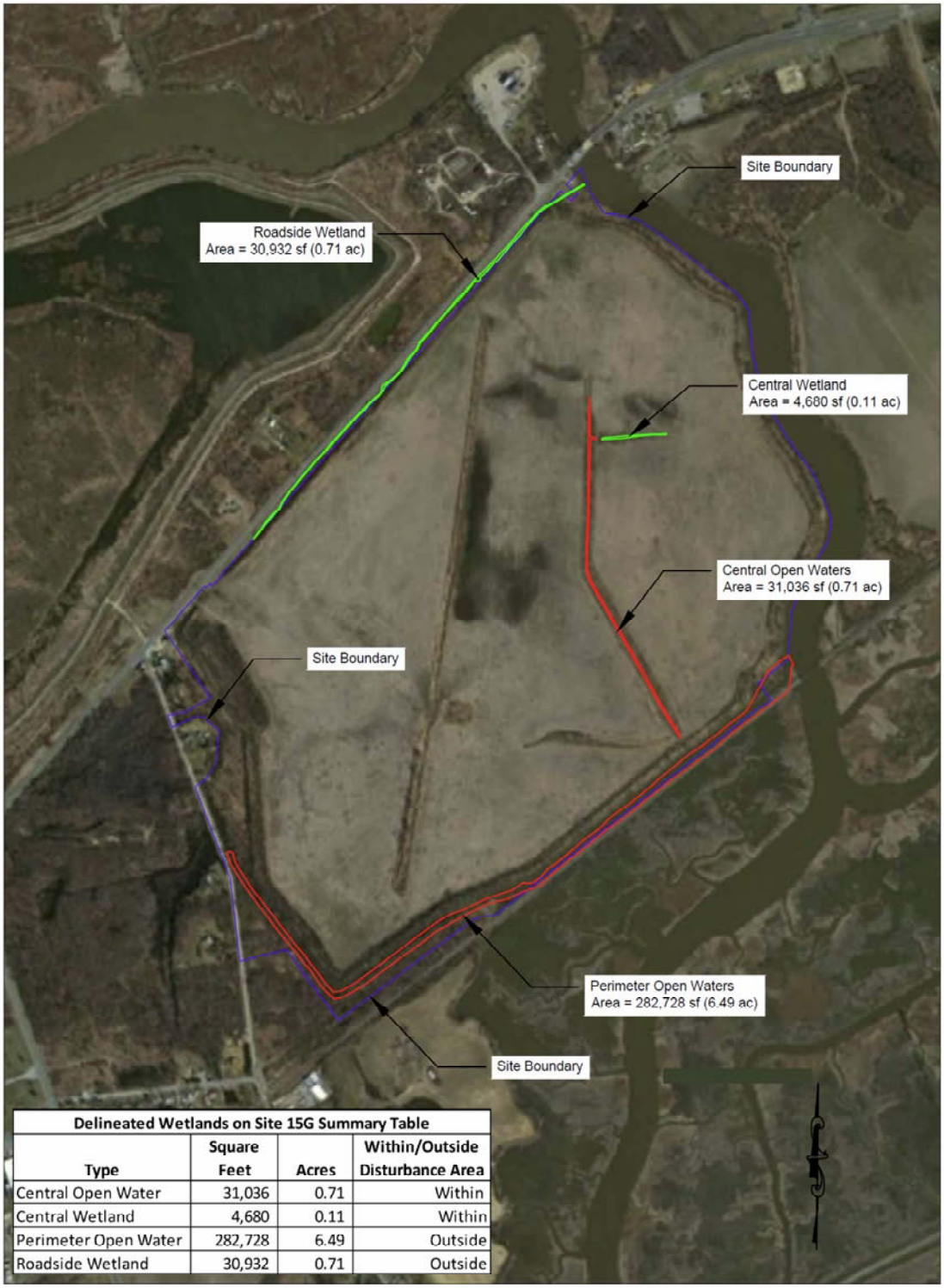
PSEG Lands in Oldmans and Logan Township

The PSEG lands in Oldmans and Logan Township is a former CDF located along Oldmans Creek. The tidal wetlands of the Oldmans Creek complex are dominated by freshwater (oligohaline) plant species such as cattail (*Typha augustifolia*), pickerel weed (*Potendria cordata*), arrow arum (*Peltandra virginica*), and the invasive *Phragmites australis*.

Prior to being converted to an upland CDF in the 1950s by the USACE, the site was tidal marsh associated with Oldmans Creek. The CDF conversion included filling and relocating a meander within Oldmans Creek and the construction of the perimeter containment berms around what is now the proposed project site. After previous dredging activities were completed, the site was briefly used for agriculture. More recently the only activity conducted at the site has been mechanical maintenance of vegetation.

The USFWS National Wetlands Inventory (USFWS, 2013) identifies the entirety of the site as a Freshwater Emergent Wetland classified as PEMH (Palustrine emergent permanently flooded). The elevations at the site range from 9 to 13 feet (NAVD88). Other than the existing ditch, there are no signs of surficial flooding, standing water, or stained vegetation that would suggest the presence of surface water hydrology. The vegetation on the majority of the site is comprised of upland grasses and other early successional plants (See Section 4.8.1). The soils at the site are a result of dredged material disposal operations in the 1950s, which are not a reliable indicator of hydric soils.

A jurisdictional wetland delineation was performed at the site in December 2011 in accordance with the guidelines presented in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989) and the 1987 Corps of Engineers Wetland Delineation Manual (1987) and 2008 Supplement. A follow-up Jurisdictional Determination site visit was made in November 2012 with USACE personnel. The USACE completed a Jurisdictional Determination for wetlands within Site 15G on May 27, 2014 (CENAP-OP-R 2009-157(JD)). The JD determined that there are no federally jurisdictional wetlands interior to the existing dikes at the site. The NJDEP assumed delineated wetlands within the confines of the existing dikes are 0.71 acres of open water and 0.11 acres of emergent freshwater wetlands (dominated by *Phragmites australis*) in the interior of the site (Figure 6). The open water feature is a drainage ditch running north to south through the northeastern portion of the site. It currently discharges water from the site through a non-functioning tide gate.



Delineated Wetlands on Site 15G Summary Table			
Type	Square Feet	Acres	Within/Outside Disturbance Area
Central Open Water	31,036	0.71	Within
Central Wetland	4,680	0.11	Within
Perimeter Open Water	282,728	6.49	Outside
Roadside Wetland	30,932	0.71	Outside

Figure 6 - Delineated Wetland on Site 15G

4.6 Water Quality

USACE Lands at Artificial Island

Surface Water

The USEPA's Delaware Estuary Program Scientific and Technical Advisory Committee (now managed by the Partnership for the Delaware Estuary) has delineated three zones of the Estuary based on patterns of salinity, turbidity, and biological productivity (PSEG 1999): the freshwater Tidal River Zone (or Upper Zone), the Transition Zone, and the Delaware Bay Zone (or Lower Zone). The Delaware Bay Zone extends from RM 50 to RM 0. The Delaware Bay Zone is characterized by high salinity, low turbidity, and high biological productivity. The Transition Zone extends from RM 80 to RM 50, and includes the USACE lands at Artificial Island (located at RM 52). This zone is characterized by the greatest turbidity values, low biological productivity, and varying salinity. The Tidal River Zone is one of variable salinity that extends 53 river miles, from the head-of-tide at Trenton, NJ (RM 133, the head of the Estuary) down to Marcus Hook, PA (RM 80), and is characterized by high turbidity and relatively low biological productivity. Although the freshwater Tidal River Zone is the area most impacted by human use; its quality has been improving during the past two to three decades due to improvements in discharge process controls, reduced point and non-point discharges to the system, and regulatory programs.

According to Sutton et al. (1996), "The Delaware Estuary is one of the most heavily used estuary systems in the world. The Estuary supports one of the world's greatest concentrations of heavy industry, the world's largest freshwater port, and the second largest refining petrochemical center in the Nation…" These land uses historically have affected, and continue to affect, the water quality of the entire Estuary.

The Estuary has a long history of serious water pollution problems primarily attributable to discharges from human population centers, industrial activity, historical and current land use, and consumption and diversion of water from the watershed. Pollution sources include point source discharges, such as municipal and industrial wastewater treatment facilities, and non-point discharges, including urban and agricultural runoff. The urbanization of the regional watershed is illustrated by population trends: from 1880 to 1990, the population in the watershed grew from 2 million to 7 million people (Sutton et al. 1996). Agricultural land use in the watershed has declined somewhat during this period, but still accounts for substantial land use in the region (31%). Various industries in the region (manufacturing, oil refining, coal, chemicals, metals, textiles, and paper, for instance) have contributed to historical water quality degradation. Waste discharge from population centers has also contributed to historical pollutant loads. The Delaware watershed has some 1,450 industrial and municipal wastewater discharges, 162 of which are located along the Estuary itself (Sutton et al. 1996).

The Estuary receives one of the largest loadings of nutrients of any estuary in the United States particularly in the Burlington, New Jersey to Wilmington, Delaware Ranges of the Estuary (Santoro, 2004). The estimated load of total nitrogen to the Estuary is about 1.1×10^8 pounds per year; the estimated total phosphorous load is about 2.1×10^7 pounds per year (Sutton et al. 1996). Despite high nutrient loads, primary productivity is limited by light penetration in turbid portions of the Estuary (Santoro 1998; Santoro 2004). The very high nutrient concentrations in the Estuary do not appear to support massive algal blooms or to have caused eutrophication (Sutton et

al. 1996). Nutrient levels in the Estuary waters appear to peak near Philadelphia where the highest concentrations of discharges are located. Improved sewage treatment has reduced the levels of ammonia (NH_3) nitrogen during the past three decades (PSEG 1999). By contrast, the level of nitrate ("NO_3"), another form of nitrogen, has stayed the same or only slightly decreased in the Tidal River and Transition Zones during the last decade.

Prior to the 1980s, the dissolved oxygen (DO) concentrations in most of the Estuary did not meet applicable DRBC standards (Sutton et al. 1996). Warm water dissolved oxygen concentrations approached zero in the Philadelphia region (PSEG 1999) of the Estuary, and fish and other aquatic organisms were impacted. These depletions were due to bacterial respiration during decomposition of the largely untreated sewage entering the Estuary. Since that time, major sewage treatment facility upgrades have improved the DO levels. However, combined sewer overflows (CSOs) still continue to contribute untreated wastewater and stormwater runoff to the Estuary, affecting DO concentrations. Philadelphia, for instance, has 176 CSOs, and Camden County, NJ has 36 (DRBC 1998).

Historical profiles of DO concentrations along the axis of the Estuary show a seasonal sag in oxygen from RM 110 seaward to approximately RM 55 (PSEG 1999). The DO concentration sag was most pronounced between RM 105 and RM 65. In recent years (1995-1997), the DO sag had decreased to approximately 1.5 milligrams per liter (mg/L) compared to earlier sags of about 3.5 mg/L (PSEG 1999). Santoro (2004) reported no significant summer DO sags during the summers of 1998 through 2003 where previously there had been serious oxygen sags (RM 75 to RM 95). This increase in DO concentration is a direct result of management actions taken to improve the water quality of the Delaware River and Estuary.

Other specific pollutants potentially impairing the uses of the Estuary have been identified by regulatory agencies under §303(d) and §305(b) of the Clean Water Act. These pollutants include PCBs, PAHs, DDT, DDD, DDE, perchloroethylene (PCE) or tetrachloroethylene, 1,2-dichloroethane, dieldrin, copper, and fecal coliforms (PSEG 1999). In December 2003, USEPA Regions II and III promulgated the first stage of its TMDLs for PCBs for DRBC Zones 2-5 in the tidal Delaware River (DRBC 2003). In that document, USEPA concluded that the load allocations of PCBs to non-point sources are significantly higher than waste load allocations to point sources in Estuary Zones 2 – 5. For all zones when the current loading proportions are used as a basis for allocating the zone TMDLs, ancillary evaluations of PCBs in biota and sediment were performed in 2001 and 2002 (Ashley et al. 2004). The highest PCB concentrations in sediments and biota were found in DRBC Zones 3 and 4 and are likely attributable to the non-point and point sources in the urbanized and industrial sectors adjacent to these zones.

In the Transition Zone of the Estuary, increases in the level of DO, and decreases in the levels of ammonia, total phosphorus, turbidity, and fecal coliforms have occurred during the past two decades. The historic DO sag between RM 110 and RM 60 never extended down-estuary to the vicinity of the Artificial Island, and there has been no significant trend up or down during the past 30 years in the area. Levels of nitrate have increased - the single offset in an otherwise significant improvement in water quality. In particular, DO levels have improved in the Transition Zone. Several reports indicate steady improvement in summer time DO levels in the Estuary for the years 1971, 1977,

1987, 1994, and 1998 through 2003 (Santoro and Sharp 1999 and Collier et al. 1999 in Santoro 2004).

Despite the overall improvement to the water quality of the Estuary during the past 30 years, some indicators of poor water quality remain. For example, in 1996-97, 95 percent of areas of the Estuary, including the vicinity of the Artificial Island, were at least partially supporting of the aquatic life designated use, and 69 percent of the same area was fully supporting of aquatic life (DRBC 1998). However, the most recent Delaware River and Bay Integrated List Water Quality Assessment Report lists Water Quality Management Zone 5, along which the USACE lands are located, as being not fully supportive of aquatic life with respect to Dissolved Oxygen. Furthermore, fish consumption limits exist in all water quality management zones in the Delaware Bay or River, based on consumption advisories issued primarily due to the presence of polychlorinated biphenyls (PCBs) and mercury in fish tissue samples (DRBC 2008, DNREC 2013).

Groundwater

Recent investigations by (PSEG 2010) categorized ground water quality in the area near the USACE lands at Artificial Island. Groundwater quality in the shallow aquifers and water bearing zones is poor. They are saline and not suitable for potable water. The deeper aquifers, including the Mount Laurel-Wenonah and the PRM are used as potable sources and are designated by USEPA as sole source aquifers.

Two observation wells were screened within the Hydraulic Fill that comprises Artificial Island. For inorganics, naturally occurring calcium, iron, magnesium potassium and sodium were detected in each of the locations at concentrations consistent with water samples from the wells screened within the underlying alluvium. Most of the detected inorganics exceed the NJDEP drinking water standards. Mercury was detected during the one sampling event at an estimated value of 0.00014 mg/L. Lead was detected at an estimated concentration of 0.0015 mg/L during the same sampling event at one observation well.

Groundwater within the hydraulic fill is saline, with elevated specific conductance and turbidity and relatively neutral pH levels ranging from 6.6 to 7.3. One round of sampling indicated an elevated pH of 10.4. This reading is suspect as it was not consistent with the other rounds and represents the highest reading for samples collected from the upper wells. This data corresponds to the round of sampling where mercury and lead were detected in groundwater suggesting that the elevated pH, or the source/cause of the elevated pH may have affected the reported metal concentrations.

PSEG Lands in Oldmans and Logan Township

Surface Water

Oldmans Creek is a tidal tributary of the Delaware River. Given the proximity of the PSEG lands to the Delaware River and twice-daily tidal exchange, the water quality within Oldmans Creek is substantially similar to that of the Delaware River. In terms of site specific studies, in November of 2011, a complete laboratory analysis of water quality grab samples taken upstream of the site, downstream of the site, and within the site was conducted. In general, all sample data was in compliance with New Jersey surface water quality samples with the following exceptions. All three locations exhibited elevated levels of arsenic (between 1.4 and 15.9 µg/l) compared to the

NJDEP human health standards of 0.017 µg/l for freshwater and 0.061 µg/l for saline water. In addition, exceedances for lead were found at the drainage control structure (9.8 µg/l) and the upstream location (36.3 µg/l). The NJDEP freshwater human health standard for lead is 5.0 µg/l (AKRF 2011).

Groundwater

An initial site evaluation was conducted by (AKRF 2011) which included a desktop review of available information from environmental database reviews and client supplied material relating to previous site investigation activities completed for the property owner and other interests at the site. Several site investigation reports were identified that collected soil and groundwater samples from a variety of locations and depths at the site. Each of these reports identified elevated levels of arsenic in both soil and groundwater exceed NJDEP Residential and Non-Residential Direct Contact Health Based Criteria (19.0 milligrams/kilogram each) for soil and the NJDEP Groundwater Criteria (3 micrograms/ liter).

The site evaluation also included a field survey of the site to identify visible evidence of contamination or potential Areas of Concerns (AOC). Four potential AOCs were identified. One potential area of apparent distressed vegetation was identified along the dirt perimeter road in the eastern portion of the site. A second potential AOC was identified upstream of the drainage control structure connecting the eastern most drainage ditch with adjacent marsh land. A third potential AOC was identified along the dirt perimeter road in the southern corner of the site at a location of a remnant fire and debris pile. A fourth potential AOC was identified as a soil mound at the head of a drainage swale in the northwestern portion of the site. Each of these AOCs was targeted for sampling activities.

Following completion of the site evaluation, a site investigation strategy which included the proposed installation of four groundwater monitoring wells, ten soil boring locations, and three surface water/sediment grab sample locations was developed. The site investigation strategy combined the results of the site evaluation with the proposed project objectives and identified sample locations, sample types, and analytical procedures.

Site investigation activities in November 2011 included the collection of four groundwater samples, twenty soil samples and three surface water/sediment grab samples. The samples were collected in accordance with the NJDEP Site Remediation Program Technical Requirements for Site Remediation (N.J.A.C. 7:26E) and submitted for analysis to a NJDEP certified laboratory. Laboratory analysis of all collected samples included the full United States Environmental Protection Agency (USEPA) Target Compound List/Target Analyte List.

Laboratory analysis of the soil, groundwater, and surface water/sediment samples identified few exceedances of relevant NJDEP standards. Of note were fairly consistent exceedances (consistently between 20 and 40 mg/kg) of arsenic relative to the NJDEP Residential and Non-Residential Direct Contact Human Health Standards for soil, Surface Water Quality Standards, Groundwater Quality Standards, and sediment based ecological screening criteria. These elevated levels of arsenic were identified in soil (surface and subsurface), groundwater, and surface water/sediment samples collected throughout the site. Additionally, the levels of arsenic throughout the site appeared to be consistent with arsenic levels presented in previous site

investigations complete by Environmental Resolutions in September 1999 (ER 1999) and the site assessment report prepared by Resource Control Corporation in April 2001 (RCC 2001).

Laboratory results also identified minor detections and exceedances of several semi-volatile organic compounds and heavy metals, but not at the consistency of arsenic. Additionally, while nearly all the soil samples included detections of at least one of the commonly identified pesticides, none exceeded NJDEP residential or non-residential standards (AKRF 2011).

4.7 Aquatic Resources

USACE Lands at Artificial Island

PSEG has maintained an extensive baywide finfish biological monitoring program as a condition of the Salem Generating Station's New Jersey Pollutant Discharge Elimination System Permit (NJPDES) for the waters near the USACE lands at Artificial Island for over 30 years. This biological dataset includes data collected by trawl, plankton net, and beach seine throughout the Estuary. PSEG data is supplemented with data collected by NJDEP and Delaware Department of Natural Resources and Environmental Control (DNREC)

In general, approximately 200 finfish species occur within the Estuary, mostly on a seasonal basis. Fish species can be divided into two distinct groups: resident fish and migratory fish. Residents can be classified further by salinity preference as either tidal-freshwater, brackish water estuarine, or nearshore coastal marine residents. Migratory fish can further be divided into three groups: diadromous species, predominantly estuarine types, and predominantly marine types. The predominantly estuarine types include hogchoker (*Trinectes maculatus*), white perch (*Morone americana*), bay anchovy (*Anchoa mitchilli*), Atlantic silversides (*Menidia menidia*), naked goby (*Gobiosoma bosc*), and mummichog (*Fundulus heteroclitus*). Predominantly marine species that use the Estuary include weakfish (*Cynoscion regalis*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulatus*), bluefish (*Pomatomis saltatrix*), summer flounder (*Paralichthys dentatus*), and Atlantic menhaden (*Brevoortia tyrannus*). The notable diadromous migratory species are American eel (*Anguilla rostrata*), blueback herring (*Alosa pseudoharengus*), American shad (*Alosa sapidissima*), striped bass (*Morone saxitalis*), and alewife (*Alosa aestivalis)*. Two Delaware Estuary diadromous species, the shortnose and Atlantic sturgeon (*Acipenser brevirostrum* and *Acipenser oxyrhynchus*), are listed as endangered.

Although estuaries are productive ecosystems, transition zones between the strictly freshwater and higher salinity areas are stressful environments for fish and other organisms (Sutton et al. 1996), due primarily to osmoregulatory stress from tidally induced changes in salinity, as well as to the high concentrations of suspended solids and low primary productivity in this transition area. In the Delaware Estuary, fish species that normally inhabit only the fresh to brackish tidal river zone or saline Delaware Bay region generally cannot tolerate the full range of the saline/freshwater extremes, and are therefore restricted in their longitudinal distribution in the Estuary (Sutton et al. 1996). Relatively few species of fish can tolerate, during part or all of their life cycles, the pelagic, brackish-water Transition Zone near the site. The species that can include some whose population resides in the Estuary for most or all of their life cycle (e.g., white perch); some that migrate seasonally between the ocean and the

freshwater tidal river reaches (e.g., blueback herring, alewife, striped bass, and American shad); and marine species with distribution ranges that extend into the Transition Zone (e.g., weakfish, bay anchovy, spot, and Atlantic croaker).

Results of PSEG's bottom trawling surveys (PSEG, 2009) performed in the Delaware River in the vicinity of Artificial Island from 2003 through 2007 generally reflect the community composition typical of the area. Numerically dominant species include bay anchovy, weakfish, Atlantic croaker, white perch, hogchoker, and spotted hake (*Urophycis chuss*). Other consistently common species are American eel, striped cusk-eel (*Ophidion marginatum*), and oyster toadfish (*Opsanus tau*). In PSEG's pelagic trawl samples conducted in 2003 and 2004, bay anchovy, weakfish, and Atlantic croaker were also abundant, while other species common in bottom trawl collections were not, owing to differential distribution of species between the benthic setting and the water column. In near-shore areas sampled by the seine survey, many of the same species were encountered as in the trawl surveys. Exceptions were primarily small cyprinodontid species (e.g., mummichog, striped killifish) or juvenile centrarchids, but also included an Atlantic sturgeon in 2003. Total abundance in bottom trawl surveys ranged from 6,110 to 12,492 fish between 2003 and 2007. Greater abundance (18,087 to 19,166 individuals) was obtained in the pelagic trawl samples of 2003 and 2004. Total species richness is comparable among surveys of the three methods, ranging from 21 to 34 species over the 5-year period considered.

In addition to PSEG's historic data series on finfish distribution and abundance, site specific surveys of the fish inhabiting the CDF ponds and the smaller marsh creeks on or near the site were performed from winter 2009 through winter 2010. Fish were collected using seines and weirs set at high tide and retrieved at low tide.

Important species in small marsh creeks and ponds on-site are limited to American eel, Atlantic menhaden, striped bass, and white perch. American eel and white perch were collected from both creeks and ponds, whereas Atlantic menhaden and striped bass were collected only from creeks. No threatened or endangered aquatic turtles or commercially important invertebrates were encountered in surveys of these habitats near the site. A single American eel was found in pond habitat in July and marsh creek habitat in winter. White perch and striped bass were not common in creek or pond surveys, and the individuals collected were juvenile specimens. Atlantic menhaden, an important forage species, was common in marsh creek samples in both May and July. All of these species are common in the Delaware River, and individuals found in ponds or marsh creeks are likely strays from the riverine habitat.

PSEG Lands in Oldmans and Logan Township

At least 52 species have been documented as using tidal salt and brackish marshes associated with the Delaware Estuary (Able et al. 2001, Able et al. 2007, PSE&G 1999, PSEG 2006). Although many studies conducted in Delaware Estuary tidal creeks and tributaries include trawl samples and fish collections on the river main stem (PSEG 2003, 2004, and 2005) and salt/brackish marshes, relatively few incorporate extensive surveys of tidal freshwater marshes. O'Herron *et al.* (1994) surveyed creeks in the Delaware drainage as far north as Trenton, New Jersey. Based on the data available, there were no species of fish that were exclusive to the tidal freshwater marshes. The fish species that were common in freshwater tidal marshes are also found in nontidal freshwaters, tidal rivers, Oligohaline marshes, and/or estuaries. Furthermore, many of

the species found in tidal wetlands exhibit distributional ranges within the main stem of the Estuary that co-occur or overlap with other species. It is not uncommon to capture a “freshwater” species (e.g. bluegill) with a “saltwater” species (e.g., summer flounder) in close proximity, or even within a single sample (Able et al. 2001, PSEG 2003, 2004, and 2005) in these marsh creeks.

Because many species are transients, the abundance of fishes varies temporally, with different species exhibiting population peaks during different seasons. Generally, the most abundant fishes in the Estuary’s tidal wetlands including Oldmans Creek, regardless of salinity, are mummichog, white perch, Atlantic menhaden, Atlantic silversides, bay anchovy, and sheepshead minnow (*Cyprinodon variegatus*) (Able et al. 2001, PSEG 2006).

Seasonal resident or transient fishes include those marine species that move into tidal marshes during at least one life history phase and those anadromous fishes whose reproduction is tied to the marshes. A large number of the seasonal transients are important commercial or recreational fishery species that use the estuary during some life history phase. Salt marsh seasonal residents constitute a significant portion of the prey base for larger piscivorus species that inhabit the estuary.

Bay anchovies and silversides (*Menidia* spp.) occur in tidal marshes and are seasonal transients in Delaware Estuary. Bay anchovy, striped anchovy (*Anchoa hepsetus*), and silversides spawn in the spring and summer, and the juveniles inhabit tidal creeks of all salinities during the summer. Anchovy larvae and early juveniles are widely dispersed throughout the estuary, and can occur as far upriver as Burlington, New Jersey (PSEG 2004, NJDEP Striped Bass Beach Seine Survey data - various years). The two silverside species in the Estuary spawn in intertidal areas where they attach eggs to aquatic vegetation; the young develop in marsh creeks. Inland silverside (*Menidia berylina*) migrate to higher salinity bay waters during the winter, whereas Atlantic silverside migrate offshore.

Atlantic menhaden are another important estuarine seasonal transient species upon which many recreationally or commercially important fish species, wading birds and raptors, and marine mammals rely as a prey item. The species spawns in the open ocean, and post-larval fish enter the estuary and marsh creeks in October through June. This species supports a fishing industry that produces products such as fish oils, fish meal used in animal feeds, and ingredients used in cosmetics, paints, and a number of other products.

Fishes of family Sciaenidae that are salt marsh and estuary seasonal transient species include weakfish, spot, Atlantic croaker, and black drum (*Pogonias cromis*). These fishes are sought by anglers for food and bait, and significant commercial and recreational landings are taken annually from Delaware Estuary. Adults generally enter the estuary in the spring and return to offshore waters to overwinter. Spawning occurs offshore or in deep waters of the Estuary, but tidal marshes provide nursery and feeding habitat when conditions are appropriate. These early life stages may occur in the freshwater reaches of the main stem Estuary as far upriver as Trenton, New Jersey and in salt, brackish, or freshwater marsh creeks (PSEG 2003, 2004, 2005). Weakfish, like the other sciaenids, feed on organisms produced in tidal marshes, including killifishes, summer flounder, herrings, juvenile crabs, and many invertebrate species.

Summer flounder have planktonic larvae that enter the estuary and reside through their first summer in salt and brackish marshes. Both adults and juveniles from the estuary ascend marsh creeks to forage during high tide. They commonly consume mummichogs, Atlantic silverside, and grass shrimp (*Palaemonetes pugio*) while foraging in marsh areas (Rountree and Able 1992).

Due to the salinity regime of Oldmans Creek (oligohaline to freshwater), only the juveniles seeking seasonal nursery habitat would be expected in the area. The waters and habitats necessary for spawning, breeding, feeding, or growth to maturity are considered Essential Fish Habitat (EFH) (16 U.S.C. 1802(10)), and the Range of the Delaware Estuary adjacent to Site 15G contains designated EFH for several fish species and life stages.

The salinity requirements of several of the fish species and life stages are considerably higher than the conditions that have been reported in the vicinity of site 15G. For those species whose EFH salinity requirements do not match the local conditions, the typical salinity range of the tidal Delaware River and Oldmans Creek near site 15G are at the marginal lower limit for the three EFH species that could occur near site 15G. Of these species, only butterfish juveniles (*Peprilus triacanthus*), windowpanes (*Scopthalamus aquosus*), and winter flounder (*Pleuronectes americanus*) larvae and spawning adults would be present during periods of low freshwater flow (i.e. when salinities fall within the tolerance range of these species/life stages).

4.8 Terrestrial Resources

4.8.1 Vegetation

USACE Lands at Artificial Island

Because the active USACE upland CDFs have been historically diked as part of CDF operations, these areas are no longer tidally influenced or directly connected to tidal waters, except by manmade water control outlet boxes and associated culverts. Section 4.5 (Wetlands) includes a discussion of the physical features and operations of the CDF cells and the related effects on the vegetative community.

The habitat associated with the CDF cells is generally poor, with varying dredge material silt / sand substrates, and lack of surface connectivity to surrounding tidal waters. Similarly, the vegetative community associated with the CDF is periodically disturbed as a result of dredge material placement. The plant community in these areas is of low habitat quality and is characterized by a monoculture of the common reed, *Phragmites australis.* Because they are part of operational upland CDFs, the present configuration of the ponds and associated vegetative communities are highly transitory and/or ephemeral and are subject to ongoing changes resulting from the timing and placement of dredged material.

The wetlands to the east of the Artificial Island CDFs are dominated by common reeds. In addition, native marsh cordgrasses such as *Spartina alterniflora* and *Spartina patens* occur in marshes to the east of Artificial Island; however, common reed has largely taken over the tidal marshes nearest to the CDF.

PSEG Lands in Oldmans and Logan Township

Site 15G is characterized as having low habitat diversity, being composed almost entirely of one large fallow field with a fringe of common reed, woodlands, and ruderal areas. The open, former agricultural field is bisected in a north and south direction by tree/hedge-rows. A baseline characterization of ecological resources, including vegetation, at Site 15G was performed (AMEC 2012). The floral survey was conducted along three transects through the site: on the western property line, the eastern property line, and along the tree row that bisects the site. The dominant vegetation community at the site is upland to mesic old field with a few areas exhibiting wetter conditions.

The tree-rows along the property lines and bisecting the site are similar in composition. The transect bisecting the site has trees younger in age than those on the perimeter; therefore it could be better characterized as a hedge-row rather than tree-row. The dominant vegetation in all three tree-rows includes white heath aster (*Aster pilosus)*, lesser daisy fleabane *(Erigeron strigosus)*, Japanese honeysuckle (*Lonicera japonica)*, common reed (*Phragmites australis*), and Canada goldenrod (*Solidago Canadensis*) (see Table 5).

The upland to mesic old field covering most of the site is dominated by white heath aster, common mugwort (*Artemisia vulgaris*), Canada thistle (*Cirsium arvense*), horseweed (*Erigeron Canadensis*), common plantain (*Plantago major*), English plantain (*Plantago lanceolata*), Canada goldenrod, gray goldenrod (*Solidago nemoralis*), giant foxtail (*Setaria faberi*), and Bermuda grass (*Cynodon dactylon*). Wetter areas in the site contain these species as well, but also an abundance of common reed, kiss-me-over-the-garden-gate (*Polygonum orientale*), and curlytop knotweed (*Polygonum lapthifolium*). Undesirable and invasive species are abundant along all three transects at the site. Common reed, tree-of-heaven (*Ailanthus altissima*), and Japanese honeysuckle are all recognized as widespread invasive species in the state of New Jersey (see Table 5).

Table 4: Plant Species Observed at Site 15G

Scientific Name	**Common Name**	***Scientific Name***	**Common Name**
Abutilon theophrasti	Velvetleaf	*Microstegium vimineum*	Japanese stiltgrass
Achillea millefolium	Yarrow	*Morus alba*	White mulberry
Ailanthus altissima	Tree-of-heaven	*Oxalis acetosella*	European wood sorrel
Albizia julibrissin	Silk-tree	*Panicum clandestinum*	Deer-tongue grass
Ambrosia artemisiifolia	Common ragweed	*Parthenocissus quinquefolia*	Virginia creeper
Ambrosia trifida	Great ragweed	*Paulownia tomentosa*	Princesstree
Apocynum cannabinum	Hemp dogbane	*Persicaria perfoliata*	Asiatic tearthumb
Arctium minus	Common burdock	*Phragmites australis*	Common reed
Artemisia vulgaris	Common mugwort	*Phytolacca americana*	American pokeweed
Asclepias syriaca	Common milkweed	*Plantago lanceolata*	English plantain
Asclepias tuberosa	Butterfly weed	*Plantago major*	Common plantain
Aster pilosus	White heath aster	*Polygonum lapthifolium*	Curlytop knotweed
Bidens coronata	Crowned beggarticks	*Polygonum orientale*	Kiss-me-over-the-garden-gate
Bromus japonicus	Japanese brome	*Polygonum persicaria*	Lady-thumb
Centaurea nigra	Common knapweed	*Prunus serotina*	Black cherry
Chenopodium album	Lamb's-quarters	*Rhamnus cathartica*	Common buckthorn
Cirsium arvense	Canada thistle	*Rhus typhina*	Staghorn sumac
Cynodon dactylon	Bermuda grass	*Robinia pseudoacacia*	Black locust
Cyperus esculentus	Yellow-nut sedge	*Rosa multiflora*	Multiflora rose
Daucus carota	Queen Anne’s lace	*Rubus allegheniensis*	Allegheny blackberry
Digitaria sanguinalis	Crabgrass	*Rumex crispus*	Curly dock
Echinochloa crusgalli	Barnyard grass	*Sambucus canadensis*	Common elder
Erigeron canadensis	Horseweed	*Sassafras albidum*	Sassafras
Erigeron strigosus	Lesser daisy fleabane	*Setaria faberi*	Giant foxtail
Eupatorium album	White boneset	*Solanum carolinense*	Horse nettle
Humulus japonicus	Japanese hops	*Solanum dulcamara*	Bittersweet nightshade
Juncus effusus	Soft rush	*Solidago canadensis*	Canada goldenrod
Juncus tenuis	Path rush	*Solidago nemoralis*	Gray goldenrod
Lactuca serriola	Prickly lettuce	*Taraxacum officinale*	Common dandelion

Scientific Name	Common Name	*Scientific Name*	Common Name
Lonicera japonica	Japanese honeysuckle	*Toxicodendron radicans*	Poison ivy
Lythrum salicaria	Purple loosestrife	*Verbascum thapsus*	Common mullein
Melilotus albus	White sweet-clover	*Vitis sp.*	Grape
Melilotus officinalis	Yellow sweet-clover		

Source: AMEC 2012

4.8.2 Wildlife

USACE Lands at Artificial Island

Wildlife of the site and vicinity was characterized using historical data, recorded information from natural resource agencies, and supplemental field surveys conducted in 2009 and 2010. Field studies completed in 2009 and 2010 included general site reconnaissance and observation, waterfowl spot counts, roadside bird surveys (similar to those historically conducted by the USGS), anuran listening surveys, and transect surveys.

Surveys were conducted in January 2010 for locations at the USACE CDF. Prior to initiating field surveys, a records review was conducted to identify mammals that may occur in the region. This included information from NJ and DE wildlife management agencies regarding game species that are legally hunted and trapped in the vicinity, and agency consultation regarding listed mammal species that may occur in the area.

The most common mammal species observed during the 2009-2010 field surveys included white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), opossum (*Didelphis virginiana*), and eastern gray squirrel (*Sciurus carolinensis*). Mammal species not observed in 2009-2010 but previously collected include the short-tailed shrew (*Blarina brevicauda*), meadow vole (*Microtus pennsylvanicus*), house mouse (*Mus musculus*), marsh rice rat (*Oryzomys palustris*), white-footed mouse (*Peromyscus leucopus*), Norway rat (*Rattus norvegicus*), masked shrew (*Sorex cinereus*), and meadow jumping mouse (*Zapus hudsonius*). In the winter 2009, a black bear (*Ursus americanus*) (incidental) was supposedly observed by PSEG plant security. Many species of bats and other mammals expected to occur near the site are active mainly at night and were not readily observed during the field studies.

The Delaware Estuary and the surrounding habitats are important areas in terms of migratory and non-migratory bird species. The Estuary is located along the Mid-Atlantic flyway, and serves as an important foraging location for migrating waterfowl (e.g., ducks and geese) and shorebirds (e.g., ruddy turnstones, red knots, etc.). In addition, the region hosts a number of important rookeries for wading birds such as egrets and herons. Pea Patch Island, DE, located 9 miles north of Artificial Island, is one of the largest of such rookeries on the East Coast (USFWS 2007). In addition, raptors (e.g., eagles, hawks, ospreys) are seasonally common throughout the Estuary, where they breed and hunt. Upland game birds (e.g., wild turkey, ring necked pheasants) are also common in the region, especially in areas dominated by agricultural uses, and songbirds (passerines) are seasonally abundant in various habitats.

A records review to identify bird species reported to occur at or near the site was conducted in 2010. Additional supporting field studies completed in 2009 - 2010

include general site reconnaissance and observation, waterfowl spot counts, roadside bird surveys (similar to those conducted by the USGS), and transect surveys.

During the course of the 2009-2010 field surveys, 15,112 birds were observed, representing 125 species. Typical bird species observed during field surveys included a mix of songbirds and waterfowl such as northern cardinal (*Cardinalis cardinalis*), song sparrow (*Melospiza melodia*), killdeer (*Charadrius vociferus*), red-winged blackbird (*Agelaius phoeniceus*), American crow (*Corvus brachyrhynchos*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), and American black duck (*Anas rubripes*).

The majority of the natural habitats on the site are dominated by common reed. This monoculture of *Phragmites* does not provide optimum breeding/nesting habitat for many birds, therefore most of the birds observed on the site are likely using it for migratory and foraging purposes. Marsh wrens (*Cistothorus palustris*) and red-winged black birds are two observed species that could use the fringe of the common reed habitat for breeding/nesting. Most of the raptor species observed on-site (northern harriers, bald eagles, and ospreys) forage near water. The Delaware River borders the site to the west and therefore it provides moderate to good foraging for these species. Ospreys (*Pandion haliaetus*) have been observed nesting in transmission towers within the site vicinity.

Many species of wading birds observed within the site and vicinity likely use the area for foraging. Observed species include great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), little blue heron (*Egretta caerulea*),great egret (*Ardea alba*), snowy egret (*Egretta thula*), cattle egret (*Bubulcus ibis*), glossy ibis (*Plegadis falcinellus*), black-crowned night heron (*Nycticorax nycticorax*), black-necked stilt (*Himantopus mexicanus*), greater yellowlegs (*Tringa melanoleuca*), and lesser yellowlegs (*Tringa flavipes*). Although there are no known rookeries (colonial nesting grounds) within the site, there is a large rookery approximately 9 miles north of the site on the Delaware River at Pea Patch Island. Pea Patch Island is part of Fort Delaware State Park. The rookery is located on the northern, undeveloped end of the island and is the largest heron and egret rookery on the east coast of the United States. Pea Patch Island provides breeding habitat for 5000 to 12,000 breeding pairs of wading birds (Parsons 1995). The nine species of birds that breed at this rookery are the great blue heron, great egret, little blue heron, snowy egret, cattle egret, yellow-crowned night heron, black-crowned night heron, glossy ibis, and tricolored heron (*Egretta tricolor*) (Audubon Society, 2009).

Qualitative surveys were conducted in the spring, summer and fall of 2009 to identify herpetofauna species found in the various habitats at the site. Prior to initiating field surveys, a records review was conducted to identify herpetofauna expected to occur in the region. This review included information from NJ and DE wildlife management agencies regarding records and established ranges of representative species and agency consultation regarding listed herpetofauna which may occur in the area. These records searches were supplemented with additional field studies conducted in 2009.

The most common herpetofauna species observed or heard during field surveys included the eastern painted turtle, northern spring peeper, and southern leopard frog. Federal and/or NJ listed turtles that could occur in the vicinity of the site include the loggerhead (*Caretta caretta*), Atlantic green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), Hawksbill (*Eretmochelys imbricata*), and Kemp's Ridley

(*Lepidochelys kempii*). None of these species were observed at the site in the 2009 studies; however, they occasionally occur in the Delaware River near Artificial Island

PSEG Lands in Oldmans and Logan Township

Site 15G supports fauna typical of old field and disturbed woody areas. A baseline characterization of ecological resources, including wildlife, at Site 15G was performed in July 2012 (AMEC 2012). In addition, USNRC personnel visited the site in May 2012 and recorded bird species observed. The most abundant bird species were barn swallow (*Hirundo rustica*) (observed flying overhead), common yellowthroat (*Geothlypis trichas*), eastern towhee (*Pipilo erythrophthalmus*), red-winged blackbird, brown-headed cowbird (*Agelaius phoeniceus*), and American goldfinch (*Spinus tristis*). Table 5 presents the results of the avifaunal survey along with observations during the USNRC Environmental Audit (as part of the ESP review) in 2012.

The distribution of bird species through the site reflects the different habitat types available. Species with a preference for forests such as downy woodpecker (*Picoides pubescens*), red-bellied woodpecker (*Melanerpes carolinus*), red-eyed vireo (*Vireo olivaceus*), and wood thrush (*Hylocichla mustelina*) were observed in a wooded portion of the site. Species with a preference for successional shrub lands such as red-winged blackbird, common yellowthroat, brown-headed cowbird, and indigo bunting (*Passerina cyanea*) were observed along a hedge-row.

Other wildlife observed at the site include three mammals - white-tailed deer, eastern cottontail, and striped skunk (*Mephitis mephitis*). Small mammals, including the white-footed mouse and meadow vole may also utilize the site as they are widespread in the area (USACE 1997). There are no reptiles or amphibian species known to occur at the site, although common species in the area include the common snapping turtle (*Chelydra serpentine*), eastern box turtle (*Terrapene carolina*), eastern garter snake (*Thamnophis sirtalis*), Fowler's toad (*Bufo woodhousii*), and bull frog (*Rana catesbeiana*) (USACE 1997).

Habitat quality at Site 15G is generally low, as the site is composed almost entirely of one large former agriculture field with a fringe of common reed, woodlands, and ruderal areas.

Table 5: Avian Species Observed at Site 15G

Species		Observation Date	
Common Name	**Scientific Name**	**May 2012**	**July 2012**
American crow	*Corvus brachyrhynchos*		X
American goldfinch	*Spinus tristis*	X	X
American robin	*Turdus migratorius*	X	X
Bald eagle	*Haliaeetus leucocephalus*	X	
Baltimore oriole	*Icterus galbula*	X	
Barn swallow	*Hirundo rustica*	X	X
Black-throated blue warbler	*Dendroica caerulescens*	X	
Blue jay	*Cyanocitta cristata*		X
Brown-headed cowbird	*Agelaius phoeniceus*		X
Carolina wren	*Thryothorus ludovisianus*	X	X
Cedar waxwing	*Bombycilla cedrorum*		X
Common grackle	*Quiscalus quiscula*		X
Common yellowthroat	*Geothlypis trichas*	X	X
Downy woodpecker	*Picoides pubescens*		X
Eastern kingbird	*Tyrannus tyrannus*	X	
Eastern towhee	*Pipilo erythrophthalmus*	X	X
European starling	*Sturnus vulgaris*	X	
Field sparrow	*Spizella pusilla*		X
Gray catbird	*Dumetella carolinensis*	X	X
House wren	*Troglodytes aedon*	X	
Indigo bunting	*Passerina cyanea*	X	X
Mourning dove	*Zenaida macroura*		X
Mute swan (carcass)	*Cygnus olor*	X	
Northern cardinal	*Cardinalis cardinalis*	X	X
Northern mockingbird	*Mimus polyglottos*		X
Red-bellied woodpecker	*Melanerpes carolinus*	X	X
Red-eyed vireo	*Vireo olivaceus*		X
Red-winged blackbird	*Agelaius phoeniceus*	X	X
Scarlet tanager	*Piranga olivacea*		X
Song sparrow	*Melospiza melodia*	X	X
Tree swallow	*Tachycineta bicolor*	X	

Species		Observation Date	
Common Name	**Scientific Name**	**May 2012**	**July 2012**
Turkey vulture	*Cathartes aura*	X	
Wild turkey (carcass)	*Meleagris gallopavo*	X	X
Wood thrush	*Hylocichla mustelina*		X
Yellow warbler	*Dendroica petechia*	X	
Yellow-breasted chat	*Icteria virens*	X	

4.9 Threatened and Endangered Species

USACE Lands at Artificial Island

The NJDEP, DNREC, and USFWS were consulted for information regarding sensitive species and habitats in the vicinity of the site (DNREC 2009, NJDEP 2009, NJDEP 2010a, NJDEP 2010b, USFWS 2009b, USFWS 2009c, and USFWS 2010). Letters of correspondence, phone conversations, and personal meetings were held with NJDEP and DNREC to obtain agency input regarding threatened and endangered species, sensitive habitats, commercial and recreational species, and other characteristics for the site and vicinity.

Table 6 lists protected animal and plant species recorded in the coastal environments immediately surrounding the site or having the potential to occur in the project area. The species are those that are state or federally listed as endangered or threatened, and those that are candidates or proposed for federal listing.

Bald eagles (*Haliaeetus leucocephalus*) and peregrine falcons (*Falco peregrinus*) are occasionally seen in the vicinity of site. Due to its successful recovery, the bald eagle has been de-listed and is no longer a federally listed species by the USFWS. Peregrine falcons were also removed from the federal list of endangered and threatened wildlife in 1999 (USFWS 1999), but the species remains on the NJ list of endangered species. The bald eagle was identified as important because of its status as a federally protected species (Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act) and state listed threatened species. Although bald eagles were occasionally observed during the 2009 field surveys, there are no known bald eagle nests or suitable roosting habitat at the site, primarily due to the absence of large trees or suitable structures that support nesting activities.

The northern harrier (*Circus cyaneus*), a state-listed endangered species in NJ and DE, is commonly observed foraging in the coastal wetlands on and near the site. Nests were not observed during the 2009 field surveys but nesting habitat in the coastal marsh is present in the vicinity.

The red shouldered hawk (*Buteo lineatus*), a NJ listed endangered species, has been identified in recent years in Salem County during the Audubon Christmas Bird Count (Audubon 2009). No red shouldered hawks were observed during the 2009 field surveys. Preferred habitat (deciduous and mixed forest communities adjacent to water) is absent at the CDFs but present in the vicinity.

Osprey, a threatened species in NJ, was occasionally observed in the vicinity of the Artificial Island during the 2009 surveys. Natural osprey nesting sites such as large trees are not present.

The Cooper's hawk (*Accipiter cooperii*), bobolink (*Dolichonyx oryzivorus*), and grasshopper sparrow (*Ammodramus savannarum*) have been observed within 6 miles of the site (AEC 1973). None of these birds is federally-listed. The Cooper's hawk and bobolink are state-listed as threatened. Cooper's hawk (breeding) is proposed to be upgraded from threatened to special concern due to improvements in their population and distribution in NJ for the specified (seasonal) populations. Cooper's hawks prefer large tracts of forested land where they nest in large mature trees. The preferred habitat of large trees is not present. Therefore Cooper's hawks are more likely residents of forested habitat in the vicinity of the site. NJDEP classifies the breeding population of grasshopper sparrows as threatened, and the migratory or winter population of grasshopper sparrows as stable in number (NJDEP 2010a). None of the remaining state-listed avian species included in Table 6 has been observed on the site.

The red-headed woodpecker is not a federally listed species, but its breeding and non-breeding populations are listed by NJ as threatened. No red-headed woodpeckers were observed during the 2009 field surveys nor have they been reported in the USGS Breeding Bird Survey or the Audubon Society's Christmas Bird count. Due to the lack of appropriate habitat (i.e., open woods, deciduous forests, forest edges, river bottoms, orchards, grasslands with scattered trees and clearings, dead or dying trees) within the site and vicinity.

Five federally listed species of sea turtle may occur in Delaware Bay: the threatened loggerhead sea turtle, threatened Atlantic green turtle, endangered Kemp's ridley sea turtle, endangered hawksbill turtle, and endangered leatherback turtle. The NJDEP classifies these turtle species as endangered, except the Atlantic green turtle, which is state-listed as threatened. Young sea turtles move from the open waters of the Atlantic Ocean into near-shore coastal areas where they forage and mature into adults. The young turtles make occasional forays into the shallow waters of mid-Atlantic estuaries in late summer to feed and rest. While no nesting occurs along Delaware Bay beaches, all five sea turtle species can move into the Bay and may travel up the Estuary as far as Artificial Island (Delaware Estuary Program 1996). Most of the sea turtles found in Delaware Bay are sub-adults that were hatched on beaches in the Caribbean, Florida, and the Carolinas and have migrated north to nursery grounds in the mid-Atlantic region. The vast majority of the sea turtles observed in Delaware Bay are loggerheads, with smaller numbers of Kemp's ridley and Atlantic green turtles occasionally observed.

Two federally-listed fish, the shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus*), occur in Delaware Bay. In the Delaware River system, adult shortnose sturgeon spend most of their lives in the upper tidal freshwater portion of the river (the most heavily used portion of the river is that between RM 118 and RM 137). Shortnose sturgeon often move further upstream to spawn (O'Herron et al. 1993). After spawning, some adults move downstream into low-salinity reaches of the river (including Delaware Bay), primarily in spring and summer (O'Herron et al. 1993). This is in sharp contrast to sturgeon in southeastern rivers, which spend most of the year in the lower Estuary and move upstream in spring into the middle and upper reaches of natal rivers to spawn. Based on surveys conducted in the 1980s, the Delaware River shortnose sturgeon population is estimated to range from 6,408 to 14,080 individuals (NMFS 1998).

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) also occurs in the Delaware River. NMFS recently listed the species as endangered status under the Endangered Species Act (ESA). The Atlantic Sturgeon is a member of the Acipenseridae family as is the short-nosed sturgeon and sturgeon are among one of the oldest fish species in the world. Its range extends from New Brunswick, Canada to the eastern coast of Florida. Atlantic sturgeon have not been recorded in the 2002 through 2004 PSEG biological monitoring program in the bottom trawl, pelagic trawl, ichthyoplankton and macrozooplankton sampling, impingement sampling, nor as eggs, larvae, juveniles or adults in entrainment sampling. A single Atlantic sturgeon was reported in PSEG's 2003 beach seine sampling. Periodic observations of both Atlantic and shortnose sturgeon occur in the vicinity of Artificial Island at the Salem Generating Station.

Table 6: Current List of Threatened and Endangered Species Potentially Occurring Near the USACE Lands at Artificial Island (Sources: NJDEP 2010, USFWS 2010)

Common Name	Scientific Name	State Status	Federal Status
Birds			
Bald eagle	*Haliaeetus leucocephalus*	E	-
Peregrine falcon	*Falco peregrinus*	E	-
Osprey	*Pandion haliaetus*	T/T	-
Northern harrier	*Circus cyaneus*	E/U	-
Grasshopper sparrow	*Ammodramus savannarum*	T/S	-
Savannah sparrow	*Passerculus sandwichenis*	T/T	-
Vesper sparrow	*Pooectes gramineus*	E	-
Sedge wren	*Cistothorus platenis*	E	-
Pied-billed grebe	*Podilymbus podiceps*	E/S	-
Upland sandpiper	*Bartramia longicauda*	E	-
Bobolink	*Dolichonyx oryzivorus*	T/T	-
Cooper's hawk	*Accipiter cooperii*	T/T	-
Red-headed woodpecker	*Melanerpes erythrocephalus*	T/T	-
Mammals			
Bobcat	*Lynx rufus*	E	-
Fish			
Shortnose sturgeon	*Acipenser brevirostrum*	E	E
Atlantic sturgeon	*A. oxyrinchus oxyrinchus*	E	E
Reptiles and Amphibians			
Atlantic loggerhead turtle	*Caretta caretta*	E	T
Atlantic green turtle	*Chelonia mydas*	T	T
Atlantic hawksbill turtle	*Eretmochelys imbricata*	E	E
Leatherback turtle	*Dermochelys coriacea*	E	E
Kemp's ridley turtle	*Lepidochelys kempi*	E	E

Common Name	Scientific Name	State Status	Federal Status
Plants			
Sensitive Joint Vetch	*Aeschynomene virginica*	E	T
Low rough aster	*Eurybia radula* (*Aster radula)*	E	-
Erect bindweed	*Calystegia spithamaea*	E	-
Coast flat sedge	*Cyperus polystachyos*	E	-
Black-fruit spike-rush	*Eleocharis melanocarpa*	E	-
Sandplain flax	*Linum intercursum*	E	-
American lotus	*Nelumbo lutea*	E	-
Wooly three-awn grass	*Aristida lanos*	E	-
Marsh flat sedge	*Cyperus pseudovegetus*	E	-
Carolina elephant-foot	*Elephantopus carolinianus*	E	-
Darlington's glade spurge	*Euphorbia purpurea*	E	-
Featherfoil	*Hottonia inflata*	E	-
Floating marsh-pennywort	*Hydrocotyle ranunculoides*	E	-
Barton's St. John's-wort	*Hypericum adpressum*	E	-
Minute duckweed	*Lemna perpusilla*	E	-
Hairy wood-rush	*Luzula acuminate*	E	-
Virginia bunchflower	*Melanthium virginicum*	E	-
Cut-leaf water-milfoil	*Myriophyllum pinnatum*	E	-
Virginia false-gromwell	*Onosmodium virginianum*	E	-
Southern adder's tongue	*Ophioglossum vulgatum pycnostichum*	E	-
Greek-valerian	*Polemonium reptans*	E	-
Chickasaw plum	*Prunus angustifolia*	E	-
Dwarf azalea	*Rhododendron atlanticum*	E	-
Coarse grass-like beaked-rush	*Rhynchospora globularis*	E	-
Small skullcap	*Scutellaria leonardii*	E	-
Two-flower bladderwort	*Utricularia biflora*	E	-
Broad-leaf ironweed	*Vernonia glauca*	E	-
Squirrel-tail six-weeks grass	*Vulpia elliotea*	E	-
Sword bogmat	*Wolffiella floridana*	E	-

[1] State status for birds separated by a slash(/) indicates a dual status. First status refers to the state breeding population, and the second status refers to the migratory or winter population. E = Endangered; T = Threatened; S = Stable; C = Candidate; - = Not listed. (NJDEP 2008g)

[2] E = Endangered; T = Threatened; - = Not listed.

PSEG Lands in Oldmans and Logan Township

The Delaware River Main Channel Deepening Project EIS (USACE 1992) and SEIS (USACE 1997) did not identify any species listed for protection at the federal and state levels as occurring on Site 15G. To assess the current potential for sensitive species to occur on the site, information was obtained from the USFWS and NJDEP starting in 2012. In addition, field surveys were conducted in 2011 and 2012 to document any observed species on-site.

The potential for federally listed species to occur within the site was conducted by accessing the USFWS Information, Planning, and Conservation System (iPaC). In the resulting iPaC report, two species are identified as having the potential to occur at Site 15G, the bog turtle (*Glyptemys muhlenbergii*) and sensitive joint-vetch (*Aeschynomene virginica*) (USFWS 2013). The USFWS's New Jersey municipality list identifies the bog turtle as having the potential to occur in Logan Township, Gloucester County and Oldmans Township, Salem County. The sensitive joint-vetch has historically occurred in both municipalities but they are not considered part of the current distribution.

The NJDEP was contacted in November 2012 regarding state-listed species and sensitive habitats within the site footprint and surrounding areas (NJDEP 2012). The only species identified by the NJDEP as potentially occurring on the site are the bald eagle (foraging habitat) and great blue heron. The NJDEP identified several other species that may occur within one mile of the site: black-billed cuckoo (*Coccyzus erythropthalmus)*, osprey, pied-billed grebe (*Podilymbus podiceps)*, sharp-shinned hawk (*Accipiter striatus)*, bronze copper (*Lucaena hyllus)*, checkered white (*Pontia protodice)*, bobcat (*Lynx rufus)*, and shortnose sturgeon. While these species potentially occur in the vicinity of Site 15G, they are not considered to be potentially present on-site and are therefore, not potentially impacted by construction or operational activities.

In 2011, Site 15G was surveyed for federal and state listed species. During this survey, a single northern harrier was observed foraging over the mown field along the northern perimeter of the site. A site review conducted in 2012 did not identify any listed plant or animal species on the site. Table 7 contains information regarding listed species identified by state and federal agencies as potentially occurring at the site, species observed onsite, their protection status, and preferred habitat. The following paragraphs provide more detailed information about the species listed in Table 7:

<u>Sensitive Joint-vetch</u>

The sensitive joint-vetch was listed as federally threatened in 1992. In New Jersey, it is a state listed endangered species and is also protected under the Pinelands Commission and Highlands Water Protection and Planning Act. This species inhabits the intertidal zone of fresh to slightly salty tidal river segments where they are flooded twice daily (USFWS 2011). These habitats are found along stretches of rivers close enough to be influenced by tides, yet far enough upstream that the water is fresh or only slightly brackish. The sensitive joint-vetch is typically found in bare or sparsely vegetated substrate, such as river banks and tidal marshes.

The sensitive joint-vetch is known to occur in Maryland, New Jersey, North Carolina, and Virginia. The historical range also includes Delaware and Pennsylvania. In New Jersey, the species currently inhabits Cumberland County and was formerly found in Burlington, Camden, Gloucester, Salem, Atlantic, and Cape May counties (USFWS 2011). The main threat to the species is loss of habitat due to dredging and filling of

marshes, dam construction, shoreline stabilization, and commercial and residential development. Habitat degradation also threatens the species through increased sedimentation, invasive species, pollution, and salt water intrusion due to sea level rise. The USFWS New Jersey Field Office (2011) does not list Oldmans Creek as a present or historic location for sensitive joint-vetch.

Table 7: State and Federally Listed Species Potentially Occurring at Site 15G

Scientific name	Common name	Federal status	State status	Preferred habitat	Habitat at site (Y/N)
Aeschynomene virginica	Sensitive joint-vetch	T		Intertidal zone of coastal marshes in sandy, muddy, gravelly, or peaty substrate.	N
Ardea herodias	Great blue heron		SC[(a)]	Fresh and saltwater marshes, mangrove swamps, flooded meadows, lake edges, or shorelines. Always close to bodies of water.	N
Circus cyaneus	Northern harrier		E[(a)]	Tidal marshes, emergent wetlands, fallow fields, grasslands, meadows, airports, and agricultural areas.	Y
Glyptemys muhlenbergii	Bog turtle	T	E	Open-canopy, herbaceous sedge meadows and fens bordered by wooded areas	N
Haliaeetus leucocephalus	Bald eagle[(b)]		E	Forested or open habitats with little human disturbance near large bodies of water	Y

[(a)]breeding population only

[(b)]foraging habitat only

Great Blue Heron

The great blue heron is listed as a species of concern for New Jersey. The species lives in both freshwater and saltwater habitats across North America. During the breeding season they extend further north into Central Canada and eastward to Nova Scotia. In the winter, the species may be as far south as the coastlines of Colombia and Venezuela (National Audubon Society 2013).

Foraging takes places in still or slow-moving fresh or salt water and occasionally in grasslands and agriculture fields. They primarily feed on fish, although will opportunistically feed on a variety of animals including shrimp, crabs, aquatic insects, rodents, and small birds. Preferred nesting sites are close to the foraging areas and are usually found in treetops where it is relatively difficult for humans and other predators to reach. Nesting colonies can include up to several hundred pairs, with each pair being seasonally monogamous. Clutches can be two to six eggs and are incubated by both parents (National Audubon Society 2013).

The species is threatened by habitat loss through the destruction of wetlands, clearcutting of forests, and construction near heronries. The colonies are vulnerable to disturbance and may abandon rookeries if disturbed early in the breeding season. The great blue heron may make use of tidal marshes adjacent to Site 15G. However, because wetlands are limited onsite, its occurrence is considered to be incidental.

Northern Harrier

The northern harrier is not a federally listed species, but is listed as endangered by NJ and DE. Once a thriving bird of prey, the northern harrier was hunted due to suspected predation on poultry and other game birds. Populations continued to decline through the 1900s as a result of habitat loss due to the draining and filling of coastal wetlands. In the 1950s and 1960s, northern harrier populations further declined from reproductive failure caused by the pesticide DDT (NJDEP 2012c).

The northern harrier inhabits open areas such as tidal marshes and estuaries, wetlands, pastures, grasslands, meadows, and woodland areas. Unlike most other hawks and raptors, the northern harrier nests on the ground in the higher and drier portions of marshes, fields, or meadows. Nests are constructed of sticks and grasses. The northern harrier appears to make periodic use of the site as foraging habitat. No nesting of northern harrier has been observed on Site 15G.

Bog Turtle

The bog turtle was federally listed as a threatened species in 1997 and is listed as endangered by the state of New Jersey. The preferred habitat includes open, unpolluted emergent and scrub/shrub wetlands such as shallow spring fed-fens sphagnum bogs, swamps, marshy meadows, and wet pastures. Characteristics of these habitats include soft muddy bottoms, interspersed wet and dry pockets, vegetation dominated by low grasses and sedges, and a network of shallow pools. Bog turtles prefer areas with ample sunlight, high evaporation rates, high humidity near the ground, and perennial saturation of portions of the ground (USFWS 2012).

In New Jersey, the species occurs in multiple counties including Gloucester and Salem. The greatest threats to the bog turtle are loss, degradation, and fragmentation of its habitat. Wetlands have been altered due to development, pollution, invasive species, and natural plant community succession. The species is also a target of illegal

collection for wildlife trade. The preferred habitat for bog turtles does not occur on Site 15G; and no individuals were observed during the site surveys.

Bald Eagle

While the bald eagle is no longer a federally listed species, it is still federally protected under the Bald and Golden Eagle Protection Act. In the vicinity of the site, it is listed as state endangered for foraging habitat. Even before the use of DDT, habitat destruction, shootings, and poisonings had already reduced the population of bald eagles. By 1970, only one bald eagle nest remained in NJ, and it was listed as endangered (NJDEP 2012b). With the ban of DDT in 1972, captive breeding programs, reintroduction efforts, law enforcement, and nest site protection, the bald eagle has recovered to a point where there are a record 27 nests and 34 young fledged in 2001 (NJDEP 2012b).

Bald eagles roost in forested areas, but forage in areas near water such as rivers, lakes, and marshes. They nest in the tops of large, mature trees and typically reuse their nests year after year. In NJ, ideal locations for foraging are the Delaware River, Delaware Bay, and associated tidal marshes (NJDEP 2012b). Site 15G may provide limited suitable foraging habitat for the bald eagle, however nesting does not occur at the site.

4.10 Cultural Resources

USACE Lands at Artificial Island

The project area was created in modern times. Research of historic topographic maps and aerial photos show the area as open water until approximately the 1920s when it became an active CDF; therefore, little likelihood exists for the proposed project to impact a historic property eligible for or listed on the National Register of Historic Places.

PSEG Lands in Oldmans and Logan Township

A cultural resource due diligence assessment was completed in November/ December 2011 by AKRF, Inc. for the proposed site. The goal of the due diligence assessment was to document the history of the project site as well as its potential to yield archaeological resources dating to both the pre-contact and historic periods in order to determine if the proposed action has the potential to affect cultural resources. The assessment has been designed to satisfy the requirements of the *Guidelines for Preparing Cultural Resources Management Archaeological Reports Submitted to the Historic Preservation Office* as published by the New Jersey Historic Preservation Office (NJHPO).

The project site was primarily a former tidal wetland complex although a portion of the site adjacent to N.J. Route 130 historically had an elevation of between 0 and 10 feet NAVD 88. Beginning in the 1950s the property was converted into a dredged materials CDF. The site is currently predominantly open, undeveloped land bordered by a series of containment berms. Berm elevations vary throughout the site, but generally range from 12 feet to 20 feet (NAVD 88). Elevations internal to the site range from between approximately 10 feet and 15 feet (NAVD 88).

Based on a geotechnical investigation involving the excavation of eight soil borings completed for a previous project, depths of fill range from 15 to over 20 feet across the site (CVM Industries, Geotechnical Division, Inc. 1999). In addition, the geotechnical report concludes that the soft organic buried wetland soils have likely been compressed

and submerged due to the weight of the overlying fill. Additional soil borings conducted in 2011 confirm the presence of fill deposits (ibid).

The project site was the subject of a cultural resource investigation prepared for the USACE (Heite and Heite 1986). That investigation involved a review of cartographic information, a site file search, interviews with local residents, and consultation with the New Jersey State Museum (NJSM). In a letter dated May 19, 1986, the NJSM reported that the boundaries of two previously identified archaeological sites (28-SA-49 and 28-SA-50) overlap the boundaries of the Site 15G (Heite and Heite 1986). No information was provided regarding the two sites. In addition, Heite and Heite reported that one or two houses may have once occupied the site based on an 1848 map (ibid). Based on the previously identified archaeological sites and possible map documented structures, and the likelihood that the original ground surface may be protected beneath the substantial layer of fill deposits, the Heite and Heite report concludes that site 15G is sensitive for the presence archaeological resources.

A site file search was conducted at the NJ Historic Preservation Office (NJHPO) in November 2011. A single historic structure and 12 archaeological sites are located within a one-mile radius of site 15G. The historic structure is the US Route 130 Bridge over Oldmans Creek (Structure #1710152), which was recommended as eligible for listing on the National Register of Historic Places. The bridge is adjacent to the northwest corner of Site 15G and is a single span-moveable Waddell-type vertical lift bridge constructed in 1936. The 12 archaeological sites were recorded as the result of unsystematic surveys or surface finds and no additional information on the sites was collected.

Based on the close proximity to the Delaware River as well as Oldmans Creek, the proposed site is projected to have a low to moderate sensitivity for archaeological resources. In the mid-twentieth century, the proposed site was used as a disposal facility for dredge spoils from the Delaware River. The survey concludes that archaeological resources may be present on the site, but are currently buried under dredge spoils and any archaeological resources that may be present are beyond the reach of any potential effect of additional deposition.

4.11 Air Quality

USACE Lands at Artificial Island

Air quality in the region surrounding Artificial Island is monitored at the same locations as discussed below for the Oldmans and Logan Township Site 15G region. The USACE Artificial Island CDF cell 3 and the adjoining coastal wetlands that are subject to the Proposed Land Exchange are located entirely in Salem County.

The Artificial Island CDF includes lands in both New Jersey (CDF cells 2 and 3, and a portion of CDF cell 1) and New Castle County, Delaware (a portion of CDF cell 1). CDF cell 1 is bisected by the New Jersey / Delaware state line. All of the lands subject to the proposed land exchange are located in New Jersey. Similar to the status in New Jersey, the pollutant ozone is in a nonattainment status in New Castle County, Delaware. Similarly, $PM_{2.5}$ remains in a nonattainment status in northern Delaware (New Castle County only).

PSEG Lands in Oldmans and Logan Township

Air quality in the region surrounding the Oldman's Township section of Salem County and Logan Township section of Gloucester County is monitored by the NJDEP at locations in Gibbstown where Particulate Matter less than 2.5 microns ($PM_{2.5}$) is monitored and in Clarksboro where Ozone (O_3) is monitored. Additional measurements are conducted in Camden (Camden County) for background concentrations of Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), O_3, Sulfur Dioxide (SO_2) and $PM_{2.5}$. There are numerous refinery, power generation and other emissions sources in the region along the lower Delaware River. While air quality throughout NJ has been generally improving over the last ten years, the air quality in the portion of southwestern NJ surrounding Site 15G has been determined by EPA to be either unclassifiable or "in attainment" of the National Ambient Air Quality Standards (NAAQS) for all pollutants except for ozone. Ozone concentrations measured by the Camden and Clarksboro monitors exceed the NAAQS and the entire state is in a nonattainment status for this pollutant.

At its closest point, Site 15G is located approximately 1,200 meters from the state border with Delaware and about 2,150 meters from Pennsylvania. Similar to the status in New Jersey, the pollutant ozone is in a nonattainment status in both northern Delaware and southeastern Pennsylvania. $PM_{2.5}$ remains in a nonattainment status in both southeastern Pennsylvania and in northern Delaware (New Castle County only).

4.12 Hazardous, Toxic and Radioactive Waste (HTRW)

In accordance with ER 1165-2-132, entitled *Hazardous, Toxic and Radioactive Wastes (HTRW) Guidance for Civil Works Projects,* dated June 26, 1992, investigations must be conducted to assess the existence, nature and extent of HTRW within a project impact area (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA}, 42 U.S.C. 9601 et seq. ,as amended). Hazardous substances regulated under CERCLA include "hazardous wastes" under Section 3001 of the Resource Conservation and Recovery Act (RCRA), (42 U. S. C. 6921 et seq.), "hazardous substances" identified under Section 311 of the Clean Water Act; "toxic pollutants," designated under Section 307 of the Clean Water Act, (33 U.S.C. 1317); "hazardous air pollutants" designated under Section 112 of the Clean Air Act, (42 U.S.C. 7412); and "imminently hazardous chemical substances or mixtures," upon which EPA has taken action under Section 7 of the Toxic Substances Control Act (15 U. S. C. 2606).

USACE Lands at Artificial Island

PSEG performed preliminary evaluations of the Artificial Island CDFs as part of their investigations into potential use of the property for electric generation or other operating needs. In addition, the USACE lands at Artificial Island have been operating / active CDFs for multiple decades, with monitoring required under certain conditions by the NJDEP Water Quality Certificate. The results of these reviews generally indicated contaminants that would be expected at an operational or prior CDF.

PSEG Lands in Oldmans and Logan Township

To comply with the HTRW section as mandated under CERCLA, a preliminary assessment was conducted to ascertain the presence of hazardous, toxic, or radioactive waste at Site 15G. The HTRW evaluation was completed (AKRF 2011 and InfoMap 2009) to determine the potential for encountering on-site hazards. Site investigation activities in November 2011 included the collection of four groundwater samples, twenty soil samples and three surface water / sediment grab samples. Laboratory analysis of all collected samples included the full United States Environmental Protection Agency (USEPA) Target Compound List / Target Analyte List.

Laboratory analysis of the soil, groundwater, and surface water/sediment samples identified few exceedances of relevant NJDEP standards. Of note were fairly consistent exceedances (consistently between 20 and 40 mg/kg) of arsenic relative to the NJDEP Residential and Non-Residential Direct Contact Human Health Standards for soil, Surface Water Quality Standards, Groundwater Quality Standards, and sediment based ecological screening criteria. These elevated levels of arsenic were identified in soil (surface and subsurface), groundwater, and surface water/sediment samples collected throughout the site. Additionally, the levels of arsenic throughout the site appeared to be consistent with arsenic levels presented in previous site investigations complete by Environmental Resolutions in September 1999 (ER 1999) and the site assessment report prepared by Resource Control Corporation in April 2001 (RCC 2001).

Laboratory results also identified minor detections and exceedances of several semi-volatile organic compounds and heavy metals, but not at the consistency of arsenic. Additionally, while nearly all the soil samples included detections of at least one of the commonly identified pesticides, none exceeded NJDEP residential or non-residential standards (AKRF 2011).

The results of these reviews did not identify any contaminants beyond those generally expected at a CDF. The potential impacts were considered in the design of Site 15G. The description of the design features of Site 15G is included in Section 3.2.2. Additionally, Sections 5.3.4, 5.3.7, 5.3.8, and 5.3.9 address the potential impacts on soil, water and wildlife.

5.0 ENVIRONMENTAL EFFECTS

5.1 No Action Alternative

The No-Action Alternative will continue the USACE maintenance dredging conditions that presently exist in the region. These activities do not have a significant adverse environmental impact. Under the No-Action Alternative, the limitations in disposal capacity would likely require that a new CDF location within Delaware River Ranges with high shoaling rates to be developed at year 50 or beyond. The development of a new CDF on a site other than Site 15G (or other prior CDF site) would likely have adverse impacts from land clearing, site preparation, and associated impacts to other environmental factors that would exceed those found at Site 15G, which had previously been used as a CDF by the USACE. As discussed in Sections 1 and 3, there have been several prior NEPA analyses associated with the selection of Site 15G and the prior USACE conclusion that Site 15G was environmentally acceptable for the overall needs for dredged material disposal sites.

Under the No-Action Alternative the Artificial Island Site will continue to have adequate capacity for the Delaware River Navigation Project including any dredged material from the southern ranges should the open water disposal sites be closed.

5.2 Alternative Locations

The selection of the site 15G property is consistent with prior alternative disposal site analyses performed by the USACE in preparation for and during the Delaware River Main Channel Deepening Project. An alternative evaluated in this Environmental Assessment is the acquisition and use of an alternate property for the land exchange and development of the Class B CDF.

In several prior evaluations, including the June 1984 Delaware River Dredging Disposal Study, the various NEPA evaluations of the Delaware River Main Channel Deepening Project including the 1992 Environmental Impact Statement (EIS), the 1997 Supplemental Environmental Impact Statement (SEIS), and the 2009 and 2011 Environmental Assessments, evaluations of dredge material disposal were performed. In the 1984 Study and the 1992 EIS significant evaluations of alternate and potential dredge disposal sites were conducted. There were approximately 100 potential sites identified and subsequently evaluated via programmatic and analytical screening and evaluation process. The 1997 SEIS evaluated the potential dredge material quantities and further assessed and refined the new upland disposal site listing. The outcome of this evaluation, as documented in the 1997 SEIS was the finalization of four new upland disposal sites that were deemed to be the most appropriate and economical, available for development of a Class B CDF, and which were shown to have the least environmental impacts.

The upland disposal sites in the 1997 SEIS included Site 17G, Raccoon Island, Site 15D, and Site 15G (the property proposed for this land exchange and CDF development). Site 17G has subsequently been developed as a recreational center and golf course and is now longer a potential upland disposal site as a result. Degraded coastal wetlands, primarily *Phragmites australis*, is the predominate land cover on Raccoon Island and therefore, it is less desirable as an upland disposal site than the proposed development of site 15G. Finally, Site 15D is a partially developed

and partially degraded coastal wetland with insufficient capacity, and as such, is less desirable than the larger Site 15G. In addition, the ability to acquire title, for eventual transfer to the United States was pursued unsuccessfully for the undeveloped sites noted above. Site 15G is in private ownership with a willingness to transact the land exchange at this time, and the property was selected as one of four screened sites for potential upland disposal sites in the vicinity of Delaware River ranges with high shoaling rates. It is the only currently viable alternative for this land exchange and related development of a Class B CDF. This analysis is consistent with the prior evaluation of impacts or environmental affects included in prior NEPA reviews associated with the Delaware River Main Channel Deepening Project.

5.3 Proposed Land Exchange and Development of Type B Upland CDF

As part of the Alternative for the Proposed Land Exchange and development of a new Type B upland CDF, the land exchange with PSEG would be completed and a CDF with initial capacity of 4,000,000 cubic yards and eventual capacity of up to approximately 20,000,000 cubic yards would be constructed at site 15G. The USACE would own, operate and manage dredged material disposal operations at Site 15G in support of maintenance dredging in Delaware River Ranges with high shoaling rates. Site 15G would augment the existing CDFs in the area (Pedricktown North and South, Oldmans) and allow for expanded capacity and operational flexibility. In general, there are no direct environmental effects from the land transfer itself. Cumulative effects associated with the land transfer are discussed in Section 5.4. The Environmental Effects discussed in the following sections reflect those effects associated with the construction of a CDF at Site 15G.

5.3.1 Physical Environment

The construction of the CDF at Site 15G will involve new containment dikes constructed from the previous placed dredged materials within the existing perimeter dike system. As such, the existing dikes will serve as a de facto secondary containment system to the new dike system. Utilizing appropriate soil erosion and sediment control measures supported by the containment offered by the existing dikes at the site, the potential for soil erosion impacts from construction of the site is minimal.

As designed, dredge piping from the Delaware River to the site will be routed through the existing Pedricktown CDF, under U.S. Route 130 and into Site 15G. Subsequently, any impacts associated with malfunctioning dredge piping would occur within a contained environment and potential impacts of such an occurrence would be minimal.

There is potential for spills from dredged material disposal activities within the newly constructed dikes at Site 15G to escape into Oldmans Creek. The NJDEP Waterfront Development permit to be obtained by PSEG will include the necessary Section 401 Water Quality Certification related to the regulation of discharges from the constructed sluice gates, but will not regulate spills resulting from malfunctioning of the CDF. The likelihood of a spill from breaching of dikes is minimal, given the remnant dikes that will remain as part of the design providing limited secondary containment and the USACE internal practices that require the regular inspection and maintenance of perimeter dikes.

In general, impacts to the physical environment at Site 15G are minimal. Vegetation is limited to predominantly remnant grasslands with isolated scrub-shrub stands. The

site's elevation is above FEMA 100 year flood elevations and wetlands are limited to 0.82 acres of federally non-jurisdictional open water and wetlands associated with an on-site drainage ditch.

The site is located within the "Industrial" zone of Oldmans Township and is generally isolated from densely populated residential areas. Residences to the south of the site are buffered from the site by intervening forest vegetation. The proposed construction activities at Site 15G will increase the height of perimeter dikes. Because the new dike and weir system will be constructed within the existing perimeter berm, construction equipment would not be readily visible from U.S. Route 130 or adjoining properties. Additionally, following completion of the construction phase, the new dike would be vegetated, further screening the interior of the site from the adjacent roadway.

Noise sources during CDF construction will be limited to earth-moving machinery used in site grading, berm construction, and weir construction. Some lower levels of noise occur during dredged material disposal activities associated with noise emissions from hydraulic dredges and other equipment used to place dredged materials into the CDF. It is expected that the dredges and barges will remain approximately one mile away in the Delaware River, similar to current operations of the nearby Pedricktown North and South and Oldmans CDFs. Existing berms are expected to act as a barrier to noise emissions from the site. Because construction and operation activities are relatively short term and the mitigating effects of the existing berms, impacts associated with noise generation are expected to be minimal.

5.3.2 Socioeconomics

Construction and operation of Site 15G as a CDF does not displace or adversely affect residences or businesses. Construction and operation activities provide employment to a workforce that is expected to be readily available within the area; however, should some workers originate from outside the area, sufficient housing is available within area hotels or vacant rental housing. Given the small required initial construction workforce of 20-30 personnel, Oldmans and Logan Townships have ample vacant housing units to accommodate the nonresident workforce without impacting demand for housing.

Beneficial local economic impacts associated with the construction of 15G are payment of salaries, sales taxes, and income taxes. Capital expenditures associated with the project are also expected to provide indirect benefits from regional suppliers providing materials and services to the construction workforce. Additionally, operation of the CDF has the indirect impact of aiding in the maintenance of the Delaware River shipping channel, which is considered to be vital to the economic base of the region. No jobs will be lost due to construction and operation of the CDF and there are potential beneficial impacts associated with the creation of new jobs such as indirect beneficial effects of payroll and taxes.

The land transfer between the USACE and PSEG will result in the shifting of local property real estate tax revenues within Salem County, and to a much smaller degree in Logan Township in Gloucester County. The USACE CDFs and adjoining property in Lower Alloways Creek Township on Artificial Island will become property subject to local real estate tax after transfer to PSEG. Conversely, the properties associated with Site 15G will become non-taxable for local real estate tax purposes after transfer to the U. S. Government.

5.3.3 Land Use

Since development of a CDF constitutes a continuation of the historical use of the site, it does not represent a notable change in land use. Neither construction activities nor operation of the site are expected to result in temporary or permanent road closures that will disrupt or alter community cohesion. It is anticipated that the dredge intake pipe will be installed under U.S. Route 130 via a construction technique such as directional drilling that will not result in a road closure, with a potential for minor lane closures. As project impacts do not extend beyond the site boundaries, there are no expected changes in connectivity between residential neighborhoods and community resources. The transportation network and community identity are expected to remain intact.

The Proposed Land Exchange is consistent with the federal Farmland Protection Policy Act (FPPA), which is intended to minimize the extent to which federal actions contribute to the conversion of farmland to nonagricultural use and to assure that federal actions are compatible with state and local governmental policies to protect farmland. The FPPA protects agricultural land based on soil type and other criteria, without regard for whether it is currently farmed, on the basis of soils mapping and classification conducted by the Natural Resources Conservation Service. Relevant soil mapping was reviewed to perform this assessment.

While the property has been used for agricultural activities in the past, the site does not meet the definition of prime farmland and/or farmland of “statewide” or “unique” importance. The site is not included in the state’s Farmland Preservation Program.

Portions of the site lie within New Jersey’s regulated waterfront. Prior to the actual land exchange and construction of the CDF, a Waterfront Development permit will be obtained by PSEG for the site to document the project’s acceptability under New Jersey’s coastal zone management program.

5.3.4 Geology and Soils

During construction, site specific soil erosion and sediment control best management practices will be developed and implemented to prevent erosion of on-site soils and sediments that would have the potential to transport arsenic laden soils. The new containment berms are to be constructed within the footprint of the existing berms, thus providing secondary containment that prevents off-site transportation of soils and sediment. While the new berms would be constructed using excavated material from internal portions of the site, which contain arsenic-impacted soils, the placement of the new berms within the footprint of the exiting berms will effectively contain eroded material on-site. In addition, the design includes an approximate 25 acre forebay to accelerate deposition of dredged material.

The vegetated cover of the berms resulting from early colonization by fast-growing plant species limits erosion of material from the berm. Additionally, all operations-related discharges from the site from dredge material supernatent water and stormwater will occur through a controlled sluice gate. The design of the sluice gate and internal baffling will result in the settling of suspended solids prior to discharge, reducing the total suspended solids by over 80 percent and preventing the transportation of arsenic impacted soils. The new dredge material added to the site will be subject to review and

sampling protocols through the NJDEP prior to issuance of a Water Quality Certification.

5.3.5 Hydrology

Construction of a new CDF on Site 15G results in the filling of the existing surface water feature and ditches at the site, which may or may not have water in them at the time of construction. During periods of active operation, water derived from dredging operations is impounded within the containment berms to allow for settlement of suspended solids prior to discharge through the sluice gate structure. During periods of inactivity, surface waters contained within the berms are limited to that generated by internal surface stormwater runoff. Construction and operation activities are not expected to affect off-site surface waters, including Oldmans Creek.

Calculations have been completed (Duffield, 2013) on potential discharge quantities from the CDF to Oldmans Creek. Given the size of the proposed CDF, a proposed intermittent deposition of 1,000,000 cubic yards of dredge material during any given dredging event (generally over approximately one month), and a designed retention time of at least 48 hours to satisfy water quality requirements, the expected maximum discharge from the CDF ranges from 31 to 74 cfs or less. Calculated tidal flow at the discharge point (Duffield 2013) shows a net flux of 2,700 cfs. Tidal flow varies with tidal cycle and the values provided are approximate. Accordingly, the discharge represents approximately 2.7% of flow in Oldmans Creek. Given the tidal nature of the site, the proximity of the discharge to the Delaware River, the origin of the discharge waters from the Delaware River, the assimilative capacity of tidal areas within the Delaware River watershed, and the intermittent nature of the discharge, the discharge will not have an adverse impact on the hydrologic characteristics of Oldmans Creek and/or the Delaware River.

5.3.5.1 Floodplains

Executive Order 11998 requires all Federal agencies to take actions to reduce the risk of flood loss, to restore and preserve the natural and beneficial values in floodplains, and to minimize the adverse effects of floods on human safety, health, and welfare. Even though the site is identified as being in the 100-year floodplain, past site activities have resulted in an effective increase in site elevations. Furthermore, tidal flood waters at an elevation of 9 feet NAVD 88 (the 100-year flood elevation) would not overtop the existing perimeter berms to flood the lower interior portions of the site. As a result, the site is no longer considered to be within the 100-year floodplain and does not represent tidal floodwater storage for any storm events less than the 100-year event.

The proposed CDF will include the construction of new perimeter containment berms, an inflow pipe, and a sluice gate structure with discharge pipes. The proposed containment berms will be 15 and 20 feet above the site's average interior elevation, or up to approximately 30 feet (NAVD 88). The proposed containment berms will be located inside the footprint of the existing containment berms which will not be disturbed as part of the proposed development. The inflow pipe is a 30-inch diameter steel or HDPE pipe which will penetrate both the proposed and existing containment berms. The sluice gate discharge structure includes three sluice gate structures, each with a 30 inch diameter steel discharge pipe. The invert elevation of the discharge pipes will be 8 feet (NAVD 88). The discharge pipes are located within the floodplain, but will not have

an adverse impact on flood plain elevations on the tidal reaches of Oldmans Creek because they do not represent a significant amount of fill within the existing floodplain. Finally, scour protection measures will be installed around the outfall structure to prevent erosion during high energy discharge or tidal events.

Therefore the proposed operation complies with Executive Order 11998 (Floodplain Management).

5.3.5.2 Groundwater

the site to allow for the construction of new berms. Seasonal high groundwater elevation is in excess of 6.5 feet below ground surface throughout most of the site (AKRF 2011), however, isolated lower topographic areas may have seasonal high groundwater closer to the ground surface and may be minimally impacted. Neither construction nor operation of the site requires the installation of groundwater withdrawal systems. Therefore, no temporary or permanent groundwater withdrawals are proposed with the potential to impact local or regional groundwater quality, flow, salinity, or water table elevation.

There would be increased potential for recharge caused by proposed project operations due to increased hydraulic pressure on the base of the facility and a reduction in the sediment thickness caused by grading operations. However, even under the worst-case condition which will exist at the initiation of operations, vertical recharge rates are expected to be minimal since the base of the proposed CDF already consists of historically deposited dredged materials (CVM 1999, AKRF 2011). The hydraulic conductivity (K) of typical dredged material disposal sites is extremely low, ranging from approximately 10^{-6} cm/sec to 10^{-10} cm/sec (USACE 2004). Such seepage velocities, even under increased hydraulic heads will be so minimal as to render the amount of recharge through the confining beds as negligible. As Site 15G receives dredged materials, dewatering sediments from the dredge operation will increase the thickness of the on-site sediments and further reduce the potential for vertical recharge of water from the facility.

Previous studies at Site 15G found that the surficial unconfined groundwater flow at the site is generally eastward toward Oldmans Creek and the adjacent wetlands (AKRF 2011). Oldmans Creek is a tributary of the Delaware River and tidal in the area around the site and is the principal discharge for both the unconfined water table and surface water bodies such as drains and ditches connecting to area wetlands.

USACE reported (USACE 1997) that thick layers of fine grained material from past dredging operations exist within the 15G site. Additionally, the site is underlain by marsh sediments and clays, all of which would greatly impede the vertical migration of recharge from the surface to the underlying aquifers. Subsequently work performed at the site (C.V.M., 1999) indicated a minimum underlying low-permeability sediment thickness of 14.5 feet with most areas having 18 or more and as much as 60 feet in some areas. Accordingly, it is anticipated that the vast majority of groundwater emanating from the site flows to perimeter drainage systems and vertical recharge of the underlying aquifer is minimal.

5.3.6 Wetlands

Wetlands impacted by the site are estimated to include only 0.82 acres of federally non-jurisdictional area identified as open water and emergent freshwater wetlands. These areas are currently low quality habitats associated with linear ditches and dominated by invasive plant species. The Site 15G CDF formerly served as an upland CDF. The disposal of dredged materials may result in seasonal and / or temporary increases in wetland area and quality during and subsequent to operations. These are potential ancillary outcomes of the operation of the CDF for the disposal of dredged material.

Increases in ephemeral wetland quantity, potential habitat diversity, and ecological management options results from the reactivation of the site as an active CDF. Ultimately, these benefits are temporary and may or may not become permanent features of the CDF upon completion of its use for dredge disposal. The 0.82 acres of federally non-jurisdictional open water and emergent wetlands identified herein will be eliminated as part of the CDF operations.

5.3.7 Water Quality

Surface Water

Dredging operations that utilize Site 15G will employ hydraulic dredging techniques that result in the withdrawal of Delaware River water along with sediments. The dredge material would be deposited within the CDF with the water eventually being discharged through an outfall structure north of the interior baffle dike that will drain into Oldmans Creek (see Figure 4). Per USACE regulations for CDF design, all dredge material would be contained within the site for at least 48 hours to remove a minimum of 80 percent of suspended solids.

Discharges will be monitored and managed by the USACE as necessary to ensure compliance with NJDEP water quality standards. The design for the Site 15G CDF includes provisions that will meet the designed removal of 80% of the initial supernatant suspended solids within 48 hours (Duffield Associates 2013). The available land within the dikes is approximately twice necessary to achieve the minimum 48 hour retention time, resulting in margin and the likelihood of additional retention time / suspended solid removal.

As part of the Delaware River Main Channel Deepening Project SEIS (USACE 1997), sediments from the river channel were tested for heavy metals, pesticides, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, phthalates, volatile organics, and semi-volatile organics. The results of the tests indicated that the dredged material placed at disposal sites such as Site 15G would not be a significant risk to wildlife exposed to an ecosystem developed on the CDF for dredged material from the Delaware Estuary (USACE 1997).

As part of the analysis of impacts to water quality Influent laboratory data collected at the USACE's Pedricktown North and South CDFs in 2008, 2010, and 2012 represent the material coming from dredging of Delaware River Ranges with high shoaling rates of the Delaware River. Influent had relatively uniform concentrations of regulated inorganic substance for the three years of data reviewed. This uniformity suggests that similar material would be discharged to Site 15G (Duffield Associates 2013).

Effluent passing over the CDFs' weirs was reviewed for the Pedricktown North and South laboratory reports for 2008 and 2010. Regulated substances detected included SVOCs, pesticides, and inorganic substances. PCBs were not detected in these effluent samples. The concentrations of inorganic substances in effluent from the USACE's Pedricktown North and South CDFs were relatively uniform between sampling events and would be similar to Site 15G. Thirteen inorganic substances had a higher variation in concentrations, which would indicate that such variation may also apply to effluent from Site 15G (Duffield Associates 2013).

Background surface water (Delaware River), effluent, and effluent mixed with surface water had aluminum concentrations that exceeded Delaware River Basin Commission standards. Aluminum is a naturally occurring substance in clay minerals. NJDEP does not have an aluminum standard for surface water.

Laboratory results from the Site 15G assessment identified minor detections and exceedances of some semi-volatile organic compounds and heavy metals, including lead; however, no pattern of elevated values or consistent exceedances of NJDEP residential or non-residential standards were evident for any contaminants except arsenic (AKRF 2011). The elevated levels of arsenic found in surface water at Site 15G are consistent with levels found at similar disposal sites in the area (Duffield Associates 2013). It is likely that the elevated arsenic is a remnant of historic dredging operations. Additionally, the design of the discharge system prevents the transportation of arsenic impacted soils and sediments into adjacent surface waters by decreasing suspended solids.

Regulated inorganic substances and organic compounds are projected not to degrade surface water quality. Dredged material from Delaware River Ranges with high shoaling rates would enter Site 15G with limited disturbance to the historic sediment. Supernatant will be managed to settle out solids and associated regulated inorganic substances and organic compounds by the planned dikes and a weir prior to discharge to Oldmans Creek (Duffield Associates 2013).

The design of the Site 15G CDF is based on calculations performed to assure that zone settling of Total Suspended Solids (TSS), retention time to meet the minimum of 80% TSS removal, and scour resulting from the influent discharge into the CDF all meet appropriate standards and are protective of Oldmans Creek water quality. The estimated maximum discharge of effluent from the CDF is anticipated to be *de minimus* relative to the instantaneous discharge of Oldmans Creek near maximum tidal velocity (31 to 74 cubic feet per second (cfs) vs. 2700 cfs) (Duffield Associates 2013).

To address re-mobilization and possible re-suspension of historic sediments that may contain contaminants, a forebay is included in the design to contain potential re-suspended soils that may contain contaminants. This forebay will cover an approximate 25 acre area over which settlement of the coarse-grained sediments will occur (Duffield Associates 2013).

For analytical purposes, data was obtained from the Pedricktown North and South CDFS. Both of these facilities receive dredge materials from the same ranges of the Delaware River as 15G and both effectively utilize gravity methods for sediment removal. Effluent data from both facilities report low concentrations of suspended solids in the effluent, in the range of a few tens of milligrams per liter Laboratory data was reviewed to estimate concentrations of regulated substances that may be

introduced to or discharged from the Site 15G CDF. These included influent representing material from the Delaware River ranges in the vicinity of Site 15G, effluent, and surface water mixed with effluent. Influent data was from Pedricktown North and South CDFs collected in 2008, 2010, and 2012. Similarly, effluent data was reviewed for the same CDFs from laboratory reporting for 2008 and 2010. The effluent concentrations from the two Pedricktown CDFs were similar to what would be anticipated for Site 15G and were relatively uniform between sampling events (Duffield Associates 2013).

Conclusions reached from a review of the data at Pedricktown North and South include the following:

- Influent data collected at both CDFs in 2008, 2010, and 2012 represent the material coming from a similar reach of the River as 15G. The influent to the CDFs had relatively uniformed concentrations of regulated inorganic substances. Influent data also indicates the presence of SVOCs, pesticides, and PCBs
- Effluent data from both CDFs did not detect PCBs but did detect SVOCs, pesticides and inorganic substances in 2008 and 2010.
- Concentrations of inorganic substances were relatively uniform per discreet sampling events and would be expected to be similar for 15G. Significant variation in concentrations was observed.
- For samples collected in surface waters in the immediate vicinity of the CDFs, concentrations of SVOCs, PCBs, and inorganic substances were not considered significant with the exception of aluminum which was elevated when compared to DRBC standards. Background aluminum samples in the Delaware River are elevated.
- Because of variability and lack of information regarding hardness, uncertainty exists in the expected concentrations of metals including cadmium, chromium, nickel, zinc and silver.
- In general, regulated inorganic substances and organic compounds are not projected to degrade surface water quality. Supernatant will be managed to settle out solids and associated regulated substances by the dikes and weirs prior to discharge to Oldman's Creek. (Duffield Associates 2013).

Surface water samples were collected immediately downstream of both facilities. The discharge data from the CDFs was compared to both NJDEP and DRBC samples. Background samples collected by AKRF (AKRF 2011) in Oldmans Creek (see Section 4.6) were also evaluated. It is expected that the discharges from 15G will approximate the prior results in the immediate vicinity of the discharge locations in Oldmans Creek.

The design of Site 15G CDF includes provisions to assure appropriate settlement and water quality criteria for Oldmans Creek are met. Calculations supporting these conclusions were prepared consistent with USACE standards for CDF design (USACE 1987).

Arsenic mobility increases in lower pH conditions and when soils under anaerobic conditions are exposed to aerobic conditions. The proposed project includes the potential for changing the oxidation state of arsenic impacted soils during construction activities. On-site soils located below the groundwater table may be saturated and

under anaerobic conditions. If these soils are excavated during construction of new containment berms and exposed to aerobic conditions, arsenic mobility has the potential to increase. To eliminate this potential, excavation will be limited to unsaturated soils located within four feet of the ground surface, well above the groundwater depth (6.5 feet). Due to the variable nature of the existing site topography, in cases where depth to groundwater is less than 6.5 feet, excavation depths will be shallower to avoid excavation of saturated soils.

The elevated levels of arsenic found in the soils are consistent with levels found in previous site assessments reviewed in the AKRF site assessment report (AKRF 2011). It is likely that the arsenic is a remnant of historic dredging operations that concluded in the 1950s and not the result of current activities. During this time, on-site arsenic has likely reached an equilibrium based on pH and oxidation conditions; therefore arsenic mobility related to construction and operation activities is expected to be minimal.

Ground Water

Several studies were prepared to assess the geology, hydrogeology, and ecological resources of the subject site. The 1994 USACE "Environmental Assessment for Site 15G Dredged Material Disposal Area" (Dames & Moore 1994) directly addresses the issue of potential impacts to the site due to disposal of dredge material. The 1997 SEIS (USACE 1997) was prepared to assess the impacts of modifications to the Delaware River channel and to select sites for disposal of dredged material through a comprehensive screening process using environmental criteria. The 1994 USACE report referenced in the 1997 SEIS found that no significant adverse impacts would occur to site geology or groundwater quality in the vicinity of the proposed site (USACE 1997).

Specific to the preliminary design for the site, it is estimated that approximately four feet of existing site material needs to be excavated at the site to allow for the construction of new berms. Seasonal high groundwater elevation is in excess of 6.5 feet below ground surface throughout most of the site (AKRF 2011). However, isolated lower topographic areas may have seasonal high groundwater closer to the ground surface and may be minimally impacted. Neither construction nor operation of the site requires the installation of groundwater withdrawal systems. Therefore, no temporary or permanent groundwater withdrawals are proposed with the potential to impact local or regional groundwater quality, flow, salinity, or water table elevation.

As described in section 4.4.2, significant hydraulic changes are not expected to occur as a result of operations since the unconfined groundwater flow at the site is controlled principally by Oldmans Creek and surrounding wetlands, and more regionally, by the Delaware River. The construction of the Site 15G CDF may change certain site conditions affecting the geochemistry of substances already at Site 15G or which will be added to the site. However the very thick existing dredged material deposits combined with the site hydraulic conditions serve to minimize the largely surficial effect of any geochemical changes that may occur within or just beneath the new CDF.

In the 1997 SEIS, USACE reported that concerns had been raised in regards to the use of 15G and other dredged material disposal sites. The main concern involved the potential impact to drinking water aquifers from leachate generated by the disposal operations. It was hypothesized that water could percolate through the dredged material, leach out potential contaminants such as heavy metals, and carry them to the groundwater.

Accordingly, USACE tasked the United States Geological Survey (USGS) with performing an evaluation of potential contaminant travel times from the proposed project disposal sites to nearby drinking water and industrial production wells. The report entitled, "Evaluation of Groundwater Flow from Dredged Material Disposal Sites in Gloucester and Salem Counties, New Jersey" (USGS. 1995), stated that the disposal sites would not impact local wells since the 15G site and other nearby sites would provide a very small percentage of well recharge, and potential contaminant travel times were on the order of fifty to one hundred years. The mean travel times for groundwater from the new proposed disposal areas to reach any potential water supply well is in excess of 50 years, except for a cluster of wells near area 15G where the report states that "travel time to these wells could be relatively short, perhaps on the order of several years". The proposed (site 15G) and existing (Oldmans, Pedricktown North and south) disposal areas are in the contributing area to these wells. The adjacent Oldmans disposal area is centrally located among the sites between areas 15G and Pedricktown North and has been used for more than 56 years by USACE for disposal of maintenance material from the prior Delaware River 40 foot project. USACE conducted a detailed groundwater investigation of the Oldmans disposal area and concluded that potential environmental impacts to that site should not preclude further expansion and continued use of this site as a dredged material disposal area. The 15G site is adjacent to, and hydraulically similar to the Oldmans site.

It is important to consider all of the contributing factors when evaluating the potential negative impact of the travel times from all disposal areas. First, the existence of 14.5 or more feet of fine grained material from past dredging within the disposal areas greatly impedes the flow of water from the areas and increases the travel times substantially. In addition, USACE reported that the new dredged sediments from the 45 foot project would contain no harmful levels of contamination; so in the event that the water were to reach a well from the disposal area, it would have no impact on water quality. Finally, the expected low hydraulic conductivities of the in-place dredged material along with the expansive lower permeability units below the fill would result in only negligible groundwater movement out of the bottom of the Site 15G facility. The extremely low likelihood of contaminant transport through the underlying marsh sediments and clays underlying the site provide an even greater level of protection to surrounding groundwater receptors. The USGS in a letter to USACE contained in Appendix A of the 1997 SEIS stated:

> “…..The concern that fluids leaching from the dredged-material disposal areas could infiltrate to the aquifer with recharge water can also be set aside. A poor connection exists with the aquifer or the contributing volume of recharge is insignificant at most of the disposal sites. For the several instances where the travel time is short and the contributing volume may be higher than insignificant, the risk of contamination can still be considered low. The Corps of Engineers has investigated the potential for the presence of hazardous substances in the dredged material. Their sampling and analyses indicate that the dredged material is not likely to contain hazardous substances that will exceed regulatory levels. Therefore, even though a recharge pathway may exist and travel time may be short, the risk of contamination will be low.”

Subsequent to the SEIS, work performed at Site 15G (C.V.M., 1999) indicated a minimum underlying low-permeability sediment thickness of 14.5 feet with most areas having 18 or more and as much as 60 feet in some areas. This confirms that site

conditions exist as represented in the SEIS and by the USGS. Given that no appreciable changes are being proposed in the operation of the site from what was proposed in 1997, any projected impacts are expected to remain unchanged from the original USACE determination.

Accordingly, as USACE concluded in the 1997 SEIS, the aforementioned conditions with respect to travel time, recharge, contamination levels, and conclusions from the groundwater investigation conducted by USACE at Oldmans disposal area indicate that possible risk of groundwater impacts at the dredged material disposal sites is negligible. The placement of additional dredged material in the proposed areas of Site 15G is not expected to adversely impact the groundwater/aquifer system in both the local and regional area.

To summarize, the conclusions regarding the mobility of arsenic and other metals, as well as groundwater protection due to construction or operation of the new CDF, subsurface conditions at Site 15G consist of existing dredged material deposits that are reflective of very low hydraulic conductivity based on USACE studies. Therefore the movement of groundwater within the existing deposits is expected to be very slow and the existing deposits and the lower extremely low permeability confining clays, silts and peats are the primary factors controlling the potential for transport from the site. The addition of dredged material to the Site 15G CDF adds additional hydraulic pressures to shallow groundwater, but the slow groundwater movement and sorption capacities of underlying sediments and low permeability units minimizes or nullifies the effects of the new CDF on nearby groundwater.

5.3.8 Aquatic Resources

The waters derived from the upland basin of the Delaware system carry a variety of dissolved and suspended substances of natural and anthropogenic origin. Sediment is one of these important substances. Sediment can be stored temporarily in the river floodplains, and its removal from the terrestrial landscape can be dramatically accelerated by human activities. Once transported to the estuary, suspended sediments may alter the environment by: (1) decreasing light penetration, affecting photosynthetic organisms; (2) transporting other materials absorbed to their surface; and (3) modifying the shape and cross-section of the estuary when deposited on the bottom (and necessitating dredging when this deposition occurs in navigation channels).

Fitzgerald and Karlinger (1983) estimated that the Delaware River at Trenton discharges about 750,000 tons of suspended sediment per year, except in record flood years, when the annual discharge can reach 900,000 tons. They found that over 85% of the suspended sediment is discharged during I0% of the year, all during periods of highest fresh water flows. The sediment consists of both inorganic and organic components. Mansue and Comings (1974) estimated that 12% of Delaware Estuary sediments consist of organic matter. The inorganic component consisted of 53% silt, 43% clay, and 4% sand. Biggs *et al.* (1983) estimated the total suspended load to the Delaware Estuary, from gaged and ungaged sources, to be 2 million tons per year.

As a consequence of this sediment load and complex tidal dynamics, Estuaries generally contain turbidity maxima somewhere in their upper reaches. The Delaware Estuary contains areas of high turbidity and suspended sediment concentrations that have been described in Biggs et al. (1983). These turbidity maxima are not stationary, but move landward and seaward in close association with the salinity distribution which,

in turn, responds to variations in freshwater inflow and the tidal regime. In the Delaware River, this turbidity maximum is usually centered at salinities of 1-3 ppt and 7.5-10 ppt and may generally be found somewhere between River Mile (RM) 35 (River Kilometer (RK) 56) and RM 80 (RK 129) in the Transition Zone. The mouth of Oldmans Creek is at RM 77, within the typical turbidity maximum.

Life stages of estuarine-dependent and anadromous fish species, bivalves and other macroinvertebrates necessarily are tolerant of these elevated suspended sediment concentrations and have evolved behavioral and physiological mechanisms for coping with variable concentrations of suspended sediment (see Birtwell et al. 1987, Dunford 1975, Levy and Northcote 1982, and Gregory 1990 in Nightingale and Simenstad 2001, LaSalle et al. 1991 for a detailed treatment of these various coping mechanisms). As a first response, fish are mobile and generally avoid unsuitable conditions such as increased suspended sediment and noise (Clarke and Wilber 2000). While a localized increase in suspended sediment may cause fish to temporarily avoid the area where bottom disturbing activities are occurring, the affected area would be expected to be small. Other estuarine fish species that inhabit turbid waters throughout their entire life cycle (e.g. mummichogs) also have the ability to physically expel materials that may clog their gills. Fish that are primarily sight feeders in clearer waters rely on acoustic cues and their sensitive lateral line system to detect pressure fluctuations that might indicate prey. Other fish (e.g., catfish) have ancillary sensory organs such as barbels (whiskers) that are used to locate prey and habitat features in turbid settings.

Apart from finfish, the shellfish species (e.g., bivalve mollusks) found in the Delaware Estuary are necessarily adapted to naturally turbid estuarine conditions and can even tolerate short-term exposures to extremely high turbidity events by closing valves or reducing pumping activity. Mobile benthic invertebrates (e.g. crabs) that occur in estuaries have been found to be tolerant of extremely elevated suspended sediment concentrations. In studies of the tolerance of crustaceans exposed to suspended sediments for up to two weeks, nearly all mortality was caused by the full-time exposure to high suspended sediment concentrations (greater than 10,000 mg/L) (Clarke and Wilber 2000).

While many fish species inhabit the waters of the Delaware River and Oldman's Creek (see Section 4.7 above), most of these species are either seasonal transients or resident species that are highly adapted to the high turbidity concentrations and a fluctuating salinity regime of the estuarine Transition Zone. These would include striped bass, white perch, Atlantic menhaden, mummichogs, sturgeon, and various catfish species. With respect to NMFS designated Essential Fish Habitat (EFH) species, the typical salinity range of the tidal Delaware River and Oldmans Creek near site 15G are at the marginal lower limit for only three. Of these species, only butterfish juveniles, windowpanes, and winter flounder larvae and spawning adults could be present during periods of low freshwater flow (i.e. when salinities fall within the tolerance range of these species/life stages). Like the estuarine residents, these species and life stages are adapted to high turbidity environments, and in particular, the two EFH flounder species are demersal (bottom oriented) and often infaunal (buried in the sediments) when they are ambush hunting, placing them in direct contact with ambient sediments and associated high turbidity concentrations.

During operation of the proposed Site 15G CDF, the discharge of regulated inorganic substances and organic compounds is not expected to degrade surface water quality. Dredged material from Delaware River Ranges with high shoaling rates would enter Site 15G with limited disturbance to the historic sediment. Supernatant will be managed to settle out solids and associated regulated inorganic substances and organic compounds by the planned dikes and a weir prior to discharge to Oldmans Creek.

Effects of this discharge to transient or resident finfish species, the three EFH species (if or when present), shellfish, and shortnose and Atlantic sturgeon are expected to be negligible for several reasons. First, as documented by Duffield Associates (2013), no degradation of the surface water quality of Oldmans Creek (and by extension, the Delaware River) is expected due to the design and operation of the CDF. Second, the material deposited into the Site 15G CDF will originate from Delaware River Ranges with high shoaling rates and/or a history of the sediment deposition described above. By definition, the maintenance dredging of this material is necessary because these sediments were formerly suspended in the Delaware River by tidal flows and subsequently were deposited in the deeper channel areas.

Determining the concentrations of various compounds that might be present in these sediments at any specific place or time (either prior to or following deposition) is a function of the hydraulic complexity of the tidal Delaware Estuary. It is reasonable to conclude that EFH species and sturgeon present in Delaware River Ranges with high turbidity and shoaling rates near Site 15G would come in contact with these *in situ* sediments. This is especially true for the flounder and sturgeon species, which reside in the estuary for much of their lives and exhibit high fidelity to the bottom, including foraging within the bottom sediments. Furthermore, during active dredging operations, the USACE locally re-suspends deposited sediments through the action of the hydraulic dredge, thereby potentially (if temporarily) increasing the concentrations of various compounds in the water column, if and when they are present.

If EFH species or sturgeon were present during dredging operations, exposure to increased concentrations of various, and potentially harmful, compounds could be possible; however, such exposure would not be directly related to the operation of Site 15G. Finally, the design and operation of the proposed CDF at Site 15G will ensure that surface water discharges to Oldmans Creek and the Delaware River comply with applicable surface water standards. As a consequence, no adverse effects to the three EFH species that could be present near the site, or to the two protected sturgeon species, would be expected.

5.3.9 Terrestrial Resources

5.3.9.1 Vegetation

During construction of the CDF the internal vegetated areas will be cleared to allow for site grading and construction of the new perimeter containment berms. The existing perimeter berms are to remain vegetated and largely unchanged during construction. Prior to commencement of operations, the new perimeter containment berms will be seeded to aid in soil stabilization and prevent erosion. During operation, the central portions of the site would be impacted due to inundation with hydraulic dredged materials, but are expected to quickly revegetate during periods of inactivity. Considering the disturbed nature of the existing vegetation, adverse impacts to

vegetation resources as a result of construction and operation of the CDF are negligible.

5.3.9.2 Wildlife

Potential impacts to wildlife resources are primarily related to the magnitude of habitat loss and the quality of the habitat affected. The new CDF will be self-contained within the existing berms of a previously used CDF. The site has low habitat diversity, and has been maintained regularly over the last few decades through agricultural or mowing activities. As a result of past use of the site for dredged material disposal and vegetation clearing associated with agricultural activities, wildlife communities are typical of early successional communities that will likely re-establish once initial CDF construction is completed. Operation of the CDF would result in more extensive, if ephemeral, wetland and ponded areas, increasing the site's value to aquatic and wetland-dependent species.

To minimize impacts on wildlife, construction activities such as dike construction and site grading would be considered for the late summer and fall months. This time period is characteristically a dryer time that results in avoidance of impacts to nesting or migratory species that may use the site in the spring and summer. Pumping of dredged materials prior to the nesting season to avoid covering already-constructed nests can minimize impacts to wildlife from operations activities. In consideration of the generally low habitat quality present on the site, and the potential for creating higher quality wildlife habitat, adverse impacts on wildlife are expected to be minimal.

5.3.10 Threatened and Endangered Species

The construction and operation of a CDF on Site 15G is not anticipated to adversely affect sensitive plant or animal species. The site may provide limited suitable foraging habitat for the bald eagle and northern harrier; however, better quality foraging habitat is located adjacent to the site and along the Delaware River. During construction activities it is expected that bald eagles and northern harriers will likely forage elsewhere without experiencing any impacts to food availability. Operation of the CDF on Site 15G could result in more extensive foraging habitat for bald eagles, northern harriers, great blue herons, and other species that utilize marsh and open water habitats. Therefore, potential impacts to sensitive species are minimal and possibly beneficial.

5.3.11 Cultural Resources

Though the original ground surface of Site 15G has been determined to be sensitive for the presence of archaeological resources, these potential resources are buried beneath at least ten feet of modern fill and in some areas significantly more than ten feet of fill. As the construction of the new Site 15 CDF will result in the excavation of no more than four feet of the modern fill material in order to construct new higher containment berms within the perimeter of the existing berms, there is no potential for the original ground surface or any archaeological resources that may be located at that depth to be impacted by proposed excavation. In addition, as the proposed inflow pipe and sluice gate discharge structure will be constructed within the upper few feet of the existing modern fill, they too have no potential to impact the original ground surface and any archaeological resources that may be located at that depth.

In an email dated February 21, 2013, the NJ Historic Preservation Office (NJHPO) concluded that the placement of dredged material within the existing CDF will have no effect on any potential buried archaeological sites, but the construction of dikes and inlet / outlet features needed further NJHPO evaluation. In addition, the USACE concluded in the 1997 SEIS that any additional deposition of dredge spoils on Site 15G, as is currently proposed, will have no impact on any historic resources. Previously, the NJHPO had issued a finding of "No Effect" for the disposal sites in a letter dated July 28, 1994 (USACE 1997).

The project is also expected to have no effect on the US Route 130 Bridge over Oldmans Creek (Structure 1710152), which is eligible for listing on the National Register of Historic Places, or any of the 12 previously-identified archaeological sites located within a one-mile radius of Site 15G.

Therefore, given that possible buried resources are protected beneath a substantial deposit of modern fill and the lack of possible effects to other resources, the project will have no effect on historic properties eligible for or listed on the National Register of Historic Places..

5.3.12 Air Quality

Construction of the new CDF will entail the use of equipment for excavation, dike-building and other earth-moving activities. Air quality emissions will be primarily fugitive particulates from earth-moving activities and products of combustion from diesel engines.

Fugitive emissions from earth-moving activities and equipment travel on unpaved roads will consist primarily of particles larger than $PM_{2.5}$ which settle to the ground quickly in the immediate vicinity of the activity. Fugitive particulate emissions will be limited by good construction management practices.

Emissions of products of combustion from the heavy equipment used in construction will be limited by the increased degree of control inherent within modern diesel engines coupled with the newly tightened sulfur in fuel regulations promulgated by the NJDEP at N.J.A.C 7:27-9.2.

Disposal of dredge materials in a CDF requires transport of the materials from the dredging site to the CDF. In the case of short distances, this transport may be accomplished by installation of a temporary pipeline. For larger distances, the dredge material must be deposited into a barge or other vessel which is then moved either to an intermediate site or to the immediate vicinity of the CDF. The transport of the dredge material produces emissions of products of combustion from the engine(s) of the tug or dredge as well as from pumping activities. These emissions include the pollutants NO_x, CO, SO_2, $PM_{2.5}$ and Particulate Matter less than 10 microns (PM_{10}). The quantity of air pollutants emitted for the transport of a given amount of dredged material is related to the distance between the maintenance dredging site and the disposal site. The new Site 15G CDF would be primarily used for dredged materials from the Delaware River ranges extending from approximately Oldman's Creek to the Delaware Memorial Bridge. The actual disposal process involves handling only wet dredged materials which are pumped to the CDF for dewatering and storage. No fugitive dust emissions are expected from this process since the material is wet. There will be relatively small emissions of combustion products and roadway fugitives periodically

from support vehicles. Air emissions for actual dredging are not changed by the proposed land exchange. The construction of the Site 15G CDF will result in additional air emissions.

The General Conformity Rule ensures that the actions taken by federal agencies in nonattainment areas do not interfere with a state's plans to meet National Ambient Air Quality Standards (NAAQS). The region surrounding Site 15G in Salem County, New Jersey is classified as attainment for all criteria pollutants, with the exception of ozone. For ozone, this area is designated as "moderate non-attainment". Under the "General Conformity Rule" (40 CFR Part 93, Subpart B - Determining Conformity of General Federal Actions to State or Federal Implementation Plans), this project is required to demonstrate conformity for any pollutant designated as non-attainment. In this case, the formation of ground-level ozone results from complex chemical reactions between VOCs and NO_x in the presence of sunlight. As such, for demonstration of conformity with regard to ozone non-attainment, the project must demonstrate *de minimis* emission levels of NO_x and VOC during construction of the CDF at Site 15G. For NO_x the *de minimis* emission level is 100 tons per year, while VOC is limited to 50 tons per year.

Primary (direct) emissions of NO_x and VOC during the construction of the CDF will result from the fuel combustion of the construction equipment at the site. Secondary (indirect) emissions of these pollutants will also be generated by the activities of the workers (i.e. commuting), as well as material deliveries to the site. Primary emissions of NO_x and VOC for all construction engines were calculated using the latest available EPA factors for non-road engines (USEPA 2010a, 2010b). Emission rates for all on-road vehicle emissions were developed using the EPA's Mobile 6.2 model.

For the six-month period of construction of the CDF, emissions of NO_x are expected to be approximately 7.35 tons, while VOC emissions are predicted to be approximately 0.43 tons. Since there are no related emissions during the second 6 months of the year, these values equate to 7.35 tons/year for NO_x and 0.43 tons/year for VOC. These emissions are well below the *de minimis* levels for conformity for the respective pollutants, therefore it is expected that this project will not interfere with New Jersey's plans to meet the ozone NAAQS.

5.4 Cumulative and Secondary Effects

5.4.1 Cumulative Effects

The CEQ (Council on Environmental Quality) defines cumulative impacts as "the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

The other actions that were evaluated by the USACE as projects with the potential for introducing cumulative effects associated with this Environmental Assessment are the potential development of a new nuclear plant at Artificial Island, routine USACE Delaware River maintenance dredging, the Delaware River Main Stem Channel Deepening Project and the other potential future development and uses of Artificial

Island CDF cell 3 (the land to be transferred to private ownership at Artificial Island) and / or the adjoining coastal wetlands.

5.4.1.1 Potential New Nuclear Plant

PSEG has filed an "Early Site Permit" (ESP) application for a potential new nuclear plant at the PSEG Site in Lower Alloways Creek Township, Salem County, NJ.

The use of USACE property to the north of the PSEG Site at Artificial Island was included in the ESP application to the USNRC. The Proposed Land Exchange was conceptually included, but at the time of the ESP submittal in May of 2010, no details were available. PSEG is continuing to pursue the land exchange as it has independent utility and is not subject to the USNRC action. The potential new nuclear plant is a potential Cumulative or Secondary Effect and as such, is evaluated in this section.

There has been no commitment or announcement on the part of PSEG to construct a new nuclear plant and when the ESP is issued by USNRC, it does not authorize construction. An additional federal action, a "Combined License" (COL) is required to be issued by the United States Nuclear Regulatory Commission (USNRC) prior to construction of a nuclear plant. As such, while the ESP is a reasonably foreseeable action, the construction of a new nuclear plant is not. The USNRC's ESP process evaluates the impacts of a potential new nuclear plant including potential cumulative or secondary effects. That action is ongoing within the USNRC. Changes in direct, cumulative or secondary impacts beyond those that are addressed in the ESP application, that are deemed new and significant, will be fully developed, analyzed and reviewed under NEPA by the USNRC when a COL application is filed. That will follow a PSEG decision to construct a new nuclear plant.

The wetland impacts resulting from the construction of the potential new nuclear plant at the PSEG Site are addressed in the USNRC ESP review process and will be fully evaluated in the USNRC Final EIS. Similarly, other impacts including socioeconomic, environmental justice, cultural and historic resources, and other land, water, and air impacts are fully described in the ESP application and subject to the separate USNRC review processes. As such, there are no additional impacts resulting from the development of the USACE Artificial Island CDF cell 3 other than those addressed by the USNRC.

5.4.1.2 Delaware River Maintenance Dredging

The USACE conducts annual maintenance dredging of the Delaware River Federal navigation channel and certain port facilities on an annual basis. This is part of the Philadelphia District mission to assure that the channel is maintained to its authorized depth of 40 feet, with an increase in depth to 45 feet in progress. The USACE operates numerous CDFs and has analyzed disposal capacity of the regional CDFs to assure that there is a minimum of 50 years of dredged material disposal capacity within a reasonable distance from dredging locations. These analyses are updated periodically.

It is reasonably foreseeable that the USACE will use the new Type B CDF at Site 15G for disposal of channel maintenance derived dredged materials. This is consistent with the Purpose and Need of this Proposed Land Exchange and the environmental impacts are evaluated within this document. The initial dredged material disposal capacity is approximately 4,000,000 CYs. During the life of the CDF it is anticipated that up to approximately 20,000,000 CYs of dredged material will be deposited. There are no

additional impacts associated with the Proposed Land Exchange or the development of the Type B CDF at Site 15G.

The dredging requirements are driven by sedimentation rates and other natural processes and the addition of a CDF at Site 15G or elimination of the Artificial Island CDF cell 3 do not affect current channel maintenance dredged material disposal requirements.

5.4.1.3 Delaware River Main Channel Deepening

The authorized and ongoing project to deepen the Delaware River Federal navigation channel to a depth of 45 feet is not affected by this proposed action as the disposal requirements for the channel deepening project do not include new CDFs. Additionally, the use of Artificial Island for dredge material sourced from the channel deepening project is scheduled and expected to be complete at approximately the time that the land transfer occurs. There are no identified additional impacts or cumulative effects that would affect the Proposed Land Exchange. The reviews associated with the channel deepening project provided for a comprehensive review of alternative CDF locations as well as the disposal and maintenance dredging data that the USACE has used to analyze the proposed action.

5.4.1.4 Future Development at Artificial Island CDF Cell 3

As discussed in Chapter 4 (Affected Environment), the Artificial Island CDF is a disturbed area that lacks significant vegetative or terrestrial species as a result of the historic and active fill activities, and the habitat that results from the deposition of dredged material. There is no documented Threatened or Endangered species habitat, no socioeconomic or environmental justice impacts due to its isolated location more than 2 miles from and residential structures, and no significant impacts to surrounding land use. The Artificial Island CDFs have a land use of historic / old dredge field, with changing vegetation and surface water hydrology. They are contained within dikes and generally cut off from tide. They are characterized as isolated land forms, with no identified cultural or historic resources. The wetlands within CDF cell 3 are considered disturbed and were delineated in accordance with a recent USACE Jurisdictional Determination.

Beyond the potential for a new nuclear plant at the PSEG Site, there are no identified, active, or current plans for development of the land to be transferred from U. S. Government ownership to PSEG ownership at Artificial Island. PSEG has indicated that there is a potential for a new nuclear plant, which is being evaluated for NEPA purposes by USNRC through their Early Site Permit EIS, but a decision to proceed with developing a new nuclear plant has not been made by PSEG.

It is expected that PSEG may expand the Exclusion Area Boundary (EAB) for the existing site as it relates to the potential for a radiological release from the existing nuclear plants. The EAB is designated as an area where PSEG must be able to control public access if needed. The same prohibition exists with regard to site security at the nuclear facility, should a security issue have the potential to impact the public. The likely action consists of excluding the public for either radiological or security purposes. The land to be exchanged is currently not open to public use, as it is under USACE control, and this is not a change from any of the current conditions or existing impacts.

There are other potential future uses of the lands at Artificial Island proposed to be transferred to PSEG, which include:

- Non-nuclear power generation;
- Office or warehousing / laydown uses:
- Expansion of current PSEG Site operations to areas of CDF cell 3;
- Preservation or mitigation of the existing cdf and/or adjoinng wetland areas.

These potential uses are described in more detail below. With the exception of potential mitigation or preservation of the coastal saltmarsh surrounding the CDFs and specifically CDF cell 3, future developable area is limited to the land within the CDF dikes. The surrounding coastal saltmarsh is generally considered to be precluded from development by existing state and federal regulations protecting wetlands. As such the potential development discussed below will focus on the CDF cell 3 interior areas.

The PSEG ESP Application (PSEG Power 2010) and the subsequent USNRC Requests for Additional Information and PSEG responses that were prepared in support of the draft EIS provide a significant amount of quantification and impact evaluation related to the Artificial Island CDF. Where appropriate, this is referenced in the analyses below.

5.4.1.4.1 Potential for Continued Use as an Upland CDF

For the near term and potentially for a prolonged period of time, the Artificial Island CDF cell 3 may be used for the ongoing disposal of dredged materials, either by PSEG or the USACE with PSEG authorization. The CDF cell 3 may be used by PSEG to supplement the existing CDF on PSEG property that is used currently for the disposal of intake structure silt material and barge slip / intake dredging, when required. These uses are consistent with the existing use of CDF cell 3, and as such, there are no changes in impact to land use, terrestrial or aquatic species, socioeconomic factors, surface or groundwater hydrology, water or air quality, or any of the other potential impacts.

5.4.1.4.2 Potential for Electricity Generation from Renewables

Artificial Island CDF cell 3 contains approximately 94 acres. Assuming that the entire area is utilized for either solar or wind based electric generation, approximately one to two utility sized (approximately 2 megawatts electric (MWe) each) wind turbines and up to approximately 80% of the area can be covered with solar panels. The one to two wind turbines could potentially generate between 2 MWe and 4 MWe. Similarly, using a value of approximately four to five acres per MWe for solar panels, up to approximately 15 MWe could be generated. This potential use is consistent with the existing nuclear plant site to the south of the CDF cell 3. It is assumed that electric transmission interconnections would be through the existing HCGS switchyard.

The impacts of development of CDF cell 3 for renewable-based electric generation are considered to be minimal to small, based upon the limited existing resources, the ongoing changes that result from periodic dredged

material disposal within the CDF, and the industrial nature of the adjacent PSEG Site. Wind turbine heights, which may range from 200 ft. to 300 ft. tall, could introduce visual impact considerations. However these are considered to be bounded by both the existing features of the adjoining PSEG Site, which includes a 512 ft. tall cooling tower, three large containment structures that are approximately 250 ft. tall, security lighting stanchions, switchyard A-Frame structures and other large buildings and structures. Therefore, visual impacts are considered to be minor. Other than modest construction related traffic, which is bounded by the proposed nuclear plant assumed construction workforce of approximately 4100 peak workers as documented in the ESP Application (PSEG Power 2010), the operational workforce would be minimal (less than 100 and likely less than 25), which is within the normal range of workforce changes that occur on a day-to-day basis at the adjoining existing PSEG Site due to outages, projects, etc. Resulting traffic impacts and secondary impacts would be expected to be negligible.

5.4.1.4.3 Potential for Electric Generation – Steam Plant or Combustion Turbines

The potential for a steam electric or combustion turbine power plant in CDF cell 3 was evaluated and is considered to be unlikely due to either fuel supply limitations or environmental considerations. If a standard steam electric plant or combustion turbine was considered, a source of fuel would be required. There is not a natural gas supply or transmission pipeline in the vicinity of the site and therefore development would be considered to be unlikely. It would be expected that an alternate site, closer to a source of natural gas, could be identified. Therefore, the likelihood of developing a steam electric generating facility fueled by natural gas is low and was not further evaluated.

An oil-fired facility could also be considered due to the ability to construct fuel oil storage and marine delivery facilities. However, the use of Ultra Low Sulfur Distallate (ULSD) as fuel for either steam electric generation or combustion turbines, is environmentally prohibitive and is unlikely to meet air permitting requirements in NJ. Therefore this potential generation plant type is also considered to not be likely and was not evaluated further.

The impacts of such a facility would be approximately the same as the impacts of a potential nuclear facility, with approximately the same level of disturbance etc. Air emissions that result from combustion of fossil fuels would have significantly greater impacts than those associate with new nuclear power. The impacts of the potential nuclear plant bound a potential steam electric or combustion turbine power plant, excepting for increased air emissions that would result from the combustion of fossil fuels.

5.4.1.4.4 Potential Light to Medium Industrial Development

While not defined specifically, there is a potential for light to medium industrial development within CDF cell 3. Light/medium industrial development could take the form of energy-related infrastructure manufacturing, such as wind turbine

blades, structural module fabrication, or other types of assembly / fabrication facilities and would consist of shops, open bay structure, overhead gantry cranes, office, laydown or storage, or other similar configurations. This type of development is bounded by the site layout / civil design for the potential new nuclear plant and therefore, the impacts are considered to be approximately the same of less.

If water intake may be required to support manufacturing use, it would need to comply with Clean Water Act §316(b) requirements, consistent with other potential industrial or electric generation development. Runoff and stormwater management would be within the existing dike structures subject to NPDES regulations and water quality impacts would be considered small. An industrial site workforce is assumed to be up to 500 workers and therefore is bounded by the 4100 workers evaluated for the potential new nuclear plant. Other impacts such as aquatic and terrestrial species, wetland impacts, socioeconomic or environmental justice considerations, visual impacts, etc. are all bounded as well by the ESP analysis performed by the USNRC. No supplemental transportation corridors or causeway would be necessary as the workforce size does not constitute enough of a change to warrant the expense of an alternate access to Artificial Island. Therefore, transportation and wetland impacts are also minor and bounded by the prior analyses.

5.4.1.4.5 Potential Preservation or Mitigation of Coastal Saltmarsh

The majority if not all of the coastal saltmarsh adjoining CDF cell 3 which would be transferred to PSEG is expected to remain in a natural state, or be restored to a higher functioning saltmarsh complex. If no further activities were conducted in the coastal saltmarsh, there would be no additional impacts from the transfer of the land parcels to new owners. In the future, PSEG may opt to restore all or part of the coastal saltmarsh areas, using techniques that would be consistent with those used during the restoration activities conducted under the PSEG Estuary Enhancement Program (EEP). There would be only limited temporary disruption of habitat during active restoration. At the conclusion of the restoration, higher functioning saltmarsh species, geomorphology, and habitat would be in place.

To summarize the potential impacts of development of CDF cell 3 and / or the adjoining coastal saltmarsh acreage, impacts are bounded by the proposed new nuclear plant impact assessments conducted by PSEG in their ESP Application and the USNRC in their related NEPA evaluations. Impacts that can be reasonably approximated to be less than those evaluated in the ESP reviews include wetland impacts, aquatic and terrestrial species impacts, including Threatened and Endangered species, socioeconomic, environmental justice, surface and groundwater hydrology, land use, geology, soils, and cultural resources. The one potential impact that would require further evaluation beyond that associated with new nuclear power generation is air emissions, which is site / development specific. These impacts, if any would require permitting under the NJ Air Permitting Regulations, and the NJDEP issuance of the appropriate Title V or individual source permits. However, the air emissions for ancillary equipment at an operating nuclear facility for emergency diesel generators, air

compressors and other support equipment are considered to be broadly and approximately considered to be the same as what would be likely from the undefined potential development of CDF cell 3.
Overall, there are no identified direct or physical impacts to PSEG ownership of this land that are not bounded by prior analyses. No additional cumulative impacts have been identified or would be expected from potential development of CDF cell 3 or the preservation / restoration of the adjoining coastal wetlands.

5.4.2 Secondary Effects

5.4.2.1 Sea Level Rise and Climate Change

Sea level rise and climate change science continues to progress. Assuming sea level rise within the bounds determined by NOAA the future use of the proposed CDF will not be compromised. The CDF dike elevations will far exceed foreseeable sea level rise, especially considering the reduced impacts of sea level rise in the tidal riverine portion of the Delaware Estuary. The CDF minimum dike elevations are 15 and 20 feet above the average interior elevation and are at least 10 feet above the 100 year recurrence flood elevation and the highest NOAA sea level rise projections. With regard to climate change, the predominate impact is the aforementioned sea level rise, combined with projections for more severe weather events. As the CDF is being designed in accordance with the USACE Design Manual, and the construction of the CDF will progress over numerous years to its final capacity, potential impacts due to climate change can be addressed, as they become better understood, during the construction of subsequent lifts within the CDF. As such sea level rise and climate change is not expected to be an impact.

5.4.2.2 Greenhouse Gases

Greenhouse gases (GHG) germane to the proposed action consist of Carbon Dioxide ($CO_{2)}$), Methane (CH_4) and Nitrous Oxide (N_2O), collectively referred to as CO_2e. Much of the direct GHG emissions from operation of the CDF will originate from combustion of fuel oils associated with transport of the dredged material to the CDF and pumping of the dredged material into the CDF. The ability to dispose of this material at the new Site 15G CDF in Oldmans and Logan Townships is expected to reduce the travel distance and result in a significant reduction in marine engine GHG emissions.

5.4.2.3 Confined Disposal Facilities

There are numerous other CDFs along the Delaware River and Bay. These have been evaluated in depth in USACE documents related to the Delaware River Main Channel Deepening Project as well as the periodic USACE reviews of dredged material disposal and disposal capacities. There are no foreseeable adverse effects or impacts from the existence of other CDFs in the Delaware River watershed. The new Class B CDF will not have an adverse impact on existing CDFs as the result of the Site 15G CDF will be a reduced deposition of dredged material in the other existing Federal CDFs. This has the effect of prolonging their design and operating life by reducing the frequency of determining locations for other dredged material disposal areas. Finally, there are minimal indirect impacts of the construction of the site 15G CDF. These are minor increases in construction traffic and construction equipment noise during construction and infrequent material movements within the CDF. These impacts will be minor in nature and limited to periods of time (after initial construction) when the CDF is actively being used or prepared for deposition of dredged material.

5.4.2.4 Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental impacts associated with the Proposed Land Exchange include loss of agricultural habitat and existing vegetation at Site 15G due to the disposal of dredged material and the potential for aquatic impacts due to water quality that could result from the discharge from Site 15G. These impacts are the same as would be expected at the Artificial Island CDF cell 3 or the continued use of the Pedricktown or Oldmans CDFs for these dredged materials. Water quality considerations are accounted for in the design of the Site 15G CDF and the requisite retention times for settling of solids. The site was previously used for disposal of dredged material and is disturbed. Site 15G does provide some wildlife habitat of marginal value and will continue to do so. The environmental impacts associated with use of existing or previously used CDFs is considerably less than the use of new undisturbed or coastal wetland areas.

5.4.2.5 Short-term Uses of the Environment and Long-term Productivity

This section considers the relationship between the short-term use of the natural environment and the long-term benefits associated with the location of the Site 15G CDF. Short-term use of the natural environment would be necessary to achieve long-term productivity for the Philadelphia to the Sea Delaware River Channel Maintenance mission. Dredging will occur regardless of disposal location as it is required as a function of natural deposition processes. Other as yet undetermined future uses of Artificial Island CDF cell 3 would be subject to appropriate regulatory review at the time a proposal is made, regardless of the fact that the areas inside the dikes are disturbed and subject to fill in their current state and use as a CDF. While there is a net increase in CDF acreage and cubic yards of disposal as a result of this Proposed Land Exchange, the increases have the effect of reducing future development of new CDFs for long-term (50 year) dredging projections.

5.4.2.6 Irreversible and Irretrievable Commitments of Resources

Construction of the Site 15G CDF would involve utilization of time and fossil fuels, which are irreversible and irretrievable. Adverse environmental impacts associated with the construction of the CDF are short-term in nature and will cease after initial construction is completed. There will be periodic operational impacts as the CDF is prepared for annual dredge material disposal. The use of Site 15G as a CDF does not represent an irreversible or irretrievable commitment of resources. Site 15G was a prior dredge material disposal site. The site will continue to provide an approximately comparable level of wildlife habitat benefits. There is sufficient dredged material disposal capacity in the existing Federal CDFs, and the addition of Site 15G with the concurrent elimination of Artificial Island CDF cell 3, after an initial use by the USACE post land transfer, does not change the overall impacts of dredge material disposal for the Delaware River Channel Maintenance mission.

5.4.2.7 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) requires that federal projects consider whether the project will have a disproportionate adverse effect on minority or low-income populations. According to the Council on Environmental Quality guidelines (CEQ 1997), minority populations that comprise more than 50 percent of the affected population or represent a significantly higher percentage (typically 20 percent higher) of a population in a reference geographical area, such as a county or state, qualify as special populations that require special consideration when assessing impacts. Populations considered in this assessment are limited to those where Site 15G is located within Oldmans and Logan townships as the affected populations with Salem and Gloucester counties as a whole serving as the reference populations.

Population characteristics from the 2010 Census that relate to environmental justice for the affected townships and reference counties were reviewed. Based on comparisons of income and poverty levels, populations of block groups in the affected townships have higher income and lower poverty levels than those in the reference counties. There is one low-income block group in Salem County; however it is not located in Oldmans Township.

There is no development anticipated as part of this action for the Artificial Island CDF property and as such no changes in Environmental Justice populations or potential for impacts exist. The impacts of a potential new nuclear plant are addressed as Cumulative Effects.

Low-income and minority populations are present in the counties in which the site is located, they are not in the same townships as Site 15G or the Artificial Island CDF. No impact to the greater population, including these special groups, is expected because construction and operation activities are limited to vacant lands and are not expected to affect community facilities or community cohesion. The project as described in this document is expected to comply with Executive Order 12989 - Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994. Project components are not located in close proximity to a minority of low-income community, and no impacts are expected to occur to any minority or low-income communities in the area.

5.4.2.8 Other Permits and Approvals

The other permits, authorizations and approvals necessary to complete the land exchange and construct a Type B CDF are listed in Table 8. These include local zoning approvals from Oldmans and Logan Townships in New Jersey, County Soil Erosion and Sediment Control Certifications, New Jersey Department of Transportation approvals for the inlet pipe under New Jersey Route 130 at Site 15G, NJDEP Waterfront Development Permit, Tidelands Instrument, and Water Quality Certificate, and transfer of the existing USACE Water Quality Certificate to PSEG for the Artificial Island CDF cell 3.

Table 8: Listing of Required Permits and Approvals

Agency	Permit or Authorization	Applicable Property
NJDEP	Waterfront Development Permit (includes Federal Consistency Certification under the Coastal Zone Management Act)*	Site 15G
NJDEP	Water Quality Certification*	Site 15G
DRBC	Docket for Discharge	Site 15G
Salem County	Soil Erosion and Sediment Control Plan Certification (NJPDES General Stormwater Discharge Permit)*	Site 15G
Gloucester County	Soil Erosion and Sediment Control Plan Certification (NJPDES General Stormwater Discharge Permit)*	Site 15G
Oldmans Township	Zoning Board Approval	Site 15G
Logan Township	Zoning Board Approval	Site 15G
NJ Department of Transportation	Highway Opening Permit and Traffic Safety Plan	Site 15G
NJDEP	Water Quality Certification Transfer	Artificial Island CDF cell 3
NJDEP	Tidelands Conveyance	Site 15G

*Federal requirements

5.5 Environmental Laws and Compliance

The EA fulfills the requirements of NEPA and of other pertinent laws and regulations as discussed below.

Table 9: Compliance with Environmental Quality Protection Statutes and Other Environmental Review Requirements

FEDERAL STATUTES	COMPLIANCE W/ PROPOSED PLAN
Clean Air Act of 1970, as amended (42 USC 7401 et seq.)	Full
Clean Water Act of 1977 (CWA) (33 USC 1251 et seq.)	Partial (WQC to be issued through NJDEP)
Coastal Zone Management Act	Partial
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 USC 9601 et seq.)	Full
Endangered Species Act of 1973, as amended (ESA) (16 USC 1531 et seq.)	Full
Fish and Wildlife Coordination Act (16 USC 661)	Partial
Magnuson-Stevens Act	Full
Migratory Bird Treaty Act (MBTA) (16 USC 715- 715s)	Full
National Historic Preservation Act of 1966, as amended (NHPA) (16 USC 460b, 470l-470n)	Partial
National Environmental Policy Act, as amended (NEPA) (42 USC 4321 et seq.)	Full
Noise Control Act of 1972, as amended (42 USC 4901 et seq.)	Full
Executive Orders, Memorandums, etc.	
EO 11514, Protection and Enhancement of Environmental Quality, amended by Executive Order 11991, Relating to Protection and Enhancement of Environmental Quality	Full
EO 11988, Floodplain Management	Full
EO 11990, Protection of Wetlands	Full
EO 12088, Federal Compliance with Pollution Control Standards	Full
EO 12898, Environmental Justice in Minority Populations and Low-Income Populations	Full
EO 13112, Invasive Species	Full
EO 13148, Greening the Government through Leadership in Environmental Management	Full
EO 13195, Trails for America in the 21st Century	N/A

Full Compliance – Requirements of the statute, EO, or other environmental requirements are met for the current stage of review.
Partial Compliance – Some requirements and permits of the statute, EO, or other policy and related regulations remain to be met.
Noncompliance – None of the requirements of the statute, EO, or other policy and related regulations have been met.
N/A – Statute, EO, or other policy and related regulations are not applicable.

5.5.1 National Environmental Policy Act (NEPA) (42 USC 4321 et seq.)

NEPA is the nation's primary charter for protection of the environment. It establishes national environmental policy which provides a framework for Federal agencies to minimize environmental damage and requires Federal agencies to evaluate the potential environmental impacts of their proposed actions. Under NEPA, a Federal agency prepares an Environmental Assessment (EA) describing the environmental effects of any proposed action and alternatives to that action to determine if there are significant impacts requiring development of an Environmental Impact Statement (EIS) or if a Finding of No Significant Impact (FONSI) is appropriate. The EA must identify measures necessary to avoid or minimize adverse impacts, and all impacts must be reduced to a level below significance in order to rely upon a FONSI.

5.5.2 U.S. Fish and Wildlife Coordination Act (16 USC 661)

This Act requires Federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted or otherwise controlled or modified" by any agency under a Federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources." The intent is to give fish and wildlife conservation equal consideration with other purposes of water resources development projects.

The Proposed Land Exchange and development of the new Type B upland CDF does not involve impoundment, diversion, or other modification to bodies of water within the Delaware Watershed, no Fish and Wildlife Coordination Act Report is required.

5.5.3 Endangered Species Act (ESA), as amended 16 USC 1531 et seq.)

The ESA protects threatened and endangered species, and their designated critical habitat, from unauthorized take. Section 9 of the Act prohibits such take, and defines take as to harm, harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct. Section 7 of the ESA requires Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat. Consultation with the USFWS or National Marine Fisheries Service is required if the Federal action may affect a Federally-listed species or designated critical habitat.

This Environmental Assessment provides current information on Special Status Taxa Occurrences within the vicinity of the Proposed Land Exchange properties. There would be no anticipated effects to listed species as a result of this action.

5.5.4 Migratory Bird Treaty Act (MBTA) (16 USC 715- 715s)

The MBTA prohibits the taking or harming of any migratory bird, its eggs, nests, or young without an appropriate Federal permit. Almost all native birds are covered by this Act and any bird listed in wildlife treaties between the United States and several countries, including Great Britain, Mexican States, Japan, and countries once part of the former Soviet Socialist Republics. A “migratory bird” includes the living bird, any parts of the bird, its nest, or eggs. The take of all migratory birds is governed by the

MBTA's regulation of taking migratory birds for educational, scientific, and recreation purposes and requiring harvest to be limited to levels that prevent over-utilization. Section 704 of the MBTA states that the Secretary of the Interior is authorized and directed to determine if, and by what means, the take of migratory birds should be allowed and to adopt suitable regulations permitting and governing take. Disturbance of the nest of a migratory bird requires a permit issued by the USFWS pursuant to Title 50 of the Code of Federal Regulations (CFR).

The Proposed Land Exchange and development of the new Type B upland CDF is in compliance with the MBTA as no such wildlife is known to use the CDFs.

5.5.5 Clean Water Act (CWA) (33 USC 1251 et seq.)

Section 401 of the CWA requires every applicant for a Federal license or permit for any activity that may result in a discharge into navigable waters to obtain a State Water Quality Certification (Certification) or waiver that the proposed activity will comply with state water quality standards (*i.e.*, beneficial uses, water quality objectives, and anti-degradation policy). The NJDEP issues section 401 Water Quality Certifications for activities within NJ via the Waterfront Development Permits and CAFRA Permits processes. The Proposed Land Exchange and development of the new Type B upland CDF is in compliance with the Section 404 of the Clean Water Act (CWA). The proposed CDF will require an NJDEP-issued Waterfront Development Permit.

Section 402 prohibits the discharge of pollutants to "waters of the United States" from any point source unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) Permit (NJPDES in NJ). The NJDEP is permitting the new Site 15G CDF via the Waterfront Development Process and a Water Quality Certification is required. An NJPDES General Stormwater Discharge Permit will be obtained during the Soil Erosion and Sediment Control Plan Certification process.

Section 404 authorizes the Secretary of the Army acting through the USACE to issue permits for the discharge of dredged or fill materials into the waters of the United States, including wetlands, at specified disposal sites. The selection and use of disposal sites must be in accordance with guidelines developed by the Administrator of EPA in conjunction with the Secretary of the Army and published in 40 CFR Part 230 (known as the 404(b)(1) guidelines). Under the Section 404(b)(1) guidelines, the USACE shall examine practicable alternatives to the proposed discharge and permit only the Least Environmentally Damaging Practicable Alternative (LEDPA).

For USACE actions such as the development of the new Type B CDF, the USACE does not issue permits, but demonstrates compliance, or "equivalency," with Section 404 through a Section 404(b)(1) analysis. In addition, the requirements and conditions of nationwide permits and regional permits may be applied for USACE actions and thus considered when addressing compliance with Section 404. All other entities must obtain a Section 404 permit from the USACE before undertaking any discharge of dredged or fill materials into waters of the United States, unless determined to be exempt from regulation.

The Proposed Land Exchange and development of the new Type B upland CDF does not involve the discharge of dredged or fill material in waters of the United States and therefore, the USACE has determined that a 404(b)(1) analysis is not required.

As discussed in Section 4.2.2, the lands at Artificial Island are located within New Jersey's coastal zone as defined by its Coastal Area Facility Review Act (CAFRA). Any future development of these lands will require a CAFRA permit from NJDEP, which will address compliance with the Coastal Zone Management Act. The Artificial Island lands included in the Proposed Land Exchange are not within the jurisdiction of Delaware's Coastal Zone Management Program.

Similarly, portions of Site 15G lie within New Jersey's regulated coastal zone. PSEG has applied for a NJ Waterfront Development Permit (WFD) for Site 15G as they are a private entity. The NJDEP WFD permit also includes the New Jersey Coastal Consistency Determination, which will precede USACE taking title to Site 15G. An Interstate Coastal Consistency Determination is not required from Delaware under their Coastal Zone Rules as the site and the discharge from the upland CDF at Site 15G is not within Delaware's Coastal Zone jurisdiction, and therefore will not have an effect on Delaware's Coastal Zone.

5.5.6 Clean Air Act of 1970 (42 USC 7401 et seq.)

Section 118 of the Act states that any Federal action that may result in discharge of air pollutants must comply with Federal, State, interstate and local requirements respecting control and abatement of air pollution. Section 176(c) of the Act requires that Federal actions conform to an implementation plan after it has been approved or promulgated under Section 110 of the Act.

Section 176(C) of the Clean Air Act (CAA) General Conformity Rule Review. A conformity determination for a specific pollutant is not required if for each criteria pollutant or precursor for the total of direct and indirect emissions of the criteria pollutant or precursor in the nonattainment area caused by the Federal action would not equal or exceed any of the rates in 40 CFR 93.153(b)(1) or (2).

Potential air quality impacts of the Proposed Land Exchange have been reviewed. Air emissions will result from the limited Site 15G construction activities, and were found to be within deminimis thresholds for NOx and VOCs. All other air emissions associated with Delaware River Channel Maintenance activities are exempt, and will occur regardless of whether Site 15G is available as a CDF.

A conformity analysis has been completed and the Proposed Land Exchange conforms to the Federal Clean Air Act, as amended.

5.5.7 Noise Control Act of 1972, as amended (42 USC 4901 et seq.)

Noise generated by any activity, which may affect human health or welfare on Federal, state, county, local, or private lands, must comply with noise limits specified in the Noise Control Act.

The Proposed Land Exchange and development of the new Type B upland CDF will comply with all applicable noise standards and effective local controls per the standard USACE operating practices for CDFs and therefore if will not have any direct impacts to noise levels in the area. Noise will continue to be regulated with Federal, state, and local laws and ordinances.

5.5.8 National Historic Preservation Act (NHPA) (16 USC 460b, 470l-470n)

Section 106 of the NHPA requires any Federal agency to take responsibility for the impact of the decisions on historic resources. Under Section 106, Federal agencies are prohibited from approving any Federal "undertaking" (including the issuance of any license, permit, or approval), without 1) taking into account the effects of the undertaking on the historic properties, and 2) affording the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on the undertaking. The NHPA forces an agency to stop and consider the consequences of its undertakings on any historic property, and assures that the agency does so by requiring it to receive comment from the ACHP, or agencies acting in its stead, and from the public before proceeding with any such undertaking. In order to comply with the NHPA, a Federal agency considering an undertaking must go through the process outlined in the ACHP's regulations at 36 C.F.R. Part 800.

The Proposed Land Exchange and development of the new Type B upland CDF continues current and / or prior uses of the properties. In addition, for the Artificial Island CDFs, there is no potential for impact as all of the land is considered "made land" since dredging started in the late 1890s. For the Site 15G new CDF, earth disturbing activities will affect dredge material and limit disturbance to strata within previously filled lands. Therefore, the Proposed Land Exchange and development of the new Type B upland CDF will have no effect on historic properties and is in compliance with Section 106 of the Act and its implementing regulations (36 CFR part 800).

If any cultural resources are discovered in the future they will need to be evaluated for their eligibility for inclusion in the NRHP pursuant to 36 CFR 800.13(b).

The Proposed Land Exchange and development of the new Type B upland CDF is in compliance the NHPA as no cultural resources will be affected. The State Historic Preservation Office was consulted during the PSEG Early Site Permit Environmental Audit in 2012.

5.5.9 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 USC 9601 et seq.)

CERCLA regulates the release or substantial threat of release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare.

The potential for discharge of pollutants or contaminants from the Proposed Land Exchange and development of the new Type B upland CDF is addressed in the design and any conditions necessary to preclude discharges that impact Surface Water Quality Standards are addressed in the NJDEP Waterfront Development Permit's conditions.

5.5.10 Executive Order (EO) 11514, Protection and Enhancement of Environmental Quality, amended by Executive Order 11991, Relating to Protection and Enhancement of Environmental Quality

This EO mandates that the Federal government provide leadership in protecting and enhancing the quality of the nation's environment to sustain and enrich human life. Federal agencies must initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. These regulations include procedures for early EIS preparation and require impact statements to be concise, clear, and supported by evidence that agencies have made the necessary analyses.

This Environmental Assessment has been prepared to document that the Proposed Land Exchange and development of the new Type B upland CDF is in compliance with the mandates of this EO.

5.5.11 Executive Order 11988, Floodplain Management

In accordance with this EO, the USACE shall take action to "…avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative."

This EO requires that Federal Agencies take action to manage the risk and/or impacts of floods on human safety, health, and welfare; and restore and preserve natural and beneficial values served by the floodplains. Each agency also has the responsibility to evaluate potential effects of Federal actions that may be made within floodplains.

Compliance with this EO requires proper implementation of engineering regulations (ER) 1165-2-26, which states that the policy of the USACE with respect to floodplain management is to formulate projects which, to the extent possible, avoid or minimize adverse impacts associated with use of the base (100-year) floodplain and avoid inducing development in the base floodplain unless there is no practicable alternative. Since the properties associated with the Proposed Land Exchange and development of the new Type B upland CDF are not in the base floodplain, this action cannot result in further inducing development in the base floodplain.

5.5.12 Executive Order 11990, Protection of Wetlands

Federal agencies shall take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agencies responsibilities. Each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use. In making this finding, the head of the agency may take into account economic, environmental, and other pertinent factors. Each agency shall also provide opportunity for early public review of any plans or proposals for new construction in wetlands.

The Proposed Land Exchange and development of the new Type B upland CDF has minimal impact to federally non-jurisdictional open water and emergent wetlands

(0.82 acres at Site 15G) which will be addressed via the NJDEP Waterfront Development Permit. The review actions of the NJDEP and the USACE assure that the Proposed Land Exchange and development of the new Type B upland CDF is in compliance with this EO.

5.5.13 Executive Order 12088, Federal Compliance with Pollution Control Standards

Federal Agencies are responsible for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to Federal amenities and activities under control of the agency.

The action does not negatively affect the natural and beneficial values of the Delaware Estuary as the Proposed Land Exchange and development of the new Type B upland CDF continues current and / or prior uses and therefore is in compliance with the EO.

5.5.14 Executive Order 12898, Environmental Justice Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

EO 12898 is intended to direct each Federal agency "to make achieving environmental justice part of its mission by identifying and addressing... disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations in the [U.S.]..."

No minority or low income communities would be disproportionately affected by implementation of the Proposed Action. The Proposed Action is in compliance with the EO.

5.5.15 Executive Order 13112, Invasive Species

Federal agencies are to expand and coordinate efforts to prevent the introduction and spread of invasive plant species and to minimize the economic, ecological, and human health impacts that invasive species may cause.

There are no activities associated with the Proposed Land Exchange and new Site 15G CDF that would result in additional invasive species being introduced. The periodic management of the Site 15G CDF would have the effect of providing periodic disturbance of any species that did become established. The proposed action is in compliance with and meets the intent of the EO.

5.5.16 Executive Order 13148, Greening the Government through Leadership in Environmental Management

Environmental management considerations must be a fundamental and integral component of Federal Government policies, operations, planning, and management. The primary goal of this EO in the natural resources arena is for each agency to strive to promote the sustainable management of Federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices, and programs to reduce adverse impacts to the natural environment.

The design of the Site 15G CDF and the underlying Proposed Land Exchange are specifically intended to reduce environmental and financial impacts from the USACE mission associated with maintenance dredging of the Delaware River. As such it meets the intent of this EO.

5.5.17 Executive Order 13195, Trails for America in the 21st Century

This EO states that Federal agencies will, to the extent permitted by law and where practicable and in cooperation with Tribes, States, local governments, and interested citizen groups, protect, connect, promote, and assist trails of all types throughout the United States.

The new CDF at Site 15G will not be open to the public. Similarly CDF cell 3 at Artificial Island is intended to remain closed to public use due to the proximity to the operating nuclear plants at Artificial Island. As such, compliance with this EO is not practicable.

6.0 COORDINATION AND PUBLIC INVOLVEMENT

Preparation of this Environmental Assessment has included inputs from numerous coordination and scoping meetings with appropriate Federal and State resource agencies. Proposed Land Exchange and development of a Type B CDF in the Ranges of the Delaware River where high shoaling rates occur has been reviewed with other Federal, State and Regional agencies. In addition, it was discussed generally in the PSEG ESP application, submitted to the USNRC in May 2010 and available in its entirety, including subsequent submittals, for review in the USNRC Public Document Room (Agencywide Documents Access and Management System - ADAMS).

In November 2010, the USNRC conducted public scoping meetings under NEPA for the PSEG ESP application where the land exchange was subject to public comment. The USNRC has documented those comments in an Environmental Scoping Summary Report dated September 2011(ADAMS Accession Number ML112150127). In addition, transcripts of the two public scoping meetings and other related documents are available on ADAMS for review.

Site 15G specifically was reviewed during the USNRC Environmental Audit conducted in May 2011. The NRC documented the Environmental Audit in the Environmental Site Audit Cover Letter (ADAMS Accession Number 12199A050), and the Environmental Audit Trip Report (ADAMS Accession Number 12251A216). These reviews included site tours of Site 15G as well as a comprehensive overview of the Artificial Island CDFs.

A series of review meetings were held with public agencies prior to the submission of the PSEG ESP application in May 2010, and representatives of all of those agencies either attended or were otherwise updated on the USNRC Environmental Audit. These agencies included the USNRC, United States Environmental Protection Agency Regions 2 and 3, United States Fish and Wildlife Service, National Marine Fisheries Service, Delaware River Basin Commission, New Jersey Department of Environmental Protection, and the Delaware Department of Natural Resources and Environmental Control. The USACE is a Cooperating Agency in the PSEG ESP review process in accordance with the Memorandum of Understanding between USNRC and USACE. The USNRC has also initiated consultations on the PSEG ESP with the appropriate Native American tribes and nations.

In addition, prior to the PSEG ESP submittal, briefings for state and regional environmental organization and interested academic organizations were conducted by PSEG. These included New Jersey and Delaware Chapters of The Nature Conservancy, New Jersey Conservation Foundation, New Jersey Audubon Society, Rutgers University Institute of Marine and Coastal Studies, and the Delaware Nature Society, among others. USNRC conducted briefings as to their review processes with various state and local representatives during the public scoping process as well.

The PSEG ESP application served as the initial reason why the land exchange was pursued. However, the exchange has independent utility to both the USACE and PSEG and is being pursued separately from the ESP NEPA process. The consultation and coordination conducted by the USACE, the USNRC, and PSEG for the PSEG ESP application addresses the requirements for coordination associated with this proposed action.

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APPENDIX A

CONCEPT APPROVAL PACKAGE – ASSISTANT SECRETARY OF ARMY FOR CIVIL WORKS

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
WASHINGTON DC 20314-1000

REPLY TO
ATTENTION OF

MAY 2 0 2010

Director of Real Estate

William Levis
PSEG Power, L.L.C.
80 Park Plaza
Fourth Floor
Newark, NJ 07102-4194

Dear Mr. Levis:

This letter is written in response to your Letter of Intent dated May 7, 2010 regarding a proposed land exchange between the U.S. Army Corps of Engineers (Corps) and PSEG Power, L.L.C. (PSEG).

The Corps has authority under 33 U.S.C. § 558b to exchange land or other property of the Government of a rivers and harbor project for private lands or property required for such project in any case in which it is necessary or advisable. We are committed to continuing to work closely with you and to consider the possible use of this authority with respect to the Artificial Island dredged material disposal facility. In this regard, we could agree to an exchange of land that involves substituting another operating combined disposal facility (CDF) of suitable capacity for a portion of the existing Artificial Island CDF if the exchange would be advisable, would result in an overall net benefit to the Government and if the exchange would satisfy any other terms and conditions established by the Army.

We understand that in the exchange you would like to receive approximately 94 acres in fee that would include 50 acres of Cell 3 of the Artificial Island CDF plus 44 acres of coastal wetlands, 35 of which abut the 50 acres in Cell 3 and an additional 9 acres next to an existing right-of-way controlled by PSEG. Your Letter of Intent presents three options that would allow PSEG to obtain a portion of our existing operating CDF, including a fee for fee exchange, a fee for easement exchange, and a fee for easement exchange with transportation of dredged material.

We appreciate the time and effort that PSEG has spent working on this proposal; however, there are several issues that must be addressed before any commitments can be made regarding an actual exchange. In order to proceed with this transaction, the Corps must be certain that its dredged material disposal operations will not be disrupted. Therefore, it is critical that the exchange would involve the substitution of one operating facility for another. In that regard, before the substitute facility could be put in an operating condition, the Corps would have to comply with a variety of environmental laws and regulations that would apply to the new facility. The Corps

cannot delegate or otherwise transfer to a private entity the responsibility to comply with these laws and regulations. Thus, it is not clear how the proposed fee for fee exchange could be structured to ensure that the Corps would receive an immediately available operating dredged material disposal site, given the uncertainties inherent in the permitting and approval processes. The other alternatives discussed in your letter raise similar issues. In general, while we remain receptive to further considering these proposals, more information must be presented fleshing out the proposals and explaining how they would result in a disposal facility with suitable capacity that could be immediately used by the Government at no extra cost.

In addition, before any exchange agreement could be finalized, the benefits received by the Army from the exchange would have to be deemed appropriate by the Army, and the Corps would have to comply with all environmental laws and regulations associated with establishing the new CDF and the proposed exchange of property. All costs associated with the exchange, including but not limited to environmental, transactional and administrative costs, as well as the cost of the Corps to obtain the appropriate permits to establish an operating facility, would have to be borne by PSEG. Other terms and conditions may also be imposed as various options are explored.

We understand that your goal is to complete a land exchange within the next five years and are amenable to the idea of utilizing the authority conferred in 33 U.S.C. §558b to facilitate this transaction. We look forward to continuing to work with you regarding your proposal, pursuant to applicable law and policy.

Sincerely,

Scott L. Whiteford
Director of Real Estate

Information Paper
Benefits and Values of Proposed PSEG Power, LLC Exchange
Artificial Island, New Jersey

a. The purpose of the proposed real estate exchange action is to exchange disposal area capacity in one location (Artificial Island) for equivalent disposal area capacity in a better and therefore more valuable location (Pedricktown) for the Philadelphia District's Delaware River, Philadelphia to Sea project.

b. The disposal area at Artificial Island has been used periodically in the past, whereas, the Pedricktown disposal area is used annually for disposal of dredged material. The exchange will be beneficial to the U.S. Government because the new disposal area capacity gained through this exchange is optimally located in the area of highest annual maintenance in the Delaware River. In the dredging industry, the transportation costs of moving material from the dredge site to a disposal area are often the most significant cost drivers. As such, this proposed exchange should reduce future dredging contract unit costs for Philadelphia to the Sea maintenance dredging. With more affordable unit costs, the District will be better able to perform the amount of maintenance dredging required to meet our mission goal of maintaining the navigation channel to its required depth. In addition, more disposal area capacity at the proposed location will ease the disposal area management burden at the disposal site at Pedricktown, better enabling the staff to keep up with site maintenance. Under both exchange alternatives described below, final capacity requirements will be determined by a dredge material consolidation study to be performed by PSEG Power, LLC subject to USACE approval or other acceptable method of calculating capacity. This action will result in an overall net benefit to the government.

c. Property to PSEG Power, LLC: The disposal area at Artificial Island is segmented into three disposal area cells. The proposed exchange will cede a portion of one of those cells to PSEG Power, LLC. That portion which is partially full already has an approximate lifetime capacity of 4 million cubic yards. The Government will be retaining the remaining two disposal cells at Artificial Island to support the infrequent dredge material disposal needs in that section of the Delaware River. The exchange properties include two parcels of US Government-owned fee lands currently a part of the Artificial Island Confined Disposal Facility: 85 acres adjacent to the current Salem and Hope Creek Generating Stations and 9 acres next to an existing right-of-way controlled by Public Service Electric and Gas Company located proximate to (but not directly adjacent to) the aforementioned 85 acres. The approximately 94 acres of land is comprised of the southern 50 acres of Cell Number 3 of the Artificial Island facility plus 44 acres of coastal wetlands.

d. Property to the United States:

1. The first alternative is a fee for fee exchange. PSEG Power, LLC is attempting to procure property in Pedricktown to exchange with the Government. The Government will receive approximately four (4) million cubic yards of disposal area capacity in the better-situated Pedricktown area, which is much more valuable to the Government toward its annual maintenance dredging project. This site must be completely permitted for use as a dredged material

site before title to the United States' land at Artificial Island is granted to PSEG Power, LLC.

2. The second alternative is a fee for easement exchange with the additional terms and conditions described providing an overall net benefit to the government. If, after good-faith efforts to do so (as determined by the U.S. Army Corps of Engineers), PSEG Power, LLC fails to acquire the title to land in the Pedricktown area as described in (d1) or the necessary permits required for use of the site as a dredged material deposit site cannot be obtained, the alternative would be for PSEG Power, LLC to provide the United States with an easement(s) for the placement of approximately four (4) million cubic yards of dredged material from the Pedricktown disposal area. If necessary, as a condition precedent to the land exchange in the easement scenario, PSEG Power, LLC shall be responsible for the removal, transport and placement of dredged material from current dredged material deposit sites owned by the United States to the PSEG Power, LLC property designated under the easement or other licensed disposal facility. The removal, transport and placement activities shall be at no cost or expense to the United States. In either case, this property exchange will enhance the benefit to the United States not only due to the location of the dredge disposal site, but also in potentially providing greater disposal capacity than will be lost at Artificial Island.

William Levis
President and Chief Operating Officer

80 Park Plaza, 4th Floor, Newark, NJ 07102-4194
tel: 973.430.5687 fax: 973.242.5162
email: william.levis@pseg.com

PSEG
Power L.L.C.

May 7, 2010

Lieutenant Colonel Thomas J. Tickner
District Commander – Philadelphia District
U. S. Army Corps of Engineers
Wanamaker Building
100 Penn Square East
Philadelphia, PA 19107-3390

Dear Colonel Tickner:

LETTER OF INTENT - PROPOSED LAND EXCHANGE
ARTIFICIAL ISLAND CONFINED DISPOSAL FACILITY

This letter of intent serves to document our discussions over the past year regarding a land exchange between PSEG Power, LLC (PSEG) and the U. S. Army Corps of Engineers (USACE). PSEG currently owns and operates the Salem and Hope Creek Nuclear Generating Stations located in Lower Alloways Creek Township, Salem County, New Jersey. PSEG is applying shortly to the U. S. Nuclear Regulatory Commission (NRC) for an Early Site Permit (ESP) for a potential new nuclear plant adjacent to the existing nuclear plants. The acquisition of a portion of the Artificial Island Confined Disposal Facility (CDF) provides operational, security and environmental benefits to the siting and construction of a new nuclear plant.

PSEG will convey property rights (either in fee or by easement) to the USACE for land that is licensed and permitted as a CDF with a capacity of approximately four (4) million cubic yards of dredge material. PSEG intends to acquire the exchange property and to obtain all appropriate permits and authorizations for the operation of a CDF prior to the transfer. PSEG also intends to acquire an exchange property in a location that benefits the government by reducing the costs and environmental impact of transporting dredge material. This is targeted for the area between the existing Killcohook and National Park CDFs. At the completion of PSEG's actions in permitting a new CDF, PSEG will exchange the property with the USACE for part of the Artificial Island CDF located adjacent to the Salem and Hope Creek site. PSEG requires a minimum of 85 acres of land from the USACE, including a portion of the southernmost cell of the CDF. An additional 9 acres to the east of the CDF is also included on the attached map, as this property supports potential road and transmission improvements for the new plant. The final acreage to be exchanged will be determined during finalization of the necessary exchange agreement with the USACE.

PSEG has initiated negotiations for a potential exchange property that your Operations and Real Estate staff have found to be acceptable. The real estate interest to be conveyed to PSEG will be of approximately equal value as that granted to the government, and which will provide an overall net benefit to the government as required by law.

Should PSEG be unable to acquire a separate exchange property acceptable to the USACE, PSEG will transfer dredge disposal easement rights for a portion of PSEG's current Salem and Hope Creek site, commensurate with the dredge material capacity of the portion of the Artificial Island CDF that PSEG is interested in acquiring. This area will also be permitted as a CDF prior to transfer. If necessary, PSEG will be responsible for the removal, transport and placement of dredged material from current dredged material deposit sites owned by the United States to the PSEG property designated under the easement, or other licensed disposal facility. The removal, transport and placement activities shall be at no cost or expense to the United States. Final capacity requirements will be determined by a dredge material consolidation study to be performed by PSEG subject to USACE approval or other acceptable method of calculating capacity.

PSEG anticipates completion of this exchange within five (5) years from the date of USACE execution of the Concept Approval. As we discussed during your recent site visit, we request an expeditious execution of the Concept Approval by May 20, 2010 to support PSEG's ESP application submittal to the NRC. This action will result in an overall net benefit to the government and the USACE mission to maintain federal navigation projects along the Delaware River for the benefit of the American people by providing dredged material capacity for maintenance dredging of the Delaware River in locations that reduce dredge material transportation costs and the associated environmental impacts of this transportation.

The exchange is conditioned upon PSEG's acquisition and / or identification of an exchange property and the execution of a legally binding exchange and acquisition agreement pursuant to 33 U.S.C. §§558b and 558b-1. This agreement will be finalized after the completion of the required studies and documentation for such an exchange have been completed and approved. All costs incurred due to the exchange and acquisition agreement, including closing and administrative, incurred by the United States for the proposed land exchange shall be borne by PSEG.

I appreciate the hard work of you and your staff as we have developed this mutually beneficial solution. I want to specifically thank Mike Landis, Heather Sachs and Craig Homesley of your team for their diligence and focus. I have no doubt we will continue this working relationship through the execution of the Concept Approval and the subsequent exchange agreement. I would appreciate a phone call in the near term that indicates that this letter of intent is acceptable. Thanks for your support in this important energy project.

Sincerely,

Enclosure – USACE Land Exchange Property Map

C The Honorable Frank A. LoBiondo – Member of Congress
Anthony DePasquale – USACE Philadelphia District Operations Chief
Craig Homesley – USACE Baltimore District Real Estate Chief

PSEG NUCLEAR PROPERTY WITH PROPOSED LAND ACQUISITION

September 11, 2009

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U. S. ARMY CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MD 21203-1715

CENAB-RE-C

13 May 2010

MEMORANDUM THRU NAD Commander, USACE, North Atlantic Division, ATTN: CENAD-PSD-R (John Brown), 302 General Lee Avenue, Brooklyn, New York 11252

FOR Regional Integration Team (CEMP-CR/Mr. Redmond), 441 G Street, NW, Room 3T55, Washington, DC 20314-1000

SUBJECT: Concept Approval, Artificial Island Contained Disposal Area Land Exchange, Lower Alloways Township, Salem County, New Jersey (Delaware River, Philadelphia to Sea Federal Navigation Project)

1. Recommended Action. This memorandum seeks Assistant Secretary of the Army (Civil Works) concept approval of the proposed exchange.

2. Authorities: Title 33 USC Sec 558b-1 authorizes the Secretary of the Army to exchange land or property for a project of river or harbor improvement upon "terms and conditions deemed appropriate by him."

3. Background.

a. PSEG Power, LLC is a publicly-traded diversified energy company headquartered in New Jersey and is one of the ten largest electric companies in the United States. PSEG Power, LLC operates the Salem and Hope Creek Nuclear Generating Stations, located in Lower Alloways Creek Township, Salem County, New Jersey. PSEG Power, LLC is applying shortly to the U.S. Nuclear Regulatory Commission (NRC) for an Early Site Permit for a potential new nuclear plant adjacent to existing nuclear plants. In order to reduce environmental impacts and allow the use of new nuclear security design features, the company has proposed a land exchange for a part of the adjacent Corps-managed federal dredged material disposal facility.

b. The Artifical Island Confined Disposal Facility is an active, federally-owned dredged material placement location used in support of navigation along the Delaware River. The area subject to the request by PSEG Power, LLC contains a lifetime capacity of approximately four (4) million cubic yards of dredged material.

c. PSEG Power, LLC is currently preparing an Early Site Permit application to the NRC for the proposed new project. The NRC has specific requirements that PSEG Power, LLC must meet to demonstrate "control" of the property for licensing and construction of a nuclear power plant. At this point in the application and permitting process, PSEG Power, LLC must demonstrate progress towards "control" of the land proposed for the new plant at the time of Early Site Permit application, due May 20, 2010.

4. Concept Package. This package includes a memorandum from CENAB-RE-C through the NAD Regional Integration Team CEMP-CR explaining the concept of the exchange between the United States and PSEG Power, LLC, along with several enclosures: Enclosure 1 (Information Paper), Enclosure 2 (Map), Enclosure 3 (Letter of Intent from PSEG Power, LLC), Enclosure 4 (A letter from Congressman LoBiondo , 2nd District, New Jersey, to the Assistant Secretary of the Army (Civil Works) in support of this action.)

5. Concept. The Philadelphia District has proposed that the United States enter into a land exchange agreement with PSEG Power, LLC to acquire the necessary real estate interests to allow the deposit of approximately four (4) million cubic yards of dredged material from federal navigation projects in the Pedricktown, New Jersey area. In return, PSEG Power, LLC will receive approximately 94 acres of land currently a part of the Artificial Island Contained Disposal Facility and adjacent to the existing Salem and Hope Creek Nuclear Generating Stations, Lower Alloways Township, Salem County, New Jersey. As part of the exchange, all real estate transactional costs for the proposed land exchange including environmental, investigative, analytical and documentation costs, closing costs, etc. and administrative costs, shall be borne by PSEG Power, LLC.

6. Property Description:

a. Property to PSEG Power, LLC: The disposal area at Artificial Island is segmented into three disposal area cells. The proposed exchange will cede a portion of one of those cells to PSEG Power, LLC. That portion, which is partially full already, has an approximate lifetime capacity of 4 million cubic yards. The United States will be retaining the remaining two disposal cells at Artificial Island to support the infrequent dredge material disposal needs in that section of the Delaware River. The proposed exchange properties include two parcels of United States-owned fee lands currently a part of the Artificial Island Confined Disposal Facility: 85 acres adjacent to the current Salem and Hope Creek Generating Stations and 9 acres next to an existing right-of-way controlled by Public Service Electric and Gas Company located proximate to (but not directly adjacent to) the aforementioned 85 acres. The approximately 94 acres of land is comprised of the southern 50 acres of Cell Number 3 of the Artificial Island facility plus 44 acres of coastal wetlands. Enclosure 2 attached hereto depicts the location of the 94 acres.

b. Property to United States:

(1) The first alternative is a fee for fee exchange. PSEG Power, LLC will use best efforts to acquire appropriate land in fee with approximately four (4) million cubic yards of disposal area capacity in the better-situated Pedricktown, New Jersey area. Capacity in the Pedricktown area is much more valuable to the United States toward its annual maintenance dredging project. This site must be completely permitted for use as a dredged material deposit site before title to the United States land is granted to PSEG Power, LLC.

(2) The second alternative is a fee for easement exchange with the additional terms and conditions described providing an overall net benefit to the United States. If, after good-faith efforts to do so (as determined by the U.S. Army Corps of Engineers), PSEG Power, LLC fails to acquire the title to land in the Pedricktown, New Jersey area or the land cannot be permitted for dredged material deposit use, PSEG Power, LLC will grant to the United States (acting through the U.S. Army Corps of Engineers) an easement(s) to place approximately four (4) million cubic yards of dredged material upon lands that are permitted for use as dredged material deposit sites. If necessary, as a condition precedent to the land exchange, PSEG Power, LLC shall be responsible for the removal, transport and placement of dredged material from current dredged material deposit sites owned by the United States to the PSEG Power, LLC property designated under the easement, or other licensed disposal facility. The removal, transport and placement activities shall be at no cost or expense to the United States. All dredged material sites considered for this removal action will be part of the Delaware River - Philadelphia to the Sea Federal Navigation Project.

7. Exchange Benefits and Values: The purpose of the proposed real estate action is to exchange disposal area capacity in one location (Artificial Island) for equivalent or better disposal area capacity in a more valuable location (Pedricktown) for the Philadelphia District's Delaware River, Philadelphia to Sea project.

a. The exchange facilitates beneficial acquisition. This exchange will facilitate acquisition of property rights that are typically difficult to obtain. Dredged deposit sites for the material dredged from proximate federal navigation projects have finite capacities and new contained disposal facilities are difficult to acquire. This exchange would lead to acquisition of a new contained disposal facility in a better location.

b. A better location means cost savings. This proposed exchange should reduce future dredging contract unit costs for Philadelphia to the Sea maintenance dredging. In the dredging industry, the transportation costs of moving material from the dredge site to a disposal area are often the most significant cost drivers. As such, this proposed exchange should reduce future dredging contract unit costs for this project. With more affordable unit costs, the District will be better able to perform the amount of maintenance dredging required to meet our mission goal of maintaining the navigation channel to its required depth.

c. A better location contributes to efficiency. The exchange is beneficial to the United States because the new disposal area capacity gained through this exchange is optimally located in the area of highest annual maintenance in the Delaware River. With more affordable unit costs, the Corps will be better able to perform the required amount of maintenance dredging. More disposal area capacity at the proposed location would ease the disposal area management burden at this site, better enabling the staff to keep up with site maintenance.

d. The exchange provides for retention of capacity in a less frequently used disposal area. The United States will still retain significant disposal capacity in the less used Artificial Island area. The disposal area at Artificial Island has been used periodically in the past, whereas, the better located Pedricktown disposal area is used annually for disposal of dredged material. The United States would retain the remaining two disposal cells at Artificial Island to support the infrequent dredge material disposal needs in that section of the Delaware River.

8. Conclusion. The exchange proposal affords the United States an opportunity to obtain additional dredged material deposit capacity in locations more beneficial to the United States. Dredged deposit sites for the material dredged from proximate federal navigation projects have finite capacities and new contained disposal facilities are difficult to acquire. This proposed exchange should reduce future dredging contract unit costs for Philadelphia to the Sea maintenance dredging. With more affordable unit costs, the Corps will be better able to perform the amount of maintenance dredging required to meet our mission goal of maintaining the navigation channel to its required depth. In addition, more disposal area capacity at the proposed location will ease the disposal area management burden at the proximate disposal site at Pedricktown.

9. The following conditions are part of the Concept approval:

a. That the benefit received by the Army under this exchange will be deemed appropriate by the Secretary of the Army.

b. That all environmental issues are addressed in appropriate environmental documentation.

c. That the exchange must be accomplished without adverse impact on the Army's mission.

CENAB-RE-C
SUBJECT: Concept Approval, Artificial Island Contained Disposal Area Land Exchange, Lower Alloways Township, Salem County, New Jersey (Delaware River, Philadelphia to Sea Federal Navigation Project)

10. It is recommended that this be forwarded to Assistant Secretary of the Army (Civil Works) for approval.

11. You may contact Heather Sachs at 410-962-4648 for further information.

FOR THE COMMANDER:

SUSAN K. LEWIS
Acting Chief, Real Estate Division
U.S. Army Corps of Engineers, Baltimore District

4 Encls.
1. Information Paper
2. Site Map
3. Signed Letter of Intent from PSEG Power, LLC
4. Letter from Congressman LoBiondo

FRANK A. LoBIONDO
2ND DISTRICT, NEW JERSEY

REPLY TO:
☐ 2427 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-3002
202-225-6572
FAX 202-225-3318

☐ 5914 MAIN STREET
MAYS LANDING, NJ 08330
609-625-5008
FAX 609-625-5071

1-800-471-4450

Congress of the United States
House of Representatives
Washington, DC 20515-3002

COMMITTEES:
TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEES:
RANKING MEMBER
COAST GUARD AND MARITIME TRANSPORTATION
AVIATION
WATER RESOURCES AND ENVIRONMENT
ARMED SERVICES
SUBCOMMITTEES:
AIR AND LAND FORCES
READINESS
TERRORISM, UNCONVENTIONAL THREATS AND CAPABILITIES

April 20, 2010

The Honorable Jo Ellen Darcy
Assistant Secretary of the Army for Civil Works
Army Corps of Engineers
108 Army Pentagon
Room 3E446
Washington, DC 20310-0108

Dear Assistant Secretary Darcy:

I write in support of the agreement in principle to execute a land exchange between PSEG Power, LLC (PSEG) and the Army Corps of Engineers currently under review by your office and encourage you to complete the review in a timely manner.

As you know, PSEG is working closely with your North Atlantic Division staff, through the Philadelphia and Baltimore Districts to execute an agreement in principle to acquire land currently under USACE control through a land exchange. It is my understanding PSEG is interested in acquiring a minimum of 85 acres of the 305-acre USACE Artificial Island CDF used by the Philadelphia District for dredge spoils from channel maintenance activities. In exchange, PSEG is pursuing potential properties that will ensure the land exchange is beneficial to the government. According to PSEG, the ability to acquire this property would provide significant environmental, plant layout, security and operational benefits for a new nuclear plant PSEG is considering building at their Salem County, New Jersey site.

I understand PSEG needs an approved land exchange agreement in principle by May 20, 2010, to meet the deadline for submittal of an Early Site Permit (ESP) application to the NRC for the new nuclear plant. Therefore, I am asking for your assistance in approving the agreement in principle in time to meet the PSEG ESP submittal deadline.

This is a critical first step in the process building a new nuclear plant to provide needed carbon free energy to New Jersey. Thank you for your attention to this matter.

Sincerely,

Frank A. LoBiondo
Member of Congress

FAL:gg

APPENDIX B

The USACE's 7 Environmental Operating Principles

1. *Strive* to achieve environmental sustainability;

2. *Recognize* the interdependence of life and the physical environment, and proactively consider environmental consequences;

3. *Seek* balance and synergy among humans and natural systems by designing solutions that support and reinforce each other;

4. *Continue* to accept corporate responsibility for activities under our control that impact human welfare and the viability of natural systems;

5. *Seek* ways and means to assess and mitigate cumulative impacts to the environmental; bring systems approaches to the full life cycle of our processes;

6. *Build* and share an integrated scientific, economic, and social knowledge base that supports greater understanding of the environment and impacts of our work;

7. *Respect* the views of individuals and groups interested in Corps activities; listen actively and learn their perspective in the search to find win-win solutions that also protect and enhance the environment.