Department of Energy

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NOV 2 1 2013

Dr. David Snyder
Archaeology Reviews Manager
Resource Protection and Reviews
1982 Velma Avenue
Columbus, Ohio 43211

PPPO-03-2164867-14

Dear Dr. Snyder:

TRANSMITTAL OF THE GEOMORPHOLOGICAL INVESTIGATION OF THE LITTLE BEAVER CREEK AND ASSOCIATED DRAINAGES AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO

Enclosed for your information is the *Letter Report: Geomorphological Investigation of the Little Beaver Creek and Associated Drainages PORTS Plant, Piketon, Ohio,* conducted by ASC Group, Inc.

The geomorphological analysis of Little Beaver Creek was performed to determine the potential that deeply buried ground surfaces persist in Little Beaver Creek and its two associated drainages. The analysis of the soils determined whether buried ground surfaces were present, and if present, had the potential to contain archaeological resources. The geomorphological investigation did not identify soils that might contain deeply buried ground surfaces or archaeological sites within the surveyed drainages. No further archaeological investigations are recommended.

This study fulfills the recommendations made in the "Phase I Archaeological Survey of Area 1 at the Portsmouth Gaseous Diffusion Plant (PORTS) in Scioto and Seal Townships, Pike County, Ohio" and the "Phase I Archaeological Survey of Areas 5A, 5B, and 6A at the Portsmouth Gaseous Diffusion Plant (PORTS) in Scioto and Seal Townships, Pike County, Ohio" (submitted to the Ohio Historic Preservation Office on February 28, 2013).

A copy of the report is enclosed and can also be obtained at the Environmental Information Center by contacting 740-289-8898 or at eic@wems-llc.com. Additionally, an electronic copy can be found at http://www.pppo.energy.gov/nhpa.html.

If you have any questions please contact Amy Lawson of my staff at (740) 897-2112.

Sincerely,

Dr. Vincent Adams
Portsmouth Site Director
Portsmouth/Paducah Project Office

Enclosure:
Letter Report: Geomorphological Investigation of the Little Beaver Creek and Associated Drainages PORTS Plant, Piketon, Ohio

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Letter Report:
Geomorphological Investigation
of the
Little Beaver Creek
and
Associated Drainages
Portsmouth Gaseous Diffusion Plant
Piketon, Ohio

Submittal Date
October 2013

Prepared for
U.S. Department of Energy

Prepared by
Fluor-B&W Portsmouth LLC, under Contract DE-AC30-10CC40017

ASC GROUP, INC.
ARCHAEOLOGY
ARCHITECTURAL HISTORY
ENVIRONMENT
CULTURAL AND ENVIRONMENTAL CONSULTANTS

January 29, 2013

Fluor B&W Portsmouth, LLC
3930 US Rte. 23 South
Piketon, Ohio 45661

RE: Geomorphological Investigation of the Little Beaver Creek and Associated Drainages PORTS Plant, Piketon, Ohio

INTRODUCTION

Fluor B&W Portsmouth, LLC (FBP), requested a geomorphological analysis to be performed along Little Beaver Creek and two associated unnamed drainages within Archaeological Study Areas (ASAs) 1 and 5B as defined by the ASC Group, Inc., in previous studies (Figure 1). This work supports the ongoing archaeological evaluation of sites at the Portsmouth Gaseous Diffusion Plant (PORTS).

FIELD METHODS

A narrative description of the field investigation and the determination of the genesis of landforms and the likely origin of the soils within the study area were made. The goal of the investigation was to identify deeply buried ground surfaces in the study area, or determine the potential that deeply buried ground surfaces persist in the study area. All necessary permits were obtained by FBP for the excavation/penetration required to complete the investigation.

A geomorphological analysis of Little Beaver Creek and two associated unnamed drainages within ASAs 1 and 5B was conducted to determine if pockets of alluvial or colluvial soils along them contain buried ground surfaces not identified in the previous Phase I archaeological surveys. The analysis of the soils determined whether buried ground surfaces were present, and if present, had the potential to contain archaeological resources.

The geomorphological investigation included a visual inspection by pedestrian survey over the length of Little Beaver Creek and two associated drainages in ASAs 1 and 5B. The landform and soil samples were observed in areas where these buried soils might occur. A 3.5-in (9-cm) diameter soil auger was used to recover samples in the soil profile being examined at depths greater than 12 in (30.5 cm). These samples were inspected in the field to determine

the soil characteristics, morphology, and genesis, and an analysis of the geomorphic landform. The location of each test was recorded with a Trimble ProXRS Global Positioning System (GPS) unit and field notes and photographs were taken as needed.

RESULTS

On January 7 and 8, 2013, a geomorphological investigation was performed in the field at the PORTS site in Piketon, Ohio. The purpose of the investigation was to examine the soil and fluvial geomorphological characteristics as they pertain to the probability of locating buried archaeological sites. These potential archaeological sites have a higher probability of occurring in identified paleosols or buried alluvium deposited in the floodplain of Little Beaver Creek. Paleosols are soils buried underneath sediments such as more recently deposited alluvium or colluvium. Paleosols formed long ago and many times have no direct relationship to the soils forming above them in terms of climate, organisms, relief, parent material, or the time in which they were formed (Jenny 1941).

FLUVIAL GEOMORPHOLOGY

Little Beaver Creek occurs in a highly dissected landform consisting of uplands, stream terraces, and narrow floodplains. The soils in the uplands formed in residuum and are weathered from interbedded sandstone, siltstone, and shale. The dominant bedrock in the valley of the Little Beaver Creek is sandstone. The stream terraces have water-sorted sediments weathered from sandstone, siltstone, and shale over the residuum. The presence of significant colluvium and alluvial fans was not evident on the landform that was confined to very narrow portions of upland foot slopes, where narrow and steep drainageways drain out of the uplands, and at the interface of the uplands, terraces, and floodplains. The alluvium confined to the narrow floodplains has water-sorted sediments weathered from residuum derived from sandstone, siltstone, and shale.

Little Beaver Creek is a perennial stream that is a tributary of the Scioto River. The substrate consists of bedrock, cobble, gravel, sand, and silt. The maximum pool depth is greater than 12 in (30 cm) and the bankfull width ranges from approximately 4 ft (1.2 m) to as much as 30 ft (9 m). The riparian zone is relatively narrow in most places. The floodplains are dominated by forests that have been logged and/or farmed in places. Little Beaver Creek is moderately sinuous and the unnamed drainages are mostly linear and steep. The stream gradient is moderate and the unnamed drainages have severe (i.e., steep) gradients.

SOIL GEOMORPHOLOGY

The study area in Pike County, Ohio is a deeply dissected part of the Appalachian Plateau. The abandoned preglacial stream valleys are present in the area. These valleys were formed during the period of the Teays drainage system. Nearly the entire county is drained by the Scioto River and its tributaries, including the Little Beaver Creek. Many were dammed and filled with drift as the glacial ice advanced. The bedrock is sedimentary rock and is dominated by interbedded sandstone, siltstone, and shale. Sandstones that are resistant to weathering form prominent benches and ledges. Soft shales slough and slide downhill, undermining the sandstones that have broken off, and cover the hillsides with channery material (Smith and Schmidt 1953; Stout 1916). The dominant soils mapped in the study area according to the Web Soil Survey for Pike County, Ohio are shown in Table 1 (United States Department of Agriculture [USDA], Natural Resources Conservation Service 2013; USDA, Soil Conservation Service 1990).

Table 1. Soil Survey Map Units.

Soil Symbol	Soil Map Unit Name	Landform	Parent Material
Cf	Clifty silt loam, occasionally flooded	Floodplains	Alluvium
LdD	Latham-Wharton silt loams, 15 to 25 percent slopes	Hills (Upland)	Residuum
OmA	Omulga silt loam, 0 to 3 percent slopes	Terraces	Loess over alluvium over lacustrine deposits
OmB	Omulga silt loam, 3 to 8 percent slopes	Terraces	Loess over alluvium over lacustrine deposits
OmC	Omulga silt loam, 8 to 15 percent slopes	Terraces	Loess over alluvium over lacustrine deposits
RdC	Rarden silt loam, 8 to 15 percent slopes	Hills (Upland)	Residuum
SpF	Shelocta-Latham association, steep	Hills (Upland)	Residuum (Latham) Colluvium over Residuum (Shelocta)

The floodplains consist of valley fills in the abandoned preglacial Teays River Valley. The colluvium (when present) and alluvium are derived from weathered acidic shale, siltstone, and sandstone. Older alluvium is from the surface layer of older soils and from bedrock outcrops in unglaciated areas. The surface soils of floodplains may consist of recent alluvium, which is deposited by floodwater and accumulates as fresh sediment deposited during periods of stream overflow. This sediment is derived from the surface layer of higher lying soils.

Four areas were characterized in detail as a result of soil auger borings and observations of soil profiles on the cut banks of the Little Beaver Creek (Figure 2). Two representative soil descriptions are shown in Tables 2 and 3. Photographs were taken of both cut banks that were recorded in detail (Figure 2; Plates 1 and 2).

Table 2. Soil and Landscape Evaluation Report
(Soil Morphology).

Depth in. (cm)	Basis	Horizon designation			Matrix colors				Texture class	Structure			Consistence	Additional features			Rock fragments %
					Other colors		Redox depletions			Grade	Size	Shape		Kind	Color	%	
		Pfx	Mast	Sfx	Munsell	%	Munsell	%									
0–4 (0-10)	Cut bank		A1		10YR 5/3	100			sil	1 1	M* F	SBK SBK	FRI				5
4–10 (10–25)	Cut bank		A2		10YR 4/2	100			sil	1 1	F VF	SBK SBK	FRI				5
10–14 (25–35)	Cut bank		B	w	10YR 5/4	90	10YR 5/2	10	sil	1	M*	SBK	FRI				10
14–27 (35–68)	Cut bank		B	g	10YR 5/2	85	7.5YR 5/6	15	sicl	1 1	C M*	SBK SBK	FI	Fe-Mn	10YR 2/1	5	75
27–72 (68–183)	Cut bank		CR		10YR 5/2	50	10YR 5/4	50	Channery sil Channery sicl			M**	VFI				
72+ (183+)	Cut bank		R						sandstone								

Notes: The soil profile was described from a cut bank in the Little Beaver Creek (Plate 1).

Site and Pedon Information

1. Site: Soil Profile #1
2. Evaluator: Mark S. McClain
3. Date: January 8, 2013
4. Soil Survey (sheet no.): Web Soil Survey
5. Soil map unit: LdD Latham-Wharton silt loams, 15 to 25 percent slopes
6. Location, relative: East of North Access Road
7. Land cover: Deciduous forest
8. Location, coordinate: GPS Coordinates
9. Particle-size family: Loamy-skeletal
10. Slope: 0–1%
11. Parent material(s): Alluvium over sandstone
12. Weather: Clear and approximately 30˚F
13. Landform: Floodplain
14. Landform component: slightly concave to level
15. Modifier:

M* = Moderate; F = Fine; VF= Very Fine; C = Coarse; SBK = subangular blocky; M**= Massive; FRI = Friable; FI + Firm; and VFI = Very Firm (USDA, SRCS 2002).

Table 3. Soil and Landscape Evaluation Report.
(Soil Morphology).

Depth in. (cm)	Basis in.	Horizon Designation			Matrix colors					Texture class	Structure			Consistence	Rock fragments %
					Other colors			Redox depletions			Grade	Size mm	Shape		
		Pfx	Mast	Sfx	Kn	Munsell	%	Munse	%						
0–3 (0–8)	Auger		A			10YR 3/1	100			sil	2 1	F F	GR SBK	FRI	5
3–18 (8–46)	Auger		B	w		10YR 4/6	100			sil	1 1	F VF	SBK SBK	FRI	10
18+ (46+)			CR			10YR 5/4	100			Channery sil	1	C	SBK	VFI	75

Notes: The soil profile was described from an auger boring in a narrow floodplain of the Little Beaver Creek.

Site and Pedon Information

1. Site: Soil Profile #2
2. Evaluator: Mark S. McClain
3. Date: January 8, 2013
4. Soil Survey (sheet no.): Web Soil Survey
5. Soil map unit: LdD Latham-Wharton silt loams, 15 to 25 percent slopes
6. Location, relative: West of Shyville Road
7. Land cover: Deciduous forest
8. Location, coordinate: GPS Coordinates
9. Particle-size family: Loamy-skeletal
10. Slope: 0–1%
11. Parent material(s): Alluvium over sandstone
12. Weather: Clear and approximately 30˚F
13. Landform: Floodplain
14. Landform component: slightly concave to level
15. Modifier

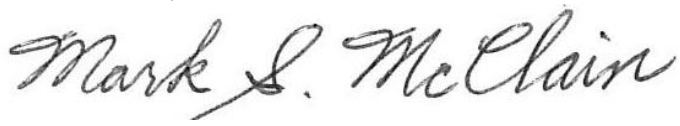
F = Fine; VF = Very Fine; C = Coarse; GR = Granular; SBK = Subangular Blocky; FRI = Friable; VFI = Very Firm (USDA, NRCS 2002).

CONCLUSIONS

The geomorphological investigation of the landform, soils, and associated fluvial deposits did not identify paleosols that might contain deeply buried ground surfaces or archaeological sites within the surveyed drainages. No further archaeological investigations are recommended.

ASC Group, Inc., appreciates the opportunity to assist you with this project. If you have questions or require additional information, feel free to reach me at 317.915.9301.

Sincerely,
ASC GROUP, INC.



Mark S. McClain
CPSS/CPSC/CPESC/RPSS/PWS

Enclosures

MC/bc

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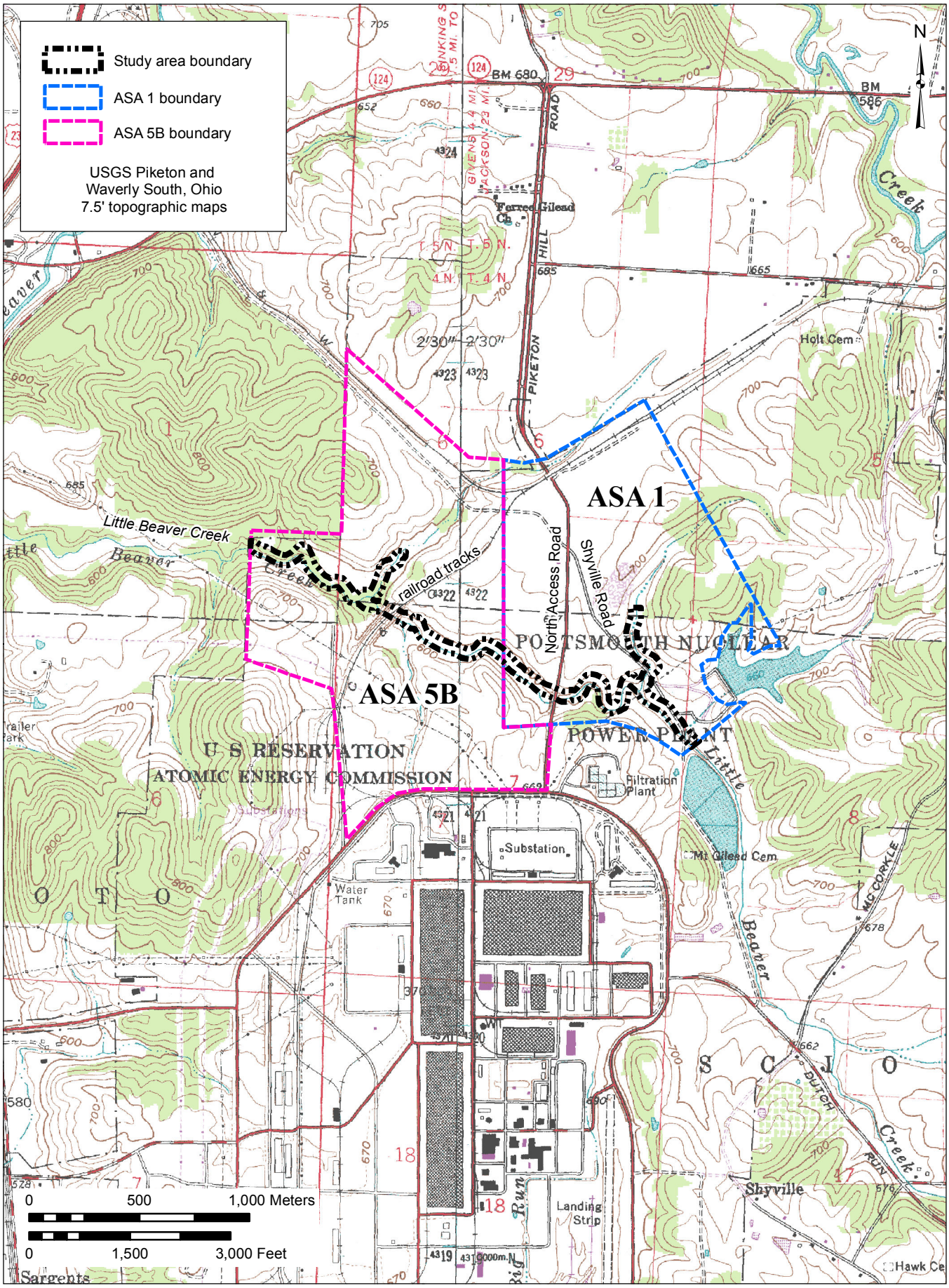

Figure 1. Portions of the 1979 Piketon and 1992 Waverly South quadrangles (USGS 7.5' topographic maps) showing the study area and Archaeological Survey Areas (ASAs) 1 and 5B.

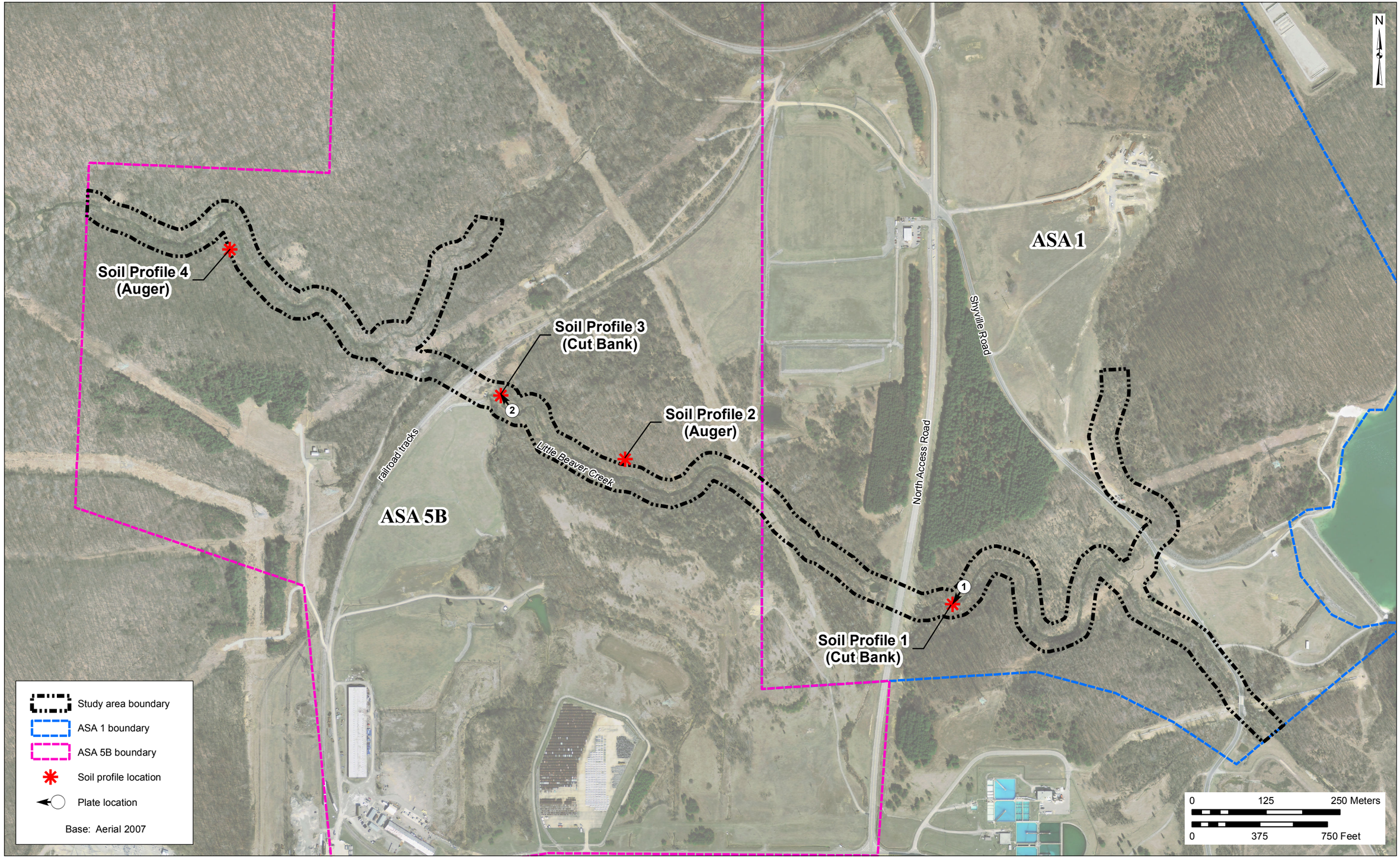

Figure 2. Aerial photograph showing the study area and locations of the soil profiles (Plates 1 and 2).

Plate 1. Soil Profile 1: cut bank along Little Beaver Creek east of North Access Road; facing southwest.

Plate 2. Soil Profile 3: cut bank at the confluence of Little Beaver Creek and an unnamed drainage; facing northwest.