404 BLOCK 18 / 401 BLOCK 8a - NATURE OF ACTIVITY
(continued from 404/401 application forms)

Project Background

State Route (SR) 104 in Pike County carries approximately 6,540 vehicles per day and crosses the Lake White Dam approximately one mile south of Waverly, Ohio (see Exhibit 1). Originally constructed by the Ohio Department of Highways in 1935, the Lake White Dam is a 4,200 foot long, 40 foot tall earth dam, which begins at the SR 551/SR 104 intersection and ends at the SR 552/SR 104 intersection. The dam was constructed in and adjacent to the Pee Peek Creek channel in conjunction with construction of the 337 acre lake by the Works Progress Administration (WPA). Lake White was officially dedicated as a state park in 1949, though most of the land surrounding the lake is privately owned. SR 104, along with SR 551 and SR 552, provides access to Lake White State Park and numerous residences located around Lake White.

The Lake White Dam spillway (Pee Pee Creek) is located at the north end of the dam, near the SR 552/SR 104 intersection (see Exhibit 2). The spillway contains two Pelican gates that are raised in summer and lowered in winter to control water levels in Lake White. State Route 104 crosses the Lake White Dam spillway via a 144-foot, eight-span box beam bridge, which was originally constructed in 1934 and rehabilitated in 1974 and 2004. Below the Pelican gates, the spillway slab is tied to the SR 104 bridge piers and abutments. A series of concrete steps direct flow in the spillway back to Pee Pee Creek.

Periodically, during heavy rain events, Lake White will fill to capacity and overtop the Lake White Dam and SR 104. During these floods, severe erosion occurs along the east (downstream) side of the Lake White Dam embankment, jeopardizing the dam and the SR 104 roadway. In response to this hazard, the Ohio Department of Natural Resources (ODNR) initiated the PIK-104-10.64 project in the late 1990's with a series of hydraulic and flood studies, culminating with construction plans for the rehabilitation of the Lake White dam and spillway. The rehabilitation work began in 2005, and included slightly lowering the spillway, removing the eight original Tainter gates and replacing them with Pelican gates, constructing a new spillway slab, and filling and grading the east side of the dam to a 3:1 slope (approximately). At that time, the proposed work also included armoring the dam with roller compacted concrete and constructing a new emergency lake drain system; however, construction work was ultimately stopped prior to the placement of the roller compacted concrete and completion of the lake drain. A portion of the 48" lake drain pipe, the outlet structure, and the emergency rock spillway to Pee Pee Creek were constructed on the east side of the dam, but no intake structure was installed in Lake White. In October 2006, a severe flood event overtopped the Lake White Dam and SR 104. Due to the damage caused by the flood, the potential for future floods that could jeopardize the dam, the deteriorating condition of the existing SR 104 bridge over the spillway, and roadway deficiencies identified on SR 104 in the Lake White Dam area, the Ohio Department of Transportation (ODOT) and ODNR are proposing a joint major rehabilitation project to address these issues.

Project Description and Need

This combined United States Army Corps of Engineers (USACE) Individual 404 Permit application and Ohio EPA 401 Water Quality Certification application is being submitted for PIK-104-10.64 (PID 83667), which involves the rehabilitation of approximately one mile of SR 104 consisting of pavement/shoulder widening, pavement surface reconstruction, intersection improvements at SR 551 and SR 552 (geometry improvements and turn lanes), and a relocation of the CR 105 intersection. The project also includes replacement of the bridge structure over the Lake White Dam spillway, rehabilitation (armoring) of the Lake White Dam/SR 104 embankment using rock channel protection and roller compacted concrete, new lake drain construction, and a relocation of Crooked Creek. These proposed improvements are necessary due to deteriorated and/or substandard conditions on the Lake White Dam and on SR 104 in the project area, as summarized below:

Lake White Dam

The Lake White Dam is classified by ODNR as Class 1 Dam, meaning it has a total storage volume greater than five thousand acre-feet and significant damage and probable loss of life would occur downstream in the event of a failure. Since the dam is a Class 1 structure, it must safely pass the Probable Maximum Flood (PMF). Hydraulic analyses have shown that the dam's spillway is unable to pass the PMF, and a less than 10% PMF 72-hour storm will cause overtopping of the dam embankment. Additionally, a 72-hour PMF event would overtop the dam by an average of 4.6 feet with a peak discharge of 96,466 cubic feet per second. Previous floods that have overtopped the dam and SR 104 have resulted in numerous erosion rills along the east slope of the dam. Over time, such erosion can reduce the structural integrity of the dam. Seepage has also been observed along the east embankment of the dam near SR 551. Seepage of this nature is evidence of embankment problems which can compromise the dam's structural integrity. Finally, a substantial amount of scour has occurred along Crooked Creek immediately below the dam. Scour along the toe of the embankment can also weaken the dam.

SR 104

Field observations have indicated SR 104 pavement deterioration on the Lake White Dam. This pavement deterioration has been determined to be most likely due to dam embankment deterioration and flood waters overtopping the dam and SR 104. Additionally, SR 104 in the dam area currently has 11-foot wide travel lanes and 3-foot wide shoulders. Current design standards require 12-foot wide travel lanes, with 8-foot paved shoulders and 12-foot wide graded shoulders. There are also no left or right turn lanes on any approach to the SR 551 and SR 552 intersections, and a turn lane analysis has determined that a southbound right-turn lane is warranted on SR 104 at both intersections and a northbound left-turn lane is warranted on SR 104 at the SR 552 intersection. The SR 552 intersection is also in need of improvement due to a lack of visibility experienced by vehicles turning left from SR 552 onto SR 104. A recent three-year crash rate study for SR 104 concluded that the project area experiences crash rates that substantially exceed statewide rates for similar two-lane undivided minor arterials. Future traffic volumes on SR 104 are expected to increase by 23 percent, while traffic volumes on SR 551 and SR 552 are expected to increase by 21 percent and 40 percent, respectively. These traffic volume increases are expected to exacerbate the roadway deficiencies described above and could result in higher crash rates.

SR 104/Spillway Bridge

According to ODOT's current Bridge Inventory Report, the existing SR 104 bridge structure over the Lake White Dam spillway has a Sufficiency Rating of 47.9 and a General Appraisal Rating of 4, which indicate deteriorated conditions and the need for improvements.

Related Design Considerations

Given the size and complexity of the structures involved in this project, the magnitude of risk involved with respect to flooding and a Class 1 dam failure, the high cost of rehabilitating and maintaining a 4,200 foot earthen dam and state highway corridor, and the rehabilitation work already completed by ODNR in 2005-2006, several design constraints/requirements related to the project Purpose and Need were identified that needed to be addressed when developing and evaluating alternatives for this project:

- Substandard roadway conditions on SR 104 in the project area must be addressed as part of the dam rehabilitation, including replacement of the deteriorated bridge over the spillway, inadequate sight distances, insufficient lane/shoulder widths, and the lack of turn lanes at the SR 551 and SR 552 intersections.

- The dam must be rehabilitated in conjunction with the SR 104 improvements without compromising the structural integrity of the dam.

- Dam/spillway hydraulics are not to be altered and there can be no increase in flood risk for properties above or below the dam. There can also be no net increase or decrease in the current winter/summer pool elevations. Consequently, the existing Lake White Dam spillway (which was previously rehabilitated by ODNR) is not to be modified, even though it does not have the capacity to pass the PMF. Therefore, in order to safely pass the PMF, the rehabilitation project must maintain the current spillway capacity and accommodate flood flows overtopping the dam and SR 104.

- Since the spillway's Pelican gates can only lower the lake elevation by approximately three feet, a secondary lake drain system is necessary in order to provide greater control of water levels in the lake - mainly for dam maintenance purposes (routine or emergency).

- Section 4(f) of the U.S. Department of Transportation Act of 1966 protects public recreational areas from impacts by federally-funded or federally-permitted projects though inter-agency coordination and consideration of avoidance/ minimization alternatives, which are documented as part of the National Environmental Policy Act (NEPA) process. The Lake White State Park is managed by ODNR - Division of Parks and Recreation as a public recreational facility. Additionally, ODNR owns property below the spillway that is planned for future use as a Pee Pee Creek/Scioto River public access area. In addition to addressing the transportation and dam safety needs of the project, and avoiding/ minimizing impacts to streams, wetlands, and other sensitive natural resources, the project design must consider/address existing and planned recreational features in the project area.

Anticipated Schedule and Sequence of Construction

Detailed design plans have been completed for the PIK-104-10.64 project and all environmental studies/clearances (including a Level 2 Categorical Exclusion) have either been completed and approved or are nearing completion. Construction is scheduled to begin in spring 2016 (tentative) and take approximately 18 months to complete. The following is a summary of the anticipated construction sequence (*Note: The exact timing, location, methods, and materials used for construction activities are generally at the contractor's discretion and are not known at this time):*

- Lower water levels in Lake White
- Perform Lake White boat ramp work and relocate Crooked Creek
- Implement traffic detour route
- Install siphon drain in Lake White
- Install rock channel protection in Lake White along SR 104/Lake White Dam embankment
- Complete spillway bridge construction
- Complete roadway and roller compacted concrete construction south of spillway
- Allow water levels in Lake White to begin rising back to pool elevation
- Adjust traffic control and implement local detour route
- Complete roadway and roller compacted concrete construction north of spillway
- Complete work in Lake White State Park and install permanent traffic control/guardrail
- Remove temporary traffic control and restore construction site

Summary of Jurisdictional Waters Impacted by the Selected Alternative

The PIK-104-10.64 project will impact nine (9) jurisdictional "waters of the United States", including two streams, six non-isolated wetlands, and one lake (see Exhibits 3 through 12). Crooked Creek and Pee Pee Creek are the two streams that will be impacted by the project. Crooked Creek is a tributary to Pee Pee Creek, and Pee Pee Creek is a tributary to the Scioto River. The six impacted wetlands (Wetlands 1, 4, 6, 8, 9, and 10) ultimately drain into Crooked Creek or Pee Pee Creek downstream of (below) the Lake White Dam/spillway. Lake White is an artificial impoundment that was created when the Lake White Dam was constructed across the Pee Pee Creek channel.

Preliminary impact estimates for two streams (Crooked Creek and Pee Pee Creek), nine wetlands (Wetlands 1, 2, 3, 4, 5, 5a, 6, 7, and 8), Lake White, and one jurisdictional pond (Pond 1) were documented in a Level 2 Ecological Survey Report (January 2013), which was coordinated with the U.S. Army Corps of Engineers (USACE), Ohio EPA (OEPA), ODNR, and the U.S. Fish and Wildlife Service (USFWS). Following a USACE field review on May 30, 2013, several wetland updates were made in the Level 2 Ecological Survey Report at the USACE's request, including identification of an additional impacted wetland (Wetland 10). On October 9, 2013, a Jurisdictional Determination (JD) was issued by USACE (see 404 Block 26/401 Block 7 and Appendix B).

In February 2014, detailed design plans were completed for the PIK-104-10.64 project, which resulted in the avoidance of several of the jurisdictional features documented in the JD and the revised Level 2 Ecological Survey Report (Wetlands 2, 3, 5, 5a, 7 and Pond 1), as well as the addition of potential long-term hydrology impacts to Wetland 9. Physical and biological characteristics for impacted jurisdictional waters are presented in attached Table A (streams), Table B1 (wetlands), and Table B2 (Lake White). Impacts are summarized in attached Table C1 (streams), Table C2 (wetlands), and Table C3 (Lake White), and on Exhibits 3 through 12. Photographs of the nine impacted features are presented in Appendix C. A summary of proposed construction activities in each feature is presented below:

Pee Pee Creek - Spillway Area (see Exhibit 4): Pee Pee Creek begins approximately 13 miles northwest of Lake White and drains into the Scioto River approximately one mile downstream of the Lake White Dam spillway. The dam and spillway were constructed across the Pee Pee Creek channel in the 1930's in conjunction with the construction of Lake White. State Route 104 is located on the Lake White Dam embankment and crosses the spillway via an eight-span concrete box beam bridge. The spillway has concrete abutment walls and wingwalls, a concrete slab floor on earthen fill, and concrete steps on earthen fill on the downstream end of the spillway. Flow through the spillway is controlled by two Pelican gates on the upstream end of the spillway. The gates are lowered during the winter and raised during the summer. The base elevation of the concrete spillway floor varies, but is approximately 566.3' at the SR 104 centerline. The Lake White winter pool elevation is approximately 569.2' and the summer pool elevation is at approximately 572.4'. The winter and summer pool elevations are controlled by the spillway gates. Regardless of the pool elevation (winter or summer), due to the storage capacity of Lake White and the width of the spillway (approximately 140 feet), the normal fluctuations in water depth that establish the Ordinary High Water Mark (OHWM) in Pee Pee Creek are diminished to the point where the spillway typically has one to two inches of water flowing through it, which establishes the "normal" high water level within the spillway (i.e. the OHWM). The total linear foot impact to Pee Pee Creek is 192 feet in the spillway area, including 102 feet of permanent impact within the spillway and 90 feet of overlapping permanent and temporary impact below (immediately downstream of) the spillway. The sections below discuss the construction activities that will affect Pee Pee Creek in the spillway area.

Bridge Piers

There are seven concrete piers with steel piles currently within the spillway that support the existing SR 104 bridge. Existing Piers 1, 2, 3, 5, 6, and 7 will be removed to the concrete floor of the spillway. Proposed Piers 1 and 3 for the new SR 104 bridge will be constructed by removing eight 3' x 3' sections of concrete from the 12" thick spillway floor and spillway steps (for each pier) and driving one steel H-pile (1' x 1') to bedrock in each 3' x 3' section. A 2' diameter concrete pier will constructed on each steel pile beginning below the spillway floor and extending up to the new bridge superstructure. Six (6) inches of granular (gravel) backfill will be placed in each 3' x 3' section where the concrete spillway floor was removed and new concrete will be poured around each of the new concrete piers. Proposed Pier 2 is located at existing Pier 4. In this area, a 60' x 12' section of concrete from the spillway floor and spillway steps will be removed. The concrete piers and steel piles in existing Pier 4 will be removed to an elevation a few feet below the spillway floor/steps. Earthen material in the 60' x 12' area will then be removed and 16 new steel H-piles (two rows of eight) will be driven to bedrock. A 57' x 9' concrete pile cap will be constructed on top of the 16 steel piles. This cap will be 3' thick and the top elevation of the cap will be just below the base of the concrete spillway floor/steps. Eight concrete piers (30" in diameter) will then be constructed from the 57' x 9' concrete pile cap to the new bridge superstructure. The 60' x 12' excavated area in the spillway will be backfilled with rock channel protection, and new concrete (approximately 1' in thickness) will then be poured in the 60' x 12' area to re-establish the spillway floor/steps.

Bridge Abutments (Spillway Walls)

The existing rear and forward bridge abutments consist of 2' wide concrete walls on steel piles. These abutments also serve as the spillway walls (which establish the lateral limits of the OHWM channel through the spillway). Therefore, construction activities involving these existing abutments are considered to be part of the Pee Pee Creek jurisdictional channel, while construction activities behind the abutments are considered to be outside the jurisdictional channel. The existing concrete abutments will be removed down to the spillway floor and new bridge abutments will be constructed 6.5' behind the existing abutment locations. Concrete closure walls (2' wide) will be constructed where the existing abutments were removed (to re-establish the spillway walls) and will connect to the new abutments.

Wingwalls and Rock Channel Protection

Existing concrete wingwalls begin at the existing bridge abutment on each side of the spillway and extend down each side of the concrete spillway steps. Since only the top three feet of each existing wingwall will be removed and reconstructed, nearly all reconstruction work on the existing concrete wingwalls will be above the Pee Pee Creek OHWM. However, similar to the new concrete bridge abutments described above, new 75' long concrete wingwalls will be constructed approximately 6.75' behind the existing concrete wingwalls. A portion of the rear abutment wingwall will be constructed in the Pee Pee Creek OHWM channel, and a portion of the forward abutment wingwall will be constructed in the Crooked Creek OHWM channel (see Page 14). The new rear wingwall will be comprised of 16' to 20' concrete panels that will step down the SR 104/Lake White Dam embankment similar to the existing wingwall. This will require excavation of earthen material behind the existing wingwall to the base elevation of each panel section. Steel H-piles (1' x 1') will then be driven to bedrock, and a 75' long x 12' wide x 3' deep concrete footer will then be constructed along the length of the rear wingwall. The new 2.5' wide concrete wingwall will then be constructed on the concrete footer. After the footer and wingwall are constructed, the remaining excavated area will be backfilled with low strength (concrete) mortar. Following construction of the new rear and forward abutment wingwalls, rock channel protection (RCP) will be placed in a small portion of the Pee Pee Creek OHWM channel beginning at the bottom of the spillway and extending downstream along the face of both existing rear and forward abutment wingwalls (which will remain in place), and then along the face of the new rear and forward abutment wingwalls. The area of RCP in the Pee Pee Creek OHWM channel along the rear abutment wingwall will vary from approximately 10' to 20' x 75', while the area of rock channel protection in the Pee Pee Creek OHWM along the forward abutment wingwall will be approximately 10' x 75' (with the remainder being within the Crooked Creek OHWM channel). As described above, the OHWM elevation in the spillway is approximately 2" above the spillway floor. However, at the bottom of the spillway steps, the OHWM elevation corresponds to the pool elevation of Crooked Creek and Pee Pee Creek below the spillway (approximately 546.5' elevation). Consequently, a portion of the new concrete wingwalls, footers, steel piles, and low strength mortar backfill, as well as all of the RCP, are located below the Pee Pee Creek (and Crooked Creek) OHWM.

Roller Compacted Concrete

The proposed project will utilize roller compacted concrete (RCC) lifts to rehabilitate/armor the east side of the SR 104/Lake White Dam embankment. The existing 3:1 embankment slope will be excavated and graded to a 2:1 slope, and a 20' wide basin (flat concrete-bottom ditch) will be constructed at the bottom of the slope. RCC lifts will also be constructed on the back side of the 20' wide basin. A base layer of granular (gravel) material will be placed on the slopes (approximately 0.75' to 1.5' in depth) and under the 20' wide basin. Small drain pipes will be placed in the base layer of granular material and RCC will then be installed in 2' lifts. A small portion of the Pee Pee Creek OHWM will be filled during roller compacted concrete (RCC) construction adjacent to the rear abutment wingwall. Fill materials placed in the OHWM channel include RCC and rock channel protection, as well as earthen fill and granular bedding (which are placed under the RCC).

Temporary Construction Activities (Below Spillway)

Wingwall construction work, as well as roller compacted concrete work along the back side of the SR 104/Lake White Dam embankment will likely result in the contractor establishing a temporary construction crossing and work area within the Pee Pee Creek OHWM channel. This temporary work area is expected to extend from the bottom of the spillway to a point approximately 90' downstream. The following temporary construction activities are anticipated in this area: excavation of shallow sump pit and dewatering, placement of temporary RCP for equipment crossing (estimated at 20' wide across the width of the channel), and equipment operation. *Note: The exact timing, location, methods, and materials used for temporary construction activities are not specifically known at this time and are at the contractor's discretion. However, at the start of construction activities, the water level in Lake White will be lowered to an elevation of approximately 564 feet to allow for construction activities in Lake White (rock channel protection, new lake drain). The contractor is also expected to relocate Crooked Creek in the first phase of construction allow for roller compacted concrete and other construction work to occur below the SR 104/Lake White Dam embankment (see Page 14). Together, these actions will significantly reduce or eliminate flow in Crooked Creek and Pee Pee Creek during construction and greatly minimize or possibly eliminate the need for any additional dewatering activities.*

Pee Pee Creek - Crooked Creek Relocation Area (see Exhibit 4): Immediately below the spillway, the natural Pee Pee Creek channel is joined by Crooked Creek and continues east through broad floodplain/lowland areas to the Scioto River. To help protect/stabilize the Lake White Dam/SR 104 embankment and to provide adequate space for the contractor to construct the bridge abutment wingwalls and roller compacted concrete lifts, a 1,090' section of Crooked Creek will be relocated away from the Lake White Dam/SR 104 embankment. The relocated Crooked Creek channel segment will be approximately 1,070' in length and will utilize natural channel design techniques to primarily offset the loss of 1,090' of existing Crooked Creek channel. Based on field observations and survey data, the OHWM elevation for Pee Pee Creek at the bottom of the spillway is approximately 546.5', decreasing to approximately 544.0' where the proposed Crooked Creek relocation connects to Pee Pee Creek. The relocated Crooked Creek channel segment will tie back into the Pee Pee Creek channel approximately 1,310' downstream of the spillway. At this location, the north bank of Pee Pee Creek will be excavated and graded to connect the relocated Crooked Creek channel to the Pee Pee Creek channel. The majority of construction work below the Pee Pee Creek OHWM will involve minor bank excavation and grading of existing earthen embankment material to establish the appropriate channel and bank elevations. The total permanent linear foot impact to Pee Pee Creek in the Crooked Creek relocation area is 110 feet, which partially overlaps an adjacent temporary construction impact area (see below).

Temporary Construction Activities

A small temporary work area (approximately 25' wide) is expected to be constructed in the Pee Pee Creek OHWM channel where the Crooked Creek relocation ties into Pee Pee Creek. The total upstream-to-downstream linear foot impact is 55 feet (due to channel skew), which partially overlaps the adjacent 110 foot permanent impact area (see above). Temporary construction activities anticipated in this area include the placement of a temporary RCP flow diversion (estimated at 5' wide) and equipment operation. Excavation of a shallow sump pit and pump-around may also occur in this area. *Note: The exact timing, location, methods, and materials used for these temporary construction activities are not specifically known at this time and are at the contractor's discretion. However, at the start of construction activities, the water level in Lake White will be lowered to an elevation of approximately 564 feet to allow for construction activities in Lake White (rock channel protection, new lake drain). The contractor is also expected to relocate Crooked Creek in the first phase of construction allow for roller compacted concrete and other construction work below the SR 104/Lake White Dam embankment. Together, these actions will significantly reduce or eliminate flow in Crooked Creek and Pee Pee Creek during construction and greatly minimize or possibly eliminate the need for any additional dewatering activities.*

Crooked Creek (see Exhibit 5): Crooked Creek begins approximately 14 miles northwest of Lake White and flows southeast and then southwest through the community of Waverly. South of Waverly, Crooked Creek parallels SR 104 and drains into Pee Pee Creek below the Lake White Dam spillway. Based on field observations and survey data, the OHWM elevation for Crooked Creek at the bottom of the spillway is approximately 546.5', and progressively increases upstream through the project area to approximately 547.0' at the beginning of the proposed Crooked Creek channel relocation. Construction activities below OHWM include: bridge abutment (wingwall) construction, placement of rock channel protection, roller compacted concrete construction, placement of earthen fill (for ODNR access drive construction and the relocation of Crooked Creek), and temporary construction activities. The total linear foot impact to Crooked Creek is 1,115 feet, including 1,090 feet of permanent impact, and 25 feet of temporary impact at the beginning (upstream end) of the Crooked Creek channel relocation. An additional 25 foot temporary impact area in Crooked Creek may also be necessary in the spillway area and is included in this permit application; however, it is not included in the total linear foot and area impact for Crooked Creek due to overlap with the permanent fill area (see temporary impact discussion on Page 15). The sections below discuss the construction activities that will affect the Crooked Creek OHWM channel in the project area.

Wingwalls and Rock Channel Protection

As described in the Pee Pee Creek section (see Page 12), new 75' long concrete wingwalls will be constructed approximately 6.75' behind the existing concrete wingwalls that parallel the spillway steps. A portion of the forward wingwall will be constructed in the Crooked Creek OHWM, where Crooked Creek joins Pee Pee Creek at the base of the Lake White Dam spillway. The new forward wingwall will be comprised of 16' to 20' concrete panels that will step down the SR 104/Lake White Dam embankment similar to the existing wingwall. This will require excavation of earthen material behind the existing wingwall to the base elevation of each panel section. Steel H-piles (1' x 1') then be driven to bedrock, and a 75' long x 12' wide x 3' deep concrete footer will then be constructed along the length of the wingwall. The new 2.5' wide concrete wingwall will then be constructed on the footer. After the footer and wingwall are constructed, the remaining excavated area will be backfilled with low strength (concrete) mortar. Following construction of the new forward abutment wingwall, rock channel protection (RCP) will be placed in a small portion of the Pee Pee Creek OHWM channel beginning at the bottom of the spillway and extending downstream along the face of the existing forward abutment wingwall (which will remain in place), and then along the face of the new forward abutment wingwall. The area of RCP in the Pee Pee Creek OHWM along the forward abutment wingwall will be approximately 10' x 75', with the remaining 10' x 75' area of rock channel protection being within the Crooked Creek OHWM channel. As described on Page 12, the OHWM elevation at the bottom of the spillway steps corresponds to the pool elevation of Crooked Creek and Pee Pee Creek below the spillway (approximately 546.5' elevation). Consequently, a substantial portion of the new forward concrete wingwall, footer, steel piles, and low strength mortar backfill, as well as all of the RCP, are located below the Crooked Creek (and Pee Pee Creek) OHWM.

Roller Compacted Concrete

The proposed project will utilize roller compacted concrete (RCC) lifts to rehabilitate/armor the east side of the SR 104/Lake White Dam embankment. Approximately 335 feet of the Crooked Creek OHWM channel immediately upstream of the spillway will be filled with earthen material, granular material, rock channel protection, and concrete as part of the RCC construction work.

ODNR Access Drive

An ODNR access drive will be constructed on the east side of the SR 104/Lake White Dam embankment near the north project terminus (at the SR 104/CR 105 intersection). Construction of this access drive will fill approximately 80 feet of the Crooked Creek OHWM with earthen material. The concrete access drive will then be constructed on the earthen fill, well above the Crooked Creek OHWM, which is approximately 546.8' at this location.

Crooked Creek Channel Relocation

To help protect/stabilize the Lake White Dam/SR 104 embankment and to provide adequate space for the contractor to construct the bridge wingwalls, roller compacted concrete (RCC) lifts, and the ODNR access drive, a 1,090' section of Crooked Creek will be relocated away from the Lake White Dam/SR 104 embankment. The relocated Crooked Creek channel segment will be approximately 1,070' in length and will utilize natural channel design techniques to primarily offset the loss of 1,090' of channel. The relocated Crooked Creek channel segment will tie back into the Pee Pee Creek channel approximately 1,310' downstream of the spillway. This relocation will permanently dewater 1,090' of Crooked Creek, approximately 335 feet of which will be filled for RCC and wingwall construction. The remaining 755 feet will be filled with earthen material to establish a forested floodplain for relocated Crooked Creek and to construct the ODNR access drive.

Temporary Construction Activities

A small temporary work area (approximately 25' wide) is expected to be constructed in the Crooked Creek OHWM channel at the beginning (upstream end) of the Crooked Creek channel relocation. Anticipated temporary construction activities in this area include placement of a temporary RCP flow diversion (estimated at 5' wide) and equipment operation. Excavation of a shallow sump pit and pump-around may also occur in this area. A small temporary work area (approximately 25' wide) may also be constructed in the Crooked Creek OHWM channel in the spillway area due to the potential need for a temporary flow diversion/pump-around in this area (depending on the contractor's sequence of construction); however, this temporary impact area is not included in the total linear foot and area impact for Crooked Creek since it overlaps with the area that will ultimately be permanently filled for roller compacted concrete construction. *Note: The exact timing, location, methods, and materials used for these temporary construction activities are not specifically known at this time and are at the contractor's discretion.*

Wetland 1 (see Exhibit 6): Wetland 1 is a 1.06 acre forested, Category 2 wetland located on the east side of the Lake White Dam/SR 104 embankment, east of the SR 104/SR 551 intersection. This wetland is adjacent to Wetland 2 and ultimately drains into Pee Pee Creek via a non-jurisdictional ditch that parallels the embankment toe of slope and a series of other wetlands (Wetlands 4 and 6), ponds (including jurisdictional Pond 1), and the Lake White Dam emergency spillway. The majority of this wetland is located within a USDA conservation easement. Roller compacted concrete (RCC) construction is expected to permanently impact 0.002 acre of Wetland 1 through the placement of rock channel protection (RCP) and granular material. Additional construction impacts (tree/vegetation clearing and equipment access and operation) are also expected along the east edge of the RCC limits (0.022 acre). Though there are no permanent or temporary fills expected in this 0.022 acre area, this is considered a permanent impact due to the alteration of forested wetland area. Consequently, the total impact to Wetland 1 is 0.024 acre. The remainder of the wetland will be flagged in the field and labeled as "Do Not Disturb" in the final design plans.

Wetland 4 (see Exhibit 7): Wetland 4 is a 0.09 acre scrub shrub, Modified Category 2 wetland located on the east side of the Lake White Dam/SR 104 embankment, south of the Lake White Dam spillway. This wetland abuts jurisdictional Pond 1 and the non-jurisdictional ditch along the embankment toe of slope and ultimately drains into Pee Pee Creek via a series of ponds (including jurisdictional Pond 1), Wetland 6, and the Lake White Dam emergency spillway. Wetlands 5 and 5a also abut Pond 1. Roller compacted concrete (RCC) construction is expected to permanently fill 0.019 acre of Wetland 4 through the placement of earthen material, granular material, and rock channel protection (RCP). Additional construction impacts (shrub/vegetation clearing and equipment access and operation) are also expected along the east and north edge of the RCC limits (0.019 acre). Though there are no permanent or temporary fills expected in this 0.019 acre area, this is considered a permanent impact due to the alteration of scrub shrub wetland area. Consequently, the total impact to Wetland 4 is 0.038 acre. The remainder of the wetland will be flagged in the field and labeled as "Do Not Disturb" in the final design plans. No impacts are expected to Pond 1, Wetland 5, or Wetland 5a. The boundaries of these features will also be flagged and labeled as "Do Not Disturb" in the final design plans.

Wetland 6 (see Exhibit 8): Wetland 6 is a 0.61 acre scrub shrub/emergent, Category 2 wetland located on the east side of the Lake White Dam/SR 104 embankment, just south of the Lake White Dam spillway. This wetland directly abuts Pee Pee Creek and Wetland 7. Roller compacted concrete (RCC) and wingwall footer construction is expected to permanently fill 0.121 acre of Wetland 6 through the placement of earthen material, granular material, rock channel protection (RCP), and concrete. Additional construction impacts (shrub/vegetation clearing and equipment access and operation) are also expected along the east edge of the RCC limits (0.019 acre). Though there are no permanent or temporary fills expected in this 0.019 acre area, this is considered a permanent impact due to the alteration of scrub shrub wetland area. Consequently, the total impact to Wetland 6 is 0.140 acre. The remainder of the wetland will be flagged in the field and labeled as "Do Not Disturb" in the final design plans. No impacts are expected to Wetland 7. This wetland will also be flagged and labeled as "Do Not Disturb" in the final design plans.

Wetland 8 (see Exhibit 9): Wetland 8 is a 3.00 acre forested, Category 2 wetland located in the floodplain between Crooked Creek and Pee Pee Creek below the Lake White Dam spillway. This wetland directly abuts Pee Pee Creek. The alignment for the proposed relocation/restoration of Crooked Creek is immediately to the north and west of Wetland 8. A 0.011 acre earthen fill/embankment grading impact is expected at the eastern end of Wetland 8 where the proposed relocated Crooked Creek channel ties back in to Pee Pee Creek. Additional construction impacts (tree/vegetation clearing and equipment access and operation) are also expected along the Crooked Creek relocation grading limits (0.031 acre). Though there are no permanent or temporary fills expected in this 0.031 acre area, this is considered a permanent impact due to the alteration of forested wetland area. Consequently, the total impact to Wetland 8 is 0.042 acre. The remainder of the wetland will be flagged in the field and labeled as "Do Not Disturb" in the final design plans.

Wetland 9 (see Exhibit 10): Wetland 9 is a 0.09 acre emergent, Category 2 wetland located at the north end of the project between Crooked Creek and the SR 104 roadway embankment. This wetland directly abuts Crooked Creek. No permanent or temporary excavation or fill impacts are expected in this wetland; however, the proposed filling and relocation of the existing Crooked Creek channel (see Page 15) is expected to have a permanent (indirect) impact on this feature due to long-term loss of wetland hydrology, and ultimately wetland function. Consequently, the total impact to Wetland 9 is 0.090 acre.

Wetland 10 (see Exhibit 11): Wetland 10 is a 0.04 acre emergent, Category 2 wetland located near the north end of the project between Crooked Creek and the SR 104 roadway embankment. This wetland directly abuts Crooked Creek. The entire 0.040 acre wetland will be filled (earthen fill) for construction of an ODNR access drive.

Lake White (see Exhibit 12): The Lake White Dam is a 4,200' long, 40' tall earth dam, which begins at the SR 551/SR 104 intersection and ends at the SR 552/SR 104 intersection. The dam was constructed in and adjacent to the Pee Peek Creek channel in conjunction with construction of the 337-acre lake. The water level in the lake is controlled by gates on the upstream end of the Lake White Dam spillway. The gates are lowered during the winter and raised during the summer. The winter pool elevation is approximately 569.2' and the summer pool is approximately 572.4'. For this permit application, the OHWM elevation for Lake White will be the summer pool elevation of 572.4'. Construction activities below the Lake White OHWM include: 1) a boat ramp extension in Lake White State Park at the south end of the project, 2) placement of rock channel protection along the top of the Lake White Dam/SR 551/SR 104 embankment, and 3) construction of a new lake drain. Prior to the start of these construction activities, the water elevation in Lake White will be lowered (via lowering of the spillway gates and manual pumping) to an approximate elevation of 564'. The total permanent impact area in Lake White is 2.222 acres, and the total temporary impact area is 0.481 acre. The sections below discuss the construction activities that will affect Lake White below the OHWM elevation in the project area.

Boat Ramp Extension

As part of the PIK-104-10.64 project, the existing concrete boat ramp located near the Lake White State Park entrance (off SR 551) will be extended 30 feet to provide boaters better access to Lake White when the water level in the lake is low. A temporary cofferdam (steel sheet piling) will be driven into Lake White around the ramp extension area. The cofferdam area will then be dewatered an excavated, and a granular base (approximately 1' in depth) will be placed in the ramp extension area. Approximately 0.5' of concrete will then be poured in the ramp extension area, and the temporary cofferdam will be removed.

Rock Channel Protection

Rock channel protection will be placed along the top of the Lake White Dam/SR 551/SR 104 embankment beginning at approximately Sta. 10+40 (for SR 551) and extending east and then north along SR 104 to approximately Sta. 205+30 (the south end of the Lake White Dam spillway). Earthen material will be excavated and the dam embankment will be re-graded to a 2:1 to 3:1 slope. A granular base (approximately 0.75' deep) will be placed on the graded dam embankment, followed by a layer of rock channel protection (RCP) approximately 2' deep. The RCP will extend approximately 25' to 30' down the embankment slope (from the SR 551/SR 104 shoulder).

Lake Drain

A new siphon lake drain intake will be constructed in Lake White approximately 200 feet west of SR 104 centerline Sta. 202+50. The structure will be used in conjunction with the spillway/Pelican gates to control water levels in the lake. The 48" outlet pipe, outlet structure, and rock channel (emergency spillway to Pee Pee Creek) are already in place on the east side of SR 104, having been constructed when the spillway and dam were last modified/rehabilitated (2005-2006). Construction of the siphon intake will involve construction of a permanent 63' x 33' steel cofferdam and a temporary 48' x 33' steel cofferdam. Steel sheet piling for the permanent cofferdam will be driven into place and the Lake White dam embankment will be dredged to elevations ranging from 555 feet to 564 feet within the permanent cofferdam area. The dredged area will be dewatered and granular material will be placed along the ground line (to a depth of one foot). An extension of the existing 48" outlet pipe will then be placed under SR 104 and through the permanent cofferdam area (on a low strength mortar backfill base). The pipe will terminate just inside the temporary cofferdam. Steel sheet piling for the temporary cofferdam will be driven into place and the Lake White dam embankment will be dredged to an elevation of 547' within the temporary cofferdam area. The dredged area will be dewatered and granular material will be placed along the ground line (to a depth of one foot) to form a work pad. Steel H-piles (1" x 1") will then be driven down to bedrock and the concrete foundation for the siphon intake structure will be constructed on the steel piles. Granular material will then be backfilled in the cofferdam to the top of the concrete foundation, and the intake structure (comprised of steel and concrete) will be installed. The temporary cofferdam will be backfilled with granular material and rock channel protection to final grade while rock channel protection (RCP) is being simultaneously installed around the outside of the permanent and temporary cofferdams (this RCP will tie into the RCP being placed along the entire west embankment of the Lake White Dam - see above). The final steps include removal of the temporary cofferdam walls, removal of the top four feet of the permanent cofferdam walls (to approximately elevation 576'), and construction of the 16' wide concrete access drive from SR 104 to the lake drain structure (the access drive will be above the Lake White summer OHWM elevation).

Long-Term Indirect Impacts

With the exception of Wetland 9 (see Page 16), construction of the PIK-104-10.64 project is not expected to have any other long-term, adverse indirect impacts to jurisdictional waters in the project area. Surface elevations and hydraulic conditions along the east side of the Lake White Dam/SR 104 embankment (in the vicinity of Wetlands 1, 2, 3, 4, 5, 5a, 6, 7, and Pond 1) will be similar to existing conditions. Post-construction flow patterns are expected to be similar to current conditions, and none of these wetlands or ponds are expected to be cut off from surface and/or subsurface runoff.

Below the spillway, Pee Pee Creek's OHWM is not expected to substantially change following the relocation of Crooked Creek. Hydraulic studies for conducted for Lake White indicate that the volume of water that will continue to pass through the Lake White Dam spillway under normal conditions will be adequate to support perennial flow in Pee Pee Creek, as well as Wetland 6, Wetland 7, and Wetland 8 which abut Pee Pee Creek. Furthermore, the removal of Crooked Creek flow from Pee Pee Creek is expected to have some positive benefits to Pee Pee Creek, particularly during wet periods. Currently, Pee Pee Creek below the spillway has scoured/eroded banks, is overly wide and somewhat incised. Extensive flood debris also lines the north bank of Pee Pee Creek. Removal of flood flows from this section of Pee Pee Creek will reduce velocities and shear stresses during high water events, and reduce erosion, scour, and further deterioration of this 1,300' section of stream channel.

Over the long term, Crooked Creek is expected to benefit from the proposed 1,070' relocation, which will incorporate natural channel design techniques to achieve appropriate channel dimension, pattern, and profile and provide better connection to its natural floodplain (compared to current conditions, which include eroded banks, a somewhat incised channel, and an artificial, linear alignment along the SR 104 embankment). Additionally, a substantial portion of Wetland 8 is located adjacent to the relocated Crooked Creek channel, and is also expected to hydraulically benefit from the proposed Crooked Creek restoration and floodplain reconnection.

Isolated Waters of the State

The PIK-104-10.64 project will not impact any isolated waters of the State of Ohio.