PEARCE CREEK
DREDGED MATERIAL CONTAINMENT AREA MODIFICATION
CECIL COUNTY, MARYLAND
DRAFT ENVIRONMENTAL ASSESSMENT

March 2015

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers Philadelphia District (USACE) has the mission and authority under the Rivers and Harbors Act to maintain navigation channels in the interest of safe navigation for both large ocean-going and smaller vessels in compliance with authorized channel dimensions. The Federal navigation project Inland Waterway from Delaware River to Chesapeake Bay, DE and MD requires a dredging management program to ensure that there is sufficient capacity for placement of material dredged during channel maintenance operations. Since 1829, the Chesapeake and Delaware Canal (C&D Canal) has allowed vessels to travel west to the Port of Baltimore from the Delaware River rather than south in the Delaware River and Bay to the Atlantic Ocean coast of Delaware, Maryland, and Virginia to the mouth of the Chesapeake Bay and from there, north up the Chesapeake Bay to the Port of Baltimore, a savings of over 300 miles (Figure 1-1). Currently, the C&D Canal and approach channels carry 40 percent of shipping traffic in and out of the Port of Baltimore.

To maintain navigability, the C&D Canal Southern and Northern Approach Channels in the upper Chesapeake Bay are periodically dredged and the material has been placed in either upland dredged material containment areas (DMCAs) or up until 2012, placed overboard in aquatic sites in the upper Chesapeake Bay (Pooles Island Open Water Placement Sites). The state of Maryland closed the use of all overboard placement sites near Pooles Island in 2012. The USACE needs to utilize alternative available placement sites for maintenance dredging. The Pearce Creek DMCA is the preferred option for its available capacity and proximity to the Chesapeake Bay approach channels. Alternative locations such as Court House Point (7 miles to the northeast) or Poplar Island (50 miles to the south) would incur higher dredging, transport, and placement costs than the use of the Pearce Creek DMCA. The USACE maintains the channel at an authorized depth of 35 feet with two feet of advanced maintenance, for a total depth of 37 feet at mean low water (MLW).

The USACE acquired 996 acres of land (the Pearce Creek DMCA property) in 1937 when the C&D Canal was deepened. Perimeter soil dikes were constructed on an area approximately 260 acres. A sluice gate was constructed for the purpose of allowing water to be released from the containment area to Pearce Creek in a controlled manner during dredged material placement operations. A second sluice was constructed near the mouth of Pearce Creek, which limited the discharge water from Pearce Creek to the Elk River and created Pearce Creek Lake. Dredge material was placed in the DMCA in 1937 and 1938, and then again beginning in the 1960s, until the last placement in 1993. The existing soil dikes were raised to their current elevation in 1989 (35-45 feet relative to the North American Vertical Datum of 1988). It is estimated that 4.0 million cubic yards (mcy) of dredged material have been placed in the DMCA.

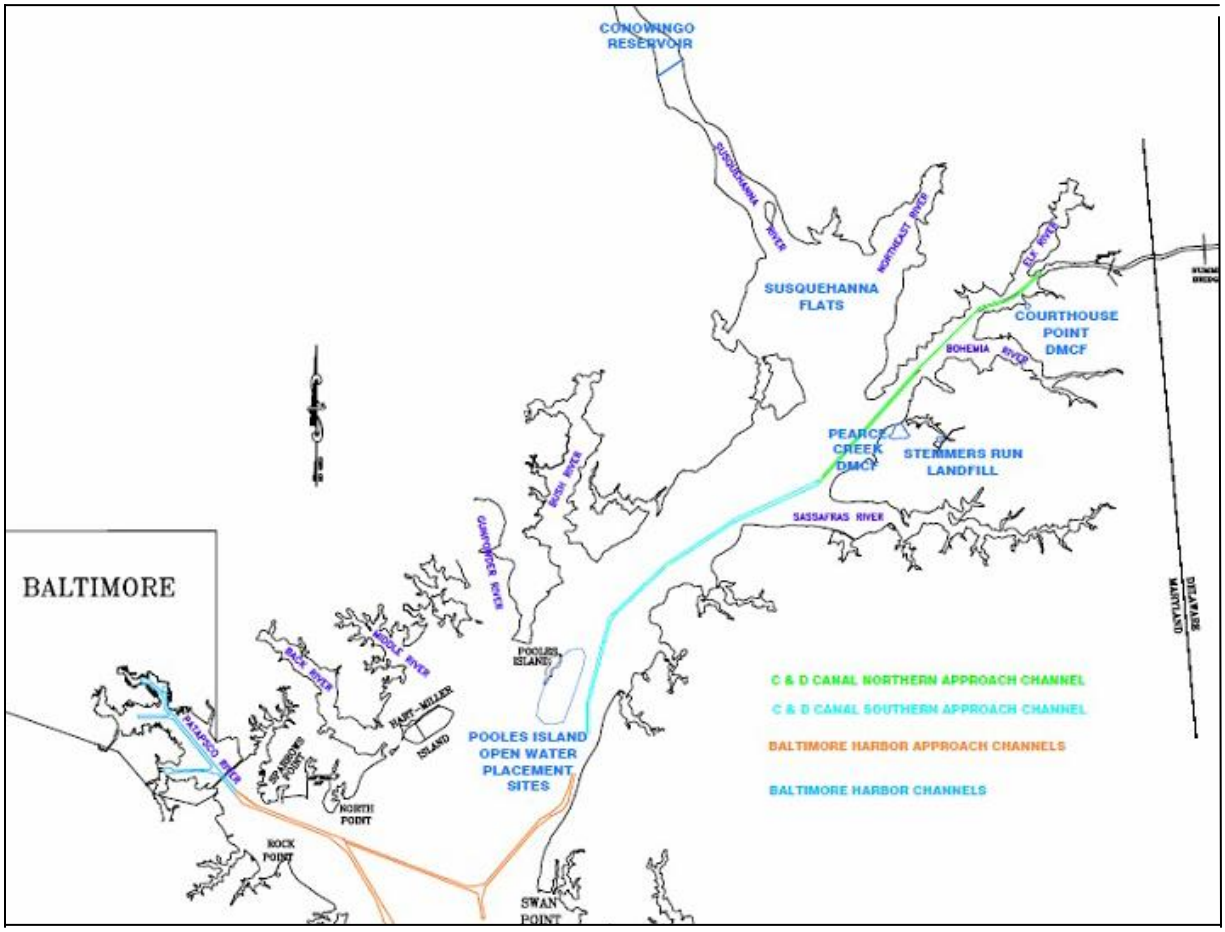


Figure 1-1: Navigation channels between the Port of Baltimore and the C&D Canal.

1.1 STUDY AREA

The Pearce Creek DMCA is located in Cecil County, Maryland (see Figure 1-2) on the eastern bank of the Chesapeake Bay near the confluence of the Elk River and the Chesapeake Bay. The site is located on Pond Neck approximately 7 miles west of Cecilton, Maryland. Several small communities border the DMCA, including West View Shores, Bay View Estates, and Crystal Beach (Figure 1-3). Development of the West View Shores community occurred mainly after World War II in the 1940s and 1950s. The development of Bay View Estates, which borders the study area to the southwest, occurred later and at a slower pace than the community of West View Shores.

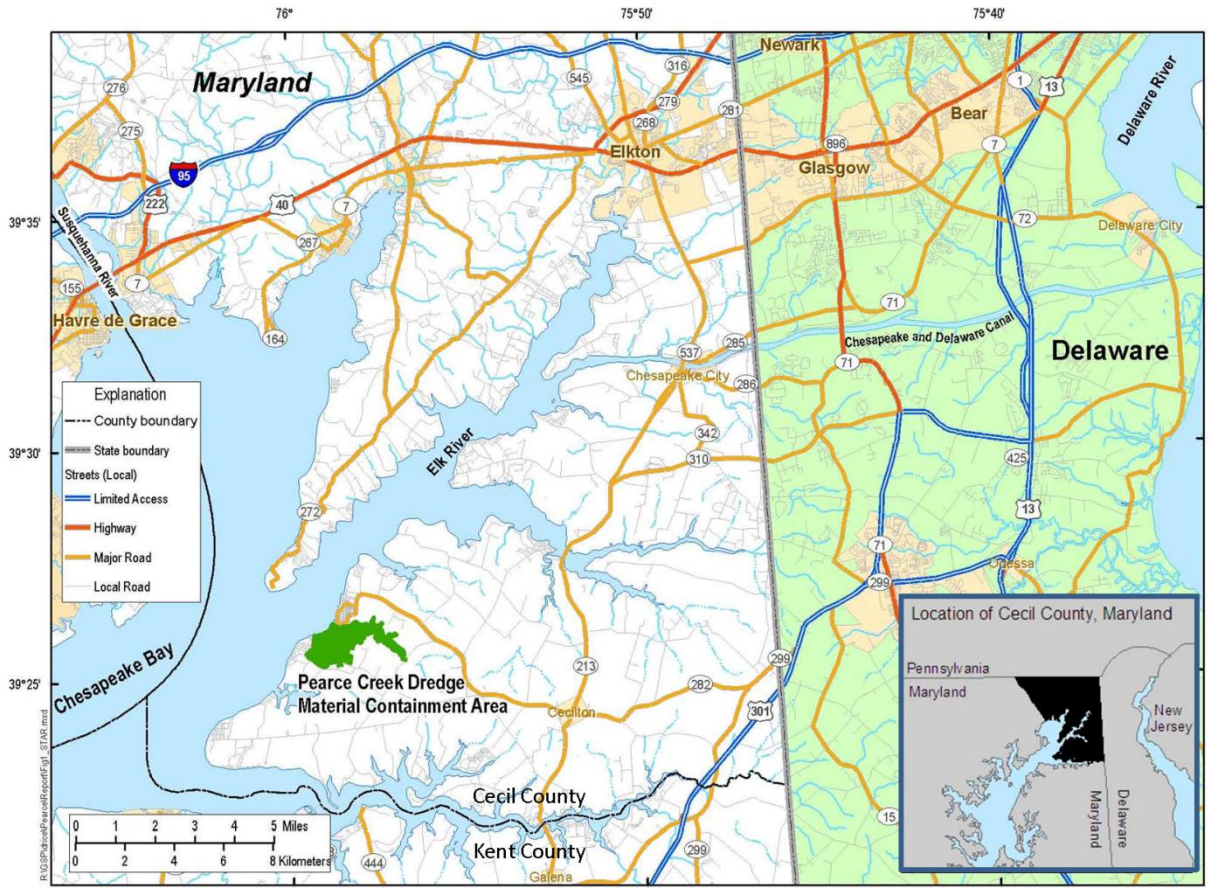


Figure 1-2: Location of the Pearce Creek Dredge Material Containment Area in Cecil County, Maryland. (Dieter *et al.*, 2013)

1.2 STUDY PURPOSE

The USACE is proposing to conduct modifications to the Pearce Creek Dredged Material Containment Area (DMCA) for future dredged material placement operations. Concerns have been raised that past use of the Pearce Creek DMCA has contributed to water quality degradation in domestic wells in neighboring residential communities. The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of proposed actions and reasonable alternatives to those actions. Although the Pearce Creek DMCA is a Federally-owned existing placement site, it has not been used for dredged material placement in 21 years. In coordination with the Maryland Department of the Environment, the USACE has developed a plan to prepare the Pearce Creek DMCA by re-establishing the perimeter earthen dikes, grading, and installing an impermeable barrier that will eliminate the hydrogeologic connection of dredged materials to be placed within the site and underlying groundwater. The purpose of this Environmental Assessment is to evaluate the potential direct, indirect and cumulative environmental impacts that could be associated with modification work proposed for the Pearce Creek DMCA.

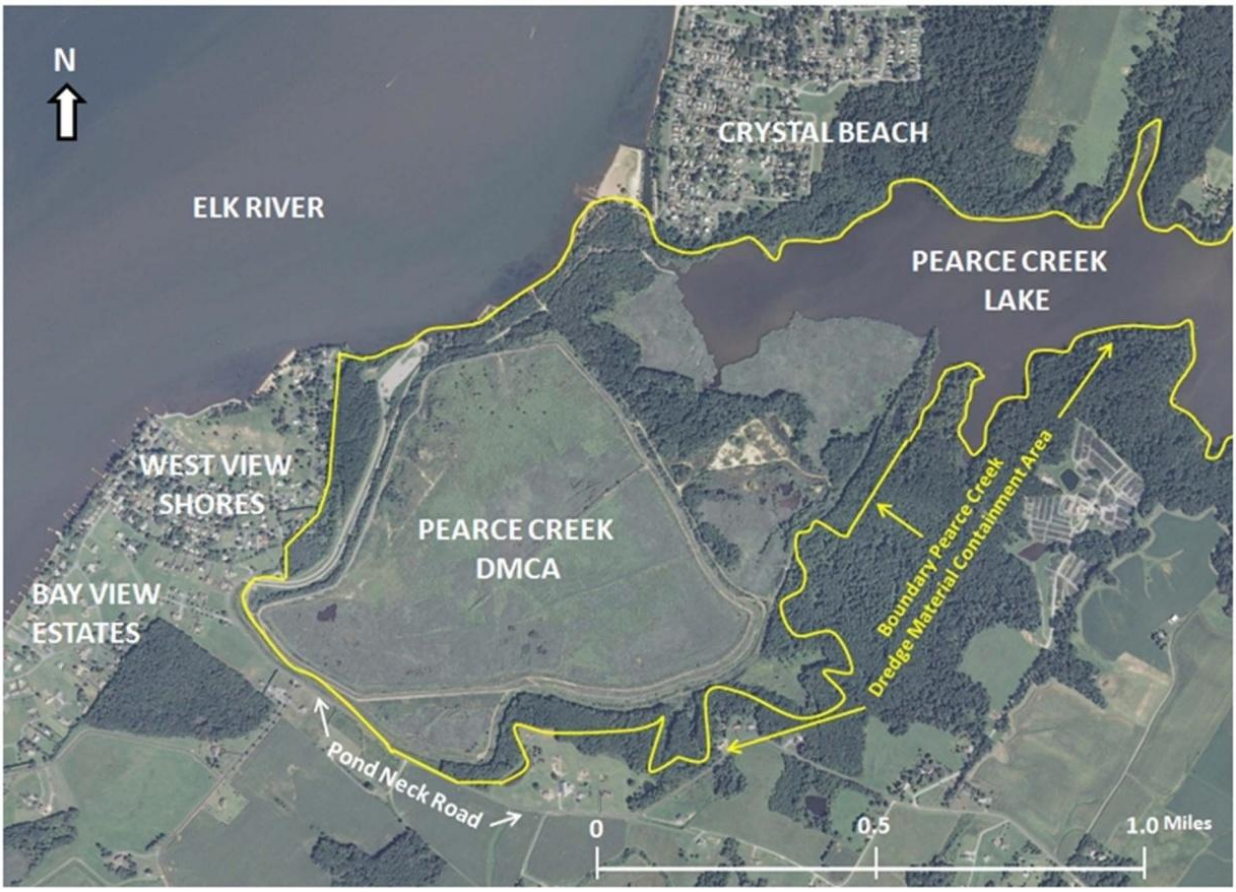


Figure 1-3: Pearce Creek Dredge Material Containment Area (DMCA) and vicinity, Cecil County, Maryland, 2009. (Dieter *et al.*, 2013)

2.0 PROJECT ALTERNATIVES AND PREFERRED PLAN

2.1 NO ACTION

The No Action alternative considered discontinuing use of the Pearce Creek DMCA for dredge material placement operations for navigational channel maintenance. During the previous 20 years, maintenance dredged material was placed overboard in aquatic sites in the upper Chesapeake Bay. These sites were closed by the state of Maryland in 2012. Pearce Creek is an established placement site used previously for deposition of maintenance dredging materials since the 1930s. Its utilization would not require the procurement of, or environmental impact to, upland habitats in an upland area not previously used for dredged material placement.

As was previously stated in Section 1.0, Pearce Creek is ideally located and has available capacity for additional dredged material placements. To maintain navigability, the upper Chesapeake Bay channels

and the C&D Canal require periodic dredging. The Pearce Creek DMCA is the preferred option. Alternative locations such as Court House Point (7 miles to the northeast) or Poplar Island (50 miles to the south) would incur higher dredging, transport, and placement costs and their capacity has been used for placement operations of other reaches of the navigation channels.

2.2 SOUTHWEST LINER AND DEEP SLURRY WALL AND BUFFER AREA

Due to concerns raised in regard to groundwater quality impacts that have been associated with prior use of the Pearce Creek DMCA, structural alternatives were evaluated that would prevent or limit water from infiltrating into the groundwater beneath the DMCA. One alternative analyzed in detail consisted of an 8,500 foot long, soil-bentonite cut-off wall constructed along the northern, western, and southern sides of the DMCA with a low permeability liner covering the DMCA area west of the cut-off wall. Vertically, the wall would extend from the ground surface down to the Upper Confining Unit. Due to an area in the southwestern part of the DMCA property where the Upper Confining Unit is too thin or not present, the wall would need to be aligned through the DMCA. The wall would reduce the DMCA groundwater connection to the Elk River and domestic wells within the Magothy aquifer (Figure 2-1).

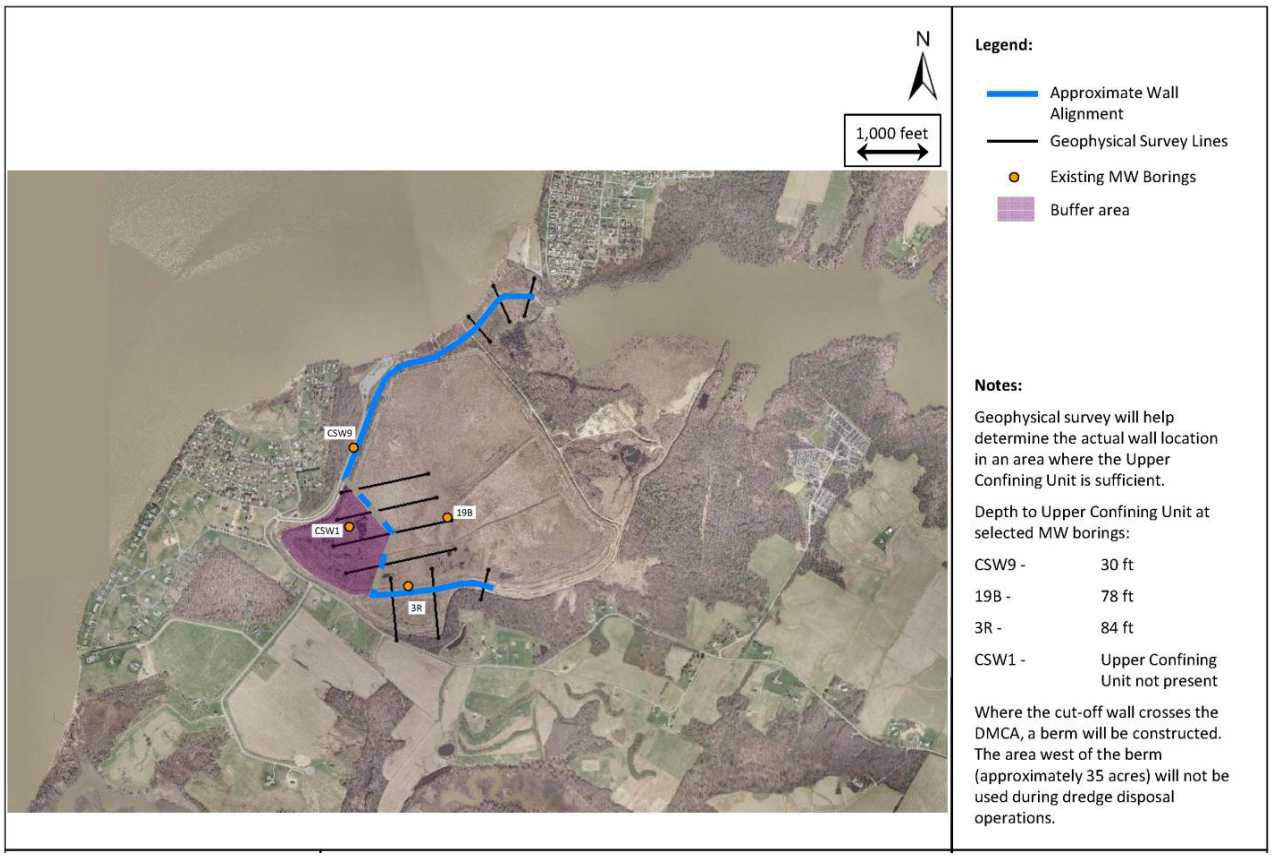


Figure 2-1: Alternative: wall alignment with geophysical survey lines and buffer area.

The USACE Philadelphia District conducted a groundwater modeling study (USACE, 2013). The

model results indicated that with a cut-off wall in place, dredge water does not travel outside the DMCA footprint into West View Shores or the Elk River within the 25-year DMCA operating life. In addition, the cut-off wall and buffer area prevented water to travel from the surface of the reduced DMCA to any domestic wells within the 25 year period of study.

While the cut-off wall would limit flow from the DMCA to surrounding communities and to the Elk River, this and other remedies would not provide immediate benefits to domestic wells where poor water quality currently exists. MDE expressed concern that the wall would not eliminate continued generation of high total dissolved solids, high iron, low pH, high sulfate, high manganese, high aluminum leachate with associated trace metals that will also mobilize naturally occurring radionuclides above drinking water standards. This alternative was subsequently rejected by the Maryland Department of the Environment (MDE). MDE stated in a 13 October 2013 letter (see Appendix) that continued use of the Pearce Creek DMCA must include a remedy for providing safe and adequate water supply for the homes already impacted and likely to be impacted by any off-site migration of degraded groundwater.

2.3 FULL LINEAR LOW DENSITY POLYETHYLENE LINER AND DIKE REPAIR

The preferred plan entails improvements to the 260-acre DMCA and includes:

- Clearing and grubbing of existing vegetation within the interior of the DMCA.
- Grading of the existing perimeter dikes to elevation of 50 ft NAVD88.
- Construction of a new sluice at the existing sluice location and associated outlet works.
- Re-grading the interior of the DMCA and installation of an impervious liner system.

The existing containment dike varies in elevation from 43 to 50 feet NAVD88. The perimeter dikes will be modified to provide a uniform 50-foot NAVD88 elevation (Figure 2-2 and 2-3). Topography is currently sloped to drain to the southeast towards the existing sluice. Drainage ditches along the outer perimeter of the DMCA are sloped to drain stormwater runoff from the containment dike to Pearce Creek Lake. The proposed liner system will be comprised of a 40 mil Linear Low Density Polyethylene (LLDPE) geomembrane with 16 ounce/square yard non-woven needle punched geotextile placed both above and below the membrane. The geomembrane will serve as the impermeable boundary between the proposed dredged materials and underlying aquifers while the geotextile layers will be utilized for cover and subgrade protection and to vent the base of the membrane (Figure 2-4).

An approved stormwater management plan is required by the Maryland Department of the Environment to reduce potential adverse impacts on the water and land resources of Maryland. Since the proposed liner will effectively eliminate infiltration and the perimeter dikes will contain storm water within the DMCA, it is assumed that all precipitation falling within the contained site will be discharged through the sluice. A 100-year (24 hour) storm event would result in an additional 7.3 inches of rain within the DMCA. With a maximum allowable operational water depth of 48 feet NAVD88, the dike would not overtop under a 100-year storm event condition. The outlet protection construction standards for the sluice are required by the 2011 *Maryland Standards and Specifications for Soil Erosion and Sediment Control*. Stormwater falling outside of the DMCA is directed to drainage ditches along the outer perimeter of the DMCA and are sloped to drain stormwater runoff from the containment dike towards the Elk River or Pearce Creek Lake.

In conjunction with installation of the impermeable liner and site preparation work by the USACE, the Maryland Port Administration has committed to funding a public water supply hookup for the communities of West View Shores, Bay View Estates, and the subdivision of Sunset Pointe. The pipeline from Cecilton was designed to provide a safe and adequate water supply for the homes already impacted. The chosen alternative was designed to reduce the input of metals and low pH to allow the aquifer to improve over time.

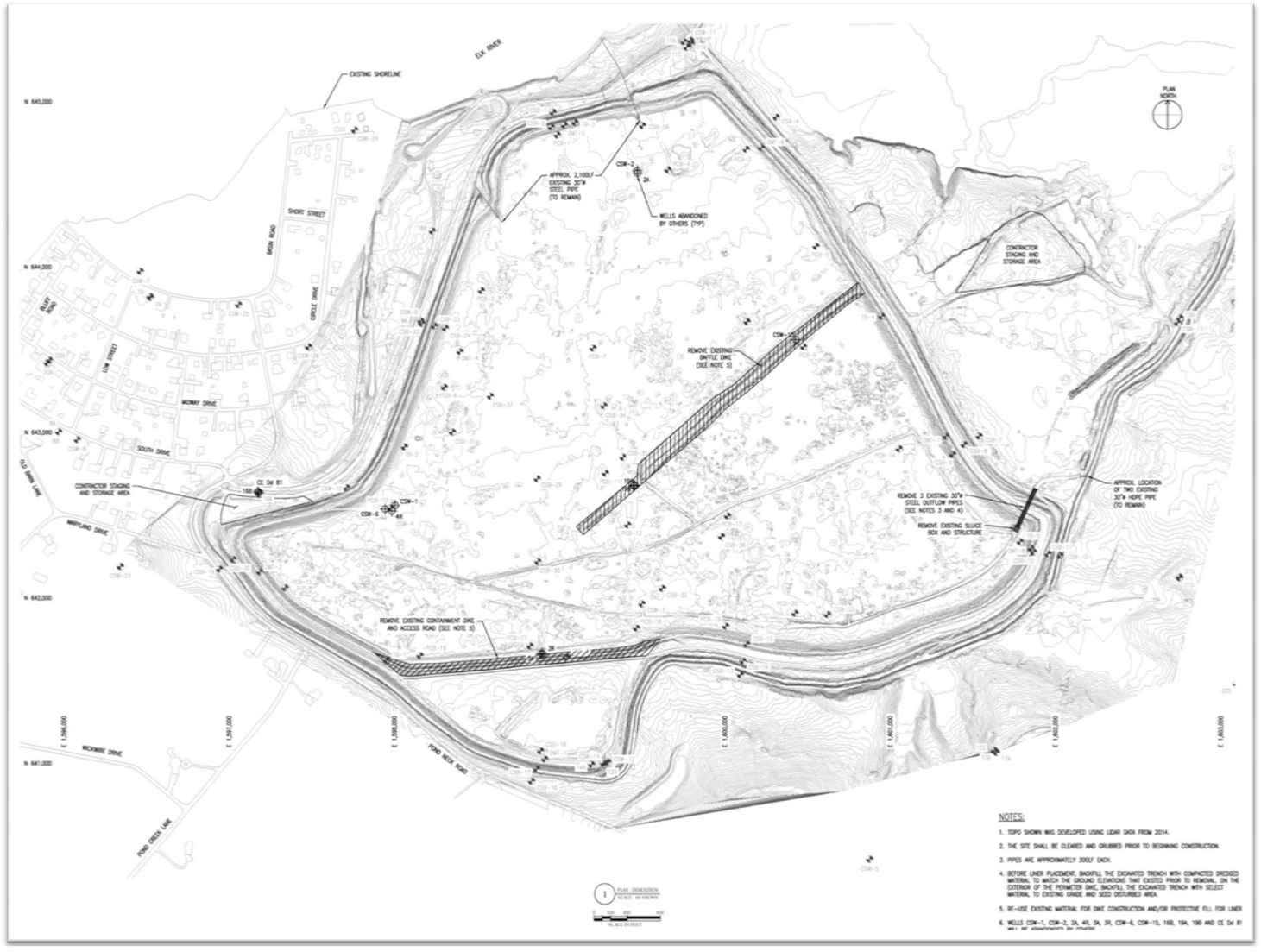
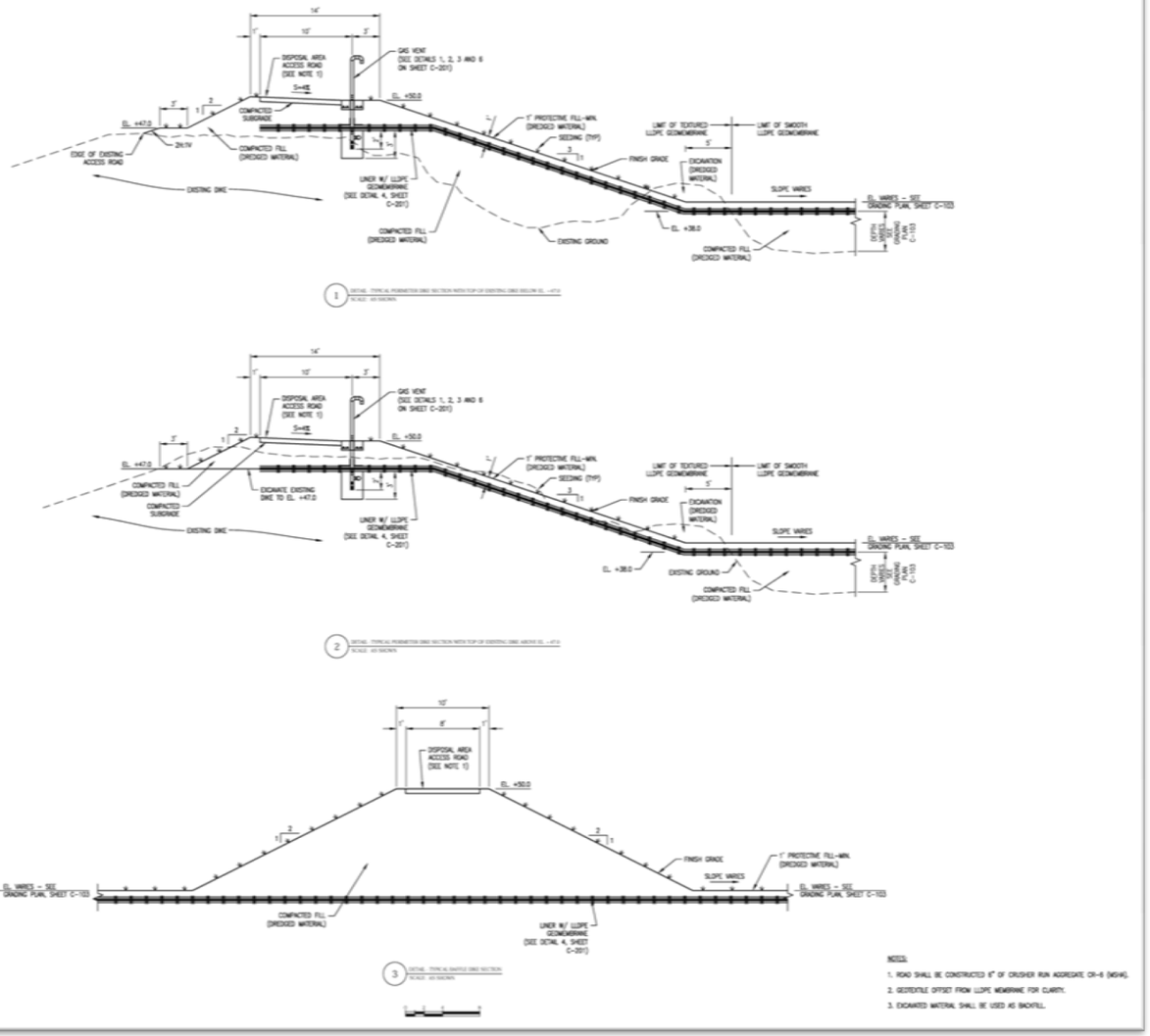


Figure 2.2: Plan view Pearce Creek DMCA - Selected Plan.



1 DETAIL - TYPICAL PERIMETER DIKE SECTION WITH TOP OF EXISTING DIKE BELOW EL. +47.0
SCALE: AS SHOWN

2 DETAIL - TYPICAL PERIMETER DIKE SECTION WITH TOP OF EXISTING DIKE ABOVE EL. +47.0
SCALE: AS SHOWN

3 DETAIL - TYPICAL BAFFLE DIKE SECTION
SCALE: AS SHOWN

Figure 2.3: Cross-section view – Pearce Creek DMCA - Selected Plan.

Figure 2-4: Linear low density polyethylene (LLDP) liner.

3.0 EXISTING ENVIRONMENT

3.1 CLIMATE

The upper Chesapeake Bay region is characterized by a generally moderate climate due to its proximity to the Atlantic Ocean, humid with well-defined seasons. The average annual precipitation is approximately 45 inches, and is relatively evenly distributed throughout the year. Snowfall averages around 13 inches per year and normally occurs between November and March. Temperature ranges from an average July high of 87 degrees F and an average January low of 23 degrees F.

3.2 GENERAL TOPOGRAPHY

At the time the USACE acquired the property for the DMCA in 1937, the site was a groundwater discharge zone with a natural wetland that drained directly into the Elk River, or into Pearce Creek, which in turn naturally flowed into the Elk River. The USACE created drainage canals and berms on the property. Pearce Creek is now a freshwater lake due to the creation of a land bridge at the mouth of the creek with the Elk River (Figure 3-1).

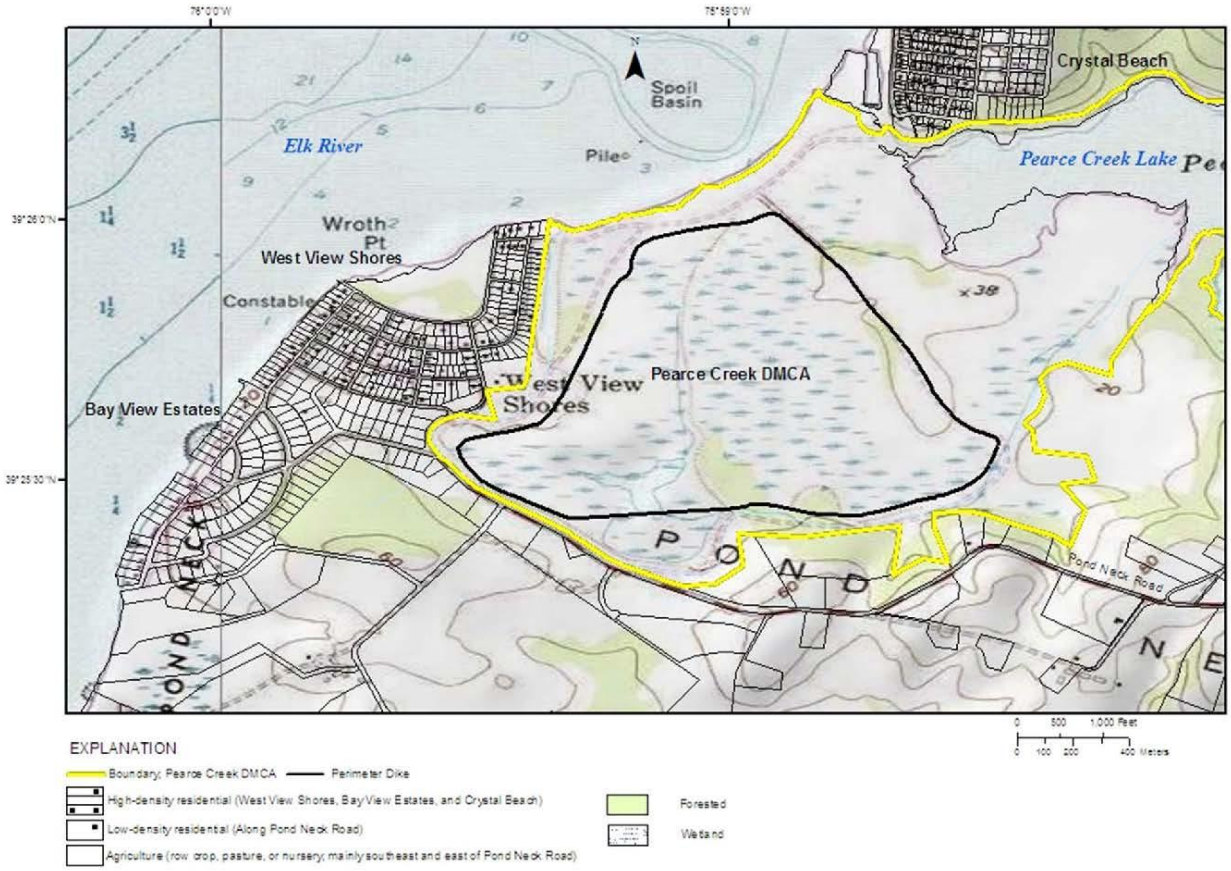


Figure 3-1: General topography of the study area during 1990s (Dieter *et al.*, 2013).

3.3 GEOLOGIC SETTING

The study area is located in the upper Chesapeake Bay region approximately 12 miles southeast of the Fall Line, which marks the western extent of the Atlantic Coastal Plain physiographic province. Coastal Plain sediments are typically gravel, sand, silt, and clay from the Cretaceous to Holocene geologic periods. In general, the subsurface soils underlying the CDF are comprised of dredged materials underlain by natural localized tidal marsh deposits and interlayered sand and clay strata. The dredged material is typically about 25 to 35 feet in thickness extending from the ground surface (ranging from about elevation (EL) +40 to +30) to about EL 0, with localized deposits extending to about EL -10. Very localized tidal marsh deposits ranging from 5 to 20 feet in thickness were encountered below the dredged materials and typically consisted of fibrous and fine grained peat, oganic silt, and organic clay. The dredged materials and/or locally encountered tidal marsh is underlain by an "upper" sand strata extending to EL -20 to -90 depending on location. The upper sands are underlain by variable thickness of interlayered clay and sand strata extending to the maximum depths explored to about EL -170 feet.

These sediments underlying the dredged material were deposited in non-marine, deltaic, and marine environments on a bedrock surface of Cambrian and Precambrian crystalline metamorphic and igneous rock. The Coastal Plain sediments in Cecil County are at their thinnest at the Fall Line, which

approximately follows Interstate 95 in Maryland to more than 1,500 feet in the southeastern part of the county at the Maryland-Delaware border. The depth to crystalline bedrock underlying the Pearce Creek DMCA study area has been estimated at 900 feet (Dieter *et al*., 2013). The geologic units evaluated in the Dieter *et al*. (2013) study relate directly to the aquifers and confining unit and comprised the shallow groundwater flow system underlying the DMCA and vicinity. They include the Patapsco Formation, the Magothy Formation, and the Merchantville Formation, all of Cretaceous age. Overlying these are the Tertiary Pensauken, and the surficial deposits of Quaternary age.

3.3.1 Hydrogeology

To understand groundwater flow in the DMCA area and vicinity, the U.S. Geological Survey (USGS) conducted the most recent ground water study (Dieter *et al*., 2013) by developing a hydrogeologic framework to delineate the shallow groundwater system underlying the Pearce Creek DMCA and adjacent residential areas. The purpose was to understand the lateral and vertical distribution of the aquifers and confining units that control the local groundwater quality. Three water-bearing units located within the top 250 feet of sediments underlying the study area were delineated, and are those that are tapped into for local water supply. In addition to the 15 monitoring wells in the study area, Dieter *et al*. (2013) installed 28 more to further define groundwater flow direction, water chemistry, and potential sources of degraded well water.

Geophysical data of previous and newly installed wells combined with physical data collected during the USGS study, were used to delineate aquifers, water-bearing zones within aquifers, and intervening confining units within the study area. Potomac Group aquifers consist largely of a thick, complex interbedded sequence of non-marine unconsolidated sand, silt and clay in the study area. Typical of fluvial sediments, the Potomac Group exhibits great lateral variation. In the upper Chesapeake Bay region south of Cecil County, the Potomac Group has been subdivided into three formations (Patuxent, Arundel, and Patapsco) (Higgins and Conant, 1990). The Patuxent and Patapsco are generally mapped as aquifers whereas the Arundel functions as a confining unit. Further south, the Patapsco Formation is further subdivided into lower and upper Patapsco aquifers (Drummond, 2007).

In Cecil County, the individual formations of the Potomac Group have been more difficult to distinguish (Higgins and Conant, 1990). Edwards and Hansen (1979) used borehole geophyics and pollen data to broadly divide the Potomac Group into upper and lower Potomac aquifers in a location approximately 2 miles west of the Pearce Creek DMCA. Within the Pearce Creek study area, the upper Patapsco aquifer is mapped as a multi-layer aquifer system. Two distinct water-bearing zones (shallow and deep), separated by a clay/silt confining unit has been delineated. The water-bearing zones and confining units exhibit the fluvial nature of the deposition, which locally includes substantial changes of unit thickness and lithology over short distances. These changes are characteristic of the riverine deposition of the Patapsco Formation in comparison to the broad sheet-like deposits typical of marine and marginal marine deposition of the overlying Magothy and Matawan units. Although locally these hydrogeologic units of the upper Patapsco Formation can be separated, at a regional scale these water-bearing zones could be connected. However, within the study area, the high density of data made it possible to correlate these individual units (Dieter *et al*., 2013).

The upper Patapsco aquifer deep water-bearning zone is the deepest hydrogeologic unit penetrated in the study area and provides water for less than 8 percent of residential wells near the DMCA. The top of this unit ranges from a maximum of approximately -150 feet just north of the southern boundary of

the perimeter dike to -180 feet NAVD 88 at the edges of the area. The upper Patapsco aquifer deep water-bearing zone ranges in thickness from 40 to 55 feet at three sites where the entire unit was penetrated in the borehole (Dieter *et al*., 2013). The predominant lithology is medium to coarse-grained sand. A confining unit of 40 to 50 feet thickness occurs within the DMCA, increases to 80 feet thickness near the Elk River in the West View Shores community., and decreases to approximately 25 feet between the aquifers along the southeastern boundary of the DMCA. Dominant lithologies of the confining unit are gray to dark gray clay and silty clay, reddish mottling, with lignite and thin fine-grained sand lenses.

The upper Patapsco aquifer shallow water-bearing zone provides water for the majority of domestic wells along Pond Neck Road and the lower half of the West View Shores community nearer the Elk River; approximately 71 percent of area wells. Structure contours of the top of the upper Patapsco aquifer for the shallow water-bearing zone has an altitude ranging from approximately -40 feet NAVD 88 in the West View Shores area to -102 feet NAVD 88 at a monitoring well located east of the DMCA perimeter dike. The thickness of the upper Patapsco aquifer shallow water-bearing zone ranges between 50 and 60 feet for much of the DMCA and West View Shores community. The unit thins to less than 30 feet in thickness near the eastern DMCA property boundary. Characteristic lithologies include fine to medium-grained sands with occasional thin beds of gravel. Clay and silt stringers are common, with some clay lenses as much as 5 to 10 feet in thickness.

The upper Patapsco confining unit overlying the upper Patapsco shallow water-bearing zone increases in thickness from 30 to more than 60 feet from the center of the DMCA north towards the Elk River and Pearce Creek Lake. The unit thins to the south and is missing in the southwestern corner of the DMCA. The unit is also missing in the southeastern part of the West View Shores community, which places the upper Patapsco aquifer shallow water-bearning zone in direct hydraulic connection with the overlying Magothy aquifer. This hydraulic connection between the two aquifers in this area has direct implications on the groundwater flow system and water quality. The upper Patapsco confining unit, consisting of clays and silty clays, increases in thickness, separating the Magothy aquifer from the upper Patapsco aquifer shallow water-bearing zone from southeast to northwest through West View Shores and parallel to Elk River.

The Magothy aquifer is composed of predominantly of medium to coarse-grained sands and fine gravel. Beds of red brown iron stained sand and gravel are present near the top of the aquifer. The Magothy aquifer is the uppermost aquifer in the study area and estimated from well completion reports to provide water for approximately 21 percent of area wells, most of which are located in the upper part of West View Shores near the DMCA property boundary. The Magothy aquifer is unconfined from the Elk River eastward to near the DMCA western berm. The altitude of the top of the unit is land surface where the unit is exposed west of the berm. The aquifer ranges in thickness from 40 to 50 feet throughout most of the study area, except near the Elk River where it thins to less than 20 feet. Matawan Group sediments overly the Magothy aquifer to form a regional confining unit in the Maryland Coastal Plain (Otten *et al*., 1988).

Higgins and Conant (1990) noted that although the predominant component of Matawan Group sediments is the Merchantville Formation, a large area is comprised of a dredged material mixture of soil, sand, clay, gravel, and debris. This fill material directly overlies the original wetland sediment, creating a buried layer of organic material. The Matawan confining unit is predominantly a dark gray to green clay and silty clay with lignite and organic detritus present. Because the fill imparts a degree

of confinement and is as much as 25 feet thick, it is difficult to distinguish it hydrologically from the underlying Merchantville Formation sediments. Confinement overlying the Magothy aquifer increases from 0 to more than 40 feet eastward across the DMCA. For information on the borehole geophyics methodologies and aquifer structure contours, please refer to the 2010-2011 USGS study report (Dieter *et al*., 2013).

Patterns in horizontal and vertical groundwater flow within the Magothy and upper Patapsco aquifers was determined by Dieter *et al*. (2013) from snyoptic water-level measurements made in May and August 2010 and March 2011. Changes in water levels (continuous data collected between January 2010 and March 2011) from wells provided additional information on how groundwater flow within and between aquifers changes through time in response to water use, recharge, precipitation, and tidal effects. Pearce Creek Lake, which is dammed at the northeastern limit of the Pearce Creek DMCA property, receives streamflow from Pearce Creek and is a potential groundwater recharge source and potential discharge area.

3.4 SEDIMENT QUALITY

The USACE collected and analyzed surficial and underlying sediment samples within the Pearce Creek DMCA and in the vicinity (USACE, 1996). All sediments in and beneath the DMCA collected in 1995-96 contained relatively high concentrations of iron, with the highest concentrations in the Matawan fill sediments. The Matawan fill sediments also contained elevated concentrations of manganese, zinc, and copper. Pore waters associated with the sediment samples were generally acidic. Sulfate concentrations were highest within the Matawan fill sediments, but also occurred at elevated concentrations in water associated with the underlying Magothy aquifer sands and the confining layer silt, peat, and/or clay.

In the vicinity of the DMCA, all sediment samples except those associated with the Magothy aquifer contained relatively high concentrations of iron. Most other metals were at moderate to low concentrations associated with sediments in either the Magothy aquifer or upper Patapsco aquifer shallow water-bearing zone. Pore waters associated with the sediment samples were acidic. Sulfate concentrations were highest in sediments associated with the upper Patapsco aquifer shallow water-bearing zone. Sulfide concentrations were measurable in sediments associated with both confining units and both aquifers; consistently high concentrations occurred in the confining unit sediments between the Magothy and upper Patapsco aquifers.

Since the methods used to collect, preserve, and analyze sediment samples in the DMCA and vicinity in the USACE (1996) study are the same, the results can be compared and contrasted for their sediment chemical composition. Iron is highly abundant, and manganese moderately abundant in both the DMCA and vicinity sediment samples. All other metals occur at relatively low concentrations in sediments both in and within the vicinity of the DMCA. Pore water is acidic and contains measurable concentrations of sulfide in both DMCA and vicinity sediments. There are, however, differences in the concentrations of some constituents in sediments in the DMCA and its vicinity. Although iron concentrations within the two sample locations are similar, whether they be surficial sediments or the underlying Magothy aquifer, confining unit, or upper Patapsco aquifer shallow water-bearing zone sediments, there are higher concentrations of manganese and zinc in the surficial fill (Matawan sediments) in the DMCA as compared to surficial Matawan sediments outside of the DMCA. The same pattern occurs in sediments in the upper Patapsco aquifer shallow water-bearing zone within the

DMCA for manganese and zinc as compared to sediments in this same zone outside of the DMCA.

Northern Chesapeake Bay Sediments. Sinex and Helz (1981) described concentrations of trace elements in bay sediments. Except for chronium, the authors found that bay sediments north of Baltimore, Maryland are enriched 3 to 8 times relative to sediments in the lower bay for most trace elements including cobalt, copper, iron, manganese, nickel, and lead. They identified the chief source as fine-grained sediments prevalent throughout the northern portion of the bay. Marvin-DiPasquale and Capone (1998) found that more than 50% of sulfur in surficial sediments in the upper bay are reduced to iron sulfide.

Hollweg *et al*. (2009) characterized general chemical composition of bay sediments using samples that were collected, maintained, and processed under anaerobic conditions to reflect their *in-situ* chemical composition and sediment pore water. In comparison with middle and lower Chesapeake Bay sediments, the upper bay sediments were low in bulk density and high in total and organic carbon, sulfur, nitrogen, and iron. Extractable bulk-phase metallic monosulfides and polysulfides were also high. Pore waters from these sediments were highly alkaline. However, compared to middle and lower bay sediments, northern bay sediments contained little nitrate-plus-nitrite nitrogen, moderately low concentrations of sulfate, moderate concentrations of sulfide, and relatively high concentrations of total iron and total manganese.

The Maryland Port Administration (MPA) and the USACE requested the Maryland Environmental Service (MES) to conduct a data search and review of upper Chesapeake Bay sediment quality in 2012. This effort was initiated in response to community stakeholder concerns regarding potential contamination within the Pearce Creek DMCA. The study also evaluated sediment data from the northern Chesapeake Bay, Susquehanna River, and the southern and northern approach channels to the C&D Canal. In addition to these areas of concern, sediment analyses were evaluated for the Courthouse Point DMCA, Pooles Island Open Water Placement Sites, Baltimore Harbor channels, and a sediment report on the Conowingo Reservoir.

At the time, no sediment data could be located for the C&D Canal Northern Approach Channel and only a few metal parameters (no organics) were located for the Pearce Creek and Courthouse Point DMCAs. Only metals data (no organics) was located for the Conowingo Reservoir. A few of the locations had data for the entire Priority Pollutant list (126 specific pollutants such as metals and organic substances that include volatile (VOCs) and semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons, (PAHs), polychlorinated biphenyls (PCBs) and pesticides).

The sites that had all priority pollutants analyzed included the Pooles Island Open Water Placement sites (post-placement and reference sites), the C&D Canal Southern Approach Channel, and Baltimore Harbor Channels. However, it should be noted that both the Pooles Island Open Water post placement site data and the C&D Canal Southern Approach Channels data are representative of the material that could be placed in the Pearce Creek and Courthouse Point DMCAs.

In this data comparison study, the detection limit is used as a substitute value for all non-detected analytes. This results in a conservative estimate of the actual concentration which could mean that the analytes were counted as being present at the detection limit but were actually not present. In some instances, the detection limit used for analysis was above the MD standards, making comparisons of the data to the standard impossible. In addition, the analytical methods were not described in several of

the datasets used in this study.

The sediment data was compiled and compared to the Maryland Department of the Environment (MDE) Residential and Nonresidential Soil Clean-Up Standards for soils (MDE, 2008). The MDE soil clean-up standards are two tiered: each pollutant has a concentration limit that is applied to non-residential zones and a lower concentration limit that is applied to residential zones, as defined by MDE Cleanup Standards for Soil and Groundwater. For more information, refer to the MES 2012 report: *Upper Chesapeake Bay Sediment Quality Comparison Study: Literature Search & Review and Data Analysis Results.*

The following discussion focuses on data sets from the specific channel reaches whose material may be placed in federal upland placement facilities in Cecil County, including the Pearce Creek DMCA:

The Pearce Creek DMCA data, the Southern and Northern Approach Channels (to the C&D Canal) data, and the Pooles Island open water placement data are most representative of the material that would be placed at the Pearce Creek DMCA. Most metals levels within these data sets are below MDE soil standards. Average and maximum concentrations of arsenic exceed the non-residential standard and some of the average and maximum total chromium concentrations exceed the residential standard. The natural geological background level for these parameters is higher than the MDE soil standards (Independent Technical Review Team, 2009).

Average and maximum thallium concentrations were also found above residential standards in some of the approach channel datasets. The highest thallium concentrations were found in channel sampling completed in 1993. Thallium concentrations in samples from the C&D Canal Southern Approach Channels, Pearce Creek DMCA, and Pooles Island Open Water Placement Site taken after 1993, while occasionally higher than the MDE cleanup standard, have not exceeded the anticipated typical concentration for thallium in Eastern Maryland soils set by MDE (MDE, 2008).

The majority of pesticides, volatile and semi-volatile organic compounds were undetected at these locations. Polycyclic Aromatic Hydrocarbons were detected in C&D Southern Approach Channel, but only one, benzo(a)pyrene, was found to have average and maximum concentrations above the residential standard. No organic parameters exceeded the non-residential standard.

The combined results from the Pearce Creek and Courthouse Point DMCAs, C&D Canal Southern Approach Channels, and Pooles Island Open Water Placement Sites show that concentrations of most metals in sediments from these areas are lower than the MDE soil standards (excluding the abovementioned exceptions), although the concentrations of the majority of metals are higher in comparison to reference soils (excepting Baltimore Harbor sediment). Conversely, the combined Upper Chesapeake Bay sediment samples have a lower average and maximum concentration for the majority of Polycyclic Aromatic Hydrocarbons than reference soils. Maximum detected concentrations of the majority of all contaminants are greater in Baltimore Harbor sediment samples than in other locations considered in this data compilation.

In preparation of the proposed modifications to the Pearce Creek DMCA and future placement operations, the USACE contracted Tetratech, Inc. to conduct a sediment study for the approach channels to the C&D Canal in 2014. Ten sediment cores were collected from June 30 to July 1 (Figure 3-2).

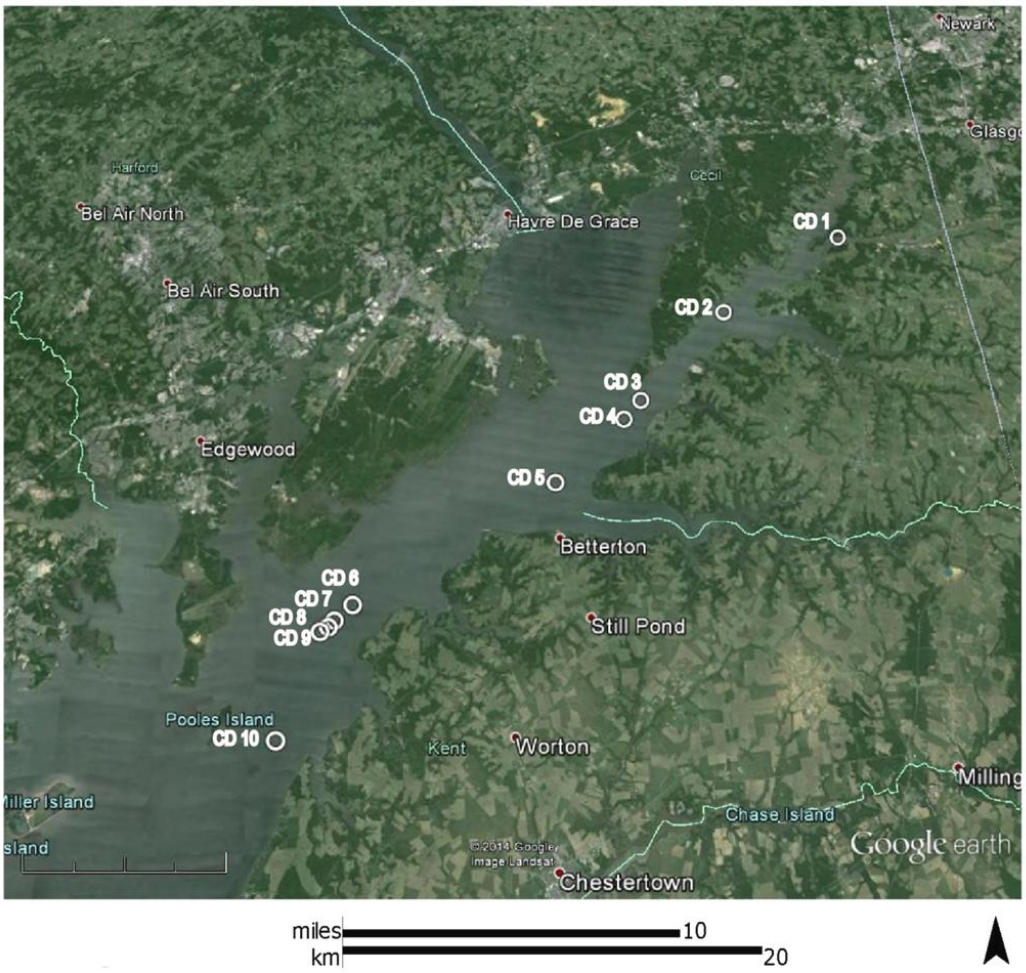


Figure 3-2: Sample locations C&D Canal approach channels (Tetratech, Inc., 2014).

The samples were analyzed for inorganics, pesticides, PCBs (as aroclors), PCBs (as congeners), volatile organics, semivolatile organics, dioxin/furans, cyanide, sulfide, total organic carbon, and grain size. Bulk sediment results were compared to MDE's *Generic Numeric Residential and Nonresidential Cleanup Standards for Soil* (2008). Of the tested analytical parameters, the only exceedances of MDE Cleanup Standards for Soils occurred in inorganics (metals) and semivolatile organics as described below.

Inorganics. Of 23 different inorganic constituents tested, aluminum, arsenic, chromium, iron, manganese, and vanadium exceeded MDE Residential Cleanup Standards. Of these, arsenic and manganese also exceeded the MDE Nonresidential standard.

Semivolatile Organics. Of 65 semivolatile constituents tested, 6 exceeded MDE Residential standards: Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Dibenz(a,h)anthracene, and Indeno[1,2,3-cd]pyrene and one or more locations. Four of these, Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, and Dibenz(a,h)anthracene also exceeded

the MDE Non-residential standard at just one location (CD-3).

Of the miscellaneous parameters tested, including cyanide, and 18 dioxin and furans, 51 volatiles, 21 pesticides, 7 PCB aroclors, and 210 PCB congeners, none exceeded MDE's Residential or Nonresidential standards (Tetratech, Inc., 2014). The full report is provided in the Appendix.

The majority of the sediment data for the C&D Canal approach channels previously discussed herein, compiled by MES for the *Upper Chesapeake Bay Sediment Quality Comparison Study* in 2012, was performed by the USACE and collected in 1993, 1994, 1999, 2002, 2005, and 2008. Tetratech, Inc. compared their 2014 data results to the MES (2012) compilation report. The tested analytes contained within the MES (2012) report included metals, pesticides, PVBs, semivolatile organics, and volatile organics. The metals data contains only those listed on the EPA's Priority Pollutant list; thus, results for metals such as aluminum, iron, manganese, and vanadium are not contained in the MES report, as they are not on the list. As described in the MES report, within the C&D Southern Approach Channel, the only analytes to exceed MDE standards throughout the data sets were the metals, arsenic and chromium, and one SVOC benzo(a) pyrene. The average and maximum arsenic concentrations of all datasets exceeded the Nonresidential cleanup standard. Additionally, average and maximum total chromium exceeded the residential cleanup standard in most of the datasets. Cyanide, antimony, beryllium, cadmium, lead, nickel, selenium, silver, thallium, and zinc were detected in one or more samples at concentrations below the Residential standard in the USACE long-term sampling. Thallium concentrations were above MDE Residential standards in one of the data sets collected in 1993. For organics, the MES report identifies benzo(a)pyrene as the only organic parameter to exceed Residential Cleanup standards. No organic parameters exceeded the nonresidential standard. The MES report (2012) documented that no sediment data could be located for the C&D Canal Northern Approach Channel.

The sediment data collected in the summer of 2014 (Tetratech, 2014) for sediment samples located within the C&D Canal Southern Approach Channel includes samples CD-5 through CD-10 (see Figure 3-2), are in general agreement with the C&D Canal Southern Approach Channel data compiled in the MES report (specifically USACE sampling and analyses conducted in 1999, 2002, 2005, and 2008). For metals, the average arsenic concentration is 12.3 mg/kg for the 2014 dataset compared to the USACE average concentration of 10.1 mg/kg reported in the MES (2012) report. Likewise for the average chromium concentration in the 2014 dataset (29.8 mg/kg) as compared to the previous USACE long-term datasets (27.2 kg/mg) reported in the MES report. Concentrations of thallium from the 2014 dataset did not exceed MDE standards, as was also the case for the long-term USACE datasets presented in the MES report. For organics, the average benzo(a)pyrene concentration was 38.5 ug/kg for the 2014 dataset compared to the USACE long-term sampling average concentration of 58.1 ug/kg; all other concentrations of organics were below MDE standards for both the 2014 and previous USACE datasets.

The 6 semivolatile organic analyte exceedances mentioned above from sample location CD-3 (located in the Northern Approach Channel), had concentrations that were one to two orders of magnitude greater than concentrations detected in the other samples within the 2014 dataset. However, given that nearby sample CD-4 (located just 5,000 feet south of CD-3) contained low concentrations of semivolatile organics, and that semivolatile organic concentrations were low in both the remaining 20014 samples and the previous years of long-term USACE datas reported in the MES (2012) report, the concentrations encountered at CD-3 appear to be anomalous and not representative of the typically

low concentrations of semivolatile organics encountered within the Northern and Southern Approach Channels.

3.5 WATER QUALITY

After the last use of the Pearce Creek DMCA in 1993, various water quality studies were conducted as a result of concerns raised by local residents and Maryland state regulators that the DMCA was contributing to poor groundwater quality in the communities surrounding the site. The Maryland Environmental Service (MES) conducted a Phase I study for the Maryland Port Administration. They compared available groundwater quality data from the local community to groundwater quality data available for the DMCA, Crystal Beach, and the relevant surficial and confined aquifers in Cecil County, Maryland. They also compared selected water-quality parameters for groundwater and surface water (*e.g.* Elk River, Pearce Creek Lake outlet, and DMCA effluent).

MES (1995) concluded that groundwater in some domestic-supply wells in the West View Shores community yielded elevated concentrations of manganese, iron, calcium, sodium, and potassium, sulfate, and chloride in wells at elevations of approximately -50 to -100 feet NAVD88. The concentrations of constituents in the wells located in West View Shores differed from typical existing groundwater concentrations in relation to Crystal Beach and to the relevant aquifers in Cecil County, Maryland. The MES (1995) report presented evidence that the elevated concentrations appeared related to the oxidation of sulfide-rich sediments, however, identification of the source of the elevation concentrations and the sulfide-rich sediments were inconclusive. MES (1995) was not able to ascertain whether these elevated constituent concentrations in groundwater reflected brackish water that intruded from Elk River or Chesapeake Bay, groundwater that flowed from the DMCA, or acidic groundwater from either of the above or other sources that reacted with *in-situ* sediments. Insufficient data on the hydrogeology, sediment, and groundwater chemistry, as well as groundwater flow in and near the West View Shores community, resulted in the inability to identify the source(s) of the elevated concentrations in the domestic-supply wells.

A second Phase I study was conducted by Black & Veatch Special Projects Corporation in 1996, hired by the USACE to determine the groundwater flow in the Pearce Creek DMCA, in followup to the MES (1995) study. The results of the Black & Veatch (1996) study were incorporated into a Phase II report and included an analysis of the geology, hydrogeology, soil chemistry, and groundwater quality of the Pearce creek DMCA and West View Shores community. The USACE concluded from the Phase II study that a) the Pearce Creek DMCA was not the source of elevated concentrations of metals, sulfate, and chloride because the area beneath the DMCA was underlain by a continuous confining unit, and b) the groundwater with elevated concentrations of metals, sulfate, and chloride originated from another source, possibly upgradient of the DMCA, or from intrusion of brackish water from the Elk River for Chesapeake Bay (USACE, 1996). The study concluded that the potential risk to groundwater due to future dredged material placement activities at the Pearce Creek DMCA relies primarily on the downward movement of water through the dredged material and into drinking water aquifers. The results of this subsurface investigation, pump testing, and chemical analysis refute this threat, and that poor water quality exists throughout the area. The low vertical hydraulic conductivity observed during the pump test, and confirmed by geotechnical analysis, suggests that the continued use of the Pearce Creek DMCA does not pose a contributing source of groundwater quality degradation.

An additional review of existing data was conducted by Roy F. Weston, Inc. for the USACE (R.F.

Weston, 1998). The analysis employed geochemical and statistical methods to identify sources of groundwater recharge in the community of West View Shores. R.F. Weston, Inc. (1998) determined that groundwater flow paths had the potential to allow groundwater to flow from the Pearce Creek DMCA into domestic supply wells in West View Shores, but there were insufficient data to determine a definitive pathway. R.F. Weston, Inc. also noted that the geochemistry is complex, and that the source of geochemical signatures in the community could be from saltwater intrusion or could reflect regional groundwater flow and quality patterns. Most of the statistical analysis did not point to the placement site contributing to degraded water quality in the residential area except possibly the southernmost portion of the area. The study concluded that data deficiencies and a lack of comparability between monitoring wells to the residential wells make it difficult to ascertain the source of the degradation.

The hydrogeologic framework and water quality of the aquifers underlying the DMCA and surrounding vicinity was evaluated by the U.S. Geological Survey (USGS) under contract to the USACE in 2010 to conduct a comprehensive study to determine whether the DMCA affects groundwater quality. The study also addressed whether groundwater samples contained chemical constituents at levels greater than maximum allowable or recommended levels established by the U.S. Environmental Protection Agency (USEPA) Safe Water Drinking Act.

Water quality measurements and samples were collected at 35 observation wells distributed throughout the study area, 15 domestic water supply wells, mainly located in West View Shores and along Pond Neck Road, and two surface water sites-Elk River and Pearce Creek Lake during the USGS study (Dieter *et al*., 2013). The selected wells cover all three of the major water-bearing zones-one in the Magothy aquifer and two (one shallow and one deep) in the upper Patapsco aquifer-beneath the DMCA and vicinity. The domestic wells provided an indication of the quality of groundwater obtained by residents mainly from the Magothy Formation and the upper Patapsco Formation outside of the DMCA property boundary. Surface water samples from the Elk River provided an indication of the quality of water used in the placement of the dredged material into the DMCA. Additionally water from the DMCA drains into Pearce Creek Lake; thus, surface water samples were taken at the outlet of Pearce Creek lake. Data for wastewater and pesticide compounds were collected at selected shallow observation wells, all domestic water-supply wells, and at both surface water sites.

Monitoring wells were installed in areas where data gaps existed, and led to inconclusive results in earlier studies. The data from existing wells and new wells were evaluated and it was concluded that the DMCA influences groundwater flow and quality. USGS integrated groundwater geochemistry data in their analysis and found that the DMCA is a source of elevated concentrations of dissolved solids and a geochemical driver of redox processes. These processes enhance the mobilization and transport of redox-sensitive metals and nutrients. The USGS study concluded that groundwater affected by the DMCA is in the Magothy aquifer and upper Patapsco aquifer (shallow water-bearing zone). Water quality in the upper Patapsco aquifer (deep water-bearing zone) does not seem to have been impacted by the DMCA. It was concluded that a combination of many human actions at the site and vicinity since the 1930 have likely contributed to the alteration of groundwater flow patterns and water quality, and the DMCA acting as an elevated recharge area.

Groundwater quality for drinking water supplies was evaluated using U.S. EPA standards in the USGS study. These include Maximum Contaminant Levels (MCLs), Health Advisory levels (HALs), and Secondary Drinking Water Regulations, even though single-residential domestic water supplies such as those in the West View Shores community are not regulated under the Federal Safe Drinking Water Act

(SDWA). Fifty-eight water quality constituents are included in the 2009 edition of the SDWA. Concentrations of 42 of these were measured at concentrations below the maximum allowable or recommended levels in all samples collected in the USGS study. The majority of these 42 constituents that did not exceed the USEPA SDWA standards were either regulated pesticides or wastewater compounds. However, 16 constituents had concentrations greater than the maximum allowable or recommended levels for the 2009 USEPA SDWA standard. These included constituents that are common to groundwater, such as total dissolved solids and pH, as well as most some inorganic trace elements such as beryllium, cadmium, thallium, nickel and arsenic. Six constituents exceeded SDWA standards in some wells: manganese, nickel, sodium, sulfate, strontium, and zinc.

3.6 VEGETATION

During the past two decades that the Pearce Creek DMCA has not been used for dredged material placement, natural plant succession and the establishment of grasses and shrubs has occurred (Figure 3-3). The most common cover types typically occurring on upland dredged material placement sites within the upper Chesapeake Bay, Elk River, and C&D Canal region are Phragmites (*Phragmites australis*) and a pioneer scrub tree community dominated by black locust (*Robinia pseudo acacia*). Phragmites is considered a pest species of low wildlife value and black locust is a short-lived, pioneer tree species of disturbed and low fertility sites. Adjacent cover types surround the area are woodland (primarily deciduous forest), farm fields and residential communities. Common tree species occur primarily along peripheral areas and include the tulip tree (*Liriodendron tulipifera*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), oak (*Quercus* spp.), hickory (*Carya* spp.), and American beech (*Fagus grandifolia*).

A small area less than ¼ acre in size is located in the southwest corner of the site can possess standing water during periods of heavy rainfall. The area is temporary and nature due to a depression in elevation as a result of past grading activities.

Figure 3-3: Pearce Creek DMCA vegetation (September 2014).

3.7 WILDLIFE

Wooded areas with small streams and ponds and neighboring grass and shrub zones within the region serve as habitat for amphibians and reptiles. Amphibians commonly observed here include the Fowler's toad (*Bufo woodhousii fowleri*), green frog (*Rana clamitans melanota*), northern cricket frog (*Acris crepitans crepitans*), spring peeper (*Pseudacris crucider*), bullfrog (*Rana catesbeiana*), pickerel frog (*Crana utricularia*), northern two-lined salamander (*Eurycea bislineata*), northern dusky salamander (*Desmognathus fuscus fuscus*), red-backed salamander (*Plethodon cinereus*), four toed salamander (*Hemidactvlium scutatum*), and northern red salamander (*Pseudo triton ruber*).

The most common reptiles observed in the area include the black rat snake (*Elapheobsoleta obsoleta),* northern watersnake *(Nerodia sipedon sipedon),* eastern garter snake *(Thamnophis sirtalis sirtalis),* ringneck snake *(Diadophis punctatus edwardsil1,* eastern mud turtle *(Kinosternon subrubrum subrubrum,* red-bellied turtle *(Pseudemys rubriventris),* and eastern box turtle *(Terrapene carolina carolina).*

Common mammalian species of wildlife observed at upland placement sites in the area include white-tail deer (*Odocileus virginianus*), Eastern cottontail (*Sylvilagus floridanus*), red fox, (*Vulpes vulpes*), raccoon (*Procyon lotor*) striped skunk *(Mephitis mephitis),* shorttail shrew *(Blarina brevicauda),* brown bat *(Eptesicus fuscus),* longtail weasel *(Mustela frenata),* meadow vole *(Microtus pennsylvanicus),* house mouse *(Musmusculus),* and the marsupial opossum (*Didelphimorphia*).

Songbird species present in the area vary depending on the time of year. The most common species include the redwinged blackbird *(Agelaius phoeniceus),* common grackle *(Quiscalusquiscalus),* and brown-headed cowbird *(Molothrus ater).* Insect-feeding arboreal birds that may also occur in the area include the tree swallow *(Tachycineta bicolor),*blue jay *(Cyanocitta cristata),* American crow *(Corvus brachynchos),* Carolina chickadee *(Poecile carolinensis),* gray catbird *(Dumetella carolinensis),* American robin *(Turdus migratorius),* wood thrush *(Hylochichla mustelina),* starling *(Sturnis vulgaris),* cardinal *(Cardinalis cardinalis),* and white-throated sparrow (*Zonotrichia albicollis*).

The Canal, Elk River, and Chesapeake Bay are strategically positioned on the Atlantic Flyway and serve as one of the most heavily used wintering area for waterfowl. Common migratory species include the snow goose *(Chen caerulescens),* and Canada goose *(Branta canadensis).* Species prominent in areas nearby water and adjacent wetland areas include the mallard *(Anas platyrhynchos),* black duck *(Anas rubripes),* canvasback *(Aythya valisineria),* redhead *(Aythya americana),* ringnecked duck *(Aythya collaris),* American wideon *(Anas americana),* and Tundra swan *(Cygnus columbianus).* Wild turkey (*Meleagris gallopavo*) are increasing in numbers in the area.

3.8 THREATENED AND ENDANGERED SPECIES

Endangered species are those species listed whose prospects for survival are in immediate danger due to a loss or change of habitat, over-exploitation, predation, competition, or disease. Threatened species are those which may become endangered should conditions surrounding the species begin or continue to deteriorate. Species may be classified as endangered or threatened on a Federal or state basis. The Maryland Natural Heritage Program (MNHP) Resource Conservation Service compiles data concerning threatened and endangered species in Maryland by county. All Federally-listed species that may occur in the upper Chesapeake Bay and C&D Canal region are considered to be occasional or transient visitors.

The Delmarva Fox Squirrel (*Sciurus niger cinereus*) was first listed as an endangered species nearly 50 years ago but has recovered across much of its historic range. The USFWS is proposing to remove the species from Endangered Species Act protection (docket no. FWS-R5-ES-2014-0021). The Delmarva Fox Squirrel occurs in mature forests of mixed hardwoods and pines, with a closed canopy and understory and therefore, it not likely to occur in the project area.

The endangered bog turtle (*Clemmys muhlenbergii*) live in a mosaic of open, sunny, springfed wetlands and scattered dry area. The species is not likely to be present on the Pearce Creek DMCA property as there are no wetlands onsite, however, the bog turtle is the only animal species listed by the USFWS, Chesapeake Bay Field Office as occurring within Cecil County.

The threatened Puritan tiger beetle (*Cicindela puritan)* was listed in 1990 and found on the eastern shore of the Chesapeake Bay. They typically occupy naturally eroding, nonvegetated cliffs. The type of habitat is not present on the Pearce Creek DMCA.

The bald eagle (*Haliaeetus leucocephalus*) typically nests in mature loblolly pines, tulip poplars and oaks along the shores of the Chesapeake Bay and rivers. They became a protected species in the 1940s under the Bald Eagle Protection Act and once the pesticide DDT was banned in the 1970s, eagle populations in the bay region have rebounded.

The peregrine falcon (*Falco peregrines anatum*) is a medium-sized bird of prey that nests on high, remote cliff ledges. Populations were decimated prior to World War II through shooting, egg collectors, and habitat destruction. After World War II, DDT reduced reproductive success. The species was listed in 1970.

Although the bald eagle (*Haliaeetus leucocephalus*) and the peregrine falcon (*Falco* peregrines) have been recently removed from the Federal endangered species list, these raptors do occur in the project area. The bald eagle is still protected under the Bald and Golden Eagle Protection Act and both birds are protected under the Migratory Bird Treaty Act.

The USFWS is proposing to list the northern long-eared bat (*Myotis septentrionalis*) as endangered and has extended its comment period through 2 April 2015. The species was proposed for listing due to the disease white-nose syndrome that has killed millions of bats and posing a significant threat to their survival.

The USFWS Chesapeake Bay Field Office lists the swamp pink (*Helonias bullata*) as a threatened plant species within Cecil County. The species is generally found in wetland areas or near headwater streams.

3.9 AIR QUALITY

The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS). The following criteria pollutant levels are provided for Cecil County: ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. Local air quality is affected by regional sources.

The 2008 ozone standard is set at a level of 0.075 ppm averaged over an 8-hour period. This standard is met at an air quality monitor when the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.075 ppm. Cecil County has an 8-hour average ozone concentration of 0.087 ppm, which does not meet the national ozone standard and is below the national average of 0.07 ppm. In 2012, the EPA strengthened the health National Ambient Air Quality Standard for fine particulates to 12.0 micrograms per cubic meter (ug/m^3), which is an annual mean that is averaged over three years. Cecil County has an annual fine-particle particulate matter concentration of 9.3 ug/m^3, which meets the national standard and is approximately the national average of 9.20 ug/m^3. There is currently no data available for Cecil County for carbon monoxide, nitrogen dioxide, lead, or sulfur dioxide levels (U.S. Environmental Protection Agency, Air Quality Statistics by County, 2012).

3.10 CULTURAL RESOURCES

The Chesapeake and Delaware Bays were formed by inundation of the lower Susquehanna and Delaware River Valleys during the recession of the continental ice sheets at the close of the Pleistocene. Prior to that time, the mouths of these two rivers were located on what now is the Continental Shelf. It was sometime during the period prior to the formation of these submerged estuary systems that humans first entered this region. The archaeological record of the prehistoric occupation of the Chesapeake Bay region, as well as the Middle Atlantic States, has been characterized by archaeologists into three main periods of cultural development: Paleo Indian (circa 14,000-8,500 B.C.); Archaic (circa 8,500-5,000

B.P.); and Woodland (5,000 B.C - 1600 A.D.). Each period is characterized by its own distinctive technologies, subsistence patterns, and settlement strategies. Prehistoric archaeological sites have been documented along the bluffs of the Chesapeake Bay shoreline, near lagoons and along river and creek channels. Few Paleo-Indian period sites have been found in the region. This is partly a result of the low population density and nomadic lifestyle of the peoples from the period and partly due to inundation of sites by sea level rise, and the subsequent burial of sites under thick layers of alluvium and cultural deposits. A lack of Archaic Period sites in the region also reflects inundation of the lower estuaries and destruction due to flooding. Therefore, the majority of archaeological investigations have traditionally focused on Woodland period sites. Sites from the Woodland period are typically found in estuarine settings.

European exploration of the upper Chesapeake area may have occurred as early as 1570 when a Spanish Jesuit named Father Sequra reportedly ventured into the northern bay area in an attempt to convert the native Indian population. English exploration intensified during the first decade of the seventeenth century when James I granted the Virginia Company of London substantial territory, including the upper Chesapeake Region. Captain John Smith led survey expeditions into the northern bay region in 1608 and 1609, with the intention of establishing trade relations with the Susquehannocks. The earliest permanent settlement in the upper Chesapeake Bay region was established as a trading post on Kent Island in 1627. In 1634, 150 English colonists established the colonial capital at St. Mary's City in the lower tidewater area. In 1649, Puritans founded the community of Providence on the Severn River in Anne Arundel County. Between 1650 and 1680, settlement occurred primarily along the shorelines of the Chesapeake Bay and its tributaries. In 1695, the capital was moved from St. Mary's City to Annapolis near the county's original community of Providence. Aside from Annapolis, substantial town growth did not occur until the eighteenth century. Tobacco dominated the economy of the coastal and riverine areas of the upper Chesapeake Bay throughout the seventeenth and early eighteenth centuries.

Agriculture remained the dominant economic activity along the coastal areas of the upper Chesapeake Bay throughout the nineteenth century. Transportation improved dramatically with the development of overland routes and bridges, construction of canals and railroads, and the establishment of sail and steamboat lines. Work on the Chesapeake and Delaware Canal was completed in 1829 as a privately owned lock canal. This 13 mile long channel connected the key commercial waterways of the Chesapeake Bay and Delaware River, facilitating trade between Philadelphia and Baltimore, Alexandria, Richmond, and Norfolk. The canal also encouraged the development of Chesapeake City and Delaware City. In 1831, a railroad running parallel to the Chesapeake and Delaware Canal was established between New Castle, Delaware, and Frenchtown, in Cecil County. The Philadelphia, Wilmington and Baltimore railroad superseded the New Castle Frenchtown line in 1837. These transportation improvements elevated Cecil County to a pivotal role in the trade network of the northern Chesapeake Bay region.

The most recent investigation conducted in the Pearce Creek DMCA was completed in 1992 by R. Christopher Goodwin & Associates, Inc. for the Maryland Port Administration (Goodwin *et al*., 1992). The cultural resource reconnaissance survey and sensitivity study was conducted to determine the effects of the proposed C&D Canal improvements on the Canal, its approaches and appurtenant facilities. The study included research at 60 dredge material containment areas, one of which was the Pearce Creek DMCA.

Archival and records research conducted by Goodwin located a total of 14 prehistoric and 3 historic archaeological sites and nine architectural resources within one mile of the Project area.

Resource	Type	NRHP status	Notes
18CE57	Prehistoric	Listed	Located in project area
18CE58	Prehistoric	Unevaluated	Located in project area
18CE129	Prehistoric	Unevaluated	
18CE130	Prehistoric	Unevaluated	
18CE131	Prehistoric	Unevaluated	
18CE132	Prehistoric	Unevaluated	
18CE133	Prehistoric	Unevaluated	
18CE134	Prehistoric	Unevaluated	
18CE136	Prehistoric	Unevaluated	
18CE160	Prehistoric/Historic	Unevaluated	
18CE161	Prehistoric	Unevaluated	
18CE165	Prehistoric	Unevaluated	
18CE166	Prehistoric	Unevaluated	
18CE167	Prehistoric	Unevaluated	
Site 8	Historic	Unevaluated	NPS Record
Site 9	Historic	Unevaluated	NPS Record – wharf
Site 10	Historic	Unevaluated	NPS Record – fishery
CE 30	Historic Structure	Unevaluated	Wickwire
CE 352	Historic Structure	Unevaluated	
CE 353	Historic Structure	Unevaluated	
CE 927	Historic Structure	Unevaluated	JW Morgan House
CE 928	Historic Structure	Unevaluated	Price-Carrion House
CE 929	Historic Structure	Unevaluated	Upper Wickwire
CE 930	Historic Structure	Unevaluated	Gromme Log House
CE 937	Historic Structure	Unevaluated	Pearce House
CE 952	Historic Structure	Unevaluated	Young-Jester House

The Area of Potential Effect (APE) includes the entire 996 acre DMCA, with a focus on the limits of disturbance to reestablish the perimeter earthen dikes, the grading of the interior, the installation of impermeable barrier, and access and staging areas.

3.11 HAZARDOUS AND TOXIC WASTES

The USACE contracted with Environmental Data Resources Inc. (EDR) to conduct a database search using the EDR Radius Map ™ Report with GeoCheck ® search criteria for a one-mile radius around the Pearce Creek Confined Disposal Facility (CDF), Earlesville, Maryland. This database search included the following National and Maryland databases:

- Federal National Priority List (NPL);
- Proposed National Priority List (Proposed NPL);

- Federal Superfund Liens (NPL LIENS);
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS);
- Federal Facility Site Information listing (FEDERAL FACILITY);
- CERCLISD No Further Remedial Action Planned (CERC-NFRAP);
- Corrective Action Report (CORRACTS);
- Resource Conservation and Recovery Act (RCRA) Treatment, Storage and Disposal (RCRA-TSDF);
- RCRA- Large Quantity Generators RCRA-LQG);
- RCRA-Small Quantity Generators (RCRA-SQG);
- RCRA-Conditionally Exempt Small Quantity Generators (RCRA-CESQG);
- Engineering Controls Sites List (US ENG CONTROLS);
- Sites with Institutional Controls (USINST CONTROLS);
- Land Use Control Information System (LUCIS);
- Emergency Response Notification System (ERNS);
- Notice of Potential Hazardous Waste Sites (SHWS);
- Permitted Solid Waste Disposal Facilities (SWF/LF);
- Recovery Sites (HIST LUST);
- Leaking Underground Storage Tanks on Indian Land (INDIAN LUST);
- Registered Underground Storage Tank List (UST);
- Permitted Aboveground Storage Tanks (AST);
- Underground Storage Tanks on Indian Land (INDIAN LUST);
- Underground Storage Tank Listing (FEMA LISTING);
- Voluntary Cleanup Program Applicants/Participants (VCP);
- Voluntary Cleanup Priority Listing (INDIAN VCP);
- Eligible Brownfields Properties (BROWNFIELDS);
- A Listing of Brownfields Sites (US BROWNFIELDS);
- Torres Martinez Reservation Illegal Dump Site Locations (DEBRIS REGION 9);
- Open Dump Inventory (ODI);
- Recycling Directory (SWRCY);
- Report on the Status of Open Dumps on Indian Lands (INDIAN ODL);
- Clandestine Drug Labs (US CDL);
- National Clandestine Laboratory Register (US HIST CDL);
- Historical UST Registered Database (HIST UST);
- CERCLA Lien Information (LIENS 2);
- Hazardous Materials Information Reporting System (HMIRS);
- SPILLD 90 from FirstSEarch;
- RCRA-Non Generators/No Longer Regulated (RCRA NonGen/NLR);
- Incident and Accident Data (DOT OPS);

- Department of Defense Sites (DOD)
- Formerly Used Defense Sites(FUDS);
- Superfund (CERCLA) Consent Decrees (CONSENT);
- Records Of Decision (RODS);
- Uranium Mill Tailings Sites (UMTRA);
- Mines Master Index File (US MINES);
- Toxic Chemical Release Inventory System (TRIS);
- Toxic Substances Control Act (TSCA);
- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act /TSCA (Toxic Substances Control Act) (FTTS);
- FIFRA/TSCA Tracking System Administrative Case Listing (HIST FTTS);
- Section 7 Tracking Systems (SSTS);
- Integrated Compliance Information System (ICIS);
- PCB Activity Database System (PADS);
- Material Licensing Tracking System (MLTS);
- Radiation Information Database (RADINFO);
- Facility Index System/Facility Registry System (FINDS);
- RCRA Administrative Action Tracking System (RAATS);
- Risk Management Plans (RMP);
- Underground Injection Wells Database (UIC);
- Registered Drycleaning Facilities (DRYCLEANERS);
- Wastewater Permit Listing (NPDES);
- Permit and Facility Information Listing (AIRS);
- Lead Inspection Database (LEAD);
- Indian Reservations (INDIAN RESERV);
- State Coalition for Remediation of Drycleaners Listing (SCRD DRYCLEANERS);
- Financial Assurance Information (US FIN ASSUR)
- EPA WATCH LIST (EPA WATCH LIST);
- Steam-Electric Plant Operation Data (COAL ASH DOE);
- Coal Combustion Residues Surface Impoundments List (COAL ASH EPA);
- Aerometric Information Retrieval System Facility Subsystem (US AIRS);
- Lead Smelter Sites (LEAD SMELTERS):
- Coal Ash Disposal Site Listing (COAL ASH):
- Land Restoration Program (LRP);
- Financial Assurance Information Listing (Financial Assurance);
- Potentially Responsible Parties (PRP);
- 2020 Corrective Action Program List (2020 COR ACTION);
- PCB Transformer Registration Database (PCB TRANSFORMER);
- EDR Proprietary Manufactured Gas Plants (EDR MGP);

- EDR Exclusive Historic Gas Stations (EDR US Hist Auto Stat);
- EDR Exclusive Historic Dry Cleaners (EDR US Hist Cleaners);
- Recovered Government Archive Solid Waste Facilities List (RGA LF);
- Recovered Government Archive Leaking Underground Storage Tank (RGA LUST); and
- Recovered Government Archive State Hazardous Waste Facilities List (RGA HWS).

The results of the database searches were provided in a report dated 2 June 2014. It located one OCPCASES site within 1 mile of the Pearce Creek DMCA property:

> AL HOFFER RESIDENCE, 979 POND NECK RD ESE 1/8 - 1/4 (0.247 mi.). This facility has closed and further details by ERD revealed that this was a vehicle accident. No other sites containing hazardous or toxic wastes were identified.

The ERD report provided site elevation, topography and local geological information, domestic water well locations, names, screened depths and other information (where available), EPA Region 3 Radon information for Cecil County, and a table listing 452 groundwater elevations for a USGS well. The data was collected from March 25, 1983 through April 16, 2004.

4.0 ENVIRONMENTAL IMPACTS

4.1 GENERAL TOPOGRAPHY

With the proposed modifications in place, the topography of the Pearce Creek DMCA will be similar to the existing topography without vegetation inside of the perimeter dikes. Clearing and grubbing of existing vegetation will occur. Vegetation will naturally colonize on the site post-construction and in between dredged material placement operations in the future. The existing containment dikes on the Pearce Creek DMCA vary in elevation from 43 to 50 feet NAVD88. Minimal impact to topography will result from moving on-site sediments to establish a uniform 50-foot dike elevation. The site has been previously graded to slope the site to drain to the southeast towards the existing sluice and re-grading will occur where necessary. The geomembrane of the preferred alternative plan will serve as the impermeable boundary between the proposed dredged materials and underlying aquifers and will be capped with on-site materials. Drainage of all stormwater that falls within the site will go through the sluice to Pearce Creek Lake. Stormwater that falls outside of the perimeter dikes will be diverted to drainage ditches along the outer perimeter of the DMCA that are sloped to drain stormwater runoff from the containment dike towards the Elk River or Pearce Creek Lake. Dike side slopes will be stabilized, seeded and fertilized to promote plant growth.

4.2 GEOLOGIC SETTING

With the No Action plan, the Pearce Creek DMCA would not be permitted for future use as a containment area for dredged material placement. Stormwater would continue to percolate through the existing dredged material and connectivity with underlying aquifers will continue. The cutoff wall alternative with low permeability liner west of the containment site extends only to the Upper Confining Unit underlying the site and would slow groundwater travel time from the DMCA to shallow domestic wells west of the site. The proposed modifications of the preferred plan to install an impermeable liner within the containment site will prevent all DMCA surface waters from leaching through the dredged material into underlying aquifers.

4.2.1 Hydrogeology

In conjunction with the USGS study (Dieter *et al*., 2013), the USACE developed a groundwater flow model of the Pearce Creek DMCA and surrounding area. The model was constructed and calibrated to existing site conditions to provide an understanding of the existing relationship of groundwater flow between the DMCA and domestic well users in the surrounding communities. Using particle tracking scenarios, a forward track follows a groundwater pathway from the DMCA outward. A 25-year time period was chosen for model run comparisons with other scenarios because it represents the estimated future project life for the DMCA. Particle tracking only follows the water pathway and does not incorporate processes that affect the movement of chemicals such as adsorption, dispersion, diffusion, biodegradation, *etc*.

Particles move radially out from the DMCA under existing conditions. Particles placed very close to the DMCA boundary exit the footprint of the DMCA while particles placed within the central DMCA do not leave the DMCA footprint. Vertically, the majority of the particles move downward through the surface layers toward or just into the Magothy Aquifer. Notable exceptions to this occur in the southwestern corner of the DMCA and along the northern boundary of the DMCA. In the southwest

corner of the DMCA, the thin Upper Confining Unit allows particles to more quickly move through the Magothy Aquifer and enter the Upper Patapsco Shallow Aquifer near West View Shores.

A backward track follows a particle from outside the DMCA to the DMCA. Because the DMCA is elevated compared to surrounding ground elevations and because in the groundwater head data plots, several aquifers show higher water levels beneath the DMCA, it was speculated that the DMCA was the source of water for all monitoring wells in the vicinity. The backward particle tracks from the southeastern monitoring wells do not support that supposition and these wells may be considered upgradient of the DMCA for existing conditions. Backward tracking from the domestic well locations provides insight into the three dimensional flow fields below the neighboring communities for the various conditions analyzed.

While the DMCA does recharge groundwater under existing and operating conditions, its effects are localized to areas beneath and near the DMCA footprint and downgradient areas. Use of three dimensional particle tracking as well as two dimensional aquifer water level contouring produces a more comprehensive view of groundwater movement than water level contouring alone. Crystal Beach and Holly Hill Farms, to the northeast and east, are beyond the limits of the DMCA effects. Existing monitoring wells just 800 feet southeast of the DMCA, were found to be upgradient of the DMCA, even for operating conditions. Areas west of the DMCA, such as West View Shores, are naturally downgradient from the DMCA as a result of topography. Changes in operation of the DMCA do impact the groundwater flow patterns for those areas.

The cut-off wall alternative (along the northern, western, and part of the southern sides of the DMCA) with a low permeability liner covering the DMCA area west of the cut-off wall was evaluated. Vertically, the wall extends from the ground surface to the Upper Confining Unit. Because there is an area in the southwestern part of the DMCA where the Upper Confining Unit is too thin or not present, the wall must be aligned though the DMCA. This southwestern area would be covered with a low permeability liner.

The model shows that the cut-off wall significantly increases the amount of time necessary for water originating in the DMCA to travel to Upper Patapsco Shallow Aquifer domestic well users. Based on backward tracking particle results during dredge disposal operations, water moving toward certain Upper Patapsco Shallow Aquifer domestic wells travels from the edge of the DMCA in 25 years. Based on forward tracking particle results during dredge disposal operations, water from certain surface locations of the DMCA may enter the Upper Patapsco Shallow Aquifer within 25 years. Therefore, water travel times from the surface of the DMCA to Upper Patapsco Shallow domestic wells will be larger than 50 years. Given these long groundwater travel times to reach domestic wells, the mass rate of unwanted constituents that could be transferred over that distance would be small due to dispersion and diffusion, and, in the case of non-conservative constituents, degradation.

The results also show that the main benefit of the partial low permeability liner is to provide a barrier to prevent future dredge water from entering the water table in the southwest part of the DMCA where the Upper Confining Unit is thin or not present. Water from the small area below the liner (*i.e.* from the Magothy Aquifer) may still move toward West View Shores from beneath the DMCA; however the rate is reduced by two factors. The first is that the recharge from above is significantly limited by the liner. The second is that the cut-off wall creates a barrier to water movement in the Magothy Aquifer such that water is deflected around the majority of the liner area rather than under it. These two factors

reduce the mass rate of unwanted constituents that could be transferred from the area of the Magothy Aquifer beneath the DMCA liner to the aquifers below West View Shores to lower than experienced under existing conditions.

While the cut-off wall would limit flow from the DMCA to surrounding communities and to the Elk River, it would not provide benefits to domestic wells where poor water quality currently exists. The model results give some insight into the locations where water quality problems may be expected for existing conditions, but uncertainties exist in extrapolating to past DMCA operating conditions.

Under the preferred plan scenario, the installation of the full impermeable liner within the entire site will prevent any surface water contained within the site to permeate downward through existing sediments above the liner, and will be controlled-released through the sluice to Pearce Creek after a sufficient settlement period. None of the evaluated alternatives provide quick relief to domestic wells. The USACE and its partner the Maryland Port Administration (MPA) recognized this and MPA has agreed to provide funding for the installation of a pipeline to deliver potable water to nearby residents. The reduction in impacts to the Magothy and Upper Patapsco downgradient of the site will take time after installation of the DMCA liner and subsequent reduction in infiltration. This progress will be measured by a groundwater monitoring program approved by MDE. This program will include installation of 15 new monitoring wells and will include analyses for metals, general chemistry and radiological parameters for 37 wells. These wells will be sampled biannually.

4.3 SEDIMENT QUALITY

Preparation of the placement site through dike repair and liner installation will have no impact on sediment quality. Existing materials on-site will be used for both the dike repairs and cap over the geomembrane liner. The sediments in and beneath the DMCA associated with the upper Patapsco aquifer shallow water-bearing zone and Matawan fill sediments will continue to have high concentrations of iron, sulfate, manganese, zinc, and copper.

4.4 WATER QUALITY

Surface Water. Under the No Action plan, surface water quality would remain the same as the Pearce Creek DMCA would be unchanged from current conditions. Potential impacts to surface water quality resulting from the proposed construction activities at the Pearce Creek DMCA would be limited to the release of water from the site, similar to, but significantly less in volume than the discharge of effluent during placement operations. Water that collects within the site during site preparation may result from a combination of heavy rainfall and excavation activities, and must be drained from the site. Excess water drained from the DMCA will be released back into Pearce Creek on the DMCA property through a sluice. An efficiently drained placement area through a sluice gate controls total suspended solids concentrations to reduce impacts to surface water quality and also insures site stability. The USACE proposes to develop a monitoring plan as part of future placement operations.

During placement operations, the USACE routinely monitors the effluent leaving upland confined placement sites so that the weir can be appropriately set to achieve the desired degree of settling to insure that water quality standards, as set forth by the state of Maryland, will not be exceeded. Section 401 Water Quality Certification has been issued by the Maryland Department of the Environment,

dated 19 December 2014 (Appendix). The standards required for total suspended solids levels within effluent water is coordinated with the Maryland Department of the Environment, and is a condition of the state's Section 401 Water Quality Certification under the Clean Water Act. The standard elutriate test was developed by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency and can be employed to monitor the soluble release of contaminants into the water column during placement operations. This test provides a suitable analysis of contaminants that would be released into the water column during dredging operations, and back into the water through discharge of effluent at the placement site.

Dredged material has not been placed at the Pearce Creek DMCA since 1993. Sediment core samples taken in 1997 from nearby sampling locations in both the C&D Canal and the approach channels (Versar, 1998) were analyzed for bulk sediment chemical constituents as well as elutriate testing (water leaching) of sub-surface sediments. Bulk chemical parameters included trace metals, sulfide, total petroleum hydrocarbons, polyaromatic hydrocarbons (PAHs), and pesticides. High resolution PCB congener, non-ortho coplanar PCB congener, dioxin, and furan tests, and total organic carbon were also conducted on sediments and elutriates. Most of the sediment contaminant concentrations measured in bulk and elutriate analyses were less than their respective soil and water quality criteria, as has continued to be the case with subsequent testing, including the most recent bulk sediment analyses (Tetratech, Inc., 2014).

Of the 15 sediment parameters of the Versar study (1998), comprising mostly metals, only arsenic and beryllium were measured at concentrations that exceeded soil criteria. Of the same parameters measured in sediment elutriates, only copper, chromium and zinc exceeded water quality criteria. However, copper and chromium exceedances measured in sediment elutriates occurred in sediments sampled from areas that had not been previously placed, nor are anticipated to be placed in the future, at the Pearce Creek DMCA (*i.e*. lower Maryland channel and Delaware approach channel to the C&D Canal). Four PAHs out of 16 measured at concentrations exceeding soil criteria. None of the 21 pesticide parameters measured exceeded soil criteria. Within sediment elutriate results, all of these parameter concentrations were less than method detection limits. Of 71 PCB congeners analyzed in sediments, 15 measured at concentrations greater than detection limits and all occurred within the eastern segment of the Canal and near the Delaware River entrance, which have not been, nor anticipated for placement within the Pearce Creek DMCA. None of the PCB congeners were detected in sediment elutriates.

Given the protocols in place to control effluent release rates and the settlement of suspended solids within the DMCA, and in combination with the installation of the polyethylene liner and dike repair, infiltration of potential contaminants to groundwater at the DMCA will be effectively eliminated.

Groundwater. Construction activities associated with the cutoff wall alternative would be similar to those under the No Action alternative as some connectivity of groundwater from the DMCA to underlying water pathways would still exist. Construction activities for dike preparation and the installation of a liner within the Pearce Creek DMCA is not anticipated to result in impacts to groundwater as there will no longer be hydrogeological connectivity between future dredged material placed on the DMCA and underlying aquifers and water gradient flow patterns. Due to concerns regarding impacts to groundwater quality with past placements of dredged material in the confined upland site, the selected plan to install a full impermeable liner within the site will be in combination with a potable water pipeline delivery system to eliminate degraded water quality.

4.5 WETLANDS

No jurisdictional wetlands are present on the site. Occasional small areas of surface water pool after heavy rainfall in depressions that result from grading operations, but these surface water areas are temporary.

4.6 VEGETATION

The majority of the site is covered by grasses and shrubs. The dominant plant is *Phragmites*. Preparation work within the earthen dikes of the DMCA entails clearing and grading and the loss of all vegetation within the site boundaries. The site has been previously used for dredged material placement and vegetation currently present is comprised primarily of early successional species that naturally revegetate rapidly (*i.e.* one or two growing seasons) and would continue to revegetate in between future dredged material placement actions. Vegetation is representative of a disturbed habitat with very low resource value.

4.7 WILDLIFE

The modification work proposed for the Pearce Creek DMCA (*i.e.* earthen dike repair, clearing, grading and the installation of a full liner and replaced sluice) will result in the removal of all vegetation and hence, existing wildlife habitat, within the perimeter dikes (260 acres) of the placement area. The liner will be covered with on-site soils and the area will likely revegetate naturally after construction. Immediately after construction activities cease, the non-vegetated open expanse of the site may attract seasonal use by migratory waterfowl as a resting site. Surrounding vegetated areas provide higher resource value habitat for wildlife and will not be disturbed.

4.8 THREATENED AND ENDANGERED SPECIES

Other than transient species passing through, there are no known state or federally-listed species present within the Pearce Creek DMCA property. Section 7 of the Endangered Species Act requires all Federal agencies to consult with the USFWS to ensure that actions are not likely to jeopardize the continued existence of listed species or adversely modify critical habitat.

The USACE initiated informal consultation with the USFWS Chesapeake Bay Field Office in fulfillment of the requirements under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The environmental review process (Consultation Tracking Number: 05E2CB00-2015-SLI-0017) did not identify any candidate species, proposed species, or proposed critical habitat with the project site. Consultation will be re-initiated within 90 days of scheduled construction or in the event that the project plans change or additional information on listed or proposed species become available.

4.9 AIR QUALITY

Air quality is generally good in the proposed project area. Emissions of criteria pollutants, greenhouse

gases, and other hazardous air pollutants would result from operation of the earth-moving machinery and transport trucks. Carbon monoxide and particulate emissions at the project site, during construction, may be considered offensive; but are generally not considered far-reaching. Exhaust from the construction equipment will have an effect on the immediate air quality around the construction operation but should not impact areas away from the construction area. These emissions will subside upon cessation of operation of heavy equipment.

4.9.1 General Conformity Review and Emissions Inventory

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). In the case of the proposed project at the Pearce Creek DMCA, the Federal action is to implement modifications to the site in preparation for future dredged material placement operations. These modifications include clearing and grubbing, regarding, dike repair, installation of an impermeable liner, and sluice gate reconstruction in an area classified as marginal nonattainment for ozone (oxides of nitrogen [NOx]). Cecil County is in the Philadelphia-Wilmington-Atlantic City PA, NJ, MD, DE
nonattainment area. The limits are 100 tons NOx and 50 tons VOC.

There are two types of Federal Conformity: Transportation Conformity and General Conformity (GC). Transportation Conformity does not apply to this project because the project would not be funded with Federal Highway Administration money and it does not impact the on-road transportation system. However, GC is applicable to this project. Therefore, the total direct and indirect emissions associated with project construction must be compared to the GC trigger levels. Criteria pollutant emissions are estimated from power requirements, duration of operations, and emission factors for the various equipment types (see Appendix).

Criteria pollutant emissions are dominated by NOx (which represents the sum of Nitric Oxide (NO) and Nitrogen dioxide (NO_2) emissions) with relatively small amounts of other criteria pollutants. Results indicate that the land-based earth moving equipment is not a significant source of emissions. Projected emissions from the proposed action would not adversely impact air quality beyond the immediate construction area or for a sustained period of time given the relatively low level of emissions, relatively short duration of the project, and the likelihood for prevailing winds to disperse the pollutants. The total estimated emissions that would result from the proposed construction activities are 35.97 tons NOX and 4.16 tons VOCs. These emissions are below the General Conformity trigger levels of 100 tons per year of NOx and 50 tons per year of VOCs for a marginal nonattainment area. General Conformity under the Clean Air Act, Section 176 has been evaluated for the project according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project because the total emissions from the project are below the conformity threshold values established at 40 CFR 93.153 (b) for ozone (NOx and VOCs) in a Marginal Nonattainment Area (100 tons of NOx and 50 tons of VOCs per year). The project is not considered regionally significant under 40 CFR 93.153 (i).

4.10 SOCIOECONOMIC RESOURCES

The proposed modifications to the existing Pearce Creek DMCA are not expected to adversely affect the local economy, social structures, or quality of life of the local communities in the vicinity of the placement site. In contrast, the modifications of the DMCA will allow for future utilization of the site for dredged material placement necessary to maintain the upper Chesapeake Bay approach channels to the C&D Canal. Shipping and port activities generate a significant number of jobs and play an important role in the regional economy. Additionally, the proposed modifications to the site will be accompanied by a hookup to public water supply for the local community of West View Shores, Bay View Estates, and Sunset Pointe subdivision, which will have a positive impact on residential water quality.

Under the No Action scenario, if future utilization of the Pearce Creek DMCA were not permitted, utilizing alternative upland containment sites for maintenance material placement would incur higher costs with the increased distance from the navigation channel. This would also entail using available containment space needed for maintenance dredging of other channel reaches within the Port of Baltimore to Delaware River navigation channel system. Implementation of the proposed plan will result in a slight increase in noise during construction activities by land-moving equipment and sluice gate construction. Aesthetics would be slightly impacted temporarily as the site would be cleared of existing vegetation inside the perimeter of the dikes.

4.10.1 Environmental Justice

Appropriate measures will be taken to ensure that any resulting projects are consistent with local, regional, state, and Federal regulations. The proposed project will not have a disproportionately high adverse effect on minority or low income populations and is in compliance with EO 12898. The project would generally have beneficial social and economic effects and would generally affect all persons equally.

4.11 CULTURAL RESOURCES

The cultural resources of the terrestrial areas bounded by the upper Chesapeake are rich and varied. Extensive archaeological research has been conducted in portions of the project area. The data resulting from those investigations provide a framework for assessing the area's archaeological sensitivity. For example, the region is especially rich in prehistoric shell middens dating from the Late Archaic through Late Woodland periods, which are a most useful archaeological resource. Since so few of these middens have been excavated professionally, any resources of this type that are encountered are likely to be determined significant.

The historic resources, both archaeological and above ground, of this region date from the first generation of settlement in Maryland and extend through the twentieth century. Although archaeologists generally view earlier sites as more significant, there has been little professional work on later sites in the region, especially on the Eastern Shore. Hence, we can expect many of these resources to be deemed to contain significant research potential.

The project area, based on the number of prehistoric and historic recorded sites in the vicinity, is considered to have a high potential for intact resources potentially eligible for listing on the National

Register of Historic Places (NRHP). However, the proposed project has a low potential to impact previously identified archaeological resources considering the area of potential impact is within an existing DMCA facility.

Although the work proposed will be conducted within an existing DMCA facility, the proposed project has the potential to adversely affect sites potentially eligible for listing on the NRHP, particularly 18CE57 (NRHP Listed) and 18CE131. Steps to avoid any impacts to these sites should be taken; however, if impacts cannot be completely avoided, further investigations would be required.

4.12 HAZARDOUS, TOXIC, AND RADIOLOGIC WASTES

The database search within a one mile radius of the Pearce Creek DMCA (EDR, 2014) identified one Oil Control Problem Case (OCPCASE) site, later identified as a vehicle accident site. No other sites were identified.

4.13 NOISE

Project-related noise at the placement site during construction will consist of the sound of earth-moving equipment such as bull-dozers and front-end loaders clearing, grubbing, and re-grading the containment area and repairing the dikes to design elevation. Heavy machinery is fitted with approved muffling apparatus to reduce engine noise and vibration. The construction period is anticipated to take 8-12 months.

4.14 CUMULATIVE IMPACTS

Cumulative Impacts, as defined in CEQ regulations (40 CFR Sec. 1508.7), are the "impacts on the environment which result 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."

Pearce Creek is located within proximity to the upper Chesapeake Bay Upper Approach Channels to the C&D Canal and is ideally suited as a placement location for maintenance dredging placement operations. Previous maintenance dredging operations conducted overboard placement into aquatic sites in the vicinity of Pooles Island but as of 2012, aquatic placement operations are no longer permitted. There are no other existing upland DMCAs to the south of the Pearce Creek DMCA and the nearest upland DMCA is located 10 miles to the northeast of the Pearce Creek DMCA and is more ideally suited for placement of dredged material from the northernmost reaches near the western end of the C&D Canal.

Pearce Creek DMCA is an existing containment site and lateral expansion to encompass additional adjacent lands beyond its existing perimeter dikes is not necessary in order to provide further capacity. The dikes will be repaired to design elevation (+50 feet NAVD88). The continued use of an existing site for maintenance dredging placement needs is preferable to developing new placement sites that are likely to conflict with other existing land uses. This avoids impacts to adjacent areas where higher habitat value exists, as well as additional real estate costs to the project. The majority of the site is covered by *Phragmites* with some scrub/shrub growth, vegetative growth representative of a disturbed

habitat with very low habitat value and is not considered significant. Dike repair and grading earthwork required is similar to standards that have been implemented at many upland confined placement sites for decades. The dewatering and consolidation of placed sediments at existing upland confined placement sites serves to reduce cumulative impacts of maintenance dredging by conserving available space.

4.15 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Modifications to the Pearce Creek DMCA will result in short-term minimal impacts and use of resources to prepare the existing site for future use as a containment site for maintenance dredged material. Future use of the site provides long-term navigational needs for the channel system connecting the Port of Baltimore to the northern ports of Wilmington, Philadelphia, and the northern trade routes. The channel system provides a short-cut for seagoing vessels by connecting the Atlantic Ocean, the Delaware River, and the Chesapeake Bay, and requires periodic maintenance dredging. The Pearce Creek DMCA can potentially handle all material dredged from the C&D Canal approach channel for the next 20-25 years. Additionally, the C&D Canal provides areas for land and water recreation, wildlife conservation, agricultural use, and prime waterfront or water view private properties in mostly rural settings.

5.0 ENVIRONMENTAL REGULATIONS

The following is a list of applicable Federal environmental quality statutes and their compliance status relative to the current stage of project review. Compliance will be met for all environmental quality protection statutes and environmental review requirements with completion of the Final Environmental Assessment.

Archaeological and History Preservation Act	Partial
Clean Air Act of 1977, as amended	Partial
Clean Water Act of 1977, as amended	Full
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act, as amended	N/A
Emergency Wetlands Resource Act	N/A
Endangered Species Act of 1973, as amended	Partial
Estuary Protection Act	Full
Federal Water Project Recreation Act	N/A
Land and Water Conservation Fund Act, as amended	N/A
Fish and Wildlife Coordination Act as amended	Partial
Marine Protection, Research and Sanctuaries Act, as amended	N/A
Magnuson-Stevens Act	N/A
Migratory Bird Conservation Act	Full
National Environmental Policy Act of 1969, as amended	Full
National Historic Preservation Act of 1966, as amended	Parital
Rivers and Harbors Act	Full
Watershed Protection and Flood Prevention Act, as amended	Full

Wild and Scenic Rivers Act, as amended	N/A

EXECUTIVE ORDERS, MEMORANDUMS

Floodplain Management (E.O. 11988)	Full
Protection of Wetlands (E.O. 11990)	N/A
Environmental Effects of Major Federal Actions (E.O. 12114)	N/A
Environmental Justice (E.O. 12898)	Full
Protection of Migratory Birds (E.O. 13186)	Full

NOTES: All applicable laws and regulations listed will be fully complied with upon completion of the environmental review. All necessary permits and approvals are issued by the regulatory agencies and will be obtained prior to construction.

The compliance categories used in this list were assigned based on the following definitions:

Full: Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of the project.

Partial: Having partially met requirements of the statute, E.O. or other environmental requirements for the current stage of the project that will be completed in full prior to construction.

Not Applicable (N/A): No requirements for the statute E.O. or other environmental requirements for the project.

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7.0 SECTION 404(B)(1) GUIDELINES EVALUATION

I. Project Description

A. Location

The Pearce Creek Dredged Material Containment Area (DMCA) is located in Cecil County, Maryland on the eastern bank of the Chesapeake Bay near the confluence of the Elk River and the Chesapeake Bay. The site is located on Pond Neck approximately 7 miles west of Cecilton, Maryland.

B. General Description

The USACE acquired the Pearce Creek DMCA property in 1937 when the C&D Canal was deepened. Perimeter soil dikes are constructed on an area approximately 260 acres. A sluice gate was constructed for the purpose of allowing water to be released from the containment area to Pearce Creek in a controlled manner during dredged material placement operations. Dredge material was placed in the DMCA in 1937 and 1938, and then again beginning in the 1960s, until the most recent placement in 1993. The existing soil dikes were raised to their current elevation in 1989 (35-45 feet relative to the North American Vertical Datum of 1988). It is estimated that 4.0 million cubic yards (mcy) of dredged material have been placed in the DMCA.

C. Authority and Purpose

The U.S. Army Corps of Engineers (USACE) is proposing to conduct modifications to the Pearce Creek Dredged Material Containment Area (DMCA) for future dredged material placement operations. The Federal navigation project is the Inland Waterway from Delaware River to Chesapeake Bay, DE and MD. The authority to conduct maintenance dredging and modify or repair dredged material placement sites is the Rivers and Harbors Act.

The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of proposed actions and reasonable alternatives to those actions. Although the Pearce Creek DMCA is a Federally-owned existing placement site, it has not been used for dredged material placement in 21 years. In coordination with the Maryland Department of the Environment, the USACE has developed a plan to prepare the Pearce Creek DMCA by re-establishing the perimeter earthen dikes, grading, and installing an impermeable barrier that will eliminate the hydrogeologic connection of dredged materials placed within the site and underlying groundwater. Concerns have been raised that past use of the Pearce Creek DMCA has contributed to water quality degradation in domestic wells in neighboring residential communities. In conjunction with the proposed modifications to the Pearce Creek DMCA and future use of the site for dredged material placements, the Maryland Port Administration will be responsible for establishing a public water supply connection for the neighboring residential community of West View Shores.

D. General Description of the Proposed Plan

The selected plan entails improvements to an existing 260-acre DMCA:

- Clearing and grubbing of existing vegetation within the interior of the DMCA.
- Grading of the existing perimeter dikes to elevation of 50 ft NAVD88.
- Construction of a new sluice at the existing sluice location and associated outlet works.
- Re-grading the interior of the DMCA and installation of an impervious liner system.

The existing containment dike varies in elevation from 43 to 50 feet NAVD88. The perimeter dikes will be modified to provide a uniform 50-foot NAVD88 elevation. The proposed liner system will be comprised of a 40 mil Linear Low Density Polyethylene (LLDPE) geomembrane with 16 ounce/square yard non-woven needle punched geotextile placed both above and below the membrane. The geomembrane will serve as the impermeable boundary between the proposed dredged materials and underlying aquifers.

II. Factual Determinations

A. Physical Substrate Determinations
   1. Substrate Elevation: 35-47 feet NAVD88. Dike slope: 3 horizontal to 1 vertical.
   2. Sediment type: gravelly sand to fine-grained silts and clays.
   3. All sediments are on-site. No dredging.
   4. Physical Effects on Benthos: N/A; Vegetation cleared.

Actions Taken to Minimize Impacts: An approved sediment erosion control plan is required during the construction period. Appropriate sluice operation is required to drain the site during the construction period. Dike alignment will remain on the existing footprint to avoid impacting higher habitat value outside of the existing dike alignment.

B. Water Circulation, Fluctuation, and Salinity Determinations
   1. Water: accumulated stormwater on-site during the construction period
   2. Salinity: 0 ppt
   3. Water Chemistry: No effect anticipated.
   4. Color: No effect anticipated.
   5. Odor: No effect anticipated.
   6. Taste: no effect anticipated.
   7. Dissolved Gas Levels: No effect anticipated.
   8. Nutrients: no effect anticipated.
   9. Eutrophication: N/A

C. Suspended Particulate/Turbidity Determinations
   1. Water drained from the construction site is through the sluice gate under controlled conditions to remove Total Suspended Solids.
   2. Effects (degree and duration) on Chemical and Physical Properties of the Water Column:
      a. Light penetration: short-term due to increased turbidity.
      b. Dissolved oxygen: potential short-term decrease.
      c. Toxic metals and organics: no effect anticipated.
      d. Pathogens: no effect anticipated.
      e. Aesthetics: short-term degradation
      f. Nutrients: no effect anticipated.
      g. Suspended sediments: the concentration in the water discharged from the site will be controlled through proper operation of the weir.
   3. Effects on Biota
      a. Primary Production: photosynthesis: vegetation inside the dike perimeter will be removed. Vegetation outside the dike perimeter will not be impacted.

b. Suspension/Filter Feeders: minor and short-term effect due to increased turbidity during construction if rainwater is drained from the site to Pearce Creek Lake.
c. Sight feeders: minor and short-term effect due to increased turbidity during construction if rainwater is drained from the site.

4. Actions Taken to Minimize Impacts
Proper use of effluent control mechanisms on-site (*e.g.* sluice gate) and compliance with an approved sediment erosion control plan. Sloped grading to channel stormwater towards the sluice.

D. Contaminant Determinations: the following information has been considered in evaluating the ecological significance of possible contaminants within the sediments contained in the DMCA.
1. Physical characteristics of sediments
2. Hydrography in relation to known or anticipated source contaminants.
3. Results of chemical testing of materials in the project area.
4. Existing water quality conditions in the vicinity of the project area.
5. Mixing and dilution by wave and wind action in Pearce Creek Lake.

E. Aquatic Ecosystem and Organism Determinations:
1. Effects on Plankton: minor and short-term effect, if any.
2. Effects on Benthos: no effect anticipated.
3. Effects on Nekton: no effect anticipated.
4. Effects on Aquatic Food Web: no effect anticipated.
5. Effects on Special Aquatic Sites: no effect anticipated.
6. Effects on Threatened and Endangered Species: no effects anticipated.
7. Effects on Other Wildlife: no effects anticipated.
8. Actions Taken to Minimize Impacts: Proper use of effluent control mechanisms on-site (*e.g.* sluice gate) and compliance with an approved sediment erosion control plan. Sloped grading to channel stormwater towards the sluice.

F. Proposed Placement Site Determinations
1. Mixing Zone Determinations: the following factors have been considered in evaluation of the placement site:
a. Depth of water
b. Current velocity, direction, and variability at the upland site.
c. Degree of turbulence.
d. Rate of discharge

The evaluation of the above factors are not applicable to the proposed construction plan. No dredged material placement will occur during construction of the proposed modifications to the site. Any effluent to Pearce Creek Lake will result only from on-site storm water accumulation and effluent during the construction period, and at significantly lower quantities than that produced during dredged material placement operations. Dike repair on the existing dike footprint to minimize impacts to adjacent areas possessing higher quality wildlife habitat. Mobile wildlife may vacate the site. Smaller, less mobile species and habitats will be impacted. Phragmites-dominated land inside the containment dike perimeter will be impacted but this vegetative cover is the result of prior placement activities and will re-establish post-construction.

2. Water Quality Certification was obtained from the State of Maryland (prior to initial construction) and the project will be in compliance with applicable water quality standards.
3. Potential Effects on Human Use Characteristics:
    a. Recreational fisheries: no effect anticipated.
    b. Water-related recreation: no effect anticipated.
    c. Aesthetics: short-term effect during the construction period.
    d. Parks, National Historic Monuments, National Seashores, Wilderness Areas, *etc.*: no effect anticipated.

G. Determination of Cumulative Effects on the Aquatic Ecosystem: no effects anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem: no effects anticipated.

III. Findings of Compliance

A. No significant adaptations of the guidelines were made relative to this evaluation.

B. Existing monitoring of the site indicates that with installation of the geomembrane liner that no future connectivity will occur between dredged materials placed within the DMCA and the underlying aquifers. Furthermore, concomitant with the proposed modifications of the DMCA, the Maryland Port Administration will be responsible for the hookup of residences within the adjacent communities of West View Shores, Bay View Estates, and the subdivision of Sunset Pointe to public water supply.

C. The proposed modifications will not violate any applicable State water quality standards. Any stormwater drainage required during construction will pass through the sluice and will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. The modifications proposed for the site will not result in adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, or special aquatic sites. Modification work to the DMCA will not harm any endangered species or their critical habitat.

E. The life stages of aquatic life or other wildlife will not be adversely affected in the long-term. Significant long-term effects on aquatic ecosystem diversity, productivity, and stability, and recreational, aesthetic, and economic values will not occur.

F. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems will occur.

G. On the basis of these guidelines, the proposed modifications to the Pearce Creek DMCA for future use as a dredged material placement site is specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the environment.

PEARCE CREEK
DREDGED MATERIAL CONTAINMENT AREA MODIFICATION
CECIL COUNTY, MARYLAND
DRAFT ENVIRONMENTAL ASSESSMENT

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

The U.S. Army Corps of Engineers Philadelphia District (USACE) has the mission and authority under the Rivers and Harbors Act to maintain navigation channels in the interest of safe navigation for both large ocean-going and smaller vessels in compliance with authorized channel dimensions. The Federal navigation project *Inland Waterway from Delaware River to Chesapeake Bay, DE and MD* requires a dredging management program to ensure that there is sufficient capacity for placement of material dredged during channel maintenance operations. Since 1829, the Chesapeake and Delaware Canal (C&D Canal) has allowed vessels to travel west to the Port of Baltimore from the Delaware River rather than south in the Delaware River and Bay to the Atlantic Ocean coast of Delaware, Maryland, and Virginia to the mouth of the Chesapeake Bay and from there, north up the Chesapeake Bay to the Port of Baltimore, a savings of over 300 miles. Currently, the C&D Canal and approach channels carry 40 percent of shipping traffic in and out of the Port of Baltimore.

To maintain navigability, the C&D Canal Southern and Northern Approach Channels in the upper Chesapeake Bay are periodically dredged and the material has been placed in either upland dredged material containment areas (DMCAs) or up until 2012, placed overboard in aquatic sites in the upper Chesapeake Bay (Pooles Island Open Water Placement Sites). The state of Maryland closed the use of all overboard placement sites near Pooles Island in 2012. The USACE needs to utilize alternative available placement sites for maintenance dredging. The existing Pearce Creek DMCA is the preferred option for its available capacity and proximity to the Chesapeake Bay approach channels.

The Pearce Creek DMCA is located on the eastern shore of the Elk River where it meets with the upper Chesapeake Bay in Cecil County, Maryland. The USACE acquired the property in 1937 when the C&D Canal was deepened. Perimeter soil dikes were constructed on an area approximately 260 acres. A sluice gate was constructed for the purpose of allowing water to be released from the containment area to Pearce Creek in a controlled manner during dredged material placement operations.

The USACE is proposing to conduct modifications to the Pearce Creek Dredged Material Containment Area (DMCA) for future dredged material placement operations. Concerns have been raised that past use of the Pearce Creek DMCA has contributed to water quality degradation in domestic wells in neighboring residential communities. The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of proposed actions and reasonable alternatives to those actions. Although the Pearce Creek DMCA is a Federally-owned existing placement site, it has not been used for dredged material placement in 22 years. In coordination with the Maryland Department of the Environment, the USACE has developed a plan to prepare the Pearce Creek DMCA by re-establishing the perimeter earthen dikes, grading, and installing

an impermeable barrier that will eliminate the hydrogeologic connection of dredged materials placed within the site and underlying groundwater.

The existing containment dike varies in elevation from 43 to 50 feet NAVD88. The perimeter dikes will be modified to provide a uniform 50-foot NAVD88 elevation. Topography is currently sloped to drain to the southeast towards the existing sluice. Drainage ditches along the outer perimeter of the DMCA are sloped to drain stormwater runoff from the containment dike to Pearce Creek Lake. The proposed liner system will be comprised of a 40 mil Linear Low Density Polyethylene (LLDPE) geomembrane with 16 ounce/square yard non-woven needle punched geotextile placed both above and below the membrane. The geomembrane will serve as the impermeable boundary between the proposed dredged materials and underlying aquifers while the geotextile layers will be utilized for cover and subgrade protection and to vent the base of the membrane.

In conjunction with installation of the impermeable liner and site preparation work by the USACE, the Maryland Port Administration has committed to funding a public water supply hookup for the communities of West View Shores, Bay View Estates, and the subdivision of Sunset Pointe. The pipeline from Cecilton was designed to provide a safe and adequate water supply for the homes already impacted in the vicinity.

In compliance with the National Environmental Policy Act of 1969, as amended, and the White House's Council on Environmental Quality (CEQ) regulations, the Philadelphia District has prepared an Environmental Assessment (EA) to evaluate the proposed modifications to the Pearce Creek DMCA. The draft EA for the project was forwarded to the U.S. Environmental Protection Agency Region II, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, the Maryland Department of the Environment (MDE), the Maryland Department of Natural Resources, and all other known interested parties for comment.

The EA concludes that the proposed Pearce Creek DMCA modifications, 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 also concludes that the project can be conducted in a manner, which should not violate Maryland's surface water quality standards (COMAR 26.08.02.10). Pursuant to Section 401 of the Federal Clean Water Act and its amendments, a Water Quality Certificate (WQC) was issued by the MDE 19 December 2014.

Although the project area is considered to have a high potential for intact cultural resources based on the number of prehistoric and historic recorded sites in the surrounding vicinity, the proposed project has a low potential of impacting previously identified archaeological resources due to previous repeated use as a placement facility. Steps will be taken to avoid any impacts to sites eligible for listing on the National Register of Historic Places.

The proposed modifications of an existing dredged material placement facility for reuse were designed with the intention of minimizing impacts and will not significantly affect the quality of the human environment. Therefore, an Environmental Impact Statement is not required.

Date

Michael Bliss
Lieutenant Colonel, Corps of Engineers
District Engineer