

ENVIRONMENTAL REPORT

CHAPTER 4

ENVIRONMENTAL IMPACTS OF CONSTRUCTION

4.0 ENVIRONMENTAL IMPACTS OF CONSTRUCTION

4.1 LAND USE IMPACTS

This section describes the impacts of site preparation and construction to the BBNPP site and the surrounding area. Section 4.1.1 describes impacts to the site and vicinity. Section 4.1.2 describes impacts that could occur along transmission lines. Section 4.1.3 describes impacts to historic and cultural resources at the site.

4.1.1 The Site and Vicinity

The BBNPP site land use is presented in Table 2.2-1 and shown on Figure 2.2-1. The land use categories are consistent with USGS, 1997, land use/cover categories. Land use/cover within the 6 mi (10 km) site vicinity is presented in Table 2.2-2 and shown on Figure 2.2-2. Highways and utility rights-of-way that cross the site and vicinity are shown on Figure 2.2-4 and Figure 2.2-5.

4.1.1.1 The Site

BBNPP and supporting facilities will be located to the west of and adjacent to SSES Units 1 and 2 within a 2,055 ac (831.6 ha) area defined by the BBNPP Project Boundary. The SSES site use activities will not change as the result of the proposed action to construct and operate BBNPP. The BBNPP site will conform to applicable local, state, and federal land use requirements and restrictions as they pertain to the proposed action. The BBNPP site is not located in a coastal area and, therefore, is not subject to requirements of the Coastal Zone Management Act. Figure 2.2-4 shows the current Salem Township zoning categories for the BBNPP site.

Through regulation, the federal, state, county, and local governments attempt to limit potential environmental impacts to land. The BBNPP site will follow local, state, and federal requirements, including those that pertain to Water Quality Standards (PA, 2007). During construction, site activities are required to be authorized by the agencies and programs listed in Table 1.3-1. There are no recognized Native American Tribal Land use plans that would have jurisdiction over, or within the vicinity of, the BBNPP site that could impact the site.

Table 4.1-1 provides an estimate of the land areas that will be disturbed during construction of BBNPP and supporting facilities, including temporary features such as laydown areas. Approximately 677 ac (274.1 ha) within the BBNPP Project Boundary will be disturbed by site preparation and construction activities, excluding areas within the Susquehanna River. Approximately 357 ac (144.6 ha), including 39 ac (15.6 ha) of previously developed land, would be permanently converted to structures, pavement, or other intensively-maintained exterior grounds, or from forested land to scrub/shrub and natural grasses within transmission line and vehicle, rail and utility bridge corridors. These facilities will include the proposed power block, switchyards, cooling towers, ESWEMS Retention Pond, combined wastewater retention pond, water treatment plant, permanent parking, buildings, yard and laydown areas, roads, railroad, storm water infiltration basins, transmission line rights-of-way, and CWS Makeup Water Intake Structure.

Approximately 306 ac (123.8 ha), including 16 ac (6.6 ha) of previously developed land, would be temporarily disturbed, only, to accommodate the batch plant, temporary sedimentation pond, dredge dewatering pond, topsoil disposal areas, installation of water intake and blowdown pipelines, temporary offices, warehouses, parking and laydown areas, and other miscellaneous temporary construction features. Acreage not containing permanent structures would be restored by grading and revegetating to the extent practicable, and certain portions may be designated for wetland or other habitat mitigation.

The proposed location of BBNPP and supporting facilities is partially farmland, and the site contains three types of soil rated as Prime Farmland by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS, 2010). Also present on the BBNPP site are five types of soil rated as Farmland of Statewide Importance (NRCS, 2010).

Approximately 825 ac (333.9 ha) of prime farmland soils are located within the BBNPP Project Boundary as illustrated in Figure 4.1-1. However, of the total acreage of prime farmland soils within the BBNPP Project Boundary approximately 197 ac (79.7 ha), or roughly 24%, have been previously developed. Developed soils include areas that may have been previously graded, excavated, covered, filled, or disturbed in some manner to accommodate residential, commercial, industrial or other non-agricultural structures and facilities.

Figure 4.1-1 illustrates both the developed and undeveloped prime farmland soils that will be impacted by site grading during construction. As a result of site grading approximately 324 ac (131.1 ha) of prime farmland soils will be impacted by construction. However, of this amount, only 292 ac (118.2 ha) represent land that has not been previously impacted by development.

As discussed in Section 4.3.1.1, an estimated 222 ac (89.9 ha) of upland forest would be either permanently lost (148 ac (59.9 ha)), permanently converted (25.2 ac (10.2 ha)) to scrub/shrub, or temporarily lost (49 ac (19.9 ha)) during construction activities.

Section 2.2.1 describes the land areas that are devoted to major uses within the BBNPP Project Boundary and the BBNPP site vicinity. These areas are depicted on Figure 2.2-1 and Figure 2.2-2, respectively. In addition, Section 2.2.1 describes the highways and utility rights-of-way that cross the BBNPP site and vicinity. PPL Bell Bend, LLC is not aware of any federal action in the area that would have cumulatively significant land use impacts.

Heavy equipment and reactor components would be transported by rail and highway to the new construction site and lay down areas. A new multi-lane access road, approximately 0.8 mi (1.3 km) long, would be constructed from highway U.S. 11 to the construction site providing access to the construction areas without impeding traffic to the existing units. A new rail road spur will connect to the existing line on the eastern boundary of SSES and provide access to the modular laydown and assembly areas located to the north of the BBNPP power block. A site perimeter road system and access road around the cooling towers area and the power block would be built. An access driveway would be constructed to connect the proposed water intake structure to an existing road.

The proposed location of the BBNPP will impact portions of the Susquehanna River and Walker Run floodplains. Figure 4.1-2 illustrates the BBNPP power block, supporting facilities, and preconstruction 100-year and 500-year floodplains within and in the vicinity of the BBNPP Project Boundary. Also illustrated in Figure 4.1-2 are those areas of the Walker Run and the Susquehanna River floodplains that will be impacted by BBNPP construction activities. As discussed in Section 2.3.1.1.1.9, the BBNPP plant grade will be at least 60 ft (18 m) above the predicted 100-yr and 500-yr flood levels. Thus, flooding from a 100-yr or a 500-yr storm should be at least 60 ft (18 m) below the plant grade.

Proposed construction activities within the Walker Run watershed will affect a total of 0.45 ac (0.18 ha) of the 100-year floodplain and 1.85 ac (0.75 ha) of the 500-year floodplain. For the Susquehanna River watershed a total of 28.1 ac (11.4 ha) of the 100-year floodplain and 32.5 ac (13.2 ha) of the 500-year floodplain will be affected. The affected 500-year floodplain acreages include affected acreages for the 100-year floodplain. Construction activities affecting the

floodplains include the installation of temporary and permanent facilities, grading and other earth disturbance work associated with these facilities, and vegetation removal and management. In-river impacts to the Susquehanna River channel associated with the cooling water intake and discharge structures are discussed in ER Section 4.3.2.2.

For the Susquehanna River most construction impacts within the floodplains will be temporary in nature, with the exception of the BBNPP Intake Structure, which will be located in the existing 100-year floodplain. Similarly, for Walker Run most of the construction impacts within the floodplains will be temporary, with the exception of a small section of roadway, bridge abutment, and yard area adjacent to the southwest corner of the BBNPP Power Block that will impact the existing 100-year floodplain. Grading impacts on the western edge of the temporary construction parking area will also result in a permanent alteration of the Walker Run 500-year floodplain.

Construction activities within the Walker Run watershed will permanently impact a total of 0.3 ac (0.12 ha) of the existing 100-year floodplain and 1.0 ac (0.4 ha) of the existing 500-year floodplain, which includes the 100-year floodplain. For the Susquehanna River watershed construction will permanently impact a total of 1.7 ac (0.69 ha) of the existing 100-year floodplain and 1.7 ac (0.69 ha) of the existing 500-year floodplain, which includes the 100-yr floodplain.

The stormwater management plan for BBNPP will utilize infiltration beds to promote groundwater recharge, limit alterations to existing hydrology, and reduce the amount of surface runoff that is discharged directly into Walker Run and the Susquehanna River. Therefore, given the limited permanent impacts to existing floodplains and hydrology within the BBNPP Project Boundary, downstream land use impacts within the Walker Run and Susquehanna River watersheds due to floodplain changes are not anticipated after construction is complete.

The only known mineral deposits having a potential of being extracted at the BBNPP site are sand, gravel, and siltstone as described in Section 2.2.1. The siltstone could not be mined economically due to its depth and only a small portion of the sand and gravel deposits along the Susquehanna River are under the flood plain at the site.

The proposed construction activities would result in the permanent loss, through filling of approximately 1.4 ac (0.6 ha) of wetland habitat, and the permanent conversion of 7.9 ac (3.2 ha) of forested wetlands to palustrine scrub/shrub for new transmission line rights of way and vehicle, rail and utility pipeline bridge corridors within the BBNPP Project Boundary. Temporary wetland losses associated with the installation of water intake and blowdown pipelines and for wetland mitigation activities total 9.3 ac (3.7 ha). Section 4.3.1.3 provides a detailed discussion of construction impacts to wetlands.

It is concluded that the land use impacts to the BBNPP site and vicinity of the BBNPP site from construction of the new unit would be SMALL, but would require mitigation due to the loss of wetlands. The mitigation measures associated with the wetlands are described in Section 4.3.1.6

4.1.1.2 The Vicinity

Land in the vicinity of the BBNPP site is rural with development generally occurring in town centers per current Luzerne County planning requirements. Land use within 6 mi (10 km) of the site is predominantly forest and agriculture as described in Table 2.2-2.

The construction activities that would degrade the visual aesthetics of the land would be limited to those activities potentially seen from the new site access road and sections of North Market Street, Confers Lane, and Beach Grove Road, which are located within the perimeter of the BBNPP Project Boundary. Because of the forested nature of much of the area surrounding the proposed site, it is unlikely that construction activities for the proposed facilities could be seen directly from the adjacent highway (US 11), with the exception of the activities to build or upgrade the BBNPP site access road and haul construction materials to and from laydown areas adjacent to the site access road. Once the proposed facility construction extends above the tree line, some construction could be seen from roadways or other areas in the vicinity of the site depending on the area's topography and the immediate land cover. However, because a portion of the land adjoining the BBNPP site is currently zoned as special industrial and already contains SSES Units 1 and 2, visual impacts from the proposed project would be similar to existing site conditions.

Section 4.4.2.4 provides the details on potential population impacts due to construction activities. The majority of the temporary construction workforce would probably live outside of Luzerne County and Columbia County. These workers would commute or find temporary housing in Luzerne County or Columbia County. No other land use changes in the vicinity would likely occur as a result of construction workforce related population changes.

Thus, it is concluded that impacts to land use in the vicinity of BBNPP would be SMALL, and not require mitigation.

4.1.2 Transmission Corridors and Offsite Areas

The electricity generated from BBNPP will be transmitted through both existing transmission corridors, including the planned Susquehanna-Roseland line, and will not require the addition of any new offsite rights-of-way. As discussed in Section 2.2.2.2, the proposed BBNPP construction activities within the BBNPP site would include the following transmission system changes:

- ◆ One new 500 kV switchyard to transmit power from BBNPP.
- ◆ Two new 500 kV, 4260 MVA circuits connecting the BBNPP switchyard to the existing Susquehanna 500 kV Yard and the proposed Susquehanna 500 kV Yard 2.
- ◆ One new 500 kV transmission system switchyard (Susquehanna 500 kV Yard 2)
- ◆ Expansion of the existing Susquehanna 500 kV Yard

Additionally, the 230 kV transmission lines currently passing through the BBNPP site will be relocated to the north of Beach Grove Road in order to provide a buffer from the BBNPP CWS cooling towers and provide additional areas for the location of plant-related structures.

In its generation interconnection Impact Study Restudy (PJM, 2008), PJM identified that BBNPP contributes to two previously identified transmission system upgrades for overloads, initially caused by prior Queue position generation additions. Any related offsite modifications are due to prior Queue position generation additions, and will be implemented independent of BBNPP.

The two 500 kV transmission lines that currently connect the existing Susquehanna 500 kV Yard with the regional grid are located in 100 to 350 ft (30 to 107 m) wide corridors, totaling approximately 120 mi (193 km) in length, within the PJM Regional Transmission Organization.

The corridors pass through land that is primarily agricultural and forest (PPL 2006). Additionally, SSES and BBNPP will both be connected to the planned Susquehanna-Roseland transmission line.

The transmission line work to support the BBNPP project will require the construction of new towers and transmission lines to connect the BBNPP switchyard to the existing Susquehanna 500 kV Yard and the new Susquehanna 500 kV Yard 2. Line routing would be conducted to avoid or minimize impact on the existing wetlands and threatened and endangered species identified in the local area. However, lines routed through forested wetlands will cause a permanent disturbance due to corridor vegetation management. No new offsite corridors or widening of existing offsite corridors are required. The new onsite connector corridor would be located on the BBNPP site or on land already in use to generate electric power. Some of the new facility locations associated with the project are located on land currently zoned and used as special industrial. The remainder is zoned as Agricultural, Highway Business and Conservation District. As discussed in Section 1.3, federal, state, and local regulations and requirements including those that deal with construction impacts will be followed.

There are no federal actions that would have cumulatively significant land use impacts within the vicinity and region of the BBNPP site activity and offsite areas as described in Section 2.8.

Because there are no new offsite transmission corridors, it is concluded that there will be no additional impacts to the offsite transmission corridor lands associated with the construction of BBNPP. The new onsite transmission line connector corridor would be located on the BBNPP site or on land already in use to generate electric power. No new access roads or modifications to existing roads associated with offsite transmission corridors are currently anticipated.

4.1.3 Historic properties

This section discusses the potential impact of BBNPP construction on cultural and historical resources within the project area. The assessment focuses on historic resources that are either listed in, or potentially eligible for listing, on the National Register of Historic Places (NRHP). These resources typically include districts, sites, buildings, structures and objects of historical, archaeological or traditional cultural significance.

Section 2.5.3 describes the significant cultural resources associated with BBNPP. The information presented was derived from a Phase Ia reconnaissance, Phase Ib surveys, and Phase II National Register site evaluations. The Phase Ia project area included lands east and west of the Susquehanna River. The Phase Ib survey, conducted in four stages, consisted exclusively of PPL Susquehanna, LLC lands west of the Susquehanna River, and more specifically, on lands selected for the BBNPP project.

A total of 24 previously-recorded archaeological sites were identified within a 1 mi (1.6 km) radius of the Phase Ia project Area of Potential Effect (APE). As presented in Table 2.5-34, six of these previously-recorded archaeological sites are located within the Phase Ia project APE—all along the west bank of the Susquehanna River. Of these, four are recommended as eligible for listing on the National Register of Historic Places (NRHP). Because of the subsequent exclusion of those portions of the initial Phase Ia project area on the eastern side of the Susquehanna River, only one of the Phase Ia sites (36LU51) is mapped within the Phase Ib project APE.

Table 2.5-35 lists previously-recorded architectural and historical resources within the proposed Phase Ia project viewshed, including those eligible for listing on the NRHP (NPS,

2008). One previously-recorded resource, the NRHP-eligible North Branch Pennsylvania Canal, lies within the project footprint west of the river (NPS, 2008).

Table 2.5-36 summarizes 52 surveyed architectural and historical resources identified within the project viewshed during the project's architectural survey, ten of which were initially recommended as eligible for listing in the NRHP. Five of these 52 surveyed resources were located within the project footprint west of the river, including three initially recommended as NRHP-eligible (Table 2.5-37). The Pennsylvania SHPO (PHMC/BHP) requested additional information (i.e. Pennsylvania Historic Resource Survey Forms) on 22 of the 52 resources, including the three recommended-eligible resources located within the project footprint (PHMC/BHP, 2008a). Pennsylvania Historic Resource Survey (PHRS) forms for these resources were included in the Phase Ib Management Summary (GAI, 2008a). Additional architectural and historical fieldwork and research was conducted in 2009 at the request of the SHPO (GAI, 2009a). Based on the results of additional research and subsequent SHPO consultation (PHMC/BHP, 2010a, PHMC/BHP, 2011b, and PHMC/BHP, 2011c) seven of the initial ten resources were concluded Not Eligible, while three resources were concluded to be eligible for listing in the NRHP (Table 2.5-43). One of these NRHP-eligible resources is located within the project footprint—the North Branch Pennsylvania Canal (141673/GAI-10) (Table 2.5-44). These resources were described in the Phase I/II Technical Report (GAI, 2010a). Further SHPO consultation, including review of the Phase I/II Technical report and participation in a 2011 field visit, concluded that proposed project impacts will result in no adverse effects to any of the three NRHP-eligible architectural resources identified in the project area (PHMC/BHP, 2011c). Accordingly, preparation of a Criteria of Effects Evaluation Report for the project is not required and no further investigations of the three NRHP-eligible architectural resources will be conducted.

The initial Phase Ib archaeological survey was conducted on the 639 ac (259 ha) BBNPP project APE west of the Susquehanna River (final calculation of the Switchyard 2 area, added during the course of initial Phase Ib fieldwork, resulted in a change in project size from 630 acres/255 hectares (GAI, 2008a) to 639 acres/259 hectares (GAI, 2010a)). The survey included a pedestrian ground survey, subsurface shovel testing, and deep testing (i.e., trenching and column samples). A total of 2,167 artifacts were found. This study identified eleven archaeological sites (three prehistoric and eight historic) and 25 prehistoric isolated finds, as well as dispersed historic/modern surface artifacts representing non-site field scatters. Figure 2.5-8 illustrates the location of identified archaeological sites. Table 2.5-38 and Table 2.5-39 summarize the eleven sites and 25 isolated finds. Both tables provide recommendations on potential NRHP eligibility for these resources. Based on these results and SHPO consultation (PHMC/BHP, 2009a), seven sites (Sites 36LU279, 36LU280, 36LU281, 36LU283, 36LU285, 36LU286 and 36LU288) were recommended as potentially-eligible for listing in the NRHP. Of these, six historic period sites (Sites 36LU279, 36LU280, 36LU281, 36LU383, 36LU385 and 36LU286) are located in upland settings west of the existing SSES facility (West Alternative) and one prehistoric site (Site 36LU288) lies on a low terrace/floodplain setting in Area 7.

Following completion of the initial Phase Ib survey, a Supplemental Phase Ib survey was conducted of approximately 263 acres (106 hectares) of new upland project areas located adjacent to Area 6 and the West Alternative (GAI, 2008b) (Figure 2.5-5). The Supplemental Phase Ib project APE comprised seven lots—Lots 4, 64, 93F, 95, 96, 97/97C, and 100. Supplemental Phase Ib fieldwork, performed between August and November 2008, investigated approximately 115 acres (46.5 hectares) of moderate to high archaeological potential (GAI, 2008b) (Figure 2.5-8). The remainder of the project APE consisted of areas of low archaeological potential (slopes in excess of 15 percent and wetlands) or disturbance/no

archaeological potential. Due to poor ground surface visibility throughout areas of moderate to high potential, fieldwork consisted of systematic shovel testing. Sampling and reporting methodologies for Supplemental Phase Ib investigations were the same as for initial Phase Ib investigations (GAI, 2008a). Supplemental Phase Ib fieldwork consisted of the excavation of 1,937 shovel test pits. The Supplemental Phase Ib survey identified no archaeological sites or isolated finds within the project area. Shovel testing produced just four historic artifacts, all representing field or roadway scatters. Based on these results and SHPO consultation (PHMC/BHP, 2009b), no further archaeological investigations are required for the Supplemental Phase Ib project area.

The Supplemental Phase Ib project area included seven architectural and historical resources identified during previous architectural survey, two of which were initially recommended as eligible for listing in the NRHP (GAI, 2008b) (Figure 2.5-7). Based on subsequent architectural studies and SHPO consultation both of these resources were concluded to be Not Eligible for listing in the NRHP (Table 2.5-44) (GAI, 2009a, PHMC/BHP, 2010a, and PHMC/BHP, 2011b). No further investigations of these resources will be conducted.

Based on the results of initial and supplemental Phase Ib surveys and SHPO consultation, Phase II National Register Evaluation or site avoidance was recommended for seven potentially-eligible archaeological sites and an Assessment of Effects study was recommended for NRHP-eligible architectural resources (PHMC/BHP, 2009c). It was initially indicated that one potentially-eligible site (36LU288) might be avoided by proposed project impacts, and avoidance measures for the site were developed in consultation with the SHPO. It was subsequently determined that site avoidance was not feasible.

Phase II National Register Site Evaluations of seven sites (36LU279, 36LU280, 36LU281, 36LU283, 36LU285, 36LU286 and 36LU288) that could not be avoided by project impacts were conducted between July and November 2009. Of the seven sites, six were historic period sites and one was a prehistoric site. The Phase II study included site-specific archival research, fieldwork, and laboratory analysis. Field investigations included the excavation of 80 test units and 1,169 shovel tests as well as pedestrian survey of cultivated fields and mechanical stripping of the plowzone in trenches at four sites. This work produced 63,169 artifacts and resulted in the documentation of 30 cultural features (GAI, 2010a).

Table 2.5-41 summarizes the results of Phase II investigations at the seven sites and provides recommendations on NRHP eligibility and the need for further work. Based on the results of the Phase II study, all seven sites were recommended Not Eligible for listing in the NRHP and, accordingly, no further archaeological investigations were recommended for these sites (GAI, 2010a). [Note that due to the shallow depth of proposed impacts in the area of Site 36LU288, Phase II investigations in this locality were limited to an evaluation of archaeological components in the upper portion of the soil profile only (to a depth of 80 cm/2.6 feet below surface); if project modifications should result in deeper impacts within this area, additional investigations of deeper deposits may be required.] Based on a review of the Phase I/Phase II Technical Report the SHPO concurred that six of the seven sites (36LU279, 36LU280, 36LU281, 36LU283, 36LU285, and 36LU286) were not NRHP eligible and required no further investigation (PHMC/BHP, 2011b). The SHPO concluded that Site 36LU288 was eligible for listing in the NRHP and recommended avoidance or Phase III Data Recovery investigations in the northern half of the site. Proposed construction activities (i.e. shallow laydown impacts) within the southern half of the site were considered to result in no adverse effect.

The SHPO was consulted to discuss appropriate site avoidance measures as per Section 106 of the National Historic Preservation Act (USC, 2007). A plan was developed to avoid adverse impacts to Site 36LU288 through the use of geotextile fabric and fill (i.e. emplacement of geotextile fabric and fill, periodic monitoring, and removal of the geotextile fabric and fill).

Following the completion of the Phase II study, a Second Supplemental Phase Ib study was conducted of approximately 176 acres (71 hectares) of additional upland project areas associated with the proposed BBNPP Power Block Relocation (GAI, 2010b). [The total Upland Section of the Power Block Relocation area consisted of approximately 215 acres (87 hectares) and encompassed the approximately 39-acre (15.8-hectare) previously-surveyed Switchyard 2 Parcel, which was excluded from further investigations.] The Second Supplemental Phase Ib APE consisted of 13 lots located adjacent to previously-surveyed parcels –Lots 54, 6, 6A, 6B, 7, 8, 31, 23, 0, 3, 41 and 93D, as well as the previously-surveyed Rail Spur Corridor, which was reevaluated due to a redefinition of proposed project impacts (Figure 2.5-5). Second Supplemental Phase Ib fieldwork, performed between April and May 2010, investigated approximately 109.5 acres (44.1 hectares) of moderate to high archaeological potential. The remainder of the project APE comprised areas of low archaeological potential (slopes in excess of 15 percent or wetlands) or disturbance/no archaeological potential (Figure 2.5-8) (GAI, 2010b). Fieldwork consisted of pedestrian ground survey or systematic shovel testing. Sampling and reporting methodologies were the same as for initial Phase Ib survey (GAI, 2008a).

Second Supplemental Phase Ib survey yielded 261 artifacts and resulted in the identification of two archaeological sites (one prehistoric and one historic period site) and one prehistoric Isolated Find, as well as dispersed historic/modern surface artifacts representing non-site field scatters (Figure 2.5-8) (GAI, 2010b). One site (36LU301) was recommended potentially-eligible for listing in the NRHP and site avoidance or Phase II investigations were recommended for this site. Site 36LU302 and the isolated find were recommended Not Eligible. Table 2.5-42 summarizes the identified cultural resources and provides recommendations on potential NRHP eligibility for these resources (GAI, 2010b). SHPO consultation on results of the Second Supplemental Phase I study provided concurrence on the report's recommendations (PHMC/BHP, 2011a).

As it was concluded that site avoidance was not feasible, a Phase II investigation of Site 36LU301 was conducted between June 24 and July 27, 2011, to conclusively evaluate site eligibility. The Phase II study included site-specific research, fieldwork and laboratory analysis. Phase II fieldwork consisted of controlled surface collection, judgmental and close-interval shovel testing, test unit excavation, plowzone stripping, and feature sampling. This work yielded 192 artifacts (49 prehistoric lithic artifacts and 143 historic specimens) and identified 212 possible cultural features (soil anomalies) (all but one located within plowzone stripped trenches). As requested by PHMC-BHP, a 25 percent sample of the possible cultural features was investigated, for a total of 55 tested features. Based on preliminary Phase II results, the 55 tested features included one historic feature (refuse pit), five thermal features of indeterminate origin (e.g., possible prehistoric hearth features, historic burn pits, or natural burn areas), two possible prehistoric or historic postmolds, and 47 non-cultural soil anomalies (primarily root/rodent disturbances). Preliminary results of Phase II investigations were presented in a Phase II Management Summary (GAI, 2011b). A Phase II Technical Report for Site 36LU301 was provided to SHPO in late 2011, and in 2012 the site was deemed not eligible for the NRHP (PHMC/BHP, 2012b).

A Third Supplemental Phase I survey was performed of approximately 26 acres (10 hectares) of new project localities representing the addition of an on-site excess cut disposal area associated with the proposed power block relocation, as well as minor BBNPP Project Boundary changes (GAI, 2011a). The Third Supplemental Phase I project area consisted of five parcels: Area 1, Area 7 North, Area 12, Area 13 East (Excess Cut Disposal Area), and Area 14 (Figure 2.5-5). The Area of Potential Effect (APE) for this study included approximately 24.3 acres (9.8 hectares) of uplands and 1.4 acres (0.6 hectares) of low terrace/floodplain settings adjacent to previously-surveyed portions of the BBNPP project area.

Third Supplemental Phase I fieldwork was conducted between July 11 and 15, 2011, and on August 25, 2011. This work included an archaeological reconnaissance and Phase Ib shovel testing in localities of moderate to high archaeological potential. Supplemental fieldwork consisted of the excavation of 71 shovel test pits within portions of two test areas (Area 13 East and Area 14), totaling approximately 4.2 acres (1.7 hectares); an additional 0.43 acres (0.17 hectares) of moderate to high potential in Area 7 North was concluded to have been encompassed by the previous 2008 Phase Ib survey of the adjacent Area 7 and was excluded from further investigation (Figure 2.5-5, Figure 2.5-8). The remainder of the project APE comprised areas of low archaeological potential (slopes in excess of 15 percent or wetlands) or disturbance/no archaeological potential (Figure 2.5-8) that were excluded from subsurface investigation.

The Third Supplemental Phase I survey produced 22 modern/historic artifacts and resulted in the identification of one historic period archaeological site (Site 36LU307). Site 36LU307 was recommended as Not Eligible for listing in the NRHP and no further investigations of the site were recommended (GAI, 2011a). The results of this study were provided in a Third Supplemental Phase I Addendum Report (GAI, 2011a). The subsequent SHPO review of that report determined that this site was not eligible for the NRHP (PHMC/BHP, 2012a).

The Third Supplemental Phase I project area included a portion of one previously-recorded NRHP-eligible architectural resource—the North Branch Pennsylvania Canal (141673/GAI-10). It was recommended that an assessment of project impacts to this resource be addressed in a separate Criteria of Effects Evaluation Report (GAI, 2011a). (Note that subsequent SHPO consultation (PHMC/BHP, 2011c) concluded that proposed project impacts will result in no adverse effects to any of the three NRHP-eligible architectural resources identified in the project area, including the North Branch Pennsylvania Canal. Accordingly, preparation of a Criteria of Effects Evaluation Report will not be required and no further investigations of this resource will be conducted.)

Following the completion of additional cultural resources investigations, if necessary, in consultation with the SHPO, BBNPP will identify measures to avoid, minimize, or mitigate any adverse effects to NRHP-eligible resources, per Section 106 of the National Historic Preservation Act (USC, 2007).

Based on Phase I and Phase II assessments conducted to date, in conjunction with review of applicable state and federal guidelines, adverse impacts may occur to historic resources from construction. Measures will be developed to limit impacts to historic resources during construction activities.

As described in Section 2.5.3, research identified 723 previously-recorded cultural resources within a 10 mi (16 km) radius of the project area. This number includes historic districts, buildings, sites, bridges, and other structures. Resource types range from historic districts with

numerous contributing resources to archaeological sites and individual architectural features. Of these, seven were NRHP-listed and 51 were eligible for listing on the NRHP.

In addition, within Luzerne County there were 32 cultural resources listed on the NRHP and 29 cultural resources were listed on the NRHP within Columbia County (NPS, 2008) (Table 2.5-45 and Table 2.5-46).

The amount of acreage potentially affected by site construction is given in Section 4.1.1.1.

BBNPP construction would require installation of a new intake structure, located east of the BBNPP power block on the west bank of the North Branch Susquehanna River near the terminus of a spillway of the North Branch Pennsylvania Canal (North Branch Canal). The new intake structure is necessary to support cooling water system makeup. Area 6, the area most likely to be affected by the new intake structure, contains one previously-recorded architectural resource, the NRHP-eligible North Branch Canal. In addition, Area 6 contains two resources identified by the project's architectural and historical survey—the Delaware Lackawanna & Western Railway and the Susquehanna and Tioga Turnpike, both of which were initially recommended as eligible for listing in the NRHP, but have been subsequently determined Not Eligible by the SHPO (PHMC/BHP, 2010a) (Table 2.5-44). It is probable that construction activities, including the use of sheet-piling coupled with directional drilling, excavation and eventual de-watering, may impact the North Branch Canal. It is also predicted that excess sediments, resulting from construction activities, may be introduced to the North Branch Canal and subsequently the Susquehanna River. However, based on the results of subsequent consultation the SHPO concluded that these proposed project impacts will result in no adverse effects to the canal, or to any of the three NRHP-eligible architectural resources identified in the project area (PHMC/BHP, 2011c). Area 7 (proposed construction lay down area) includes the mapped locations of two previously-recorded NRHP-eligible resources—archaeological Site 36LU51 and portions of the North Branch Pennsylvania Canal. Based on SHPO consultation on Phase Ib results, it was concluded that Site 36LU51 was not located within the Phase Ib project APE (GAI, 2010a). In addition, one potentially-eligible archaeological site (Site 36LU288) was identified in Area 7 during Phase Ib survey. SHPO review of the results of subsequent Phase II investigations of Site 36LU288 concluded that this site was eligible for listing in the NRHP and recommended site avoidance or Phase III Data Recovery investigations in the northern half of the site (GAI, 2010a and PHMC/BHP, 2011b). The project's proposed West Alternative, located west of the existing SSES facility, contains six archaeological sites identified by Phase Ib survey and recommended potentially eligible for listing in the NRHP (Sites 36LU279, 36LU280, 36LU281, 36LU283, 36LU285 and 36LU286). Based on the results of Phase II National Register Evaluations and SHPO consultation all six of these sites were concluded Not Eligible for listing in the NRHP (PHMC/BHP, 2011b). The Second Supplemental Phase Ib project APE, located in uplands adjacent to the SSES facility, contains one archaeological site (Site 36LU301) concluded to be potentially eligible for listing in the NRHP (GAI, 2010b and PHMC/BHP, 2011a). A Phase II National Register Evaluation of Site 36LU301 was completed, and subsequent SHPO review indicated that this site is not eligible for the NRHP (PHMC/BHP, 2012b). Third Supplemental Phase I project APE, comprising uplands south of SSES and small areas of low terrace/floodplain adjacent to Area 7, included one archaeological site which was recommended as Not Eligible (GAI, 2011a).

Pennsylvania SHPO provided a review of Phase Ia investigations in a letter dated June 5, 2008 (PHMC/BHP, 2008a). Results of Phase Ib investigations were provided in a September 2008 Management Summary (GAI, 2008a) and results of Supplemental Phase Ib studies were presented in a November 2008 Management Summary (GAI, 2008b), both of which were

submitted to the SHPO for review and consultation. The SHPO provided comments on Phase Ib architectural investigation in an October 28, 2008 letter (PHMC/BHP, 2008b). Comments on the initial Phase Ib archaeological study were received from the SHPO in a letter dated March 2, 2009 (PHMC/BHP, 2009a). The SHPO commented on Supplemental Phase Ib cultural resources investigations in a March 23, 2009 letter (PHMC/BHP, 2009b). A scope of work for Phase II National Register Site Evaluations (seven potentially-eligible sites) and an Assessment of Effects for Historic Resources (10 resources initially recommended NRHP-eligible), dated May 29, 2009, was submitted to the SHPO for review and comment. SHPO concurrence on this scope of work was received in a June 11, 2009 review letter (PHMC/BHP, 2009c). The SHPO was consulted to develop appropriate avoidance measures for one potentially-eligible site for which avoidance was initially considered.

Phase II 2009 archaeological investigations were conducted of the seven potentially-eligible archaeological sites that are located within the proposed project area and cannot be avoided, to determine their NRHP-eligibility. Phase II fieldwork was performed between July and November 2009. Consultation with the SHPO continued during the course of Phase II investigations. Results of Phase II National Register Site Evaluations were provided in an October 11, 2010 Phase I/II Technical Report (GAI, 2010a). The SHPO commented on the Phase I/II Technical Report (archaeological and architectural resources) in an August 23, 2011 review letter (PHMC/BHP, 2011b). Based on the conclusion that Site 36LU288 was NRHP eligible, the SHPO was consulted regarding appropriate measures to avoid adverse effects to this site. Results of the Second Supplemental Phase Ib study were presented in a July 9, 2010, Addendum Report (GAI, 2010b). In a May 20, 2011 review letter, the SHPO concurred with the results and recommendations of this Addendum Report, and requested site avoidance or Phase II National Register Evaluation of Site 36LU301 (PHMC/BHP, 2011a). A Scope of Work for Phase II investigations of Site 36LU301, dated May 13, 2011, was approved by the SHPO. Consultation with the SHPO continued during the course of Phase II investigations. Preliminary results of the Site 36LU301 Phase II study were provided in an October 10, 2011, Management Summary (GAI, 2011b), and subsequent SHPO review indicated that this site is not eligible for the NHRP (PHMC/BHP, 2012b). The results of the Third Supplemental Phase I investigation were presented in a September 15, 2011, Addendum Report (GAI, 2011a). The Third Supplemental Phase I survey resulted in the identification of one historic period archaeological site (Site 36LU307). Subsequent SHPO review indicated that this site is Not Eligible for listing in the NHRP and no further investigation of the site is recommended. SHPO consultation on remaining eligibility recommendations for architectural resources was conducted during a September 22, 2011, on-site field visit to the potential Wapwallopen Historic District. In an October 5, 2011, review letter (PHMC/BHP, 2011c) the SHPO provided conclusions on the eligibility of this resource and on the proposed project effects to NRHP-eligible or listed architectural resources in the project's Area of Potential Effect.

Based on the results of cultural resource investigations conducted to date and subsequent SHPO responses, impacts to cultural resources from construction are expected to be SMALL.

4.1.4 References

GAI, 2008a. "Management Summary, Phase Ib Cultural Resources Investigation, Bell Bend Nuclear Power Plant, Luzerne County, Pennsylvania, ER 81-0685-079." GAI Consultants, Inc, September 9, 2008.

GAI, 2008b. "Management Summary, Supplemental Phase Ib Cultural Resources Investigations, Bell Bend Nuclear Power Plant, Luzerne County, Pennsylvania, ER 81-0659-079." GAI Consultants, Inc., November 17, 2008.

GAI, 2009a. November 16, 2009, letter from Hannah Cole to Douglas McLearen (PHMC/BHP), ER#81-0658-079, NRC: Bell Bend Nuclear Power Plant, Management Summary Phase Ib Cultural Resource Investigation, Luzerne County, Conyngham, Nescopeck, Salem Townships.

GAI, 2010a. "Technical Report, Phase I Cultural Resources Investigations and Phase II National Register Site Evaluations, Bell Bend Nuclear Power Plant, Luzerne County, Pennsylvania, ER 81-0658-079", GAI Consultants, Inc., October 2010.

GAI, 2010b. ""Addendum Report, Second Supplemental Phase Ib Cultural Resources Investigation, Power Block Relocation, Bell Bend Nuclear Power Plant, Luzerne County, Pennsylvania, ER 81-0658-079." GAI Consultants, Inc., October 8, 2010.

GAI, 2011a. Addendum Report, Third Supplemental Phase I Cultural Resources Investigation, Bell Bend Nuclear Power Plant, Luzerne County, Pennsylvania, ER# 81-0658-079, GAI Consultants Inc., September 15, 2011.

GAI, 2011b. Management Summary, Phase II National Register Evaluation Site 36LU301, Bell Bend Nuclear Power Plant, Luzerne County, Pennsylvania, ER# 81-0658-079, GAI Consultants Inc., October 10, 2011.

NPS, 2008. National Park Service, National Register of Historic Places, Pennsylvania - Luzerne County and Columbia County, <http://nationregisterofhistoricplaces.com>. Accessed April 2008.

NRCS, 2010. Natural Resource Conservation Service, United States Department of Agriculture, Web Soil Survey. Website: <http://websoilsurvey.nrcs.usda.gov>. Date accessed: October 6, 2010.

PA, 2007. Pennsylvania Code, Title 25, Chapter 93, Water Quality Standards. 2007.

PHMC/BHP, 2008a. Letter from Doug McLearen to John Price (UniStar), ER 81-0658-079-H, NRC: Proposed Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, Pennsylvania, Phase Ia Cultural Resources Survey, June 5, 2008.

PHMC/BHP, 2008b. October 28, 2008, letter from Doug McLearen to Barbara Munford (GAI), ER 81-0658-079-M, NRC: Bell Bend Nuclear Power Plant, Luzerne County, Conyngham, Nescopeck, Salem Townships, Management Summary, Phase Ib Cultural Resources Investigations, Determinations of Eligibility.

PHMC/BHP, 2009a. March 2, 2009, letter from Doug McLearen to George Wrobel (UniStar), ER# 81-0658-079-N, Management Summary, Phase Ib Cultural Resources Investigation, Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, Pennsylvania.

PHMC/BHP, 2009b. March 23, 2009, letter from Doug McLearen to T.L. Harpster (PPL Bell Bend, LLC), ER# 81-0658-079-Q, Management Summary, Supplemental Phase Ib Cultural Resources Investigations, 263 Acres of Additional Project Area, Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, Pennsylvania.

PHMC/BHP, 2009c. June 11, 2009, letter from Doug McLearen to Rocco Sgarro (PPL Bell Bend, LLC), ER# 81-0658-079-T, Scope of Work Proposal for Phase II Archaeological Evaluations and Assessment of Effects to Historic Resources, Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, Pennsylvania.

PHMC/BHP, 2010a. March 17, 2010 letter from Andrea MacDonald to Hannah Cole (GAI), ER #81-0658-079, NRC: Bell Bend Power Plant, Phase IB Investigations Management Summary: Historic Resources, Conyngham, Nescopeck, Salem Townships, Luzerne County.

PHMC/BHP, 2011a. Letter from Douglas McLearen (PHMC/BHP) to Rocco Sgarro (PPL Bell Bend, LLC), ER# 81-0658-079-CC, Addendum Report, Second Supplemental Phase Ib Cultural Resource Investigation, Power Block Relocation, Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, Pennsylvania, May 20, 2011.

PHMC/BHP, 2011b. Letter from Andrea MacDonald (PHMC/BHP) to Rocco Sgarro (PPL Bell Bend, LLC), ER# 81-0658-079-BB, NRC: Phase I Cultural Resource Investigation and Phase II National Register Site Evaluations, Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, Pennsylvania, August 23, 2011.

PHMC/BHP, 2011c. Letter from Andrea MacDonald (PHMC/BHP) to Jared Tuk (GAI Consultants, Inc.), ER# 81-0658-079-GG, NRC: Bell Bend Nuclear Power Plant Expansion Project, Wapwallopen Field View, Conyngham Township, Luzerne County, Pennsylvania, October 5, 2011.

PHMC/BHP, 2012a. Letter from Douglas McLearen (PHMC/BHP) to Rocco Sgarro (PPL Bell Bend, LLC), ER# 81-0658-079-HH, Addendum Report, Third Supplemental Phase I Archaeological Survey, Salem Township, Luzerne County, Pennsylvania, August 20, 2012.

PHMC/BHP, 2012b. Letter from Douglas McLearen (PHMC/BHP) to Rocco Sgarro (PPL Bell Bend, LLC), ER# 81-0658-079-II, Phase II Archaeological Investigation of Site 36Lu301. Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, Pennsylvania, September 6, 2012.

PJM, 2008. PJM Generator Interconnection R01/R02 Susquehanna 1600 MW Impact Study Re-study, DMS #500623, September 2008.

PPL, 2006. PPL Susquehanna, LLC. Appendix E. Applicants Environmental Report-Operating License Renewal Stage, Susquehanna Steam Electric Station. September 2006.

USC, 2007. Title 16, United States Code, art 470, National Historic Preservation Act of 1966, as amended, 2007.

Table 4.1-1— Construction Areas Acreage and Operations Area Acreage, Land Use and Zoning

(Page 1 of 2)

Construction Feature	Construction Impact		Current Land Use	Current Zoning ⁶
	Acres	Hectares		
BBNPP Power Block	52.6	21.3	A, F, WL	I-3
ESWEMS Retention Pond and Pumphouse	11.0	4.5	A, B, F	I-3
Intake Structure ¹	2.3	0.9	A, F, W, WL	C-1
BBNPP Switchyard	5.2	2.1	A, F	I-3
SSES Switchyard Expansion	5.4	2.2	A, B, F, WL	I-3
CWS Cooling Towers	14.2	5.8	A, F	I-3
Water Treatment	2.7	1.1	F	I-3
Combined Wastewater Retention Pond	2.8	1.2	F	I-3
Susquehanna Switchyard #2	26.3	10.6	F	I-3
Roads	51.4	20.8	A, B, F, U, WL	I-3, C-1, B-3
Railroads	24.8	10.1	A, B, F, U, W	I-3, C-1, B-3
Permanent Buildings	21.5	8.7	A, B, F	I-3, C-1
Permanent Parking	29.1	11.8	A, F	I-3, C-1
Stormwater Infiltration Basins ²	39.2	15.9	A, B, F, U	I-3
Plant Yard and Permanent Laydown Areas ⁷	33.9	13.7	A, F, WL	I-3, C-1
Onsite Transmission Line ROW	35.0	14.2	A, B, F, U, WL	I-3, C-1
Total Acreage of Disturbed Area for Permanent Construction Features³	357.4	144.6	--	--
Concrete Batch Plant	11.2	4.5	A, F	I-3
Temporary Laydown Areas ⁷	63.4	25.7	A, F, U	I-3, C-1
Temporary Sedimentation Pond	3.9	1.6	A, B, F	I-3
Temporary Parking	22.0	8.9	A, B, F	I-3, C-1
Dredge Dewatering Pond	4.5	1.8	F	C-1
Water Intake and Blowdown Pipeline Corridor	7.1	2.9	A, B, F, U, WL, W	I-3, C-1
Topsoil Disposal Areas	102.7	41.6	A, F	I-3, C-1
Miscellaneous Construction Areas	27.0	10.9	A, B, F, U	I-3, C-1
Onsite Transmission Line ROW	63.9	25.9	A, B, F, U	I-3, C-1
Total Acreage of Disturbed Area for Temporary Construction Features^{4,5}	305.9	123.8	--	--
Total Acreage of Disturbed Areas¹	663.3	268.4	--	--
<p>Notes:</p> <ol style="list-style-type: none"> 1. Total does not include areas within the Susquehanna River that will be affected either temporarily (0.8 acres/0.32 hectares) or permanently (0.2 acres/0.08 hectares) by construction activities associated with the installation of the BBNPP Intake Structure and Discharge Pipeline/Diffuser and approximately 14.1 ac (5.7 ha) of temporary impacts associated with wetlands mitigation. 2. Acreage does not include Infiltration Basins located in areas occupied by permanent features. 3. Total includes 38.6 acres (15.6 hectares) of previously developed land, and 33 acres (13.4 hectares) of forested land that will be permanently converted to scrub/shrub vegetation to accommodate transmission line rights of way and vehicle, rail, and utility pipeline corridors. 4. Total includes 16.0 acres (6.6 hectares) of previously developed land. 5. Excludes temporary losses to wetlands associated with wetland mitigation activities, and 0.15 ac of impact to a nonjurisdictional wetland. 6. Current zoning based on Salem township zoning mapping from 2012. 7. Totals do not include areas to be used for laydown that will be used subsequently for other site development features. The total area of all laydown areas to be used throughout BBNPP development is approximately 167.3 acres. 				

Table 4.1-1— Construction Areas Acreage and Operations Area Acreage, Land Use and Zoning

(Page 2 of 2)

Construction Feature	Construction Impact		Current Land Use	Current Zoning ⁶
	Acres	Hectares		
<u>Land use categories</u> B = Barren F = Forest A = Agricultural U = Urban or Built Up W = Water WL = Wetlands	<u>Zoning Categories</u> A-1 = Agricultural District C-1 = Conservation District I-3 = Special Industrial District B-3 = Highway Business District			

Figure 4.1-1— Construction Impacts to Prime Farmland within the BBNPP Project Boundary