INTRODUCTION
(CHAPTER 1)
DATA RECOVERY AT SITE 36AL480
LEETSDALE INDUSTRIAL PARK, LEETSDALE, PENNSYLVANIA

LOCKS AND DAMS 2, 3, AND 4,
MONONGAHELA RIVER PROJECT

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ABSTRACT

Phase III archaeological data recovery was conducted at Site 36AL480, a stratified, multicomponent site adjacent to the Ohio River on the T1, T2, and T3 terraces near Leetsdale, Allegheny County, Pennsylvania. The data recovery project was sponsored by the U.S. Army Corps of Engineers, Pittsburgh District (District), under Section 106, National Historic Preservation Act, for the congressionally authorized Locks and Dams 2, 3, and 4, Monongahela River Project. A District construction contractor leased a 30-acre site at the Leetsdale Industrial Park for the off-site fabrication of components of a new dam to replace Monongahela River Dam 2 at Braddock. The construction site was situated between the Ohio River and a former back channel, and encompassed the 12-acre archaeological site. No extant structures were present, although previous demolition of historic structures, fill placement and flood deposits had disturbed the upper soils over much of the project area.

Both the historic and prehistoric components of Site 36AL480 were determined eligible for the National Register of Historic Places. The historic component consisted of a factory associated with the Harmony Brickworks, a late-nineteenth-century brick-manufacturing concern owned by the Harmony Society of nearby Economy, Pennsylvania. The prehistoric component was in stratified context, extending up to 4.7 m below the surface, and contained occupations from the Middle Archaic through Late Woodland periods.

Because feasible alternatives to completely avoid the archaeological site were not available, a mitigation program was designed and implemented in consultation with the Pennsylvania State Historic Preservation Officer. Mitigation consisted of Phase III data recovery investigations and a number of other stipulations including an extensive public outreach effort. As a result of the construction site's physical, schedule, and safety constraints, data recovery was conducted within three archaeology set-aside areas. The data recovery block within each of the three areas encompassed 200 m^2 and together were projected to involve the excavation of 1,700 m^3 of soil. Fieldwork and data analysis were conducted within a framework of research issues developed for each component. A major focus of the site data recovery efforts involved environmental reconstruction of the site vicinity.

TABLE OF CONTENTS

Abstract.....1-i

List of Figures.....1-iv

Introduction.....1-1

Site Evaluation.....1-3
Summary of Phase I and II Surveys.....1-3
Statement of Site Significance.....1-5

Research Design.....1-6
Prehistoric Component.....1-6
Culture Chronology.....1-7
Environmental Context.....1-7
Artifact Assemblages and Lithic Technology.....1-8
Subsistence and Seasonality Studies.....1-9
Site Settlement Pattern.....1-10
Intrasite Patterns/Community Studies.....1-10
Intersite Settlement Patterns.....1-10
Historic Component.....1-11
Harmony Brickworks Industry – Site Specific Context.....1-11
Technology at the Brickworks Component.....1-11
Architecture at the Brickworks Component.....1-12
Site Proxemics.....1-12
Economics of the Brickworks Component.....1-13
Religion at the Brickworks Component.....1-13
Transportation Network for the Brickworks Component.....1-13

General Methodology.....1-14
Background Research/Contextual Studies.....1-14
Field Methods.....1-14
Artifact and Data Analysis.....1-15

References Cited.....1-17

Appendix 1A: Figure
Appendix 1B: Effect Report and Recommended Data Recovery Plan
Appendix 1C: Project Consultants

LIST OF FIGURES

1.1 General vicinity of Site 36AL480 ..... A1-1

CHAPTER 1. INTRODUCTION

By Patricia Miller

INTRODUCTION

Phase III archaeological data recovery was conducted at Site 36AL480 adjacent to the Ohio River on the T1, T2, and T3 terraces near Leetsdale, Allegheny County, Pennsylvania. The data recovery project was sponsored by the U.S. Army Corps of Engineers, Pittsburgh District (District), under Section 106, National Historic Preservation Act, for the congressionally authorized Locks and Dams 2, 3, and 4, Monongahela River Project. The project provides improvements to the nation's Inland Waterways Navigation System.

A District construction contractor leased a 12-hectare (30-acre) site at the Leetsdale Industrial Park in Allegheny County for the off-site fabrication of components of a new dam to replace Monongahela River Dam 2 at Braddock (Figure 1.1). The construction site was located between the Ohio River, and a former back channel along the eastern boundary. No extant structures remained on the site, although residential and industrial buildings were present historically. Previous construction, demolition, flood deposits, and the placement of fill have disturbed the upper soils over much of the project area.

The fabrication required the excavation of a 182.9-m x 182.9-m (600-ft x 600-ft) pit for casting two dam segments and launching them into the river to be floated approximately 42 km (26 mi) to the site of the replacement dam. The casting basin was excavated to a depth of approximately 4.0 m to 6.5 m (13.0 to 21.2 ft) below the existing ground surface, and the launch basin an additional four meters. The project also required the excavation of sediment ponds, stockpiling of soil, and construction of an access road, outlet structure, temporary culverts, and a parking lot. Upon completion of the work, the casting and launch basins were backfilled and the ground surface restored.

Preconstruction Phase I and II surveys and a post-construction Phase II survey were conducted within the 30-acre Leetsdale Casting Facility project area (Davis 2000; Fenicle 2003; Hardlines Design Company 2000; Vento et al. 2002). The surveys identified a 4.9-ha (12-acre) multicomponent site, designated 36AL480, which was determined eligible for listing on the National Register of Historic Places. The excavations revealed both historic and prehistoric components. The historic component consisted of the Harmony Brickworks and included five kiln foundations and three other possible structural remains. The prehistoric component was in stratified context, extending up to 4.7 m (15.4 ft) below the surface, and revealed occupations from the Middle Archaic through Early Woodland periods.

Since portions of the archaeological site could not be avoided and would be destroyed by construction activities, the project was determined to have an adverse effect under Section 106. The District developed a data recovery plan in consultation with the

Pennsylvania State Historic Preservation Officer (SHPO) (Appendix B)[1]. Through minimization efforts in the project design, construction activities affected only 1.1 ha (2.75 acres) of the 4.9-ha (12-acre) archaeological site. The District's commitments were documented in a letter dated February 1, 2000, with SHPO signature indicating concurrence on February 3, 2000 (see Appendix A, Exhibit C). The subsequent *Effect Report and Recommended Data Recovery Plan, Site 36AL480, Leetsdale, Allegheny County, Pennsylvania* (December 2000), included a detailed history of the development of the plan and consultation with the SHPO.

Because of the construction's physical and schedule constraints, the District established in consultation with the SHPO three archaeology data recovery set-aside areas totaling about 0.74 hectares (1.82 acres), in place of preconstruction data recovery within the casting basin area (see Figure 1.1). The three areas (designated Areas 1, 2 and 3) each encompassed a data recovery block of 200 m^2 (2,153 ft^2) and were projected to involve the excavation of 1,700 m^3 (6,670 yd^3) of soil. The data recovery plan included volunteer excavations conducted in Area 3 as part of an extensive public involvement program. Consultation with the SHPO continued throughout the data recovery fieldwork.

To accomplish such a large-scale data recovery project, separate contracts were let for various segments of the project (Appendix C). The segments include an environmental context, presented in Chapter 2, a prehistoric cultural context (Chapter 3), a historic context (Chapter 4), historic component excavations (Chapter 5), and prehistoric component excavations in Areas 1, 2, and 3 (Chapters 6, 7, and 8). Contractors responsible for data recovery in Areas 2 and 3 also managed the Area 3N volunteer excavations, presented in Chapter 9. Chapter 10 presents a synthesis of the results in all areas of excavation. The District provided a Government Archaeologist to manage and coordinate all the various contracted aspects of the project. A Project Geomorphologist was contracted separately from the archaeological contractors to provide a consistent and unified interpretation of the depositional history across the site.

Area 1 was located on the distal side of the T3 terrace and extends onto the T2 terrace bordering the relict river channel. It was approximately 200 m (656 ft) from the current Ohio River channel. Area 1 covers 3,023.63 m^2 (32,534.26 ft^2) and includes part of the core of the historic brick factory. Fieldwork on the historic component was conducted in February 2000 and between November 2000 and April 2001. Fieldwork on the prehistoric component and additional work on the historic component was conducted between May and November 2002 and in March 2003.

Area 2 was located upstream from Area 1 and on the proximal side of the T3 terrace and extending onto the T2 terrace. It was approximately 114 m (375 ft) from the Ohio River channel and approximately 152 m (500 ft) from the relict back channel. Area 2 encompasses 1,234.45 m^2 (13,282.68 ft^2). Geomorphological investigations indicated that Area 2 had the

1. In Pennsylvania, the Pennsylvania Historical and Museum Commission's Bureau for Historic Preservation acts as the SHPO.

highest potential for early prehistoric occupations. Fieldwork was conducted from August 2002 through January 2003 and from May to July 2003.

Area 3 was located upstream from Area 2, approximately 168 m (550 ft) from the Ohio River and 70 m (230 ft) from the relict river channel. The area ran lengthwise along the approximate center of the T3 terrace, covering approximately 3,109.57 m^2 (33,458.97 ft^2). The area was divided into northern and southern sections. Fieldwork in Area 3S was conducted between June and December 2001. Area 3N was the location of the volunteer excavations conducted in the 2001 and 2002 field seasons.

SITE EVALUATION

Summary of Phase I and II Surveys

Phase I and limited Phase II surveys were conducted by Christine Davis Consultants, Inc. (CDC) from September through December 1999 (Davis 2000). The initial stage of the survey consisted of geomorphological investigations conducted by Enviroscan, Inc. and involving the backhoe excavation of 12 slit trenches distributed across the project area. The studies identified three Ohio River terraces (T-1, T-2, and T-3), as well as an inactive back channel between the T-1 and T-2 terrace and a former tributary stream channel. A second geomorphological study was conducted by Dr. Frank Vento of Clarion University following consultation with PHMC. The investigation involved the excavation of three backhoe trenches and provided additional information on the stratigraphy of the T-3 terrace. The T-1 terrace was interpreted as recent in origin and T-2 terrace was considered to have been subject to scouring and deposition during the Holocene. The T-3 terrace was considered to have the highest potential for buried prehistoric surfaces.

Archaeological testing began with pedestrian survey and the excavation of 34 50 x 50 cm shovel tests to obtain information about the nature of the soil and to define the boundaries of the historic Harmony Brickworks. Following shovel test excavation, an additional 53 backhoe trenches were excavated in areas considered to have high probability for archaeological resources. Sixty test units measuring 1 x 1 meter were excavated in along backhoe trench walls or directly adjacent to the trench where undisturbed soils were present.

The Phase I archaeological survey resulted in the identification of a prehistoric site, designated the Chinque Site (36AL480) and the historic Harmony Brickworks (36AL481). Three backhoe trenches were excavated to remove historic fill and 1 x 1 m test units were excavated as a limited Phase II effort. Fourteen test units were completed and an additional thirteen were partially excavated. Additional Archaic-period features were identified and the site was recommended as eligible for the National Register. The site was found to cover an area of 10 acres with occupations dating from the Middle Archaic to through Middle Woodland occupations (Davis 2000:122-123). Fifteen prehistoric features and over 3,000 prehistoric artifacts were recovered from stratified contexts. Diagnostic points included an Early Archaic Kanawha bifurcate point, a Middle Woodland Kiski point, and Late Archaic Brewerton points. One Middle Woodland and two Late Archaic radiocarbon dates were

secured from feature contexts. Features associated with the Harmony Brickworks included foundations, clay extraction pits, former roads, and possible refuse sites.

The CDC Phase II survey was interrupted by construction of the casting facility. However, sufficient information was recovered from the Phase I and limited Phase II surveys to determine that the site was eligible for the National Register of Historic Places. The historic and prehistoric components were subsumed under the single site number, 36AL480. However, the boundaries were not firmly established and additional field investigations were required. No preserved archaeological remains were found in testing on the T-2 terrace. No additional work was recommended on the T-1 and T-2 terraces. The T-3 terrace was considered to have a high probability for stratified prehistoric resources and additional Phase II survey was recommended.

Hardlines Design Company (Hardlines) conducted Phase II archaeological survey in February 2000 (Hardlines 2001). Fieldwork related to the prehistoric component consisted of the excavation of a block of nine 1 x 1 meter test units on the T-3 terrace to the northwest of Area 2. The block was excavated to a depth of 1.1 m; the center unit was excavated an additional 65 cm. Additional excavation was planned, but the block was destroyed during construction of the casting basin.

Three occupational strata were identified. Stratum I extended to a depth of .3 m (0.98 ft) below the surface and contained two historic occupations. Stratum II was immediately below Stratum I and extended to .8 m below the ground surface. The stratum produced 141 prehistoric artifacts and a basin-shaped hearth radiocarbon-dated to the Early Woodland period. Stratum III extended to 1.1 m (3.6 ft) below the surface and produced 225 prehistoric artifacts. Point types included Brewerton corner-notched points, suggesting a Late Archaic age for the deposit. One feature, a probable hearth, was also found. Based on the excavation results, the researchers concluded that Stratum II and Stratum III represented intact land surfaces containing relatively undisturbed zones of prehistoric activity.

Additional Phase II archaeological survey was continued beginning in October 2002 by ASC Group (ASC). The focus of the work was on defining the eastern boundary of the site and determining the depth of prehistoric archaeological deposits (ASC 2003). The Phase II survey consisted of the excavation of six blocks. Blocks 1-5 were placed in a north/south alignment along the eastern edge of the project area, near the former back channel. The sixth block was a deep excavation to determine the vertical extent of the prehistoric occupation.

The historic fill was mechanically removed from Blocks 1-5 and hand excavation was completed in each block to a depth of 2.2 m (7.2 ft) below the stripped surface. A backhoe trench was then dug along one side of each block to a depth of 3.0 m (9.8 ft) below the stripped surface. Prehistoric artifacts were recovered throughout the soil deposits in Blocks 1, 2, and 5; Blocks 3 and 4 contained no features or artifacts. In addition to lithic artifacts, Early Woodland ceramics were found. A complete sandstone bowl or mortar was also found. One prehistoric hearth and the remains of an historic building associated with the Harmony Brickworks were found.

Block 6 was placed to the east of Area 2 and was designed to test for deeply buried occupational strata. The surface area of the block measured 29 x 29 m (95 x 95 ft) and was mechanically excavated with safety benches. A 3 x 3 m (9.8 x 9.8 ft) test unit block was hand-excavated beginning at a depth of 4.0 m (13.1 ft) below the surface. The block was excavated to a depth of 1.0 m (3.3 ft) below the stripped surface. After additional backhoe work, a 2 x 2 m (6.6 x 6.6 ft) block was attempted between 5.0 and 6.0 m below the surface but could not be completed because of unsafe conditions. An auger probe encountered river gravels at approximately 7 m (23 ft) below the surface. One feature was noted in the wall of the mechanically excavated unit at a depth of approximately 1.9 m (6.2 ft) below the surface. The hand-excavated units revealed no artifacts or features.

ASC recommended that the eastern boundary of the site be modified in accordance with the findings in Blocks 1-5. However, the southern boundary was not clearly defined. Based on the total of work completed at the site, ASC recommended a vertical boundary of 5 m (16.4 ft) below the surface. They noted, however, that given the discontinuous nature of the occupations, deeper cultural remains could be present in some areas of the site.

Statement of Site Significance

Site 36AL480 was characterized as a large, approximately 4.9-hectare (12-acre), multi-component, stratified archaeological site on a terrace of the Ohio River. Archaeological components included historic surface deposits from a former brick works and prehistoric components radiocarbon dated from the Early Woodland (1000 B.C. – 200 A.D.) through the early Middle Archaic (6,000 - 4,000 B.C.) periods. Depths of occupation surfaces varied across the site, ranging from ground surface (historic brickworks remains) to 4.7 m below ground surface. This site is the only recorded large stratified site along the Upper Ohio River Valley in Pennsylvania having so many intact occupations separated by sterile alluvial deposits. There have been no modern large-scale site excavations of a similar stratified site in the Upper Ohio Valley in Pennsylvania, West Virginia, or eastern Ohio.

The Middle Archaic period is the least understood cultural period in the Eastern United States. Since the site's prehistoric components from the Archaic period have good integrity, Site 36AL480 has the potential to yield a great deal of new information on the Middle Archaic period in the region, as well as the eastern United States.

Early occupation surfaces and associated cultural features in such a well-preserved floodplain context are rare and highly significant to understanding settlement patterns, adaptation, and group dynamics. A variety of habitats within this setting provides optimal conditions for subsistence studies. Systematic investigation of such an area, not conducted to date anywhere on the Ohio River, will permit the reconstruction of seasonal activities of the prehistoric inhabitants and will allow assessment of both diversity of occupations during one period and critical analysis of occupations representing eight or more millennia. Published results may serve as the comparative template for future investigations on the Ohio River, the Appalachian Plateau of western Pennsylvania, and the eastern United States.

The Archaic period is also associated with post-Pleistocene environmental changes. The opportunity to reconstruct the Holocene environment from the landform and relate it to the numerous occupations of this multi-component, stratified site has enormous potential to increase our understanding of both environmental change and cultural continuity for the Upper Ohio Valley during the Archaic period. Based on the current knowledge, the shifts in climate and in subsistence strategies, settlement patterns, tool assemblages and lithic reduction methods, seem to occur rapidly at the transitions between Early, Middle, and Late Archaic periods.

The historic component of Site 36AL480 has the potential to yield significant information on changing architecture, technology, and economics of a brick manufactory from the mid-19th century to the early 20th century. The brickworks was associated with the Harmony Society, a religious separatist society whose communal buildings in nearby Economy are maintained by the Pennsylvania Historical and Museum Commission as a National Historic Landmark site. Excavation of brickworks would have potential to increase our understanding of the manufacturing interests of a local religious sect/community important in Pennsylvania history.

RESEARCH DESIGN

Prehistoric Component

Archaeological Site 36AL480 revealed evidence of numerous occupations throughout, dating from the Middle Archaic through Late Woodland. There is a diverse and rich ecosystem within the general site vicinity that includes the Ohio River, smaller streams at the confluence of the Ohio River, well-drained terraces, and a back channel that provides a wetlands habitat. The diverse ecosystems in close proximity to the site vicinity appear to provide optimal conditions for a variety of subsistence-related activities such as fishing, hunting, and foraging. In addition, cobble cherts found along the river provided a convenient source of lithic raw material. Reconstruction of the Holocene environment as it relates to the occupations of this multi-component, stratified site has enormous potential to increase our understanding of cultural adaptation and change in the Upper Ohio Valley.

The District, in consultation with the Pennsylvania SHPO, identified five research areas for the prehistoric cultural horizons within the site. Based on previous studies, the site presents an opportunity to increase our knowledge and understanding of early prehistory in the Upper Ohio Valley and the Appalachian Plateau with regard to: 1) cultural chronology; 2) environmental context; 3) lithic technology, including tool assemblages, lithic reduction methods, and lithic procurement strategies; 4) subsistence and seasonality, including diet and food procurement strategies; and 5) intersite and intrasite settlement patterns.

Several modifications to the research goals were required as the project progressed and new information was acquired. At the time the research issues were developed, information suggested that the prehistoric component dated only to the Archaic period. Therefore, the research issues detailed below have been modified to include the Early Woodland, identified as a major component during the data recovery investigations. The

recovery of steatite in Areas 2 and 3S led to a closer consideration of the procurement and trade of this material, which was examined using sourcing analysis. In general, however, the research goals established in the data recovery plan were appropriate for the findings in the three areas of the site.

Culture Chronology

For Site 36AL480, the baseline research question was: *What periods of occupation are represented and what is the approximate date for each occupation?*

Multi-component, stratified sites with well-dated stratigraphic sequences are limited in southwestern Pennsylvania and the Upper Ohio Valley. Occupations at Site 36AL480 extend from the Middle Archaic through the Early Woodland periods, with limited intact Middle and Late Woodland occupations evident. Mobile groups practicing a foraging economy generally characterize the occupants of the site. Defining and analyzing the numerous occupations at Site 36AL480 provided an opportunity to study changes in adaptive strategies over time at the same location.

Reconstructing the site chronology is a critical baseline since analysis of other research issues depends on the identification of temporal relationships. It is important to determine what time periods are represented at the site, particularly within each occupation zone. Mixing of artifacts from separate occupations is problematic, especially where the living surface was stable for longer periods of time. Post-depositional processes, both natural and cultural, also complicate the definition of specific occupation zones. Single occupation surfaces, if present, enable researchers to eliminate much of the noise and focus research more effectively.

Narrowly defined date ranges for occupation zones are critical in order to identify diachronic changes in site function. Dating of zones relies on radiocarbon dates, temporally diagnostic artifacts, and stratigraphic relationships.

Environmental Context

To date, there has not been an in-depth study of the environmental and depositional history of the Upper Ohio River Valley in an archaeological context. Understanding the environmental and depositional history of the Upper Ohio River Valley is important for interpretation of cultural change in the region. A major focus of the site data recovery efforts involved environmental reconstruction of the site vicinity. The studies will also help predict the potential location and depth of archaeological sites.

Research questions related to environmental context include:

- *How did the environmental setting of the site, including climate and soil deposition, change during the Holocene?*
- *How do changes in climate, deposition, stream flow, fauna, and vegetation relate to settlement activities that occurred at the site?*

- *How did flooding of the T3 terrace affect the archaeological evidence of various occupations? Is any evidence of scouring present?*
- *What were the Holocene climatic history, depositional history, and environmental history of the Upper Ohio River Valley in the site vicinity?*

Excavations at Site 36AL480 provided data to address these questions. Pollen and preserved botanical remains, such as wood charcoal, provided information on plant species present in the vicinity of the site. Faunal remains provided habitat information. The data was used to reconstruct the environmental context for each of the site occupations. Geomorphological investigations provided information on the changing landscape and on the processes that affected site formation.

The development of an environmental context provided a framework for understanding the types of resources available to the prehistoric inhabitants and how the availability of these resources changed during occupation of the site. The information from the data recovery activities at Site 36AL480 can also be compared with the information available from other site excavations in other regions.

Artifact Assemblages and Lithic Technology

Typically, lithics represent the vast majority of the archaeological material recovered from Archaic and Early Woodland sites. Lithic analysis contributes to our understanding of technology, group mobility, and activities at the site. Ceramic artifacts were also present in association with Early Woodland components. Differences in artifact assemblages among occupation zones have the potential to shed light on site function, lithic procurement, and manufacturing strategies through much of the Holocene. Research questions for the artifact analysis of each occupation surface include:

- *Is there evidence of bone or shell artifacts?*
- *What ceramic types are present? What are the vessel forms?*
- *What types and quantities of lithics were recovered?*
- *What were the sources of the lithic materials represented?*
- *What stages in the lithic reduction sequence are evident?*
- *Are there differences in the lithic reduction strategies sequence between occupation surfaces?*
- *Is there a preference in lithic material?*
- *What types of activity areas are present?*
- *What is the toolkit composition for each occupation and how do these assemblages compare between occupations?*
- *Is there a relationship between projectile point functions and lithic raw material use?*
- *Are the lithic technologies and tool assemblages identified at Site 36AL480 similar to other sites in the region of the same time period?*
- *Are there any exotics (e.g., non-local materials, non-local tool types) represented in the assemblage?*

Subsistence and Seasonality Studies

Undisturbed contexts at Site 36AL480 yielded important subsistence data. Flotation of samples from features recovered plant and other food remains that allowed conclusions to be made regarding the diet and season of occupation. Faunal, flotation, and pollen studies provided data to examine questions regarding diet, seasonality, and site activities. Discussing the types of food resources in the context of the local environment add to the information gained from this site. Recovery of subsistence remains permitted comparisons with other Archaic and Early Woodland sites in the Appalachian Plateau province and Upper Ohio Valley. Artifacts such as projectile points, nutting stones, and netsinkers also provided information on subsistence.

Research questions related to subsistence and seasonality include:

- *Is there any evidence of diachronic change in subsistence practices?*
- *How important are riverine versus non-riverine resources in the diet?*
- *What specialized food acquisition and/or processing tool types were recovered?*
- *During what season(s) was each living surface occupied?*
- *Are there storage pits or other features present that indicate longer periods of occupation?*
- *Is there variability in plant and animal remains between features that may add to our inferences regarding activity areas?*
- *Is there evidence of site specialization or abundance of certain types of subsistence resources?*
- *What does archaeological evidence suggest as to how and where food processing or preparation was performed?*

Specific questions for faunal remains may include:

- *What animal species were present?*
- *What animals were consumed?*
- *What is the habitat for these faunal resources?*
- *During what season are these animals easiest to procure?*
- *How were these foods processed or prepared?*

Specific questions for botanical remains may include:

- *What types of plants, nuts, and berries were identified?*
- *What floral remains were possible food sources?*
- *During what season are these floral remains collected for food?*
- *Is there evidence of cultigens?*
- *What wood species were used for firewood?*

Site Settlement Pattern

Research questions related to settlement patterns focused on internal site arrangement, as well as the patterning of relationships among sites. Determining the function of the occupations represented at the site is important for understanding the components of the settlement systems. Field excavations involved opening up large excavation blocks in order to examine the spatial patterning of features, artifacts, activity areas, and other data that may relate to site function. Understanding the distribution of sites across the landscape and their functional relationships is a focus for intersite settlement patterns.

Intrasite Patterns/Community Studies

Investigations at Site 36AL480 uncovered the presence of a variety of features, including hearths, roasting pits, hearth refuse, and fire-cracked rock (FCR) clusters. Although some admixture among components was present, it was possible to identify temporally specific occupation zones in each of the three set-aside areas of the site.

There is a variety of data that contributes to understanding intrasite patterns. Intensity and duration of occupations are useful in identification of site type. The duration of occupation is reflected in presence or absence of storage pits and houses or other shelter. Artifacts, features, and activity areas are used to identify site function. Analysis focused on identifying the spatial relationships among features, artifacts, and activity areas in an attempt to understand the group size and structure that produced the intrasite patterns. Estimating population size has been accomplished using various methods, including: average floor space per person, relationships between settlement size and population size, and number of fire pits or hearths per family.

For intrasite settlement pattern studies, research questions include:

- *What is the site type?*
- *What is the size of the occupation surface?*
- *What types of features and activity areas are represented?*
- *What is the spatial patterning or relationship of features and activity areas?*
- *Is there evidence of structures or shelters?*
- *Is there evidence of storage features?*
- *What is the estimated population size and/or population density?*
- *Is there evidence of specialization or abundance of certain types of resources?*

Intersite Settlement Patterns

This site has the potential to provide information on settlement systems and land-use strategies in the Upper Ohio Valley. Determining the site type for each occupation zone is critical to understanding its role in the settlement system. In order to place the information gained from the excavations at 36AL480 in the context of regional settlement, it is necessary to compare the information from the site with overall site distributions. The analysis is limited by the fact that, although many site locations have been recorded, few have been

investigated sufficiently to identify site function. However, previous settlement pattern studies have provided models within which the data from Site 36AL480 can be assessed.

Research questions related to intersite settlement patterns include:

- *How does this site compare to other riverine and/or island sites dating to the Archaic and Early Woodland periods?*
- *How does the information from this site fit with current settlement pattern models for the region?*
- *Are the site functions identified at Site 36AL480 similar to those other sites in the region of the same time period?*
- *How do the Early Woodland components at Site 36AL480 relate to the Adena Culture?*

Historic Component

The Harmony Brickworks was a late-nineteenth-century brick-manufacturing concern owned by the Harmony Society of nearby Economy, Pennsylvania. The factory contained two banks of kilns, a large hot-floor complex, and associated outbuildings. The data recovery plan outlined research questions for the Harmony Brickworks that guided the background research and field investigations.

Harmony Brickworks Industry – Site Specific Context

Research questions that could be answered from the archaeological record include:

- *What types of defects were observed on discarded bricks and the site, and where were these defected bricks deposited?*
- *How do the results of the archaeological investigation compare with expectations based on the documentary research?*
- *What was the process used to manufacture bricks and how did it change over time?*
- *What types of bricks were produced at the site (e.g., pavers, common, fire, etc.)?*
- *What was the source of water? Is there any evidence of water lines into any of the identified structures?*
- *Is there evidence of trash and/or waster brick dumps in the data recovery area? Where were trash and/or waster bricks discarded?*

Technology at the Brickworks Component

Nineteenth-century brick kilns were either of the periodic or continuous type, and the construction design was related to the technology chosen. The two kiln types are distinguished by the direction and method of controlling air circulation inside the kiln.

Research questions related to technology include:

- *What were the size, shape, and capacity of the kilns?*

- *Which types of kilns were used, periodic or continuous?*
- *What was the direction and method used to control the flow of hot air in the kilns, updraft or downdraft?*

Architecture at the Brickworks Component

Research questions related to the architecture of the brickworks include:

- *What are the construction features of the structural remnants examined during the data recovery?*
- *The floor and foundations of five structural remnants of similar size were excavated outside of Area 1. Did these five structural remains represent kilns? How were these five structures constructed? When were the kilns and other structures built?*
- *What was the function of the large structure located within Area 1? Was the structure built at one time or did it grow through a series of additions? Is there any evidence of structural expansion and/or retrofitting during the use life of the structure?*
- *How was the large structure in Area 1 constructed? Did it have a basement or cellar? Where was the door(s) for this structure? Was the front of the structure oriented towards the kilns?*
- *Within Area 1, there is a square hole with linear piles of dirt along each side. Does this represent a structural feature, possibly a cellar? If so, how was it constructed, and what was its function? Is it associated with the large structure shown on the surveyor's map?*
- *The early surveyor's map shows a small square structure in the southwest corner of Area 1. How was this structure constructed and what was its function? Where were the entrance and front side of this structure?*
- *Tree clearing and spring rains caused a part of what seems to be a brick sidewalk or flooring to collapse into a circular, brick-lined chamber. The chamber measured approximately 5 ft in diameter. What is the function of this feature? Looking at the spatial layout of the site, is it possible to discern why this feature was located near the edge of the T3 terrace? Why was this feature covered by a brick sidewalk or flooring?*
- *Are there any other features located outside the areas covered by structures in the surveyor's drawing?*
- *Is there evidence of earlier historic structures or features beneath the structures shown on the surveyor's drawing?*

Site Proxemics

Research questions related to the spatial organization of the brickworks include:

- *Which of the expected components of a typical brick factory were identified in the archaeological investigations undertaken at this site?*

- *Based on knowledge of the steps required for the manufacture of bricks, the movement of raw material, and the spatial location of structures, activity areas, and other features, what was the spatial layout of the site? Was the site layout designed for the easy movement of material and products from one step to the next? Was it designed to fit the landscape?*

Economics of the Brickworks Component

A critical factor for the economic success of brick factories was the marketing of bricks. The key aspects of marketing were transportation and consumers. The quality of bricks, scale of production, and minimized periods of idleness were also critical to the economic success of this type of business.

Research questions related to the economics of production and marketing include:

- *What was the size of each structure identified?*
- *Does the size of the brick factory, including kilns and other structures, indicate that this was a large operation compared to other brick factories of a similar date range?*
- *Is there evidence that this brick factory produced inferior bricks? Superior bricks? Specialty bricks for a specific market?*

Religion at the Brickworks Component

Research questions related to religion include:

- *Were any artifacts found that might be considered religious in nature?*
- *Was there any religious aspect to the design and construction of the buildings? Were the designs and/or construction of the structures considered "typically" Harmonist?*

Transportation Network for the Brickworks Component

Research questions related to the transportation of raw materials and finished products include:

- *How were raw materials brought to the brick factory?*
- *What was the transportation system used to move the finished product to the market?*
- *It appears that a railroad line may have entered the factory, and that separate lines led to each kiln. In order for the road and rail lines to enter the brick factory, the relict back channel of the Ohio River was filled in up to the present grade for these transportation features. Is there any archaeological evidence of a road or railroad bed in Area 1?*
- *How does the elaborate transportation system at this factory compare to that at other brickworks during the same time period?*
- *Did the river serve as a major transportation corridor for the finished bricks? Did the railroad serve as a major transportation corridor for these products?*

GENERAL METHODOLOGY

Background Research/Contextual Studies

Contextual studies were completed for the environment and for the historic and prehistoric cultural components. The environmental context, presented in Chapter 2, involved geomorphological analysis using backhoe trenches and a detailed analysis of profiles exposed during archaeological excavations. The environmental context also incorporated the results of pollen/phytolith analysis and geochemical analysis. The results provided an allostratigraphic framework for the depositional history within which the archaeological components across the site could be interpreted.

For the prehistoric cultural context, presented in Chapter 3, a review of literature related to the archaeology of the Ohio River subbasin and the Appalachian Plateau was conducted. Experts on the archaeology of the region were interviewed. Site files were also examined, including the Pennsylvania Archaeological Site Survey (PASS) files, the Ohio Historical Society files, and others. The information was synthesized using the research issues discussed above as an organizing theme.

The historic context for the Harmony Brickworks, presented in Chapter 4, was based on an extensive review of materials in libraries and governmental repositories in the Pittsburgh area. Records and reports at the Old Economy Village State Historic Site near Ambridge, Pennsylvania, were examined and the Old Economy historian was consulted. Old Economy was the Harmony Society's residential settlement from 1825 until the dissolution of the society in 1905. The context includes the history of the Harmony Society, the brick-making industry, and the brickworks at Site 36AL480.

Field Methods

Field strategies were designed to recover data needed to address the research issues discussed above. Fieldwork for the historic brickworks included the excavation of shovel tests on a 5-m grid, as well as the clearing and mapping of historic features related to the industrial site. Mechanically excavated trenches and blocks were utilized to identify historic features. Fourteen blocks were manually excavated.

Field methodology for the prehistoric components involved the excavation of large blocks of 200 m^2 or more to reveal any intrasite patterns that might be present. Single blocks were excavated in Areas 2 and 3S; because of disturbance from the historic brickworks, three blocks and a number of scattered units were excavated in Area 1. Additional features in Area 1 related to the historic brickworks were systematically excavated prior to the excavation of the undisturbed portion of the prehistoric component below.

Blocks were excavated to below the depth of cultural deposits. Excavations complied with the Occupational Safety and Health Administration (OSHA) standards for deep excavations through the use of safety benches around the excavation blocks.

Fieldwork was conducted in stages in accordance with the following general sequence:

- Mechanically remove overlying fill and disturbed deposits;
- Establish a 5-m interval grid across the excavation block using hubs placed by District surveyors;
- Excavate a sample of 1-m x 1-m test units to a depth of 1 m below the stripped surface to assess stratigraphy and artifact distributions, excavate and document any features identified, and produce maps of artifact and feature distributions by 10 cm levels;
- Consult with the Government Archaeologist and SHPO to develop a strategy for selective hand excavation of the remaining areas of the block to a depth of 1 m below the stripped surface, and complete hand excavations in accordance with the strategy;
- Mechanically remove any soil within the block not excavated by hand and without the block as needed for the establishment of OSHA-compliant safety benches, monitor mechanical excavations, and document any features identified; and
- Reestablish the grid on the newly stripped surface and repeat the excavation procedures for soils in the second 1-m soil column; repeat for third and subsequent meters.

Hand excavations were conducted in 1-m x 1-m horizontal units and 10-cm levels. Spatial control was maintained in each area using a Total Station tied into a benchmark and recorded in National Geodetic Vertical Datum (NGVD). Features were excavated and soil samples retained for flotation processing. Soil was screened through ¼-in mesh, and recovered artifacts were bagged by provenience and returned to the laboratory for processing.

Unit and feature excavations were documented on standard forms specific to each consultant. The forms documented the excavation methods, soil characteristics, and findings for each context. Soil profiles were drawn, including the Project Geomorphologist's block wall profiles. Excavations were documented using both black-and-white film and digital photographs.

Artifact and Data Analysis

Historic artifacts from Area 1 were analyzed according to characteristics that defined their age and function. Datable attributes include manufacturing technique, material, and decoration. Functional groups include domestic, architectural, furnishing, arms, clothing, personal, transportation, activities, utilities, and industrial. A typology for bricks was established based on six categories: method of manufacture, size, surface treatment, weight, color, and provenance.

Lithic analysis of prehistoric artifacts was conducted according to a lithic analysis plan developed by the consultant for each area and preapproved by the District. In general, lithic artifacts were inventoried according to type and raw material. At a meeting of all contractors' Principal Investigators and District representatives, efforts were made to standardize the categorization of lithic raw materials using defined macroscopic characteristics.[2] Lithic artifact type categories were similar across the three areas and included debitage, chipped stone tools, cores, bifaces, groundstone tools, and FCR. Although nomenclature differed, debitage from each area was classified into three reduction stages. Blade and bipolar technologies were identified. Where possible, points were classified according to regional typologies.

Ceramic artifacts were characterized by temper, surface treatment, and decoration. In general, sherds were small and eroded. If possible, sherds were identified according to the standard ceramic technologies for the region.

Radiocarbon dates were obtained from each of the three areas, including 18 from Area 1, 24 from Area 2, and 13 from Area 3S. With the exception of a bulk soil sample from a deep context in Area 1, all of the samples were wood charcoal.

A variety of specialized studies were conducted. Microwear analysis was performed for a sample of lithic tools from each area. Soils samples from features were processed using flotation techniques, and specialists analyzed the botanical and faunal remains. Steatite sourcing was conducted for a sample of steatite artifacts from 36AL480 and from several other sites in the region.

Analysis of data from the various studies focused on developing information to address research questions established for the site. Vertical and horizontal distributions of artifacts and features were analyzed to identify occupation zones. Radiocarbon dates and chronologically diagnostic artifacts, along with stratigraphic relationships, were used to reconstruct the occupational history of the site.

The types and proportions of lithic materials were compared to identify changes in lithic procurement strategies and foraging ranges over time. Lithic debitage provided information on the stages of biface reduction, the use of bipolar and blade technologies, and the relative frequency of heat treatment. The relative importance of curated vs. expedient technologies was also assessed. Projectile point chronology was assessed based on dated stratigraphic context.

Features were assigned to functional types based on form (size, shape, heat reddening of soils), as well as contents, such as charcoal, FCR, and other artifacts. Feature function, along with the results of microwear analysis, provided information on the type and spatial distribution of activities at the site. The information was used to define site function and compare the site to regional settlement pattern models.

2. Lithic materials are defined in detail in Chapter 2, Appendix C.

The specific field and laboratory methods for each of the three areas are described in detail in the following chapters.

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APPENDIX 1A: FIGURE

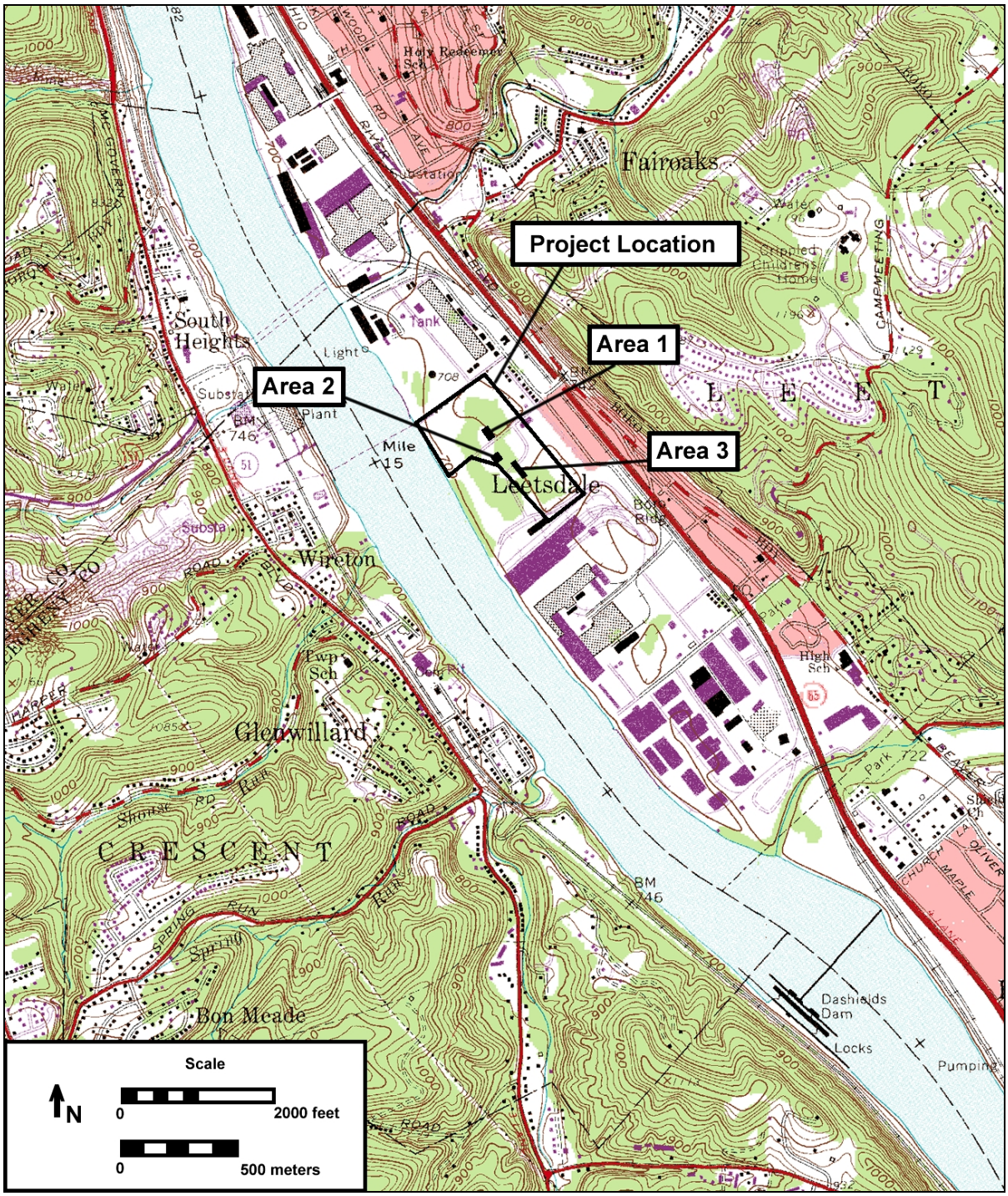

Figure 1.1. General vicinity of Site 36AL480.

APPENDIX 1B: EFFECT REPORT AND RECOMMENDED DATA RECOVERY PLAN

US Army Corps
of Engineers
Pittsburgh District

December 2000

EFFECT REPORT AND RECOMMENDED DATA RECOVERY PLAN, SITE 36AL480, LEETSDALE, ALLEGHENY COUNTY, PENNSYLVANIA

LOCKS AND DAMS 2, 3 AND 4
MONONGAHELA RIVER PROJECT

EFFECT REPORT AND RECOMMENDED DATA RECOVERY PLAN
SITE 36AL480
LEETSDALE, ALLEGHENY COUNTY, PENNSYLVANIA

TABLE OF CONTENTS

I. THE UNDERTAKING 1

A. Introduction 1
B. Description of the Undertaking 2

II. EFFORTS TO IDENTIFY HISTORIC PROPERTIES 3

III. HISTORIC PROPERTIES DESCRIPTION 5

IV. EFFECT OF THE UNDERTAKING 6

V. APPLICATION OF CRITERIA OF EFFECT 6

VI. MITIGATION ALTERNATIVES CONSIDERED 7

A. Avoidance/Minimization 7
B. Mitigation of Adverse Effects 8
C. Consultation with Others 10

VII. RECOMMENDED DATA RECOVERY PLAN 12

A. Introduction 12
B. Data Recovery Management Strategy 13
C. Prehistoric Component of 36AL480 13
1. Research Themes 13
a. Site settlement pattern *14*
Intrasite Patterns / Community Studies 15
Intersite Settlement Patterns 15
b. Subsistence and Seasonality Studies *16*
c. Cultural Chronology *17*
d. Artifact Assemblages and Lithic Technology *17*
e. Environmental Context *18*
2. Background Research / Contextual Studies 19
3. Field Strategies and Sampling Considerations 19
a. Site Preparation *19*
b. Excavation Methodology *20*
c. Features *22*
4. Analysis 23
a. Flotation Samples *23*
b. Dating (Radiocarbon and Bulk Soil Samples) *24*
c. Lithics *24*
d. Ceramics *24*
e. Pollen and Phytolith Analysis *24*

f. Intrasite Analysis *25*
g. Intersite Analysis *25*
h. Landform/Depositional Reconstruction *25*
D. Historic Brick Factory Component of Site 36AL480 25
1. Research Themes 26
a. Harmony Brick Works Industry - Site Specific Context *26*
b. Technology at Brickwork Component *27*
c. Architecture at Brickwork Component *27*
d. Site Proxemics *28*
e. Economics of Brickwork Component *28*
f. Religion at Brickwork Component *28*
g. Transportation Network for Brickwork Component *28*
2. Background Research / Contextual Studies 29
3. Site Preparation 29
4. Excavation 29
5. Analysis 31
E. Coordination 31
F. Report 32
G. Curation 32
H. Public Education 32

References Cited

FIGURES

EXHIBITS

LIST OF FIGURES

1. General Location Map, U.S. Army Corps of Engineers, Pittsburgh District.

2. Project Vicinity Map, Monongahela River Locks and Dam 2 and Leetsdale Casting Basin for Braddock Dam.

3. Project Vicinity and Site 36 AL480, USGS 7.5' Quadrangle AMBRIDGE, PA.

4. Construction Project Area showing Launching and Casting Basins, Site 36AL480, and Proposed Data Recovery Areas 1, 2, and 3.

5. Leetsdale Casting Basin Landforms Showing Site Boundary 36AL480 ("Proposed Phase II/III Mitigation Area").

6. Brickworks Survey, 1894, Overlaid on Leetsdale Casting Basin Project Area Map.

7. 36AL480, Archaeological Sensitivity Zones.

LIST OF EXHIBITS

A. Programmatic Agreement, 1992, as amended. Modernization of the Lower Monongahela River Navigation System

B. *The Monongahela Packet, Historical Bulletin for the Lower Mon Project,* Number 6, October 2000

C. Letter of Agreement, 1 February 2000, USACE – Pittsburgh District and Pennsylvania Bureau for Historic Preservation

D. Spatial Analysis and Sampling Considerations

EFFECT REPORT AND RECOMMENDED DATA RECOVERY PLAN
SITE 36AL480
LEETSDALE, ALLEGHENY COUNTY, PENNSYLVANIA

I. THE UNDERTAKING

A. Introduction

This report documents the **adverse effect** of Lower Monongahela River navigation system modernization on the archaeological components of the Leetsdale Casting Facility construction site and the **recommended plan to mitigate** for these adverse effects. The undertaking is part of the congressionally authorized modernization of Monongahela River Locks and Dams 2, 3 and 4 located in Allegheny, Washington and Westmoreland counties, Pennsylvania. The authorized plan is formally known as the "Locks and Dam 2, 3 and 4, Monongahela River Project", or, in short, the "Lower Mon Project," and the federal proponent is the Pittsburgh District, U.S. Army Corps of Engineers (District). This report assists the District in complying with Section 106 of the National Historic Preservation Act (NHPA), and is submitted in accordance with Stipulation II.B. of the project's Programmatic Agreement (Exhibit A).

On July 1, 1999, the District awarded a $107 million contract to the Joint Venture of the J.A. Jones Construction Company and Traylor Brothers, Inc, (Joint Venture) to construct the new Braddock Dam. This dam will replace the existing Dam 2 (completed in 1905) at the site of Monongahela River Locks and Dam 2 in Braddock, Pennsylvania (Figure 1). Prior to construction award, the Joint Venture leased approximately 30 acres of land from the Leetsdale Industrial Park in Leetsdale, Pennsylvania, for the dam's off-site fabrication (Figure 2). The dam is to be fabricated in two floatable segments at the Leetsdale Casting Basin and towed about 26 miles upriver to the replacement site at Braddock, Pennsylvania.

In April 1992, prior to obtaining congressional authorization, the District entered into a Programmatic Agreement with the Advisory Council on Historic Preservation (ACHP) and the Pennsylvania State Historic Preservation Officer (SHPO) to comply with Section 106 of the National Historic Preservation Act (16 U.S.C. 470f). This agreement stipulates how the District is to conduct studies and consultation to fulfill Section 106 compliance requirements for the Lower Mon Project following authorization and before construction. Notable features of the agreement include preparation of a National Register of Historic Places nomination for the Monongahela River locks and dams, identification of the Steel Industry Heritage Corporation [SIHC]) as an interested party, and public notification of the agreement. The District has fulfilled the latter stipulation by developing ***The Monongahela Packet***, *HistoricBulletin for the Lower Mon Project*, which is published on an as-needed basis (Exhibit B).

B. Description of the Undertaking

The $705 million Lower Mon Project is an important component of the Corps' Civil Works program, not only for the benefits it will provide to the nation's Inland Waterways Navigation System, but also for the application of innovative inland river construction technology. The new Braddock Dam will be constructed using innovative "in-the-wet" construction techniques to achieve cost and time savings and improve quality. This dam will be constructed from two large prefabricated concrete segments that will be floated into place above, and set down upon, a pre-constructed foundation system of sheet pile cut off walls and large diameter drilled shafts. The two prefabricated segments will be constructed at the Leetsdale Casting Facility.

The offerors for the construction of the new Braddock Dam were required to pre-select an acceptable location for dam segment construction. The location choices were constrained by several requirements: the construction site must be located along a navigable river associated with the Mississippi River and its tributaries; the construction site must have acceptable geotechnical conditions necessary for success; and the construction site must be of sufficient size to permit placement of the casting and launching basins and sediment ponds along the river and have space for all of the ancillary activities and infrastructure. The dam segments must be built at a location that would permit river transportation through any locks situated between the construction site and its future 'home' at Monongahela River Locks 2. Several offerors for this construction project took out a lease option at the Leetsdale Industrial Park since it met the necessary conditions. It is situated about 15 miles down the Ohio River from Pittsburgh, and about 26 river miles from the Locks and Dam 2 site (Figures 1 and 2).

The successful offeror was tasked with completing all of the environmental and cultural resources studies required to obtain the necessary environmental permits and approvals for the casting facility site development. Therefore, the District initiated no cultural resources compliance studies prior to contract award. As the successful offeror, the Joint Venture was required to obtain a National Pollution Discharge Elimination System (NPDES) permit from the Pennsylvania Department of Environmental Protection (PADEP) and Department of Army Section 10 and 404 permits for the development and use of a casting basin on leased lands at Leetsdale Industrial Park, Allegheny County, Pennsylvania (Figure 3).

The Joint Venture construction plan for the Leetsdale Casting Facility requires the excavation of a 182.9 meter x 182.9 meter (600 feet x 600 feet) pit for a casting and launching basin. The casting basin will be excavated to an elevation of 684 feet above National Geodetic Vertical Datum (NGVD) or approximately 4 meters to 6.5 meters (13 feet to 21 feet) below existing ground surface. The launching basin will be excavated 14 feet deeper with the bottom at 670 feet NGVD. The two adjacent basins will be surrounded by a berm with a top elevation of 704 NGVD. The project will also necessitate the excavation of sediment ponds and require ancillary construction activities including an access road, soil stockpiles, parking lot, an outlet structure and several temporary culverts (Figure 4). When the casting of each dam segment is complete, the

basins will be flooded, and the completed segment transferred to the launching basin. The exit structure between the launching basin and the Ohio River will be breached and the dam segment floated into the Ohio River. Upon completion of both segments, the basin will be filled back in and the land surface restored.

The Leetsdale Industrial Park project area is adjacent to the Ohio River and includes portions of the T-1, T-2 and T-3 terraces and two back channels (Figure 5). Prehistorically, the project area landform was once an island within the Ohio River. Although no standing structures are, at present, located within the 30-acre project area, historically, this area had domestic and industrial structures. Industry, demolition, fill, and major flood events have all disturbed the upper soils in much of the project area. Use of the project area in the past by a barge painting firm resulted in low-level lead contamination of the top two feet of soil across the entire project area.

II. EFFORTS TO IDENTIFY HISTORIC PROPERTIES

The Joint Venture retained a consultant to conduct a Phase I archaeological survey of the Leetsdale Casting Facility. The Phase I archaeological fieldwork was undertaken between September 13 to December 24, 1999, identifying one multicomponent site: 36AL480. Site 36AL480 is a stratified prehistoric and historic archaeological site located on the third terrace of the Ohio River between river miles 14 and 15. Prehistoric and historic archaeological artifacts and intact features were identified. Under direction from the Joint Venture, their cultural resource consultant began Phase II archaeological investigations within the specific area of the casting basin.

Archaeological investigations within the 30-acre project area conducted for the Joint Venture included 14 geomorphology trenches, 53 other trenches, and 60 units measuring 1m x 1m. These investigations resulted in the identification of 15 prehistoric and 7 historic features, 3,114 prehistoric lithics, 2 prehistoric sherds, and historic artifacts. The historic features represent structural remnants. The Joint Venture's cultural resource investigation determined that Site 36AL480 includes an historic brick factory component over stratified prehistoric archaeological components across 10 acres of the T-3 terrace. Later work by the District expanded the site size to 12 acres.

The historic brick works component identified in the Phase I and II archaeological investigations was found to have been associated with the historically significant Harmonist Society once located in the nearby town of Economy, Pennsylvania. Archaeological investigations identified five kiln foundations and another three possible structural remains (Figure 6). Based on the archaeological fieldwork, many of the structural foundation remnants and activity areas within the core of the industrial site possess good integrity. Some possible fill deposits associated with the brick works were also identified during the Phase I study, but these may also be associated with demolition of the brick factory structures. These outlying areas do not possess good integrity.

Based on the results of this Phase I and limited Phase II study of the project area, the Pennsylvania Bureau for Historic Preservation (PABHP) and District concurred that

Site 36AL480 is eligible for the National Register of Historic Places under Criterion D (potential to provide significant information regarding our understanding of the history and prehistory of the upper Ohio Valley region) for the purposes of the Section 106 NHPA compliance. The District consulted with the PABHP to develop a letter of agreement document dated February 1, 2000 (Exhibit C), regarding protection and excavation of the archaeological site. This agreement was executed with the concurrence of the Joint Venture.

The District, as per the agreement with PABHP, delineated and fenced three areas for future data recovery efforts, conducted a geomorphological study of the 30-acre project area, and excavated one 3 m x 3 m unit. Documentary research by District personnel produced a surveyor's map of the brick factory, which indicated the former location of five structures outside of the data recovery areas. The District conducted Phase II investigations on those five structural remnants (kilns) in February 2000 prior to construction. Upon completion of these tasks, the PADEP issued their NPDES permit with approval of the PABHP, contingent upon the commitments outlined in the February 1, 2000 letter.

The 3 m x 3 m block was excavated to a depth of 1.2 m below ground surface. The central 1 m x 1 m unit was excavated an additional 0.4 m to a depth of 1.6 m below ground surface. This excavation resulted in the identification of one historic horizon (plow zone remnant intact below the industrial disturbance on the upper soils) with a feature, an intact Woodland surface with a feature just below the plow zone, and a Late Archaic/ Terminal Archaic surface with a feature approximately 0.5 m below the base of the Woodland surface.

The District's extensive geomorphological study of the 30-acre project area was undertaken in February 2000 as part of the Phase II efforts and contributed to our knowledge of the site. Fifteen deep trenches and expansion of one of the Phase I trenches resulted in the documentation of 26 additional features. Feature depth from the various archaeological investigations varied from 0.3 m to 4.7 m below ground surface. Flotation and radiocarbon samples were taken from the features. A total of 18 radiocarbon and bulk soil samples were dated as a result of this work. This is in addition to ten radiocarbon and bulk soil sample dates obtained by the District as part of the Joint Venture's cultural resources study.

Trench 3-1 had evidence of a minimum of eight separate occupation surfaces between 0.6 m and 3.2 m below ground surface. These surfaces were identified by the presence of features in the profile. There is a possibility for other occupation surfaces to be present also. In Trench 3-2, three cultural horizons were identified between depths of 4.1 m and 4.7 m below ground surface based on the presence of features. These features were located within lamellar bands that were originally thought to date to the late Pleistocene. According to the geomorphologists, features within this lower soil package (lamellar bands) may represent remnants of surfaces that were only exposed for a brief time before subsequent flooding episodes deposited additional sterile soils. The deepest features in the lamellar deposits in Trench 3-2 dated to the early Middle Archaic period.

III. Historic Properties Description

Site 36AL480 is a large, multi-component, stratified archaeological site on a terrace of the Ohio River. The site consists of historic surface deposits from a former brick works, and prehistoric components dating from the Early Woodland (1000 B.C. – 200 A.D.) through the early Middle Archaic (6,000 - 4,000 B.C.) periods. This site is unique in that it is the only recorded large stratified site along the Upper Ohio River Valley in Pennsylvania with so many separate, intact occupations dating from the early Middle Archaic through Transitional Archaic periods. The site area occupies approximately 12 acres within an Area of Potential Effect (APE) of 30 acres. Phase I and II investigations have recovered cultural materials from a variety of prehistoric features, including possible storage pits, hearths, and fired surfaces. Radiocarbon dates associated with sample excavations of 15 features noted during geomorphologic investigations returned dates ranging from early Middle Archaic to Early Woodland periods. The Middle Archaic period is the least understood cultural period in the Eastern United States. Alluvial deposits from floodwaters have resulted in deposits of sterile soils between some occupations. Depths of occupation surfaces varied across the site and ranged in depth from ground surface (historic brickworks remains) down to 4.7 m below ground surface. The prehistoric components from the Archaic period have good integrity, while the Woodland component is mostly disturbed with isolated locations of intact cultural features beneath the disturbed industrial soils. There are no modern large-scale site excavations of a similar stratified site in the Upper Ohio Valley in Pennsylvania, West Virginia, or eastern Ohio. Site 36AL480 has the potential to yield a great deal of new information on the Middle Archaic period in the region, as well as the eastern United States. The historic component of Site 36AL480 has the potential to yield significant information on the architecture, technology, and economics of a brick plant from the mid-19th century to the early 20th century, and to increase our understanding of the manufacturing interests of a local religious sect/community important in Pennsylvania history.

Small mobile groups practicing a foraging economy generally characterize the Archaic. The Archaic is also associated with post-Pleistocene environmental changes. The shifts in subsistence strategies, settlement patterns, tool assemblages and lithic reduction methods, and climate seem to occur rapidly at the transitions between Early, Middle, and Late Archaic periods based on the current knowledge. The site shows evidence of numerous occupations throughout the Holocene Period, especially early Middle Archaic through Transitional Archaic. Holocene environment reconstruction of the site vicinity as it relates to the numerous occupations of this multi-component, stratified site has enormous potential to increase our understanding of both cultural continuity and change for the Upper Ohio Valley during the Archaic period. It may also have implications for the larger Appalachian Plateau Region during the Archaic period.

Early occupation surfaces and associated cultural features in such a well-preserved riverine context are indeed rare and very significant to understanding settlement patterns, adaptation, and group dynamics. A variety of ecosystems within this

setting provides optimal conditions for subsistence studies. Systematic investigation of such an area, not conducted to date anywhere on the Ohio River, will permit the reconstruction of seasonal activities of the prehistoric inhabitants and will allow assessment of both diversity of occupations during one period and critical analysis of occupations representing eight or more millennia. Once published, this site may serve as the comparative template for future investigations on the Ohio River, the Appalachian Plateau of western Pennsylvania, and the eastern United States.

The historic industrial component of this archaeological site is a brick works dating from the mid-19th century to the early 20th century. From the late 19th century, it was associated with the Harmonist Society. The Harmonists were originally comprised of German religious separatists who came to America seeking religious freedom. They formed a communal society and were known for their piety and industrial prosperity. The group settled in nearby Economy, Pennsylvania, in 1825, which was the third and final home for this group. The Harmony Society gradually declined in numbers and dissolved in 1905. The Commonwealth of Pennsylvania currently owns part of the Harmony Society's former property, Old Economy Village, which is located in the nearby town of Economy. Old Economy Village is a state historic site and a National Historic Landmark maintained by the Pennsylvania Historical and Museum Commission.

IV. Effect of the Undertaking

The undertaking involves extensive earthmoving and excavations across the 30-acre work area. Excavations include a large pit for the casting and launching basin and the required appurtenances such as sediment ponds, access road, spoil storage location, soil stockpiles, parking lot, outlet structure and several temporary culverts at the Leetsdale Facility. The excavations will adversely affect through removal about 2.75 acres of the 12-acre archaeological site. The remainder of the project area, with the exception of the three archaeological set-aside areas (totaling 1.82 acres), will be used for stockpiling of excavated materials and other construction activities. However, effects from these activities will be confined to the upper levels, which were shown in Phase I and II investigations to have been previously disturbed.

V. Application of Criteria of Effect

> In consultation with the SHPO/THPO and any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to identified historic properties, the Agency official shall apply the criteria of adverse effect to historic properties within the area of potential effects. The Agency Official shall consider any views concerning such effects that have been provided by consulting parties and the public. [36 CFR 800.5(a)]
>
> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of an historic property that qualify the property for inclusion in the National Register in a manner that would

diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. (36 CFR 800.5(1)]

The excavation and earthmoving for the casting and launching basin and related site development will diminish the property's integrity through the physical removal of a portion of the site. The site components to be affected contain information that may contribute to our understanding of prehistoric lifeways, and their removal constitutes an adverse effect to the property under the above criteria.

The District arrived at the adverse effect determination through consultation with the PABHP. Additionally, the District has been contacted by the Delaware Tribe of Western Oklahoma regarding rumors surrounding finds at the site (see Consultation with Others, below). The District requested, but has not received, further information from the tribe concerning their specific interest in the site or area.

VI. Mitigation Alternatives Considered

In formulating the mitigation plan, the District recognized that the project would have unavoidable adverse consequences to portions of the prehistoric and historic archaeological resources found at the Leetsdale Casting Facility. Although the presence of early occupation surfaces with features in such a well-preserved context as Site 36AL480 is rare, the District determined that it would be impractical to search for an alternative construction site due to project scheduling and funding constraints. Subsequent efforts were focused, then, on minimizing the adverse effects of the construction activities on the site, and mitigating for unavoidable adverse effects. Mitigation alternatives were considered to maximize retrieval of significant data from three strategically placed set-aside areas, while permitting the construction contractor to use the remainder of the site.

A. Avoidance/Minimization

This form of mitigation is generally the most desirable from the standpoint of historic preservation. However, moving the construction casting basin to an alternative site was not practical from a project scheduling and funding basis, recognizing that an alternative site may also present similar cultural resource constraints and potentially significant environmental issues. There are many geotechnical factors influencing site acceptability, and this site was one of the few acceptable locations for the specific constructions requirements. Within the 30-acre leased area, there is little flexibility in physical placement of the casting basin. Once archaeological testing had identified concentrations of cultural remains, the Joint Venture was required to relocate their

activities to the extent possible to protect the three archaeological set-aside areas (1.82 acres). The result was that through avoidance and minimization, construction excavation would affect only 2.75 acres of the 12-acre archaeological site. The remainder of the site not included in the set-aside areas would be subject to temporary surface impacts (storage and work areas) and not available for archaeological study during the construction period.

B. Mitigation of Adverse Effects

The District proposes to mitigate the adverse effect of this undertaking by conducting archaeological data recovery excavations to recover valuable scientific and historic information on this archaeological site. The data recovery work will address both the historic and prehistoric components of 36AL480. The Recommended Data Recovery Plan presented in Section VII details these recommended mitigative measures.

The District's recommended mitigation plan is one of a number of alternatives considered. The original plan was developed in response to the February 1, 2000, letter of commitment with the PABHP stipulating a 2,000 m^2 excavation requirement within the three set-aside areas and including six strategically placed 3 m x 3 m squares outside these areas. A summary of the proposed approach for this 2,000 m^2 plan is contained in the following Table 1.

Table 1. .
2,000 m^2 Plan - Projected Excavation Block Sizes and Locations.

	2,000 SQUARE METER EXCAVATIONS:		
Area	**Approximate Dimension of Excavation Blocks (l x w x d)***	**No. of blocks**	**Sq m**
1	20 x 30 x 1.5 m	1	600
1	10 x 20 x 1.5 m	1	200
2	18 x 19 x 3.5 m	1	342
3	17 x 35x 3 m	1	595
3	11 x 19 x 2 m (volunteer excavations)	1	209
Other	3 x 3 x 3 m	6	54
	Total		**2,000**

* **Since fence lines do not run parallel to the grid, block sizes and shapes may vary.**

The District's cost estimate associated with the 2,000 m^2 Plan exceeded $19 million. Factoring significantly in the high cost was the hand excavation and screening of clayey Bt/Btx soils prevalent at the site, and a projected volume of 6,000 square meters, based on average depths of cultural deposits across the site of between 2 and 4 meters below ground surface. This plan would recover an estimated 500 features and 300,000 artifacts, requiring a significant analysis effort and curation requirement that was not satisfactorily addressed, even at the $19 million cost level.

Any expenditure for data recovery exceeding one percent of project costs (one percent of $705 million = $7.05 million) will require approval of the National Park Service and notification of Congress under procedures established for implementing provisions of the Archaeological and Historical Preservation Act. (P.L. 93-291). At present,available information regarding the significance of the site indicates that expenditures beyond the one percent ($7.05 million) expenditure authority are not justifiable. As the site is excavated, this determination may be re-evaluated.

The District subsequently developed an alternative plan that addressed the intent of the data recovery objectives while keeping the costs within the one percent level. This plan proposed excavation of 854 m^2 at the site, which included a 200 m^2 block excavation for volunteers, the completion of which would be encouraged but not required. This plan reduced the size of block excavations across the site, which would result in far less (presumably) redundant data for analysis and curation. The excavation approach of this plan by set-aside areas is represented in the following Table 2. The estimated cost of this plan was $6.18 million, without District in-house labor or any contingency estimates. The District presented this alternative plan to the PABHP in June 2000.

Table 2.
854 m^2 Plan - Projected Excavation Block Sizes and Locations.

	854 SQUARE METER EXCAVATIONS:			
Area	**Dimension of Excavation Block (l x w x d)**	**No. of blocks**	**Size (Sq m)**	**Approx. cu m**
1	20 x 10 x 2 m	1	200	400
2	20 x 10 x 3.5 m	1	200	700
3	20 x 10 x 3 m	1	200	600
Other	3 x 3 x 3 m	6	54	162
3	20 x 10 x 2 m*	1	200	400
	Total		**854**	**2262**

* Volunteer excavations - completion of this excavation block is encouraged but not required under this Data Recovery Plan.

The PABHP rejected this alternative plan on the basis that it did not satisfy the 2,000 meter, big block excavation requirement agreed to in the February 1, 2000 letter. They also suggested that the District's estimate for the 2,000 m^2 Plan was not realistic of market values, and that contractor bid proposals would be much lower.

Failing to reach an agreement on the alternative plan, the District proceeded to prepare a detailed plan and cost estimate for the 2,000 m^2 Plan and initiated discussions with Corps of Engineers cultural resource experts for review of the plan and estimate. As a result of the Corps independent technical review (see below, Consultation with Others), the District proceeded to reformulate the Data Recovery Plan into a plan that provided a more flexible approach in treating each of the set-aside areas as the data recovery work progresses, to allow maximum retrieval of significant information from the site while

keeping within the one percent spending level. Of particular importance is the addition of the 'best block approach', which greatly increases the horizontal exposure of the selected testing areas but requires hand excavation blocks to be focused on those locations which provide the best potential to yield data regarding our research goals. We have discussed this approach with PABHP. The District will continue to consult with PABHP, particularly regarding management decisions in selecting the best locations to target hand excavations.

C. Consultation with Others

The District has met with the staff of the Pennsylvania Bureau for Historic Preservation (PABHP) on numerous occasions to discuss this project, in addition to phone calls and correspondence. The initial meetings in the fall of 1999 were to guide further study to identify and define the site based on the Joint Venture's Phase I study and preliminary findings. Once these field studies had been completed, the District and PABHP negotiated early in 2000 the conditions under which the PABHP could agree to issuance of the PADEP permit for construction. The resultant letter agreement dated February 1, 2000, specified the District's commitments for treatment of the site, including the protection of three archaeological set-aside areas for future data recovery of 2,000 m^2 to the base of cultural deposits. Subsequent consultation focused on the results of the District's geomorphological study in February 2000 characterizing the geological development of the landform relating to human occupation, and a field examination of the exposed walls of the excavated casting basin in June 2000 for further geomorphological and archaeological evidence.

The geomorphological study redefined our knowledge of the vertical extent of the site. Instead of the previous maximum known depth of about 2 m below ground surface (bgs), we learned that the site extends to more than 4 m bgs in some areas. This significantly added to the District's estimated cost of site excavation, and prompted District consideration of an alternative plan to meet the intent of the February 1, 2000 commitments, while not requiring the full volumetric extent (an estimated 6,000 m^3) of the 2,000 m^2 excavation. The basis behind the alternative plan was that hand excavation of an estimated 6,000 m^3 would generate much redundant data and an excessively larger number of artifacts to analyze and curate than would be necessary to determine site functions. The presence of heavy clayey soils in the cultural levels also added to the estimated cost of hand labor for site excavation. The District presented this alternative plan to the PABHP during a June 9, 2000, meeting. The PABHP disputed this alternative approach, suggesting that the high cost estimate may over estimate real-world contract bids, and reiterating that it did not satisfy the committed level of excavation.

Failing to obtain PABHP concurrence on the alternative plan, the District reviewed and finalized the 2,000 m^2 plan, arriving at an estimated data recovery cost of over $19 million, or approximately 2.7 percent of the total project cost of $705 million. This estimate prompted the District to obtain an independent Corps of Engineers review of the site from archaeologists Dr. Paul Rubenstein, the Corps of Engineers' Federal Preservation Officer at Headquarters, and Dr. Michael (Sonny) Trimble, St. Louis

District Center of Expertise for Curation; and attorney Ms. Rebecca Ransom, Northwestern Division, a specialist in cultural resource laws. Also participating with the independent review were Mr. Cornelius Purcell, Pittsburgh District Counsel; and Henry Edwardo, Project Manager. This review concluded on September 27, 2000, concurring that 36AL480 is a highly significant site for both the historic and prehistoric components and that data recovery should proceed in accordance with a plan to limit costs to within the one percent spending authority of the Archaeological and Historical Preservation Act of 1974 (P.L. 93-291). They also indicated that the District's cost estimate for the 2,000 m^2 plan, considered high by the PABHP, did not adequately cover analysis and curation costs.

The District consequently reformulated their previous alternative plan, which kept costs within the one percent spending authority. This is the plan presented in this report as the District's recommended plan. Although this plan has not been formally coordinated with the PABHP for comment, the methodology for proceeding with data recovery excavations in Area 1 has been discussed verbally with Dr. Carr and Mr. Funk of the PABHP, and has received their tentative approval. The issue of detailed excavation of less than 2,000 m^2 has not been resolved, but the District's recommended data recovery plan is designed to provide more specific information in several large sections of the site while focusing the intensive excavation at the site to those loci that have the best potential to address the research goals of the data recovery plan. The work will be undertaken in stages. This staged approach will provide specific information on actual costs and the suitability of the field strategies to optimize the information recovered. This information can be used to negotiate the level of approach in the remaining archaeological set-aside areas.

Word-of-mouth publicity of our archaeological excavations at the Leetsdale site has spurred the interest of two Native American groups. The District received a March 3, 2000, letter from the Delaware Tribe of Western Oklahoma claiming that we had uncovered artifacts having significance to the Delaware people, and requesting consultation under the Native American Grave Protection and Repatriation Act (NAGPRA) and Section 106, NHPA. We followed with phone calls and a letter to Ms. Rebecca Davidson, the director of their environmental programs. As to consultation under Section 106, we welcomed their interest and requested further information on the nature of the religious and cultural significance the Delaware people attach to the Leetsdale area to guide our further coordination with them as a consulting party. Regarding NAGPRA, however, our studies to date have uncovered no burials or funerary objects, and as the Leetsdale site is on privately owned lands, our activities are not subject to NAGPRA. As of October 2000, we have not received any follow-up correspondence. The second inquiry came from Mr. Bernard Humbles, Principal Chief of the United Cherokee Tribe of Kentucky, & W.V., Inc., which is not a federally recognized tribe. Mr. Humbles lives in the Leetsdale area and has an interest in our archaeological excavations. We will keep him informed of the data recovery studies once they are initiated.

The District prepared an October 2000 issue of the Lower Mon Project's historical bulletin, ***The Monongahela Packet***. This issue describes our cultural resource compliance activities since the previous issue, and describes in particular our cultural resource activities at the Leetsdale site. The bulletin is mailed to a list of about 300 recipients who have expressed an interest in the project's cultural resource compliance. Typically, issues are published as needed, describing the progress on cultural resource studies and requesting input from the readers. A copy of the latest issue of ***The Monongahela Packet*** is located in **Exhibit B.**

The District's internet web site also provides information on the archaeological site and our efforts there. This web site is updated periodically as new information becomes available, and includes photographs and a link to the District's web camera overlooking the Leetsdale Casting Basin facility and the archaeological data recovery Area 1. The address is http://www.lrp.usace.army.mil/.

VII. RECOMMENDED DATA RECOVERY PLAN

A. Introduction

The Recommended Data Recovery Plan for Site 36AL480 presented in this document is in accordance with the April 1992 Programmatic Agreement among the District, the ACHP, and Pennsylvania SHPO (Exhibit A). The plan focuses excavations in three separate loci (Areas 1, 2 and 3), all of which are strategically placed to maximize retrieval of significant data that will add to our understanding of both the historic and prehistoric components of this site, as well as to allow use of the surrounding area by the District's construction contractor concurrently with data recovery. In addition, an archaeological trench with an accompanying unit will be placed at six separate locations to the north and east of Areas 2 and 3, although the excavation size may be enlarged up to 3 m x 3 m if necessary to identify and examine occupation surfaces that may be present.

This plan is designed to allow for flexibility in field and laboratory procedures that permits the District to focus its efforts on the excavation and analysis of occupation surfaces. Intensive excavations will be undertaken in large blocks within a much larger area subjected to close interval testing. The location of these excavation blocks may shift horizontal location and size as the excavation continues downward depending upon the horizontal location and extant of these occupation surfaces. Mechanical removal of soils outside of these blocks may occur. Professional standards in excavation and analysis will be maintained. With this recommended plan, it is anticipated that the total area investigated by the block excavations **and** the close interval testing will meet or exceed 2,000 m^2 as agreed to with the PABHP in the February 1, 2000, letter. The results of the close interval testing will permit strategic location of the blocks to maximize information recovery; although the total area covered by intensive block excavations will total an anticipated 600 m^2 - 1000 m^2.

B. Data Recovery Management Strategy

The District will conduct all of the archaeological data recovery by contract under the supervision of District archaeologists. Due to time constraints, the District is proceeding with a plan of work that utilizes more than one contractor to complete the fieldwork, with contractors responsible for the analysis and reporting of their work. The District's Data Recovery Plan details the research questions and basic field and laboratory procedures but permits each contractor some flexibility to achieve these goals. One Contractor will be tasked with editing the separate studies into one inclusive report.

An additional element of the District's plan to maintain continuity and cohesion between different contractors is the assignment of one District archaeologist as a District Principal Investigator (DPI) on the project. The District will be responsible for quality assurance on all stages of the data recovery efforts. All contractors will be required to provide qualified and experienced staff to conduct this work. Supervisory and technical specialist staff must meet or exceed the National Park Service professional qualifications standards listed by the District.

Under terms of the existing District Right-of-Entry agreement with Leetsdale Industrial Park (the landowner), all fieldwork and ground restoration must be completed by Oct. 30, 2001. The District is presently negotiating with the landowner to extend the Right-of-Entry agreement for fieldwork in most of the site until December 2002. Work on the Area 1 historic component commenced in November 2000, and the prehistoric component within Area 1 and part of Area 3 are presently scheduled for fieldwork in spring, 2001. Work in Area 2 is projected to start in mid-summer, 2001..

C. Prehistoric Component of 36AL480

1. Research Themes

The site shows evidence of numerous occupations throughout the Holocene Period, especially early Middle Archaic through Transitional Archaic. There is a diverse and rich ecosystem within the general site vicinity that includes the Ohio River, smaller streams at the confluence with the Ohio River, well-drained terraces, and a back channel that may have had a wetlands habitat. The back channel was an active channel of the Ohio River at the time of the earliest known occupations at the site, indicating that this was an island setting. The diverse ecosystems in close proximity to the site vicinity appear to provide optimal conditions for a variety of subsistence related activities such as fishing, hunting, and foraging. In addition, cobble cherts found along the river would have provided a convenient source of lithic raw material. Holocene environment reconstruction of the site vicinity as it relates to the occupations of this multi-component, stratified site has enormous potential to increase our understanding of both cultural continuity and change for the Upper Ohio Valley. It may also have implications for the larger Appalachian Plateau Region during the Archaic period.

There is a difference in lifeways between the Early, Middle, and Late Archaic periods. Some archaeologists have postulated that changing environmental conditions resulted in this cultural transition. Early Archaic period (ca. 8,500 –6,000 B.C.) is identified with the introduction of a variety of notched points, Post-Pleistocene environment, introduction of chipped stone celts, reliance on local lithic sources, and a shift to hunting smaller game animals (Egloff and McAvoy 1990:64). The Middle Archaic period (ca. 6,000 – 4,000 B.C.) is associated with warmer, drier climate, evidence of ground stone tools, expanded diet which includes shellfish and hickory nuts, introduction of net sinkers, and more geographically restricted social territories (Ibid.). The Late Archaic (ca. 4,000 – 1,000 B.C.) is associated with broad-blade points, shell middens, storage pits and scattered fire cracked rock hearths, groundstone tools, steatite vessels, and exchange of exotic goods (Ibid.). In summary, there appears to be a change in subsistence, settlement patterns, tool assemblages, and climate between these periods. Site 36AL480 has features and occupation surfaces in many different cultural strata from the early Middle Archaic through the Transitional Archaic (ca. 1,800 – 800 B.C.) and more limited features associated with other cultural periods. Since there are few stratified sites that have been excavated and studied in great detail in this region, Site 36AL480 provides an opportunity to examine how these changes are manifested in a riverine setting, during the Archaic period.

Archaeological evidence at other stratified sites indicates that not all occupations may have served the same purpose and/or included the same activities. Since there are multiple occupations attributed to the range of the Archaic period, this site represents an excellent opportunity to examine the various activities that occurred in this specific location and the functions of these occupations.

The District, in consultation with PABHP, has identified five research areas that may be appropriate for cultural horizons within this site. Based on previous studies, this site presents an opportunity to increase our knowledge and understanding of the early prehistory in the Upper Ohio Valley and the Appalachian Plateau with regards to: 1) settlement patterns, including community studies; 2) subsistence strategies, including diet and food procurement strategies; 3) cultural chronology; 4) lithic technology, including tool assemblages, lithic reduction methods, and lithic procurement strategies; and 5) environmental context. This is not intended to be a complete list as other research topics may present themselves during this data recovery effort. The paucity of pottery (2 pieces) recovered from previous work at the site indicates that pottery may not be useful in addressing major research questions.

a. Site settlement pattern

Settlement patterns can address internal site arrangement, as well as, the patterning of relationship between sites. Understanding the distribution of sites across the landscape and their functional relationships is a focus for intersite settlement patterns. Determining the function of the occupations represented is important for understanding the components of the settlement systems. The Data Recovery Plan calls for opening up

large excavation blocks in order to examine the spatial patterning of features, artifacts, activity areas and other data that may relate to site function.

Intrasite Patterns / Community Studies

Previous studies have documented the presence of a variety of features, including possible storage pits. These studies have also documented that the site was reoccupied numerous times during the Archaic period. These occupations were scattered across the T-3 terrace landform. The District anticipates encountering numerous short-term occupations at this site, with some occupations separated both horizontally and vertically from others. As a result, the value of 36AL480 for understanding Archaic period settlement patterns may be tremendous.

There is a variety of data that contributes to understanding intrasite patterns. Intensity and duration of occupations are useful in identification of site type. The duration of occupation is reflected in presence or absence of storage pits and houses or shelter. The presence of household clusters and overlapping occupations provides data regarding intensity of occupation and forms the basis for community studies. Artifacts, features, and activity areas are used to identify site function. Site structure studies focus on identifying the relationship of features, activity areas, and occupation site in order to understand the social structure that produced these intrasite settlement patterns. Site structure can be examined by identifying occupation size, types of features and activity areas, and spatial patterning or relationship of features and activity areas within the occupation horizon. This information can be used to make inferences concerning group size. Estimating population size has been accomplished using various methods including: average floor space per person, relationships between settlement size and population size, and number of fire pits or hearths per family. It is critical to control for chronology in these studies.

For each occupation surface some questions need to be addressed. For settlement pattern studies, these questions include:

- What is the site type?
- What is the size of the occupation surface?
- What types of features and activity areas are represented?
- What is the spatial patterning or relationship of features and activity areas?
- Is there evidence of structures or shelters?
- Is there evidence of storage features?
- What is the estimated population size and/or population density?
- Is there evidence of specialization or abundance of certain types of resources?

Intersite Settlement Patterns

This site has the potential to provide a wealth of data concerning prehistoric lifeways during the Archaic periods and possibly other cultural periods. In order to place the information gained from the excavations at 36AL480 in its proper context, it is necessary to compare the information from this site with patterns observed from other

sites in Upper Ohio Valley and Appalachian Plateau region. Questions include:

- How does this site compare to other riverine and/or island sites dating to the Archaic period?
- How does the information from this site 'fit' with current settlement pattern models for the region?
- Are the settlement patterns identified at Site 36AL480 similar to other sites in the region of the same time period?

b. Subsistence and Seasonality Studies

Undisturbed occupations may yield important subsistence data. Flotation of samples from features may recover plant and other food remains that allow conclusions to be made regarding paleo-diet and seasonality. Faunal, flotation, and pollen studies provide data utilized to examine questions regarding diet, seasonality, and site activities. Discussing the types of food resources in the context of the local environment will add to the information gained from this site. Recovery of subsistence remains will permit comparisons with other Archaic sites in the Appalachian Plateau Province and Upper Ohio Valley.

If sufficient floral and faunal remains are recovered then specific questions concerning the subsistence strategies practiced by occupants of this site can be addressed. These questions can include the following:

- Is there any evidence of a diachronic change in subsistence practices?
- How important are riverine versus non-riverine resources in the diet?
- What specialized food acquisition and/or processing tool types were recovered?
- During what season(s) was each living surface occupied?
- Are there storage pits or other features present, which would indicate longer periods of occupation?
- Is there variability in plant and animal remains between features that may add to our inferences regarding activity areas?
- Is there evidence of site specialization or abundance of certain types of subsistence resources?
- What does the archaeological evidence suggest as to how and where food processing or preparation was performed?

Specific questions for faunal remains may include:

- What animal species were present?
- What animals were consumed?
- What is the habitat for these faunal resources?
- During what season are these animals easiest to procure?
- How were these foods processed or prepared?

Specific questions for botanical remains may include:

- What types of plants, nuts, and berries were identified?
- What floral remains were possible food sources?

- During what season are these floral remains collected for food?
- Is there evidence of cultigens?
- What wood species were used for firewood?

c. Cultural Chronology

Multi-component, stratified sites with well-dated stratigraphic sequences are limited in southwestern Pennsylvania and the Upper Ohio Valley. Based on previous studies, the site covers the early Middle Archaic through the Transitional Archaic Periods with limited intact Woodland occupations evident. The small mobile groups practicing a foraging economy generally characterize the Archaic. The Archaic is also associated with post-Pleistocene environmental changes. Patterns in subsistence, settlement, tool assemblages, and climate appear relatively stable within each period (Early Archaic, Middle Archaic, and Late Archaic) but there appears to be rapid changes in the patterns to mark the shift from the Early Archaic to the Middle Archaic period and the shift from the Middle Archaic to the Late Archaic periods based on the current knowledge. By dating the numerous occupations at Site 36AL480, we have an opportunity to conduct a finer grained study of these changes over time while keeping the location constant.

Reconstructing the site chronology is critical baseline data since many other studies are dependant on the identification of temporal relationships. Chronological information is needed in order to produce site-specific reconstructions and to make appropriate regional (Upper Ohio Valley and Appalachian Physiographic Province) site comparisons. It is important to determine what time periods are represented at the site, particularly within each occupation layer. Mixing of occupations is problematic where the living surface was stable for longer periods of time. Single occupation surfaces enable researchers to eliminate much of the noise/confusion and focus the research more effectively. Such narrowly defined date ranges for occupation layers may be critical in order to identify subtle diachronic changes in Archaic Period site usage. Site chronology is also important when discussing these occupations in terms of environmental variables. For this stratified site, an important question is: What is the approximate date for each occupation? Radiocarbon dates, bulk soils dates, temporally diagnostic artifacts, and stratigraphy sequence are used to reconstruct site-specific chronologies.

d. Artifact Assemblages and Lithic Technology

Typically, lithics represent the vast majority of the archaeological material recovered from Archaic sites. It is anticipated that over 300,000 artifacts, mostly lithics, will be recovered. At this site, lithic analysis will contribute towards our understanding of technology, group mobility, and activities at the site. Differences between lithic assemblages between occupation layers have the potential to shed light on site usage and lithic reduction strategies through much of the Holocene. Questions for the artifact analysis of each occupation surface include:

- Is there evidence of bone or shell artifacts?
- What ceramic types are present? What are the vessel forms?
- What types and quantities of lithics were recovered?

- What were the sources of the lithic materials represented?
- What stages in the lithic reduction sequence are evident?
- Are there differences in the lithic reduction strategies sequence between occupation surfaces?
- Is there a preference in lithic material?
- What types of activity areas are present?
- What is the tool kit composition for each occupation and how do these assemblages compare between occupations?
- Is there a relationship between projectile point functions and lithic raw material use?
- Are the lithic technologies and tool assemblages identified at Site 36AL480 similar to other sites in the region of the same time period?
- Are there any exotics (e.g. non-local materials, non-local tool types) represented in the assemblage?

e. Environmental Context

To date, there has not been an in-depth study of the environmental and depositional history of the Upper Ohio River Valley in an archaeological context. Understanding the environmental and depositional histories of the Upper Ohio River Valley are important for interpretation of cultural change in the region. A major focus of the site data recovery efforts will involve environmental reconstruction of the site vicinity during the Archaic period. The study will also help predict the potential location and depth of archaeological sites.

It would be useful to understand the resources available to the prehistoric inhabitants and how the availability of these resources changed during the Holocene Period. The District believes that the environmental reconstruction of Site 36AL480 has the potential to serve as a reference site for future archaeological studies. It is important to compare the information gained from data recovery activities associated with the excavation of 36AL480 with the information available from other site excavations within various regions (southwestern Pennsylvania, Upper Ohio Valley, Appalachian Plateau, Pennsylvania, and Eastern United States).

Much of the depositional processes of the T-3 terrace landform on which 36AL480 is located has already been examined but needs to be refined during the data recovery fieldwork. Pollen analysis of the site vicinity can also contribute to this research theme. Questions include:

- How did the environmental setting, including climate and soil deposition, of the site change during the Holocene?
- How do changes in climate, deposition, stream flow, fauna, and vegetation relate to settlement activities that occurred at the site?
- How did flooding of the T-3 terrace effect the archaeological evidence of various occupations? Any evidence of scouring present?
- What were the Holocene climatic history, depositional history, and environmental history of the Upper Ohio River Valley in the site vicinity?

- The Bt/Btx horizon or soil package date range appears more recent than similar soil horizons in the Susquehanna and Delaware River valleys. Does that more recent date range hold true based on the data recovery investigation? If so, what implications does that have for climatic conditions in southwestern Pennsylvania as opposed to central and eastern Pennsylvania?

2. Background Research / Contextual Studies

The Contractors will undertake all research of literature and records necessary to support contextual studies for the site and the research objectives of the Data Recovery Plan. This overview will describe a cultural overview of the region including sites from each time period in the local region and focusing on sites in the immediate area. This will include an overview of stratified sites in the Appalachian Plateau of the local region and a discussion of other excavated sites from similar time periods within the local region that will facilitate intersite comparisons.

3. Field Strategies and Sampling Considerations

The excavation procedures described here are flexible. The field strategies may be modified after consultation with the District archaeologist and PABHP.

a. Site Preparation

The District completed some preliminary site preparations for the data recovery efforts. Three areas (Areas 1, 2, and 3) were set aside for data recovery excavation and protected from construction activities by six-foot high chain link fencing with locking gates and barbed wire on the top. The three fenced areas enclose 1.82 ac. or 7368 sq. m (Figure 4). A site grid was established and stakes with grid coordinates were placed in each area.

The District has committed to the PABHP to excavate up to 2,000 sq m of the site down to the base of the known cultural deposits (approximately 2-4 m below ground surface). The recommended Data Recovery Plan proposes systematic testing in large sections that may total over 2,000 m^2 but the large block excavations will likely total less than 1,000 m^2. The excavations will occur in several large blocks, situated within Areas 1, 2, and 3. Due to problems associated with shoring, the excavation blocks will be stepped back on their perimeter.

Areas 1, 2, and 3 are numbered consecutively in a rough alignment of northwest (downstream) to southeast (upstream) following the landform. The 12-acre site runs along the T-3 terrace, which is the highest landform within the 30-acre project area. Site length from northwest to southeast measures about 365m (1200 ft) and the site width varies with the width of the T-3 terrace. The distance from the downstream end of Area 1 to the upstream end of Area 3 is approximately 320 meters (1050 ft). By excavating several large blocks within three widely separated areas, we have the opportunity to sample more cultural horizons or site occupations.

Once a block location is chosen, it is anticipated that the same basic excavation procedures will be followed (see VII.C.3.b.). The procedures used to locate the horizontal and vertical extent of each block for the prehistoric component will vary. Each of the set-aside areas is described briefly below.

Area 1 represents the downstream point of the former island on the distal side of the T-3 terrace. This area is adjacent to the relic river channel and approximately 200 m (656 ft) from the current river channel. It covers an area of 3023.63 sq m (32534.26 sq ft) or 0.75 ac. Area 1 includes part of the core of the brick factory component. Prehistoric occupations in this location appear to be restricted to the upper 2 m of soils.

Area 2 is located upstream from Area 1 on the proximal side of the T-3 terrace. It is situated 114 m (375 ft) from the current river channel and 114 m (375 ft) from the relic channel. Minimum distance between Area 1 and Area 2 is 73 m. It covers an area of 1234.45 sq m (13282.68 sq ft) or 0.30 ac. The prehistoric occupation in Area 2 includes strata with the highest potential for earlier and later prehistoric occupations. Occupations are expected to occur from 0.5 m to over 4 m below ground surface.

Area 3 is located at a minimum distance of 36 m on the upstream side of Area 2. Area 3 is approximately 168 m (550 ft) from the current river channel and 70 m (230 ft) from the relic river channel but runs lengthwise along the approximate centerline of the T-3 terrace. It covers a rectangular area of 3109.57 sq m (33458.97 sq ft) or 0.77 ac. The prehistoric occupation in the northwestern portion of Area 3 should be similar to that of Area 2 while at the southeastern end most of the features and occupations appear to be located in the upper 2.5 m of soils with little vertical separation between occupation surfaces.

b. Excavation Methodology

The focus of the data recovery project will be to excavate several large blocks of the site. This methodology refers to work undertaken within these large blocks. Lateral exposure of these large blocks will contribute to the analysis of community patterns within occupations. A combination of hand excavation and mechanical stripping will be utilized. Mechanical stripping within an excavation block will be restricted to removing disturbed fill on the surface and thicker deposits of culturally sterile soil between occupations.

The excavation plan may use two different methods to place the excavation blocks. The first method is referred to here as a **'fixed block excavation'** where the block limits are located at the same horizontal grid points as the excavation progresses from the top to the bottom of the cultural strata. This is the method typically employed in archaeological excavations. The second method is referred to as a **'best block excavation',** which is particularly useful on deep stratified sites. 'Best block excavation' permits flexibility in selecting the best location to place a large excavation block within a larger test section within a specific depth range. Units are excavated down to a certain

depth on a grid interval over the test section. The results of the unit data are used to determine the location of a test block for that depth range. After the 'best block excavation' for intact occupation surfaces for that particular vertical elevation range is excavated, then the entire section is excavated to that depth using mechanical equipment. Then the process begins again for the next depth range in the test section. The location, size, and number of block may vary within the test section from one depth range to the next depth range.

After the historic component of the site data recovery excavation is completed, the historic soil strata will be stripped off all of **Area 1** except for a buffer area around the fence line. The top 0.6 m of soil has lead contamination and will be stored in an existing spoil pile for contaminated soils within the Leetsdale Casting Facilities. Some of the historic features and activities, such as building foundations, may have disturbed some of the underlying soils.

Currently, the prehistoric components data recovery plan for Area 1 calls for a **'best block excavation'**. Based on soil conditions up to 1600 sq m will be selected for systematic testing by excavating 1 m x 1 m units on a 5 m grid. The depth of units placed on a 5 m grid will be determined based on the complexity of the stratigraphy and the depths of cultural horizons/occupation surfaces but should not exceed 1.0 m in depth for each stage. Distribution maps of total artifact count, lithics, tools, material type, and features will be generated for each excavation level for these units. This will serve as a management tool to determine the placement of the excavation block(s).

After excavation in the block is completed to that depth, then heavy equipment will be utilized to mechanically strip the remainder of the test section within Area 1 down to the depth of the block and the systematic units. Then, the process will be repeated with the re-establishment of the five-meter grid and the systematic placement and excavation of units. This process will continue until it appears that the excavations have reached the base of the cultural deposits. At that time, some exploratory units will be excavated to confirm that no cultural horizons or occupation surfaces are present below the base of the block excavations. Since the location and size of the block can be changed at different depths, the 'best block excavation' provides an effective method to obtain the best large-scale exposure of occupation surfaces within the entire area covered by the test section.

Area 2 is situated adjacent to the casting and launching basins. When the dam segments are ready for transportation on the river, these basins will be super-flooded. To avoid any potential for collapse of the earthen wall between the basin and Area 2 excavations during this process, Area 2 will be excavated after both dam segments are out of the basin, if possible. A fixed block excavation is planned for Area 2. A buffer area around the block will be removed with the mechanical equipment. For safety purposes, a buffer area outside the perimeter will be stepped back as the depth of the block increases.

Two excavation blocks are planned for **Area 3**. Because of the length of Area 3, the District would like to utilize a best block excavation within the northwest half of Area 3 and a fixed block excavation in the southeastern half. The size of the test section for the

best block excavation would be about 600 m^2 - 700 m^2. The depth of units placed on a 5 m grid will be determined based on the complexity of the stratigraphy and the depths of cultural horizons/occupation surfaces but should not exceed 1.0 m in depth for each stage. Distribution maps will be created for artifacts and features for each excavation level. Based on the results of the unit distribution data in the test section, an excavation block covering between 150 m^2 -225 m^2 will be excavated.

Volunteer excavations are planned within a portion of Area 3 to fulfill a commitment for public outreach with the PABHP. The District will supervise all volunteer excavations with assistance from a qualified contract archaeologist and will document the excavation in the same manner as other excavations within Areas 2 and 3.

Within each block, field excavations will follow standard procedures. Based on site conditions, it appears that the best approach may be to excavate these blocks in stages. At least one 2 m x 2 m test area will be excavated within each block to help determine the appropriate excavation unit and level sizes (see D). This test block will be excavated in 1.0 m x 1.0 m x .05 m unit-level sizes. A constant volume flotation sample will be taken for each excavation level within the 2m x 2m test area. The quantity and size of artifacts within the 2 m x 2 m test area will guide the subsequent excavations. For example, few artifacts or no artifacts in these 1.0 m x 1.0 m x .05 m unit-level sizes will require that they be combined in order to conduct meaningful statistical analyses for the spatial patterning studies (see D).

In addition to the 2 m x 2 m test area within each block, the plan calls for excavation of 1 m x 1 m units placed in linear **transects** located at 5 m intervals across each excavation block. The transects may run either north-south or east-west. The information from these excavations will serve as a management tool to identify the horizontal and vertical location of any occupation surfaces and guide the remaining excavations within the block accordingly. The units within each transects will be excavated down to the first occupation surface. Then, the remainder of the block will be excavated down to that level to expose the occupation surface. The features of this occupation will be sampled. Each horizon or occupation surface will receive a unique designation. This procedure will continue until the base of known cultural deposits.

Soil changes at the site are indistinct and difficult to identify in plan view but are more easily identified in profile sections. In such instances, units will typically be excavated in arbitrary 10-cm levels. Units may be subdivided into quadrants (see D). Soils from cultural horizons will typically be screened through ¼ inch mesh screen. Sterile (non-cultural bearing) soil can be removed without screening. The excavation provenience (quadrants or entire unit, 5 cm or 10 cm level, etc.), method, soil type, etc. will be recorded on level forms for each unit.

c. Features

Features within each cultural horizon will be identified by feature number and described by feature type. Features will be numbered consecutively. Any features

observed during the data recovery will be mapped and photographed. A minimum of a 25 percent sample of each type of features from each occupation surface dating to the Late Archaic through the Woodland periods will be excavated as features. The remainder will be photographed and excavated as part of a unit quadrant. All features from Middle Archaic or earlier contexts will be excavated as features. Flotation sample and radiocarbon samples should be obtained from excavated features. The remaining soil matrix will be screened through ¼ inch mesh screen. Features will be described according to feature type, fill color, texture, inclusions, dimensions (length, width, and depth) and located horizontally and vertically on feature forms. In some instances, it may be permitted to photograph fire-cracked rocks in feature plan views for documentation instead of drawing these rocks. Fire-cracked rocks from features should be counted and weighed. A sample of rocks from different feature types should be collected and analyzed in the laboratory; the remainder may be discarded in the field.

Leaching of the soils and the present of surface fires has made it difficult to locate and/or delineate many features. In locations with concentrations of fire-cracked rocks, reddened soils, reddened rocks, and charcoal concentrations that lack good feature definition, it may be necessary to excavate these cultural features and the immediate vicinity as smaller sized excavations within units (0.5 x 0.5 m or 0.25 x 0.25 m). Horizontal and vertical resolution suitable for analysis is discussed in D.

4. Analysis

Various analytical methods will be useful in the data recovery effort. Some laboratory processing will occur concurrent with the fieldwork on the prehistoric components. This will give the archaeologists data on concentrations of artifacts and features which may identify the presence of cultural surfaces in the transect units. In addition, the field laboratory processing will enable the archaeologists to see the types of tools that are being recovered from various locations. Field counts of artifacts by type can be entered on field forms and on field distribution maps. The field laboratory serves as a management tool to increase the quality of decisions made regarding the excavations.

More detailed analysis will be undertaken in a laboratory. All materials will be washed, sorted, and cataloged. Lithics and ceramics will be classified using standard typologies. The analytical procedures are geared towards the research goals of the data recovery. The artifact catalog will be placed in a database file (s).

a. Flotation Samples

Flotation analysis can aid in reconstructing the plants and animals utilized at the site, help document seasons of occupation, identify the presence of tiny artifacts that might otherwise go through the screen, and collect additional carbon samples for processing. Processed samples should include both constant volume samples and feature samples. Two units in an excavation block in each of Areas 1-3 will be used to obtain constant volume flotation samples from each 10 cm excavation level. Analysis of flotation samples will include taxa identifications of nutshell, seeds, and wood charcoal.

Each feature excavated will have up to five liters retained for flotation samples. In some instances, the feature may be too small to obtain five liters for the flotation sample. For deep features (over 20 cm deep) or large features (over 1.5 m in diameter) multiple samples may be necessary.

b. Dating (Radiocarbon and Bulk Soil Samples)

Radiocarbon dating of features from different strata and occupation surfaces will help reconstruct a timeline for the site. The District has already obtained over 20 dates on radiocarbon and bulk soil samples. Radiocarbon samples should be obtained from excavated features if present in sufficient quantity. Then, a select group of these samples can be submitted for dating purposes.

c. Lithics

The distribution and analysis of the lithics will make a significant contribution towards our understanding of this site. Lithic tools will be classified by technofunctional types and temporal affiliation, if applicable. Chert material type will be identified for a sample of the lithics. Lithic debitage will be subjected to mass analysis. Lithic reduction attributes and usewear patterns will be recorded for a sample of the lithics. The location and distribution of tool types and debitage help identify activity areas at the site. Lithics submitted for the microwear analysis will be selected based on the research goals of the Data Recovery Plan. Lithic refit studies may also provide information on lithic reduction and tool sharpening activity areas. Lithic refit studies will be undertaken on a sample of occupation surfaces that may represent a single occupation. Rocks retained for analysis will be counted and weighed and their usage will be examined.

d. Ceramics

Previous investigations indicate that few, if any, ceramics will be recovered from the excavation. Ceramics will be classified by type. The analysis of ceramics should record pottery type, temper, decoration method, temporal and/or cultural affiliation, and other useful attributes, such as vessel form.

e. Pollen and Phytolith Analysis

Grace Brush, PhD, a palynologist at Johns Hopkins University, analyzed several soil samples and determined that pollen preservation at the site was poor. However, reconstructing past environmental conditions is a high research priority for this study. The District will hire a qualified palynologist to design and conduct a pollen study in the local region (within a 2 mile radius of the site) in order to reconstruct the past vegetation, if feasible. The wetlands associated with the relict channel adjacent to the project area may provide suitable pollen data for reconstructing the vegetation for the last 4,000 years. Pollen samples should have accompanying radiocarbon dates in order to identify the temporal association.

f. Intrasite Analysis

Intrasite analysis of large block excavations can provide information on activity areas and the intensity of occupation at the site. Since more than one block will be excavated, it will be possible to compare and contrast intensity of occupations, occupation sizes, and activities within the occupations within this site. An intrasite analysis plan, authored by Keith Kintigh, Ph.D., provides guidance for this analysis (see Exhibit D). The locations of artifacts and features will be used to help identify and delineate activity areas within an occupation surface.

g. Intersite Analysis

In order to achieve some of the research goals, it will be necessary to compare the information that we have gained from 36AL480 with other sites in the region and the eastern United States, including those from similar settings. Similar stratified sites include Rose Island site in Tennessee, which is located 'on an alluvial terrace at the downstream end' of an island, and the St. Albans site in West Virginia, which was probably situated 'on the mainstream side of a large island' during the Early Archaic period (Chapman 1975: 271). Other stratified sites that may be used for comparison purposes have been excavated along the Delaware River in eastern Pennsylvania and the Susquehanna River in Central Pennsylvania.

h. Landform/Depositional Reconstruction

The Data Recovery Plan has identified environmental reconstruction as an important research goal. Reconstructing the depositional history of this landform and the environmental processes that changed the landform are an important part of environmental study. The Data Recovery efforts will expose deep linear soil profiles from several locations in the site. The site was occupied during the mid- to late- Holocene and will provide an opportunity to reconstruct the depositional history of this region along the Ohio River for at least the last 7,500 years. Results from geomorphology studies already conducted at the site and its immediate environs will be incorporated into this study.

D. Historic Brick Factory Component of Site 36AL480

Previous archaeological investigation undertaken by the Joint Venture and the District identified intact subsurface structural remains associated with the brick works. Some possible activity areas were also identified including brick kiln locations and fill deposits. Approximately 0.75 acres of the industrial complex core area has been set aside for the data recovery fieldwork and is located in Area 1. Limited Phase II fieldwork, conducted by the District, focused on documenting brick works structural remains located outside of Area 1 during early February 2000. This investigation focused on exposing and recording structural remains of five kilns that were located within a construction area (Figure 6). The Phase III excavations and historical research are intended to maximize the

data retrieval for this site to recover the significant data regarding the function of the site as a brick works.

1. Research Themes

The specific objective of this work is to collect and interpret data relating to the brick manufacturing activities at this site and collect information regarding its association with the Harmonists and this sect's goals of religious piety and industrial prosperity. Brick factories represent a special purpose industrial site. Industrial sites are part of the larger economic system, reflecting one type of economic strategy. Factors that influence the location of a brick factory include: proximity to good clay source, reliable water supply, adequate supplies, labor force, and transportation. Brick factories, like other industries and domestic sites, transformed the original landscape into a cultural landscape.

It appears that the historic brick factory component may significantly add to our understanding of the technology of brick manufacturing, architecture of industrial structures, proxemics of a late 19th century brick factory (spatial relationship between structures and activity areas), and economics of a brick works from the mid- nineteenth century to the early 20th century. The collection of documents preserved from the Harmony Society records on their business operations will compliment the archaeological investigation to increase our understanding of these research areas and provide insights into this sect during their waning period. In addition, the District is interested in the navigation system and its impact on businesses along the river corridors within the District. Therefore, the District has included an additional research topic of transportation. Contextual information on this site and its previous owners will also contribute to the historic context of this site.

To accomplish the goals of the data recovery of the brick works component, the District will: (1) conduct excavations within Area 1, (2) analyze the results of the data recovery excavations and previous fieldwork, and (3) write both a technical report documenting the results of this study as it relates to the research goals and a short educational booklet on the brick factory excavations. Specific research questions and goals are listed below.

a. Harmony Brick Works Industry - Site Specific Context

Questions that can best be answered from the archaeological record include:

- What types of defects were observed on discarded bricks at the site? Where were these defected bricks deposited?
- How do the results of the archaeological investigation compare with expectations based on the documentary research?
- What was the process used to manufacture the bricks? Did the manufacturing process change over time?
- What types of bricks were produced at the site (e.g. pavers, common, fire, etc.)?
- What was the source of the water? Is there evidence of water lines running into any of

the identified structures?

- Is there evidence of trash and/or waster brick dumps in the data recovery area? Where were trash and/or waster brick discarded?

b. Technology at Brickwork Component

The technology and the architecture of a brick factory are closely related. In the nineteenth century brick kilns can be divided into two types: continuous and periodic. There are differences in the construction design of periodic kilns. The direction and method used to control the flow of air is an important aspect of kiln and is evident on the lower portion of the kiln and may survive in the archaeological record.

Questions that can best be answered from the archaeological record include:

- What were the size, shape, and capacity of the kilns?
- Determine what types of kilns were used (periodic or continuous).
- Determine the direction and method used to control the flow of hot air (updraft or downdraft) in the kilns.

c. Architecture at Brickwork Component

Questions that can best be answered from the archaeological record include:

- Describe the construction features of the structural remnants examined for the data recovery.
- The floor and foundations of five structural remnants of similar size were examined in February and appeared to be intact subsurface archaeological remains. Were these five structural remnants kilns? Describe how were these five structures were constructed (materials, builders trenches, size, thickness, etc, of footers, foundations, walls, flooring, etc.). Determine when the kilns and other structures were built.
- What was the function of the large structure located within Area 1? Is this one large structure built at one time or one structure with additions? Is there evidence of structure expansion and/or retrofitting during the use life of the structure? Describe.
- How was the large structure in Area 1 constructed? Did it have a basement or cellar? Where was the door (s) for this structure? Was the front of the structure oriented towards the kilns?
- Within Area 1 there is a square hole with linear piles of dirt along each side. Does this represent a structural feature, possible a cellar? If so, how was it constructed and what was its function? Is it associated with the large structure shown on the surveyors map?
- The early surveyors map shows a small square structure in the southwest corner of Area 1. How was this structure constructed? What was the function of this structure? Where were the entrance and/or front side of this structure?
- The tree clearing activities and spring rains caused a portion of what appears to be a brick sidewalk or flooring to collapse into a circular, brick-lined chamber. The chamber measured approximately 5 ft in diameter. What is the function of this feature (cistern, well, or something else)? Looking at the spatial layout of the site, is it possible to discern why this feature was located near the edge of the T-3 terrace?

Why was this feature covered over by a brick sidewalk or flooring?

- Are there any other features located outside of the areas covered by structures in the surveyors drawing?
- Is their evidence of earlier historic structures or features beneath the structures shown on the surveyors drawing?

d. Site Proxemics

- Which of the expected components of a typical brick factory were identified in the archaeological investigations undertaken at this site?
- Based on knowledge of the steps required for the manufacture of bricks and the movement of raw material and finished material and the spatial location of structures, activity areas, and other features, describe the spatial layout of the site. Was the site layout design for easy movement of material and products from one step to the next? Was it designed to fit the landscape? Discuss.

e. Economics of Brickwork Component

A critical factor for economic success of brick plants is marketing the bricks (transportation and consumers). Quality of bricks, scale of production and minimizing periods of idleness are also important to the economic success of this type of business.

Questions that can best be answered from the archaeological record include:

- What was the size of each structure identified?
- Does the size of the brick factory (kilns and other structures) indicate that this is a large operation compared to other brick factory of a similar date range? Discuss.
- Is there evidence that this brick factory produced inferior bricks? superior bricks? specialty bricks for a specific market?

f. Religion at Brickwork Component

Other Research questions can best be answered by archaeological research.

- Were any artifacts found that might be considered religious in nature?
- Was there any evidence of a religious nature in the design and construction of the buildings? (i.e. Was the design and/or construction of the structures considered 'typical' Harmonists structures?)

g. Transportation Network for Brickwork Component

- How were raw materials brought to the brick factory?
- What was the transportation system used to move the finished product to market.
- It appears that a railroad track line may have entered the factory with separate lines leading to each kiln. In order for the road and rail line to enter the brick factory area, the relic back channel of the Ohio River was filled in up to present grade for these transportation features? Is there any archaeological evidence of a road or railroad bed in Area 1?

- How does the elaborate transportation system at this factory compare to other brickworks dating to a similar time period?
- Did the river serve as a major transportation corridor for the products (bricks)? Did the railroad serve as a major transportation corridor for the products?

2. Background Research / Contextual Studies

Extensive historical research will be undertaken to further illuminate our understanding of the economics of this business and provide information on the companies that operated this business over time. The literature research should answer specific research questions and provide information to guide the archaeological investigation. The historical research should include, but not be limited to, a chain of title, tax assessments, census data, court records, city/county directories, maps, atlases, photographs, newspaper ads, Harmony Society records, reports on other brick works, published and unpublished documents and records at the Pennsylvania State Archives, local libraries, and site and structure files. The Pennsylvania State Archives has approximately 311 rolls of microfilm records relating to the Harmony Society from 1786-1951. Rolls 246-260 relate to the Harmony Society-owned brick works, one of which was located in Leetsdale.

3. Site Preparation

The District completed some preliminary site preparations. One area (Area 1) was set aside for data recovery excavations for the historic brick factory component and fenced off from the surrounding construction project area to protect this location. The grid for 36AL480 has been established and four stakes with grid coordinates placed in Area 1.

4. Excavation

The District will require hand-excavation of between 60 – 70 m^2 during the data recovery of the brick factory component of the site. An additional 140 m^2 will be machine excavated to the base of the historic cultural horizon in an attempt to locate additional historic subsurface features. Also, additional structural walls and floors should be exposed utilizing a backhoe and hand tools. The mechanical excavations will be undertaken with a backhoe with a toothless bucket.

Hand excavation shall be in the form of shovel test pits (0.5 m x 0.5 m), units (1 m x 1 m or 1 m x 2 m), and small excavation blocks (2 m x 2 m). At least one structural remnant covers much of Area 1. In areas where the foundation is not present, excavate shovel test pits (0.5 m x 0.5 m) or units at regular 5 m intervals (not to exceed 1.0 m in depth).

In order to record structural information, the areas around foundations will be exposed and documented. Units measuring 1 m x 2 m will be excavated perpendicularly through foundation walls to expose the walls and interior and exterior areas to identify

builders trenches and other features that may be present. If a structure has evidence of additions, then a 1 m x 2 m unit should be used to examine the construction methods in each section. It is expected that a backhoe will be used to expose additional areas along these walls. A backhoe trench may be used to cut a cross-section through foundations to provide additional details, if necessary. Care should be taken to insure that no backhoe excavations extend below the historic cultural strata. In addition, at least six larger, judgmentally placed 2 m x 2 m blocks will be hand excavated down to the base of historic cultural deposits to examine possible activity areas or other areas of interest.

After completing 60 – 70 m^2 **hand** excavation (using STPs, unit, and block excavations), then five - 4 m x 7 m blocks will be excavated with machinery down to just above the base of the historic cultural horizon. These areas will be cleaned off using hand tools to expose the interface between the base of the historic stratum and the stratum immediately below it. These larger blocks will be utilized to identify additional features. One of the large blocks should be located within the footprint of the large structure. One block should include part of the interior of the smaller structure shown on the surveyors map. At least one of the large blocks should be located outside of any structures. Placement of the remaining two blocks is at the discretion of the principal investigator.

Excavation procedures will follow standard practices. All soils from unit and feature excavation will be screened using ¼-inch mesh screen. Excavation levels will be excavated in arbitrary 10 cm levels within natural levels. All unit levels and features will be recorded on standard forms with accompanying plan views and profiles. Documentation will also include photographs (black and white prints, color slides and digital photos). Soils information will include Munsell soil color, texture, inclusions, and any interpretation (e.g. plow zone). Logs of bags of artifacts, flotation samples, etc. should be maintained during the fieldwork. Any pertinent artifacts observed from stripping activities should be retained and provenienced by stripped area.

Features. Features will be identified by feature number and described by feature type. Any features observed during the data recovery will be excavated, mapped and photographed. Each feature should be described according to fill color, texture, inclusions, dimensions (length, width, and depth) and located horizontally and vertically. Flotation sample will be obtained from excavated features.

Feature treatment will follow acceptable procedures. Features over 10 cm deep should be excavated in arbitrary 10 cm levels. Long, linear features, such as builders trenches should be sampled in 1 m x 2 m excavation units placed perpendicular through exterior walls. On the structure interiors, floor features should be adequately documented and then removed to examine any construction aspect beneath the floor. Work on these units should proceed to the base of all historic cultural deposits. Small features should be completely excavated. Any feature over 10 cm in depth should be excavated in arbitrary 10 cm levels. Large features may be sampled.

Only a sample of brick, coal, cinders and other similar items will be retained. A sample of whole bricks and/or brickbats will be retained. The remainder of these types of

materials will be weighed and discarded in the field. The other artifacts will be collected for analysis and curation.

Flotation Samples. Each feature excavated will have a sample of up to 6 liters of flotation sample retained. In some instances, a feature may be too small to obtain 6 liters for the flotation sample. For deep features (over 15 cm deep) multiple samples may be necessary.

5. Analysis

Detailed analysis will be conducted on all field data. All artifacts will be washed, sorted, and cataloged. Historic artifacts will be cataloged according to composition and classified according to South's functional groups or similar standardized classification system (South 1977). Any archival work necessary for the identification or analysis of the artifacts shall be conducted. When possible, temporal affiliation will be assigned for artifacts. Since this site is an historic brickworks, analysis on whole bricks and brickbats will include the manufacturing method, size, general color, and other attributes that may be important for the research goals. The artifact catalog will be placed in a database. A copy of the artifact catalog data will be included in the report.

E. Coordination

The District will maintain close coordination with the PaBHP throughout the studies of 36AL480. This will be accomplished through correspondence, phone calls, emails, and meetings, both on-site and in Harrisburg. The urgency of issues will dictate the medium used. The objective of the coordination is to permit the PaBHP to effectively advise and assist the District in the excavation and analysis of this significant, multicomponent archaeological site. The District will brief the PaBHP in Harrisburg at least once a year on progress at 36AL480.

The District will maintain close coordination with the Pennsylvania Historical and Museum Commission's Old Economy Village (OEV). The Harmonist Society that established OEV in the 19th century owned and operated a brick works whose remains are one component of 36AL480. The objective of this coordination is to provide OEV with the full benefit of the information recovered from the brick works for their research and interpretive value. The District will prepare an interpretive publication on the brick works study for use by OEV. In preparing this publication, the District will consult with OEV on the proposed audience, topic coverage and previous OEV publications.

The District will coordinate with the public and media through press releases about the data recovery work, the District's Lower Mon Project internet web site, and through the District's historical bulletin for the Lower Mon Project, ***The Monongahela Packet***. Public education (see following section) of on-site activities will focus on the prehistoric data recovery operations to follow after historic data recovery is completed. Site tours will be limited and strictly controlled due to ongoing active construction.

District contractors will not be permitted to discuss work at the site outside of District participation.

The District will establish an archaeologist to serve as District Principal Investigator (DPI) to oversee all contracted archaeological data recovery services and insure consistency in approach for all data recovery work. The DPI will serve as the District's technical point-of contact for all coordination involving this study.

During previous excavations at 36AL480, **no human burials** were identified. Human remains are not anticipated. However, if their presence is identified, the archaeological contractor will stop work immediately in that area and notify the District, who will then notify the PaBHP. The District will follow the principles for treating human remains contained in Exhibit A of the Lower Mon Project Programmatic Agreement. Although the Native American Graves Protection and Repatriation Act (NAGPRA) is not applicable to this site, as the federal government has no interest in the lands where data recovery is being conducted, the District will coordinate to the extent required under Section 106 with Native American groups and others who express an interest in this site.

F. Report

Each District archaeological contractor will be required to report on the findings of their component of the overall study. In addition, the District will edit and prepare a combined report for all of the prehistoric and historic data recovery studies conducted at the Leetsdale site. The District has committed to the PABHP to have the final report completed and distributed less than two years following completion of all fieldwork. The District will also prepare a non-technical educational publication focusing on the brick factory and its relationship to nearby Old Economy Village historic site and the Harmonists.

G. Curation

Archaeological remains shall be processed and analyzed in order to address the research goals of the Data Recovery Plan. It is anticipated that work under this contract could generate over 300,000 lithics. Only a sample of the bricks from the historic component will be retained for curation. All field notes, photographs, and other records will be prepared for permanent curation with the Pennsylvania State Museum. After an authorized representative from the Industrial Park decides which items will be donated and a gift agreement form signed, then the District will prepare the artifacts for permanent curation at the Pennsylvania State Museum.

H. Public Education

The District recognizes that the new Braddock Dam construction project, with its off-site fabrication at Leetsdale, has tremendous public education value. The innovative "in-the-wet" construction method has generated intensive public interest. The District is

responding to this interest by documenting construction in print (newspaper), traditional and digital photographic and video formats, and in the District's Internet web site with a web camera viewing the Leetsdale Casting Basin. The District will expand and augment this documentation to include the site 36AL480 data recovery activities and results for the purpose of public education.

The District's conceptual public education plan includes the following components:

- Establish a volunteer, public involvement, excavation block for the prehistoric component of the site. The District would like this project to represent a model project for cooperative efforts between a federal agency (District), the Pennsylvania Historical and Museum Commission (PHMC), local colleges and universities, and amateur archaeologists (members of Society of Pennsylvania Archaeologists Chapters).

- Hold a "Media Day" or "Open House" event(s) during the height of the prehistoric excavations where tours of the site will be conducted for the general public (this must necessarily be coordinated around the District's construction contractor schedule);

- Report on the progress of the excavations and findings in **The Monongahela Packet: Historical Bulletin for the Lower Mon Project**;

- Produce a separate pamphlet/brochure/booklet for public distribution in the Leetsdale area/Old Economy Village focusing on the historic component of 36AL480;

- Produce a separate pamphlet/brochure/booklet/poster focusing on all components and data recovery at 36AL480

- Produce and distribute on demand a Compact Disk (CD) on the data recovery activities at 36AL480

- Augment the District's internet web site with information on data recovery at 36AL480.

- Distribute the data recovery technical reports to local repositories (library, colleges, etc.).

The District's archaeological contractors will be encouraged to share knowledge gained from this data recovery work with the public as well as professional archaeologists. This may be accomplished through lectures/presentations and publications.

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FIGURES

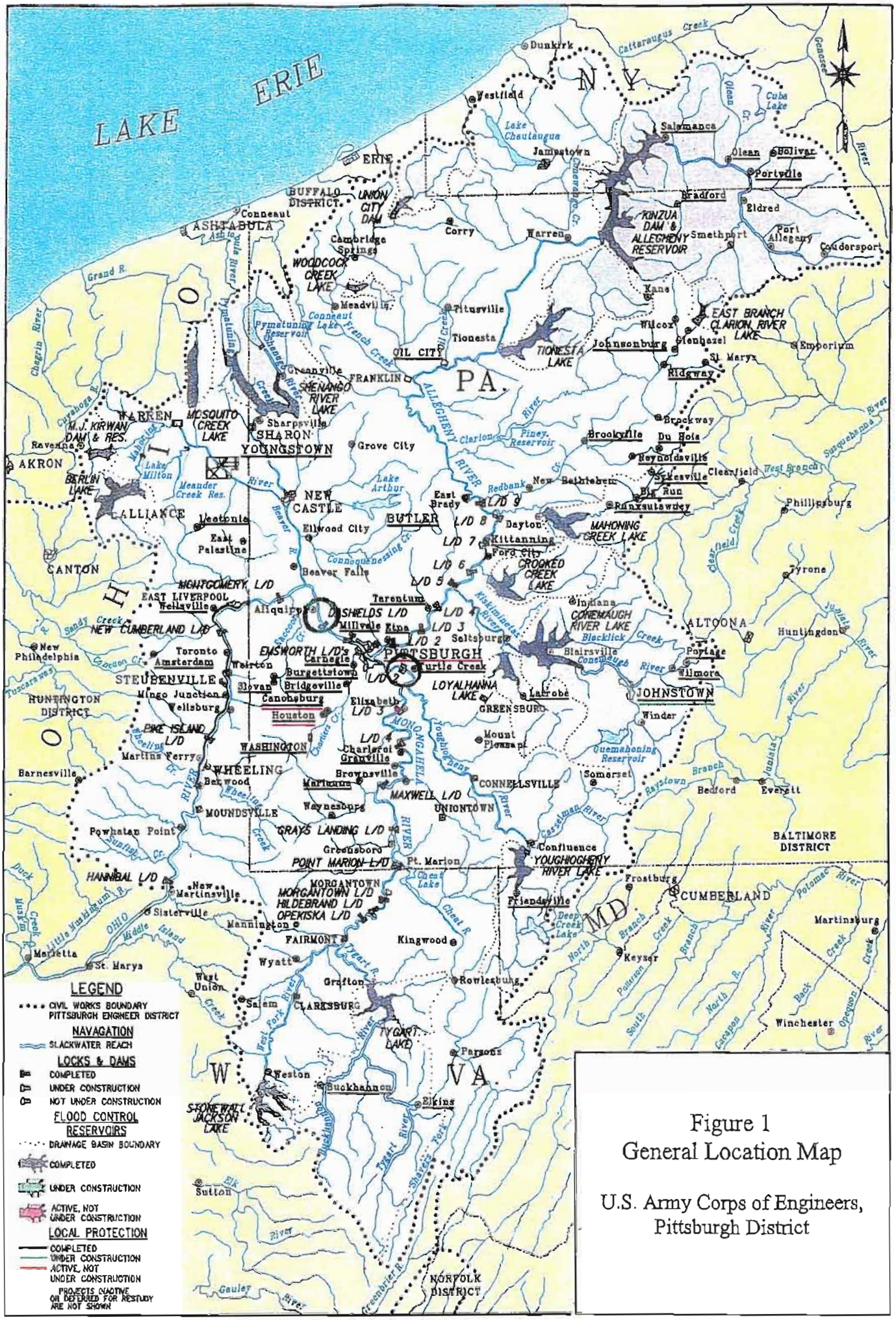

Figure 1
General Location Map

U.S. Army Corps of Engineers,
Pittsburgh District

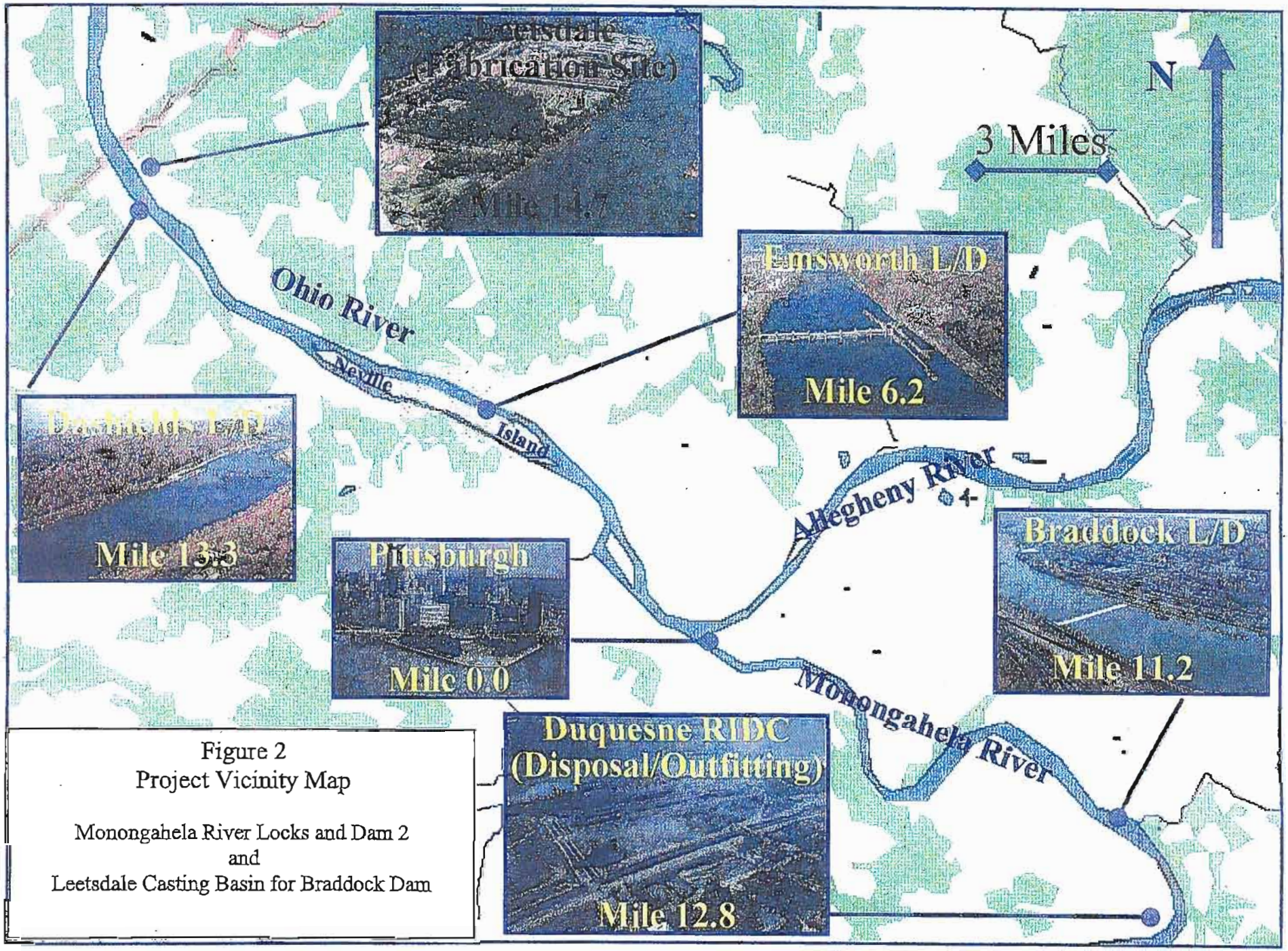

Figure 2
Project Vicinity Map

Monongahela River Locks and Dam 2
and
Leetsdale Casting Basin for Braddock Dam

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APPROVED BY	
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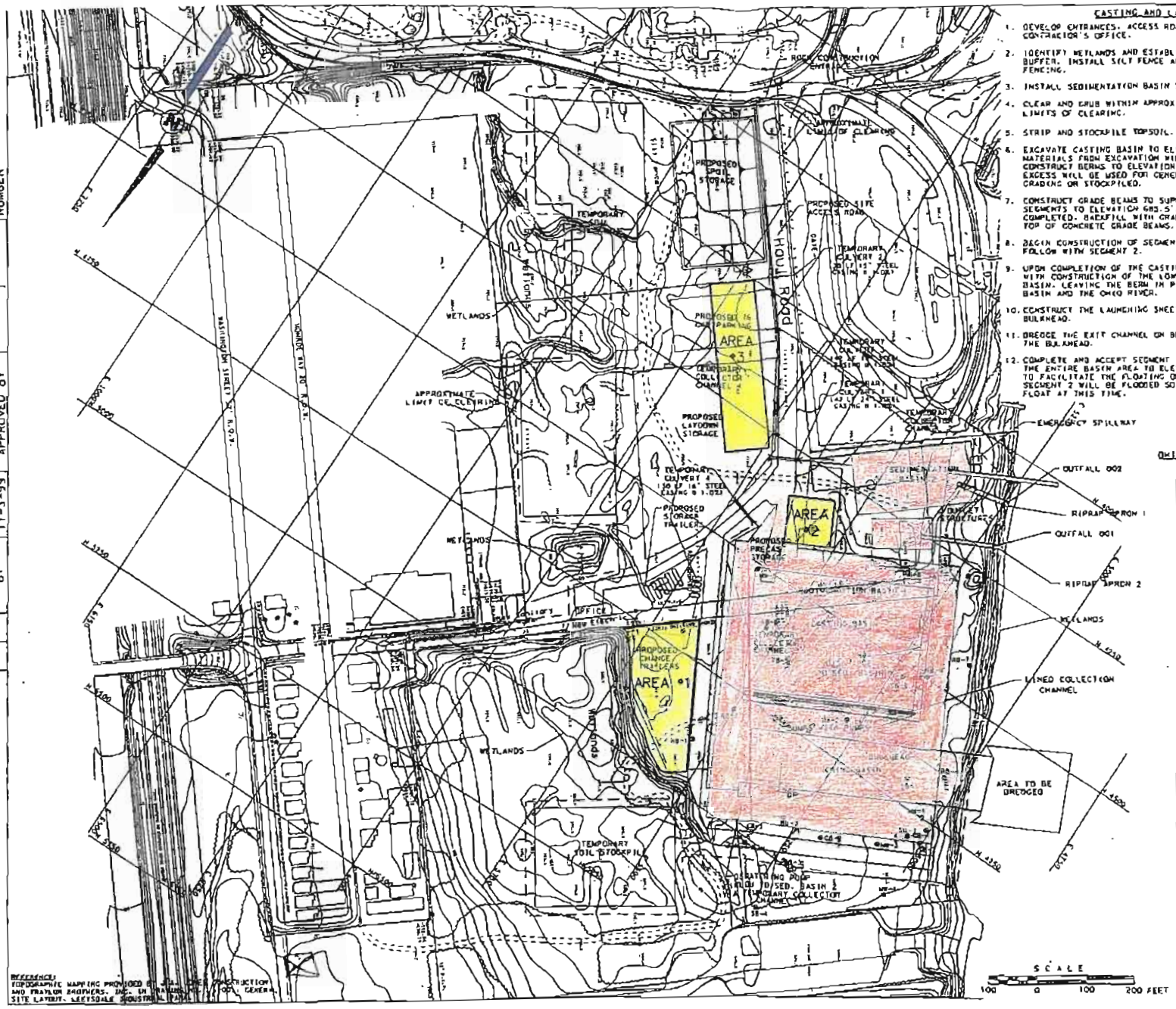


CASTING AND LAUNCHING FACILITY CONSTRUCTION SEQUENCE

1. DEVELOP ENTRANCES, ACCESS ROADS AND CONTRACTOR'S OFFICE.
2. IDENTIFY WETLANDS AND ESTABLISH VEGETATIVE BUFFER. INSTALL SILT FENCE AND PERIMETER FENCING.
3. INSTALL SEDIMENTATION BASIN 2.
4. CLEAR AND GRUB WITHIN APPROXIMATE LIMITS OF CLEARING.
5. STRIP AND STOCKPILE TOPSOIL.
6. EXCAVATE CASTING BASIN TO ELEVATION 683.5'. MATERIALS FROM EXCAVATION WILL BE USED TO CONSTRUCT BERMS TO ELEVATION 704' AND EXCESS WILL BE USED FOR GENERAL SITE GRADING OR STOCKPILED.
7. CONSTRUCT GRADE BEAMS TO SUPPORT PRECAST SEGMENTS TO ELEVATION 683.5'. AS CONCRETE IS COMPLETED, BACKFILL WITH GRADED STONE TO TOP OF CONCRETE GRADE BEAMS.
8. BEGIN CONSTRUCTION OF SEGMENT 1 AND THEN FOLLOW WITH SEGMENT 2.
9. UPON COMPLETION OF THE CASTING BASIN, CONTINUE WITH CONSTRUCTION OF THE LOWER LAUNCHING BASIN, LEAVING THE BERM IN PLACE BETWEEN THE BASIN AND THE OHIO RIVER.
10. CONSTRUCT THE LAUNCHING SHEETPILE TEMPORARY BULKHEAD.
11. DREDGE THE EXIT CHANNEL ON BOTH SIDES OF THE BULKHEAD.
12. COMPLETE AND ACCEPT SEGMENT 1. SUPERFLOOD THE ENTIRE BASIN AREA TO ELEVATION 696 TO FACILITATE THE FLOATING OF THIS SEGMENT. SEGMENT 2 WILL BE FLOODED SO IT WILL NOT FLOAT AT THIS TIME.
13. MOVE SEGMENT 1 TO A POSITION IN THE LAUNCHING BASIN AND DEWATER THE BASIN AREA TO THE ELEVATION OF THE ADJACENT OHIO RIVER.
14. REMOVE BULKHEAD AND FLOAT SEGMENT 1 INTO THE OHIO RIVER.
15. RE-INSTALL BULKHEAD AND CONTINUE WITH THE CONSTRUCTION OF SEGMENT 2. SEGMENT 2 WILL BE LAUNCHED WITH THE SAME PROCEDURE AS WAS USED FOR SEGMENT 1.
16. UPON COMPLETION OF SEGMENT CONSTRUCTION, RESTORE AREA TO APPROXIMATE CONDITION PRIOR TO ANY CONSTRUCTION AND IN COMPLIANCE WITH THE PERMITTING FOR THIS WORK.

NOTES:

1. LIMITS OF CLEARING, WETLANDS, DITCHES, STOCKPILES, AND ANCILLARY PROJECT FACILITIES ARE BASED ON CIVIL & ENVIRONMENTAL CONSULTANTS, INC. DRAWING NO. 99073-E1 DATED SEPTEMBER 23, 1999.
2. SEE "EROSION AND SEDIMENTATION CONTROL PLAN" PREPARED BY CIVIL & ENVIRONMENTAL CONSULTANTS INC., DATED OCTOBER 4, 1999, FOR ADDITIONAL INFORMATION REGARDING EROSION AND SEDIMENTATION CONTROLS.

LEGEND:

PB-1 PAUL C. RIZZO ASSOCIATES BORING
SB-1 THERMORETEC SOIL BORING
MW-1 MONITORING WELL
CB-1 ARK SOIL BORING

LEGEND

Archaeological Set-aside Area

Construction Excavation Area

Figure 4

Construction Project Area
Showing
Launching and Casting Basins
Site 36 AL 480
and
Proposed Data Recovery Areas 1, 2 & 3

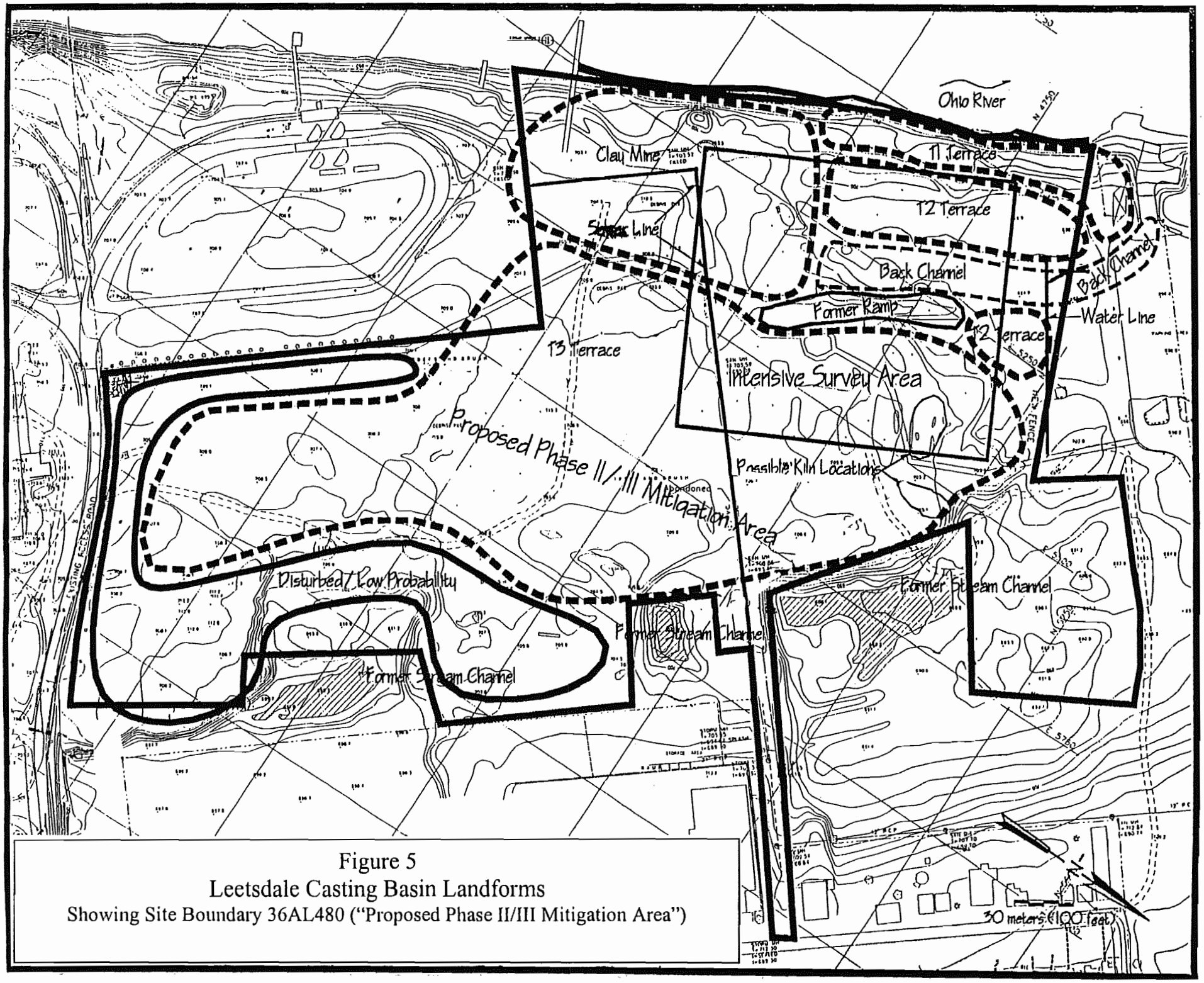
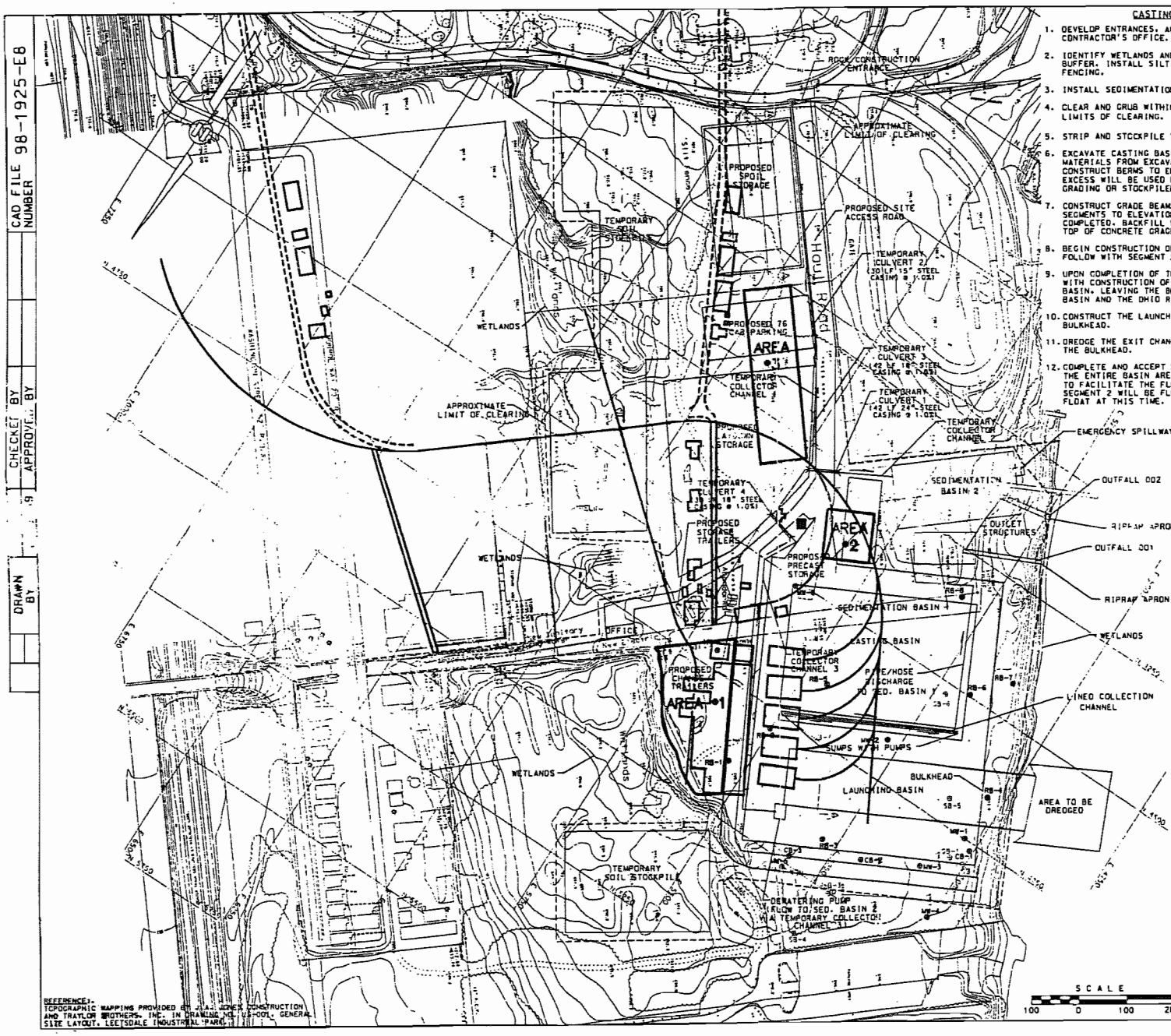


Figure 5
Leetsdale Casting Basin Landforms
Showing Site Boundary 36AL480 ("Proposed Phase II/III Mitigation Area")



REFERENCE:
TOPOGRAPHIC MAPPING PROVIDED BY J.A.J. JONES CONSTRUCTION AND TAYLOR BROTHERS, INC. IN DRAWING NO. LS-001, GENERAL SITE LAYOUT, LEETSDALE INDUSTRIAL PARK.

CASTING AND LAUNCHING FACILITY CONSTRUCTION SEQUENCE

1. DEVELOP ENTRANCES, ACCESS ROADS AND CONTRACTOR'S OFFICE.
2. IDENTIFY WETLANDS AND ESTABLISH VEGETATIVE BUFFER. INSTALL SILT FENCE AND PERIMETER FENCING.
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8. BEGIN CONSTRUCTION OF SEGMENT 1 AND THEN FOLLOW WITH SEGMENT 2.
9. UPON COMPLETION OF THE CASTING BASIN, CONTINUE WITH CONSTRUCTION OF THE LOWER LAUNCHING BASIN, LEAVING THE BERM IN PLACE BETWEEN THE BASIN AND THE OHIO RIVER.
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NOTES:

1. LIMITS OF CLEARING, WETLANDS, DITCHES, STOCKPILES, AND ANCILLARY PROJECT FACILITIES ARE BASED ON CIVIL & ENVIRONMENTAL CONSULTANTS, INC. DRAWING NO. 99073-E4 DATED SEPTEMBER 23, 1999.
2. SEE "EROSION AND SEDIMENTATION CONTROL PLAN" PREPARED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC., DATED OCTOBER 4, 1999, FOR ADDITIONAL INFORMATION REGARDING EROSION AND SEDIMENTATION CONTROLS.

LEGEND:

- RB-1 PAUL C. RIZZO ASSOCIATES BORING
- SB-1 THERMORETEC SOIL BORING
- MW-1 MONITORING WELL
- CB-1 AWK SOIL BORING

CAD FILE NUMBER 98-1925-E8

CHECKED BY

APPROVED BY

DRAWN BY

Figure 6

Brickworks Survey, 1894

Overlaid on Leetsdale Casting Basin Project Area Map

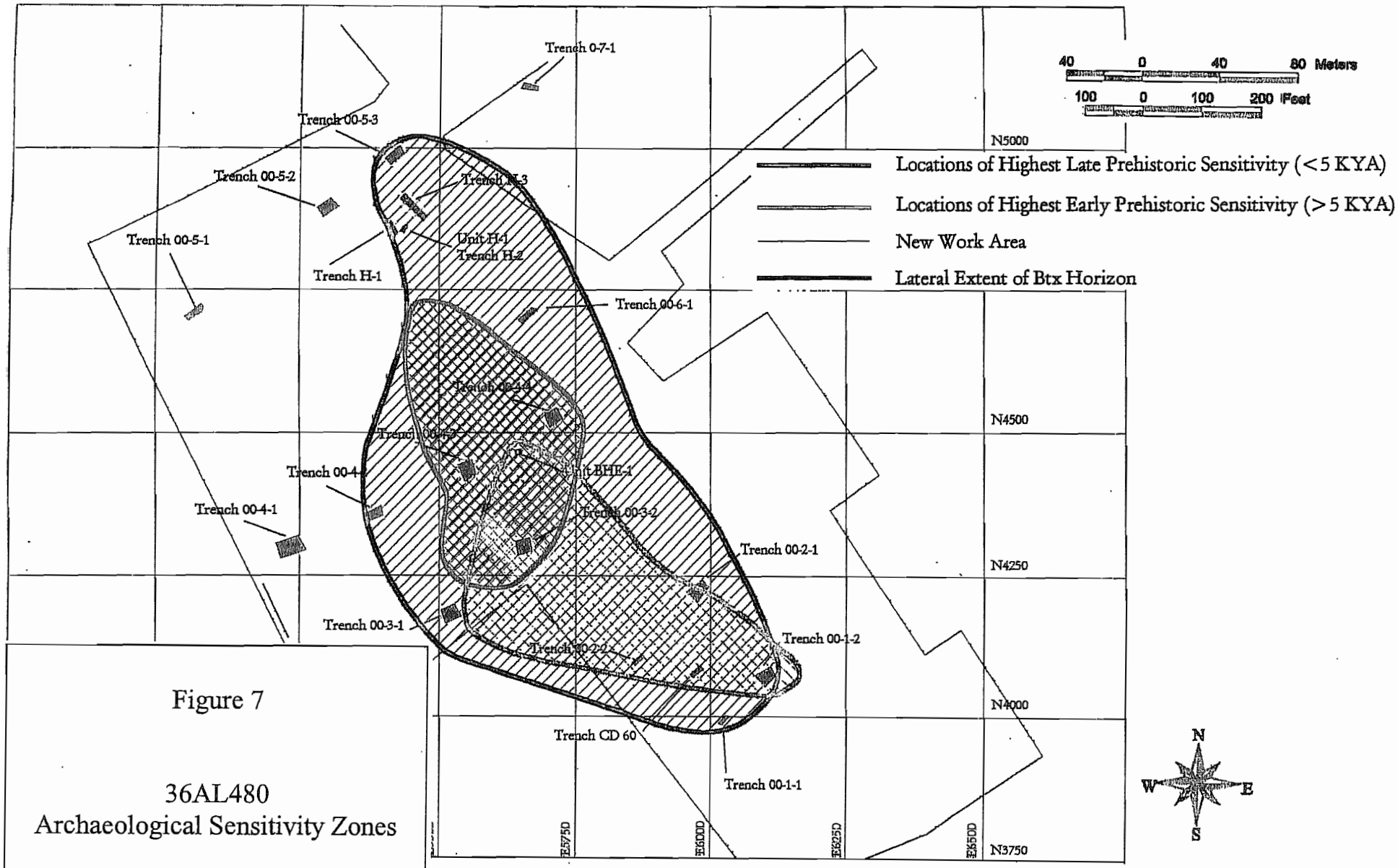


Figure 7

36AL480
Archaeological Sensitivity Zones

Exhibit A

Programmatic Agreement, as amended

Modernization of the Lower Monongahela River Navigation System

Advisory
Council On
Historic
Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

PROGRAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, PITTSBURGH DISTRICT,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND
THE PENNSYLVANIA STATE HISTORIC PRESERVATION OFFICER
REGARDING
THE MODERNIZATION OF
THE LOWER MONONGAHELA RIVER NAVIGATION SYSTEM

WHEREAS, the U.S. Army Corps of Engineers, Pittsburgh District (Pittsburgh District), proposes to modernize the existing Lower Monongahela River Navigation System, consisting of Locks and Dam Nos. 2, 3, and 4 located in Allegheny, Washington, and Westmoreland Counties, Pennsylvania; and,

WHEREAS, the Pittsburgh District has determined that modernization of the Lower Monongahela River Navigation System (Project) may have an effect upon properties included in or eligible for inclusion in the National Register of Historic Places (National Register) and has consulted with the Advisory Council on Historic Preservation (Council) and the Pennsylvania State Historic Preservation Officer (SHPO) pursuant to Section 800.13 of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f), and Section 110(f) of the same Act (16 U.S.C. 470h-2(f)); and,

WHEREAS, the Project shall be defined as those activities required to modernize Locks and Dam Nos. 2, 3, and 4, including pool changes between and around Locks and Dam Nos. 2 and 4, all construction stagings areas, all flowage easement acquisitions, all disposal sites, and all publicly owned shoreside facilities relocated at Federal expense. Nothing in this Agreement shall be construed to include activities undertaken by the private sector as a consequence of the Project which may affect historic properties. These activities, which may include pipeline and shoreside facility relocations, will be addressed separately through Department of the Army permitting authority under Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act;

NOW, THEREFORE, the Pittsburgh District, the Council, and the SHPO agree that the Project shall be administered in accordance with the following stipulations to satisfy the Pittsburgh District's Section 106 responsibility for all individual undertakings of the Project.

Stipulations

The Pittsburgh District shall ensure that the following measures are carried out:

I. Completion of Historic Property Surveys

A. The Pittsburgh District shall ensure that historic property surveys will be performed in the Project's area of potential effects as defined in the Council's regulations at 36 CFR Section 800.2(c). The objective of these surveys is to identify both recorded and unrecorded potentially historic properties within the area of potential effects that may be affected by the Project either directly or indirectly, and determine whether they meet the criteria for inclusion to the National Register of Historic Places as specified in the Department of Interior's regulations at 36 CFR Part 60.4.

B. Historic property surveys will be performed in accordance with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation and other applicable professional standards as described below.

II. Identification and Treatment of Archaeological Properties

A. Identification and Evaluation

1. An archaeological survey will be performed on all lands that will be disturbed by the Project. The surveys will be conducted in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Identification (48 FR 44720-23) and take into account the National Park Service publication The Archaeological Survey: Methods and Uses (1978) and the Pennsylvania Historical and Museum Commission's Cultural Resource Management in Pennsylvania: Guidelines for Archeological Survey and Mitigation (July 1991). The survey shall be conducted in consultation with the SHPO, and a report of the survey, meeting the standards of the SHPO, shall be submitted to the SHPO for review and comment.

2. The Pittsburgh District, in consultation with the SHPO and following the Secretary of Interior's Standards for Evaluation, shall apply the National Register Criteria to properties that may be affected by this project. If the Pittsburgh District and the

SHPO agree that a property is eligible under the criteria, the property shall be considered eligible for the National Register for purposes of this Agreement. If the Pittsburgh District and the SHPO agree that the criteria are not met, the property shall be considered not eligible for the National Register for purposes of this Agreement. If there is no agreement on National Register eligibility, or if the Council or the National Park Service so request, prior to the start of any work at the site there shall be a formal determination of eligibility from the Keeper of the National Register, National Park Service, whose determination shall be final.

3. For those archeological properties which the Pittsburgh District and the SHPO agree are not eligible for the National Register, no further archaeological investigations will be required, and the proposed project may proceed in those areas. If the survey results in the identification of properties that the Pittsburgh District and the SHPO determine to be eligible for the National Register, such properties shall be treated in accordance with Stipulation II(B) below.

B. Determination of Effect and Treatment

The Pittsburgh District, in consultation with the SHPO and the Council, shall develop appropriate treatments for Register-listed and eligible archaeological properties affected by the Project.

1. Preservation In Place

a. Wherever feasible, preservation in place shall be the preferred treatment. Such properties shall be avoided either through project design changes, use of temporary fencing or barricades, or other measures to protect sites.

b. The Pittsburgh District, in consultation with the SHPO, shall develop and implement a plan to protect archaeological sites avoided and preserved in situ on lands affected by the Project.

2. Archaeological Data Recovery

a. For those eligible archaeological sites that the Pittsburgh District, the SHPO, and the Council agree cannot be avoided, a data recovery plan for the retrieval of significant archaeological information will be developed and implemented.

b. A data recovery plan that addresses substantive research questions will be developed in consultation with the SHPO, as appropriate, for the recovery of relevant archaeological data. The plan shall be consistent with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 FR 44734-37) and take into account the Council's publication,

Treatment of Archaeological Properties and the Pennsylvania Historical and Museum Commission's Cultural Resource Management in Pennsylvania: Guidelines for Archeological Survey and Mitigation (July 1991). It shall specify, at a minimum, the following:

i. the property, properties, or portions of properties where data recovery is to be carried out;

ii. the research questions to be addressed through the data recovery, with an explanation of their relevance and importance;

iii. the methods to be used, with an explanation of their relevance to the research questions;

iv. a discussion of the potential research value of any human remains that may be encountered, including a process for consultation with the SHPO, the Council, and any persons or groups that have expressed an interest, to determine appropriate treatment(s) for the remains, and

v. a proposed schedule for the submission of progress reports to the SHPO.

c. The data recovery plan shall be submitted to the SHPO and the Council for 60 days (from receipt of documentation) review and approval. The parties shall consult to resolve any objections to the data recovery plan as proposed. The data recovery plan shall then be implemented. If no response is received from the SHPO or the Council after 60 days (from receipt of documentation), the plan shall be implemented as submitted.

d. The data recovery plan will be carried out by or under the direct supervision of an archaeologist(s) who meets, at minimum, the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-9).

e. An adequate program of site security from vandalism during data recovery will be developed in consultation with the SHPO and then implemented.

f. If any human remains and grave-associated artifacts are encountered during data recovery, the Pittsburgh District, the SHPO, and the Council shall consult to ensure treatment in an appropriate manner in accordance with the Council's resolution passed on September 27, 1988 (Appendix A).

g. Curation and Dissemination of Information:

i. In consultation with the SHPO, all materials and records resulting from the survey, evaluation, and data recovery conducted for the Project will be curated in accordance with 36

CFR Part 79. The Pennsylvania Historical and Museum Commission shall be the preferred repository. All material and records recovered from non-Federally owned land shall be maintained in accordance with 36 CFR Part 79 until their analysis is complete and, if necessary, are returned to their owner(s).

ii. The Pittsburgh District shall ensure that all final archaeological reports resulting from actions pursuant to this Agreement will be provided, to the SHPO, the Council, and upon request, to other interested parties. All such reports will be responsive to contemporary standards, and to the Department of the Interior's Format Standards for Final Reports of Data Recovery Programs (42 FR 5377-79). Precise locational data may be provided only in a separate appendix if it appears that its release could jeopardize archaeological sites.

III. Identification and Treatment of Aboveground Historic Properties

A. Identification and Evaluation

1. The Pittsburgh District, in consultation with the SHPO, shall ensure that an historical architectural survey will be conducted in those areas affected by the Project by a qualified architectural historian who meets, at minimum, the standards set forth in the meets, at minimum, the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-9).

2. All of the areas surveyed will be clearly identified and the rationale used in eliminating areas from the survey (e.g. because either no above ground facilities will be located in view of extant structures, no flowage easements will be acquired, etc.), will be described. The criteria to be used in eliminating survey areas will be established in consultation with the SHPO.

3. Particular attention will be given in the survey to the visual integrity (setting) of identified historic properties, and how the setting may be affected by views of the flood control structures or other Project-related activities.

4. The Pittsburgh District will ensure that the architectural survey meets the standards of the SHPO, and is consistent with the recommended approaches in the Secretary of the Interior's Standards and Guidelines for Identification (48 FR 44720-3), and is consistent with the recommended approaches in the Council's and National Park Service's publication Identification of Historic Properties (1988).

5. As necessary to supplement the review of aboveground historic property documentation, the SHPO may conduct an inspection of National Register-listed or eligible properties.

The SHPO shall report each determination, along with the rationale for their decision.

6. The Pittsburgh District, in consultation with the SHPO and following the Secretary of Interior's Standards for Evaluation, shall apply the National Register Criteria to properties that may be affected by this project. If the Pittsburgh District and the SHPO agree that a property is eligible under the criteria, the property shall be considered eligible for the National Register for purposes of this Agreement. If the Pittsburgh District and the SHPO agree that the criteria are not met, the property shall be considered not eligible for the National Register for purposes of this Agreement. If the Pittsburgh District and the SHPO do not agree on eligibility, or if the Council or the Secretary of Interior so request, the Pittsburgh District shall obtain a determination from the Secretary of the Interior.

B. Determination of Effect and Treatment

1. The Pittsburgh District, in consultation with the SHPO and the Council, shall determine the effect the Project will have on each listed or eligible historic building, structure, and landscape and then a treatment plan will be developed for historic buildings, structures, and landscape that will be affected by the Project.

2. The preferred alternative is avoidance of effects to historic properties. If, in consultation with the SHPO and the Council, this is not feasible, the Pittsburgh District will develop and implement plans to minimize or reduce the effect.

3. The Pittsburgh District shall ensure that mitigation plans are developed in consultation with the SHPO and the Council. The Pittsburgh District shall submit the plans to the SHPO and the Council for review and comment. Plans will also be made available for review and comment by interested parties, affected landowners, and appropriate local interest groups. Any such comments shall be made available to the SHPO and the Council and shall be taken into account by the parties to this agreement. The SHPO and Council shall have 60 days from receipt of adequate information in which to review and comment on the plan. If the SHPO or the Council fails to respond within 60 days, that party shall be deemed to have consented to the matter proposed. If there is a disagreement over adequacy, appropriateness, or extent of a mitigation plan, the disagreeing parties shall consult in an attempt to resolve the disagreement. If the disagreement cannot be resolved, it will be handled in accordance with Stipulation VI below.

IV. Historic District Nomination

Prior to construction and within five years of the date of execution of this Agreement, the Pittsburgh District shall prepare a thematic nomination to the National Register of Historic Places for the locks and dams along the Monongahela River, based on the surveys conducted pursuant to this Agreement. This nomination shall be prepared in consultation with the SHPO and submitted to the SHPO for review and processing.

V. Review of this Programmatic Agreement

A. The signatories to this Agreement shall consult at least once to review implementation of the terms of this Agreement. Prior to the review, a report shall be provided to the signatories detailing how obligations pursuant to this Agreement have been carried out. The report shall also be made available for public inspection (information regarding the location of archaeological sites shall be withheld if it appears that this information could jeopardize archaeological sites). If revisions to this Agreement are needed, the signatories to this Agreement will consult to make such revisions in a manner consistent with 36 CFR Part 800.

B. The Council and the SHPO may monitor activities carried out pursuant to this Agreement, and the Council will review such activities if so requested. The Pittsburgh District shall cooperate with the Council and the SHPO in carrying out their respective monitoring and review responsibilities.

C. In consultation with the SHPO, the Pittsburgh District shall develop a plan to inform the interested public of the existence of this Agreement, and about how the obligations under the terms of this Agreement are to be met. Copies of this Agreement and relevant documentation prepared under it shall be made available for public inspection (information regarding the locations of archaeological sites will be withheld if it appears that this information could jeopardize archaeological sites). Any comments received from the public under this Agreement shall be taken into account.

D. The Steel Industry Heritage Task Force (Task Force) shall be considered an interested party by the parties to this Agreement. The parties to this Agreement shall seek the comments of the Task Force in the identification, evaluation, treatment, and curation of historic properties pursuant to this Agreement for which the Task Force has expressed an interest. The parties to this Agreement shall take into account any comments provided by the Task Force.

E. Any party to this Agreement may request that it be amended, whereupon the parties will consult in accordance with 36 CFR Section 800.13 to consider such amendment.

F. Any party to this Agreement may terminate it by providing thirty days notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the Pittsburgh District will comply with 36 CFR Sections 880.4 through 800.6 with regard to individual undertakings covered by this Agreement.

G. The parties to this Agreement shall attempt to resolve any disagreement arising from implementation of this Agreement. If there is a determination that the disagreement cannot be resolved, the further comments of the Council shall be requested in accordance with 36 CFR Part 800.6(b). Any Council comment provided in response will be considered in accordance with 36 CFR Part 800.6(c)(2), with reference only to the subject of the dispute. Responsibility to carry out all other actions under this Agreement that are not the subject of the dispute will remain unchanged.

Execution and implementation of this Programmatic Agreement evidences that the Pittsburgh District has satisfied its Section 106 responsibilities for all individual undertakings of the Project, and that the Pittsburgh District has afforded the Council an opportunity to comment on the undertaking and its effects on historic properties.

U.S. ARMY CORPS OF ENGINEERS, PITTSBURGH DISTRICT

By: _____ Date: 4/28/92
Harold F. Alvord, Colonel, Corps of Engineers, District Engineer

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _____ Date: 4/22/92
for Robert D. Bush, Executive Director

PENNSYLVANIA STATE HISTORIC PRESERVATION OFFICER

By: _____ Date: 4/30/92
Brent D. Glass, State Historic Preservation Officer

Advisory
Council On
Historic
Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

APPENDIX A

POLICY STATEMENT
REGARDING TREATMENT OF HUMAN REMAINS
AND GRAVE GOODS

Adopted by the Advisory Council on Historic Preservation

September 27, 1988

Gallup, New Mexico

When human remains or grave goods are likely to be exhumed in connection with an undertaking subject to review under Section 106 of the National Historic Preservation Act, the consulting parties under the Council's regulations should agree upon arrangements for their disposition that, to the extent allowed by law, adhere to the following principles:

o Human remains and grave goods should not be disinterred unless required in advance of some kind of disturbance, such as construction;

o Disinterment when necessary should be done carefully, respectfully, and completely, in accordance with proper archeological methods;

o In general, human remains and grave goods should be reburied, in consultation with the descendants of the dead.

o Prior to reburial, scientific studies should be performed as necessary to address justified research topics;

o Scientific studies and reburial should occur according to a definite, agreed-upon schedule; and

o Where scientific study is offensive to the descendants of the dead, and the need for such study does not outweigh the need to respect the concerns of such descendants, reburial should occur without prior study. Conversely, where the scientific research value of human remains or grave goods outweighs any objections that descendants may have to their study, they should not be reburied, but should be retained in perpetuity for study.

Advisory Council On Historic Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

AMENDMENT
to the
PROGRAMMATIC AGREEMENT
for the
MODERNIZATION OF
THE LOWER MONONGAHELA RIVER NAVIGATION SYSTEM

WHEREAS, the U.S. Army Corps of Engineers, Pittsburgh District (Pittsburgh District), the Pennsylvania State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (Council) executed a Programmatic Agreement on April 30, 1992, for the Modernization of the Lower Monongahela River Navigation System; and,

WHEREAS, in accordance with Stipulation V.E of the executed Programmatic Agreement, the District has requested that Stipulation IV be revised to extend the deadline for the submission of the required Historic District Nomination for the locks and dams along the Monongahela River since it was unable to meet the five year deadline for completion set forth in the Agreement; and,

WHEREAS, during consultation for the amendment, the Pittsburgh District, the Pennsylvania SHPO, and the Council agreed that the addition of a **Reporting Stipulation** would enable the Pennsylvania SHPO and Council to better monitor the implementation of the provisions set forth in the Programmatic Agreement.

Now Therefore, the Pittsburgh District, the Pennsylvania SHPO and the Council agree that the Programmatic Agreement shall be implemented subject to the following amendments in order to take into account the effects of the Modernization of the Monongahela River Navigation System on historic properties.

STIPULATIONS

The Corps will ensure that the following measures are carried out.

1. Stipulation IV is revised to read as follows:

"In order to provide a historic context for the evaluation of historic properties identified within the project area and to develop a management tool for the development of treatment plans for these historic properties, the Pittsburgh District shall prepare a thematic nomination to the National Register of Historic Places for the locks and dams along the Monongahela River, based upon the surveys conducted pursuant to this Agreement. This nomination shall be prepared in consultation with the SHPO and submitted to the SHPO for review and processing. Unless otherwise agreed to by the SHPO, the thematic nomination will be completed by December 31, 2001."

2. A new Stipulation is added to the Programmatic Agreement to read as follows:

"The Pittsburgh District will provide the SHPO and Council with annual status reports summarizing actions taken to comply with the terms of the Agreement. The reports will be submitted by April 30th each year until the project is completed. The initial report shall be submitted on April 30, 1999."

Execution of this Amendment to the Programmatic Agreement for the Modernization of the Lower Monongahela River Navigation System evidences that the Pittsburgh District has afforded the Council an opportunity to comment on the amendment and its effects on historic properties and that the Pittsburgh District has taken into account the effects of the project on the historic properties.

U.S. Army Corps of Engineers, Pittsburgh District

David M. Rodemann Date: 9 Jan 99

By: District Engineer

Advisory Council on Historic Preservation

John M. Fowler Date: 10/15/98

By: Executive Director

Pennsylvania State Historic Preservation Officer

Brent D. Glass Date: 11/23/98

By: State Historic Preservation Officer

Exhibit B

The Monongahela Packet
Historical Bulletin for the Lower Mon Project

Number 6, October 2000

US Army Corps
of Engineers
Pittsburgh District

THE MONONGAHELA PACKET

Historical Bulletin for the Lower Mon Project

No.6 October 2000

The Lower Mon Project and You

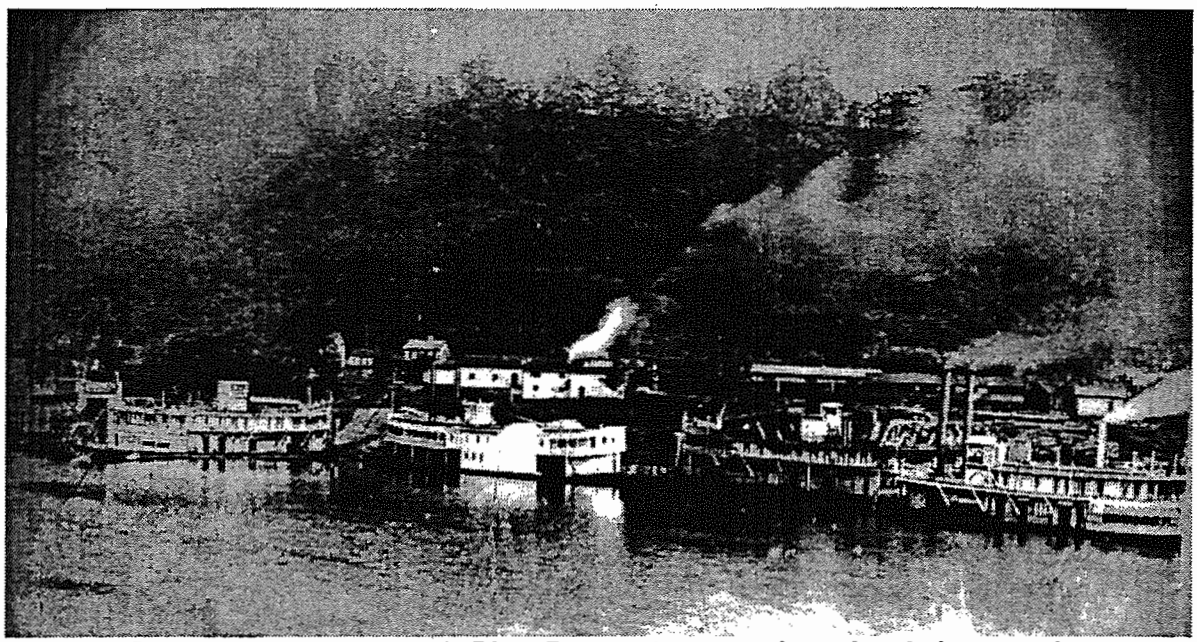
Welcome to the latest news on our Lower Mon Project. As we proceed into this New Millennium, our project to update navigation facilities on the Lower Monongahela River is well into construction. Our innovative, in-the-wet, Braddock Dam construction is under way with foundation preparations at the Locks 2, Braddock site and the floatable dam segment assembly at the Leetsdale Industrial Park casting basin. As the 21st century advances so does the pace of construction on our project to update the Lower Monongahela Navigation Facilities.

Cultural Resource Studies Update

This is the sixth bulletin in our series published to describe historical studies undertaken as part of the District's compliance activities for our 'Lower Mon Project'. 'The Lower Mon Project' refers to our plans to modernize Locks and Dams 2, 3, and 4 on the Monongahela River in Allegheny, Washington and Westmoreland, counties in southwestern Pennsylvania. The project more specifically involves the replacement of Dam 2 and Locks 4 along with the removal of Locks and Dam 3.

Navigation structures, such as locks and dams, are necessary to make inland waterways viable, year-round transportation corridors. Locks and Dams 2, 3, and 4 are the three oldest, currently operating navigation facilities on the Mon River. They were constructed in 1904-5, 1905-7, and 1931-2, respectively. Locks at these three locations experience the highest volume of commercial traffic on the Monongahela River Navigation System. The pools impounded by these dams are also popular with recreational boaters.

This newsletter presents for your information the results of recent studies undertaken as part of our activities in compliance with Section 106 of the National Historic Preservation Act. Pass it on to others with interest. We welcome comments and feedback.



Steamers at Monongahela River Boatyards shown in undated photograph

Historical Essays Highlight Role of Navigation Improvements to the Development of the Mon Valley

As part of our continuing studies on the Monongahela River Navigation Improvements, we contracted with historians from Heberling Associates to research several historic themes and compose essays placing the Monongahela River Navigation Improvements into historical perspective. The four research themes covered to date examine the role of navigation improvements in relationship to the following themes: the western movement (by Dr. Judy Heberling); boat building (by Dr. John Kudlick); community development (by Dr. Ronald C. Carlisle); and the coal, coke, iron, and steel industries of the Monongahela River Valley (Dr. Carlisle).

The results of their research produced several interesting facts:

- The Mon River was officially designated as a State Public Highway in 1782. Large volumes of traffic moved west across the Appalachians and down the Monongahela and Ohio Rivers during the peak years of westward expansion (1795 to 1830) in spite of unimproved conditions. By the time the privately run Monongahela River Navigation Company began to build locks and dams on the Mon River in the early 1840s, the main period of the Western Movement (settlement of the country west of the Ohio River) had diminished.

- During the 1800s the Mon River served as a vital transportation link, connecting the communities of the Mon Valley to each other and to their regional market center in Pittsburgh. This river, whose flow sometimes nearly dried up, moved local products to market, such as lumber, glassware, pottery, fresh produce, and coal, and to returned items from markets in larger centers, such as Pittsburgh.

- By 1807, traffic on the Monongahela River was so heavy that milldam owners were required to keep a lamp at the head of each chute to guide flatboat men through at night.

- The second steamboat using Robert Fulton's designs and financial backing was built in Pittsburgh's boatyards and traveled one way down the Ohio to New Orleans in 1811. Daniel French built the first steamboat on the Monongahela at Brownsville and Henry Shreve piloted it to New Orleans and back in 1814.

- Innovations in boat hull and steam propulsion design occurred in the Mon River valley where extremely shallow water forced

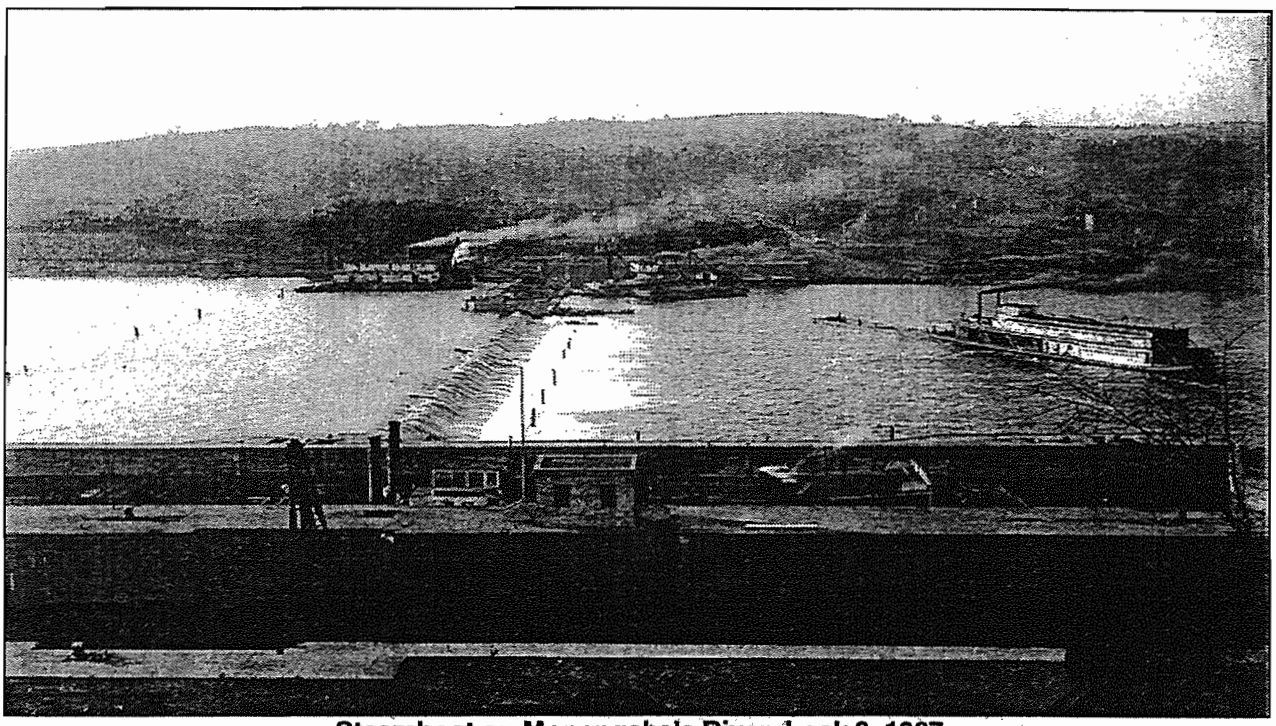
builders to redesign boats for such conditions. In its heyday, the lower Mon valley produced boats considered superior for inland waterway navigation throughout the Ohio, Mississippi, and Missouri Rivers. Monongahela boat yards built steamers that set the standard for other inland waterway boat yards to imitate.

- The early Mon River navigation facilities represent the first financially successful river navigation improvements in the U.S.

- Steam powered towing of barges on the Mon River was an innovation that lead to expansion of the bulk commercial trade of products like coal and iron.

- Through WW I, more commercial tonnage moved through the navigation locks on the Mon River than went through the Panama Canal or moved on the Ohio River.

- During WWI and WW II, the Mon River was considered a vital transportation corridor for the war efforts. This was mainly due to the coal, coke, iron, and steel produced in the Mon Valley and transported on the river.



Steamboat on Monongahela River, Lock 3, 1907

Technical Study of Locks and Dams Construction Documents Changes in Technology of Mon River Navigation Improvements

The basic concept of a lock and dam system has not changed much in the last 300 years. Inland river locks and dams resemble earlier canal system technology. The canal systems built in this country in the early 19th century used the same kind of lock system to raise and lower canal boats as the lock and dam system later built on the inland waterways.

Although the lock and dam system has used the same concept over the last few centuries, significant improvements and changes have been made in materials, design, technology, and size. Locks and dams are subject to a remarkable amount of wear and tear that occurs under daily conditions, along with less frequent damage from runaway boats and barges, and occasional ice and flood conditions. As locks

and dams are repaired, renovated, or replaced, there is an opportunity to use the latest technological design advances to better meet the needs of local river commerce. Such changes in lock and dam design over a period of time can be observed in the Mon River Navigation System whose current operational components date from 1905.

In our effort to document these technological changes, we contracted with John Milner and Associates (JMA) of Philadelphia, Pennsylvania, to undertake research and prepare a written report presenting detailed descriptions of the engineered characteristics of past and present Monongahela River locks and dams. Doug McVarish of JMA compiled the report from written documents, engineering drawings and field views, and describes each of the eighteen historic and nine operating Mon River navigation facilities. It also compares the Mon River system to other river navigation systems.

This detailed and comprehensive technical study is part of our effort under Section 106 of the National Historic Preservation Act to evaluate the engineering significance of the navigation system for National Register nomination. Some interesting facts have emerged from the study.

Although the Pennsylvania Legislature passed an act as early as 1817 to incorporate a company to improve navigation on the Monongahela, followed by surveys by the Commonwealth in 1828 and by the Federal government in 1833, Congress refused to pay for the improvements. The Monongahela Navigation Company, a private corporation, was successfully incorporated in 1836, and completed the first two slack water locks and dams at Pittsburgh and Braddock in 1841.

The demands of commerce on the Mon River required rebuilding or replacement of older Pennsylvania portions of the navigation system. This occurred even as additional locks were being built by the federal government between 1875 and 1905 to extend navigation to Fairmont, West Virginia.

As the volume of tonnage navigating the Mon River increased and linked-barge towage became the choice for coal transport, the size of the locks and the time required for lockages became outdated. For comparison, the very first locks completed on the Mon River in 1841 had chambers 50 feet wide by 190 feet long while the Grays Landing Lock and Dam completed in 1996 has a lock chamber measuring 84 feet by 720 feet.

Lock and dam technology has its own set of nomenclature. For instance, a variety of lock filling and emptying valves have been used in the Mon system, with such names as horizontal and vertical butterfly, Stoney, cylindrical, and Tainter. Various elements included in each lock and dam complex are named aprons, stilling basins, baffles, guidewalls, guardwalls, bulkheads, bulkhead hoists, Tainter gates, etc. All are described in the glossary, pictured in the appended photos, and diagrammed in sections of the Milner report.

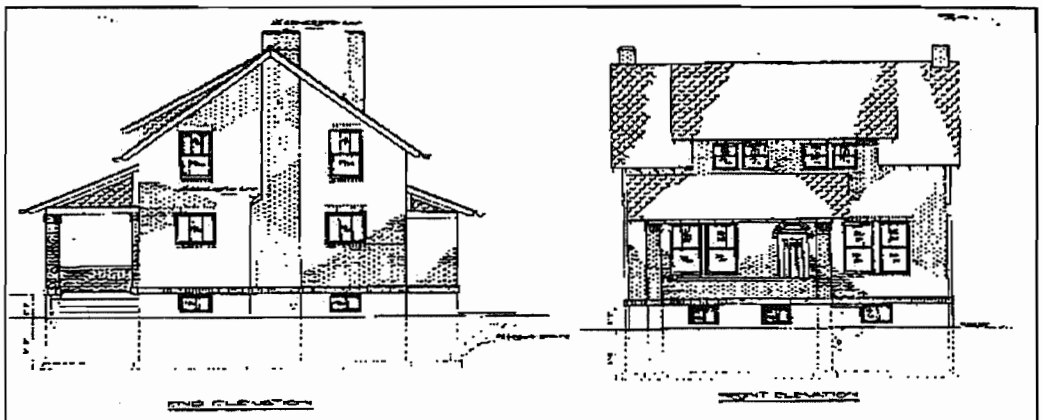
Locktender and Damtender Residence Study Receives National Award

Our office has recently completed the thematic survey of residences built for and owned by the Pittsburgh District. Hardlines Design Company of Columbus, Ohio, undertook this study of houses built for federal employees working as locktenders at navigation facilities or damtenders at flood control facilities. Residences for the Monongahela River navigation facilities are included in this thematic study.

The Monongahela River Navigation System is the oldest within the Pittsburgh District and, therefore, has the oldest surviving houses. From the beginning of the Corps' improvement of the Mon River System in the 1870s, the practice was to build two detached single-family homes to house the lockmaster and the lockman/engineer. Thus someone was always on duty to assure the operation of the lock system. The practice continued at most lock and dam sites from 1879 until the Pittsburgh District built the last lockkeeper house in 1939-40. A variety of house styles were represented in these buildings, usually reflecting the influence of private house styles of the time period.

Simple wood-framed, gable-roofed houses were built at Lock 9 in 1893. Elaborate Queen Anne Victorian frame homes with both a riverward and landward façade and the first indoor bathrooms were built at Lock 10 at Morgantown in 1903. In 1907 locktender houses were erected of red brick in the foursquare, hip-roofed style with kitchen and bath conveniences at Lock 3 in Allegheny County. Tudor-revival style, two-story, brick and stucco-veneered houses were built at Lock 1 near Pittsburgh in 1916. Craftsman style bungalows were constructed in the early 20th century at the following District facilities: stucco-covered bungalows with large front porches under gabled roofs at Lock 4 at Charleroi in 1917; two-story brick bungalows with interior glass-paneled French doors on the first floor at Lock 6 at Rices Landing in 1923; and similar craftsman bungalows at Locks 7 and 8 in Greene County in 1927 at the end of lockkeeper house construction on the Monongahela River system.

The Vernacular Architecture Forum awarded our study the Paul E. Buchanan Award for excellence in field studies at their annual conference in Duluth, Minnesota in June 2000.

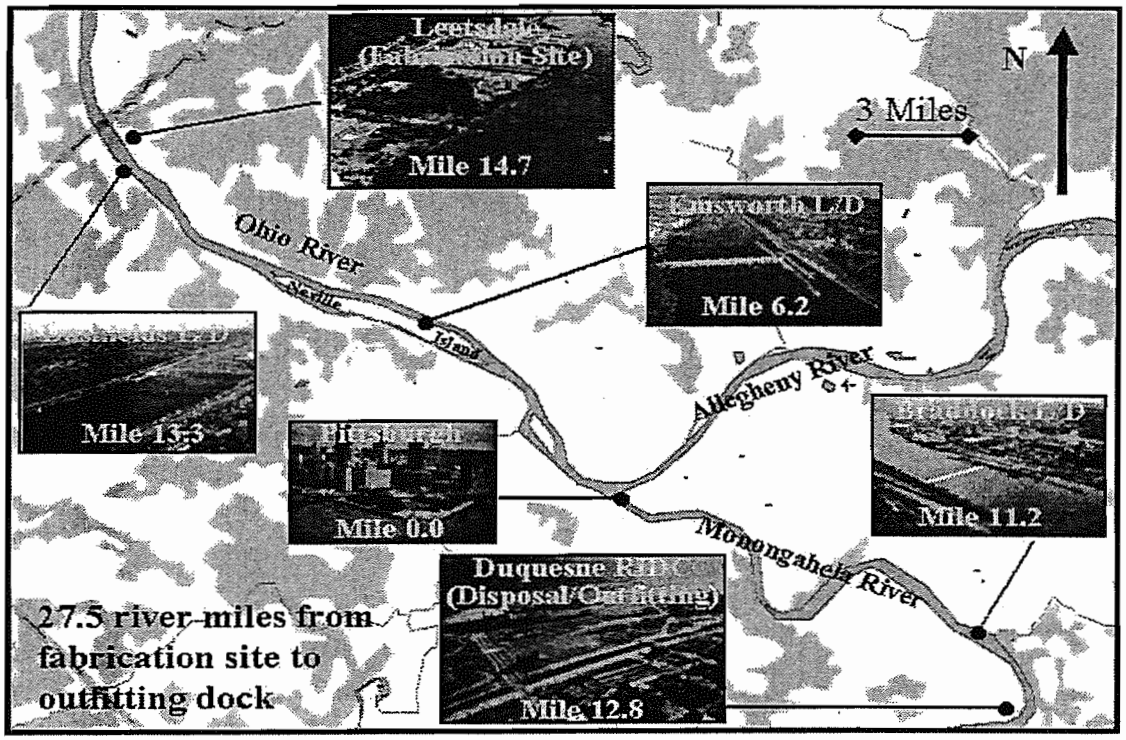


Bungalow Type B

Terracotta tile with brick veneer two story side gabled house
Style: Craftsman/Bungalow
Year Designed: 1922
Rooms: Living room, kitchen, dining room, bathroom, three bedrooms.
Built at: Monongahela Lock 6 (2 houses, built 1923) Monongahela lock 8 (2 houses built 1927-8), Allegheny locks 4, 5, 6 (2 houses each site, 1927-28)
Cost: Monongahela Lock 6, $10,190 each; Monongahela Lock 8, $11,500 each.
Notes: Unusual as only early 20th century Pittsburgh District house with most of rooms on first floor, and only a half story on second level.

Archaeological Site Discovered at Leetsdale Casting Facility Location

The District is employing an innovative "in-the-wet" construction technique for building the new Braddock Dam. The base of the dam will be constructed in two large segments at a remote fabrication site at Leetsdale Industrial Park along the Ohio River. The largest segment, a 10,800-ton concrete and steel hollow shell the size of a football field, will be launched and floated from the Leetsdale casting basin to the new site just upriver from the existing Dam 2 next spring. The second, smaller segment weighing 8,600 tons will follow several months later. Each segment, once fixed into position above the new foundation, will be flooded and sunk into place on pre-set pilings. The fabrication site occupies about 30 acres of land at Leetsdale Industrial Park, located along the Ohio River about 15 miles downriver from Pittsburgh and about 26 river miles from the new dam site at Braddock.



To comply with Section 106 of the National Historic Preservation Act, a Phase I archaeological investigation was undertaken to locate and identify any cultural resources that may be present in the Leetsdale fabrication area. The investigations also made a preliminary evaluation of resources identified, according to criteria for listing on the National Register of Historic Places.

A stratified archaeological site was identified during these archaeological investigations undertaken by our construction contractor at Leetsdale. Additional Phase I and II investigations at Leetsdale revealed cultural occupations ranging from the Archaic period of 5,600 B.C. through the Historic period.

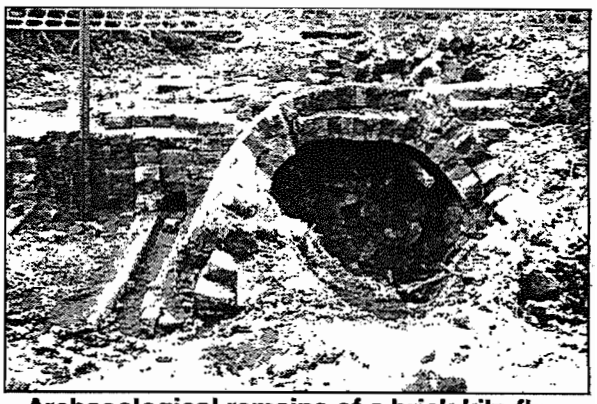
The site has been designated 36AL480. The Pennsylvania Bureau for Historic Preservation and the District have concurred that the site is eligible for the National Register under Criterion D for its potential to provide significant information regarding our understanding of the history and prehistory of the upper Ohio Valley region. The historic component of the site overlays portions of the prehistoric site and preliminary investigations indicate it contains kilns and brickworks associated with the Harmonist Society who resided at nearby Economy (Old Economy Village). Preliminary indications for the prehistoric component show a number of encapsulated occupations vertically and horizontally across the site that appear to include Middle and Late Archaic along with a later Woodland component.

Following identification of the site and further archaeological studies, we consulted with the Pennsylvania Bureau for Historic Preservation and established a work plan that will allow construction of the dam to advance on schedule but will reserve strategic areas of the archaeological site for Phase III data recovery. We are now finalizing the data recovery plan and schedule for consultation with the Advisory Council on Historic Preservation. Our studies to date have included: a geomorphologic site assessment necessitated by the complexity of the site landform, a 3 meter by 3 meter Phase II excavation, a spatial analysis/sampling report, a lithics air screening study, bulk soils dating, and radiocarbon dating submissions. Although no burials or associated funerary objects have been found so far at 36AL480, we have received inquiries from the federally recognized Delaware Tribe of Western Oklahoma and will continue to consult with them through the data recovery efforts.

More About the Historic Harmony Brick Works

The historic industrial component of archaeological site 36AL480 is a brick works dating from the mid-19th century to the early 20th century, associated with the Harmonist Society. The Harmonists purchased this brick works in the later part of the 19th century. The Harmonists were originally comprised of German religious separatists who came to America seeking religious freedom. They formed a communal society and were known for their piety and industrial prosperity. The group settled in nearby Economy, Pennsylvania, in 1825, which was their third and final home. The Commonwealth of Pennsylvania currently owns part of the Harmony Society's former property located in the nearby town of Economy (Old Economy Village). Old Economy Village is an historic site maintained by the Pennsylvania Historical and Museum Commission.

Phase I and II studies identified intact structural remains of five kiln foundations and three other former structures. Many of the structural foundation remnants and activity areas within the core of the industrial site possess good integrity. These historic remains have the potential to yield significant information on the architecture, technology, and economics of a brick plant from the mid-19th century to the early 20th century. Documentary research located a surveyor's map of the brickwork operations.



Archaeological remains of a brick kiln flue.

You Can Help

We are currently seeking input from the public for the Harmony Brickworks component of 36AL480. If you can provide old photographs of the brickworks, know of any family members who worked there, or have related information, please contact Conrad Weiser at (412) 395-7220 or e-mail **conrad.e.weiser@usace.army.mil**.

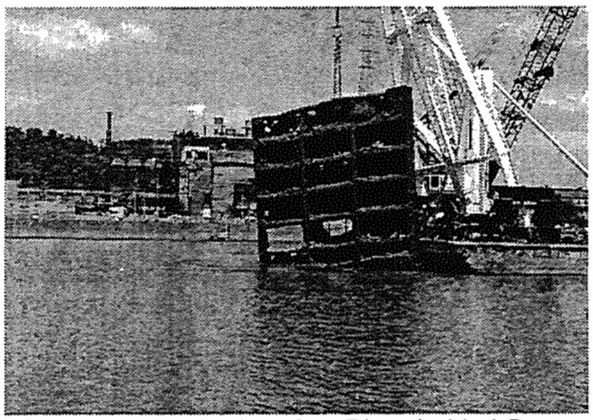
Monongahela River Navigation System Eligible for the National Register

The Monongahela River Navigation System has been determined eligible for the National Register of Historic Places. We are currently preparing a Multiple Property Documentation Form for the system and Individual Nomination Forms for Locks and Dams 2 and 4. Other locks and dams nominations may follow. Tygart Dam, near Grafton, West Virginia, is already listed on the National Register and is part of a small national group of U.S. Army Corps of Engineers and Bureau of Reclamation dams that are being considered for designation as National Historic Landmarks. Tygart Dam was authorized to augment low water flow of the Monongahela River, but also is operated for flood control.

Historic American Engineering Record (HAER) Studies Now in Progress

We are now in the process of having the Monongahela River Navigation System properly documented as a significant historic resource. Historic American Engineering Record (HAER) archival quality, large-format photographs and architectural line drawings of Locks and Dams 2, 3, 4, 7, and the Charleroi Boatyard will be part of this documentation. HAER recordation of Lock and Dam 7 is complete. Recordation of the others is in progress. Architectural drawings are being generated for each lock and dam or former lock and dam in the navigation system. A written history of these locks and dams, including the system's context, is also being developed. When documentation is complete, all aspects of this unique series of engineering resources will have been recorded for future research in the Library of Congress.

More Discoveries on the Lower Mon



While dredging in the Mon River behind Dam 2 in preparation for the new dam foundation, our construction contractor recovered a set of old lock gates from the 1905 lock and dam facility. They were apparently disposed of in the river at some unknown date. These old gates were transported by barge and offloaded at a disposal facility where we took detailed photographs and measurements.

Their discovery and our recordation procedures were carefully coordinated with the Pennsylvania Bureau for Historic Preservation and the Advisory Council on Historic Preservation. We also asked various large museums and historical societies if they would have an interest in preserving the gates, but no one expressed an interest due to their large size and deteriorated condition.

From this same area of the river, our dredging operations pulled up an old intact barrel from the Fayette Brewing Company, Uniontown, PA. The Fayette Brewing Company operated from 1900 until 1920 (Prohibition).

The barrel was brought into our office where we kept it stabilized until arrangements could be made to have it picked up by representatives from the Pennsylvania State Museum at Harrisburg. They will preserve the waterlogged barrel from deteriorating as it dries out and place it in their historic barrel collection. According to John Zwierzyna, Curator at The Pennsylvania State Museum, this barrel is the only pre-prohibition era beer barrel in the State Museum's collection.

Other Interesting Notes and Highlights

Our Office recently conducted studies to examine potential underwater cultural remains in Pool 3 of the Mon River System (Elizabeth to Charleroi). During fieldwork, we examined numerous locations for possible submerged river resources such as barge or boat remains. These locations had been identified in our previous study utilizing remote sensing - side-scan sonar and magnetometer technology. No, the mysterious B25 bomber was not found! But we did find three 19th century wooden barges or vessels for hauling coal. Our dredging and disposal operations in the pool will not affect these sunken vessels.

Our contract archaeologists and geomorphologists are conducting a landform assessment of terraces along Pools 2 and 3 and in areas where future pool changes may affect shoreline resources. The assessment, now in draft report form, identifies areas that may have potential for intact buried prehistoric or historic archaeological sites. The study will provide us with crucial information in addressing our Section 106 requirements under the National Historic Preservation Act to identify, evaluate, and mitigate cultural resources prior to pool change impact.

Engineering studies and consultation with the new owner of the Conrail Port Perry Bridge (Norfolk Southern Railroad) continue. We have previously performed an historical study of the bridge through the National Park Service Historic American Engineering Record program. Section 106 consultation with the Pennsylvania Bureau for Historic Preservation is waiting on the results of our engineering studies and discussions with the Norfolk Southern Railroad.

Our contractor, Greenhorne & O'Mara, Inc. of Greenbelt, Maryland, recently performed cultural resources studies for the lands slated for new access and construction support at Locks 4 and at our Victory Hollow fill placement site river offloading area. No archaeological or historic sites were identified in these areas.

How can you help?

You may have a particular interest in the resources or the areas we are studying. If you do, we encourage your inquiries and comments. We are continually seeking old photographs and documents on early navigation history along the Monongahela River. If you have any materials we may view and possibly copy, please let us know. We would like to publish an illustrated history of the Monongahela River Navigation System in the near future.

Questions on Mon River cultural resources or the compliance process may be directed to Mr. Conrad Weiser at 412-395-7220. Questions on the Lower Mon Project may be directed to Mr. Hank Edwardo at 412-395-7374. General questions on the Pittsburgh District mission and activities may be directed to Mr. Richard Dowling, Public Affairs Office, at 412-395-7501.

We are on the Web at *www.lrp.usace.army.mil*. Our Lower Mon Project including *live webcam* is on the web at *www.lrp.usace.army.mil/lmon/intro.htm*.

U.S. Army Corps of Engineers
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

Exhibit C

Letter of Agreement
1 February 2000

USACE - Pittsburgh District
and
Pennsylvania
Bureau for Historic Preservation

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
WILLIAM S. MOORHEAD FEDERAL BUILDING
1000 LIBERTY AVENUE
PITTSBURGH, PA 15222-4186

REPLY TO
ATTENTION OF

D
2000

February 1, 2000

Programs and Project Management Division

RECEIVED
FEB 03 2000
HISTORIC
PRESERVATION

Mr. Kurt Carr, Ph. D., Chief
Archaeology and Protection Division
Bureau for Historic Preservation
Pennsylvania Historical and Museum Commission
P.O. Box 1026
Harrisburg, PA 17108-1026

Dear Dr. Carr:

This will confirm the discussions between you and Chan Funk, and Lori Frye, Deb Campbell and me in your office on Thursday, January 27, 2000 concerning the construction of the Braddock Dam. As agreed, the Pittsburgh District, Corps of Engineers (COE) will perform the following Phase II and Phase III cultural resources work at the Leetsdale Casting Site:

1. Complete Site Geomorphology, to include relating time and climate to landform.

2. Map Harmony Brick Works.

3. Direct the construction contractor (Jones/Traylor) to erect fences and secure Work Areas 1, 2 and 3, as shown on the attached map.

4. Conduct archaeological investigations within Work Areas 1, 2 and 3.

5. Before Jones/Traylor closeout of the Leetsdale site, excavate a total of six (6) strategically placed 3-meter by 3-meter blocks outside of Work Areas 1, 2 and 3.

6. A total of 2,000 square meters of land will be archaeologically-excavated through the bottom of the cultural material.

7. A Public Education Program will be designed and coordinated with your office. As part of the public education program, the COE will reach out to educational institutions and the historical community to involve volunteers in the Phase II/Phase III work. Archaeology crews and archaeology volunteers will be prevented from collecting artifacts from back dirt piles. All volunteer work will be documented within the framework of the Phase III Reports to be prepared by the COE.

8. Prehistoric site analyses will include: Settlement patterning; Artifact distribution mapping; Site function based on features and functional tool types with comparison data; Comparison

with other stratified sites on the Appalachian Plateau; Lithic sourcing; Stone tool production (striking platforms, cores, reduction processes); Microware/use ware (use a sample of tools and large flakes); Pottery analysis as appropriate.

9. Jones/Traylor has received assurance from the owners of the Leetsdale Industrial Park that all recovered artifacts will be donated to the Commonwealth of Pennsylvania.

10. Coordinate with your office to define the feature sample strategy in the upper strata (Late Archaic thru Woodland); All Early Archaic, Middle Archaic, and Paleo-Indian features will be excavated.

11. Floatation samples will be obtained from excavation units and from features.

12. A minimum of 25 features will be carbon dated from the prehistoric layers if possible.

13. The final report will be finished 18-months after the field work is completed.

14. An approved Phase I report will be completed by March 31, 2000.

If you concur in this plan of work, it is requested that you sign and date to that effect below. Your signature will constitute official confirmation to the Pennsylvania Department of Environmental Protection that the BHP accepts this agreed upon Phase II/Phase III work and clears the Leetsdale site with respect to the National Historic Preservation Act requirements of the NPDES permit application by Jones/Traylor (NPDES permit number PA 0218286).

Kurt W Carr 2/3/00

CONCUR: Kurt Carr, PH.D. **DATE**
Chief Archaeology and Protection Division

If you have questions or concerns, please contact me at 412.395.7374. We look forward to working closely with you on this significant endeavor.

Sincerely,

Henry A. Edwardo

Henry A. Edwardo, P.E.
Project Manager

Attachment

CF: w/Attachment

Mr. Rick Scharff, J. A. Jones Construction Company

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
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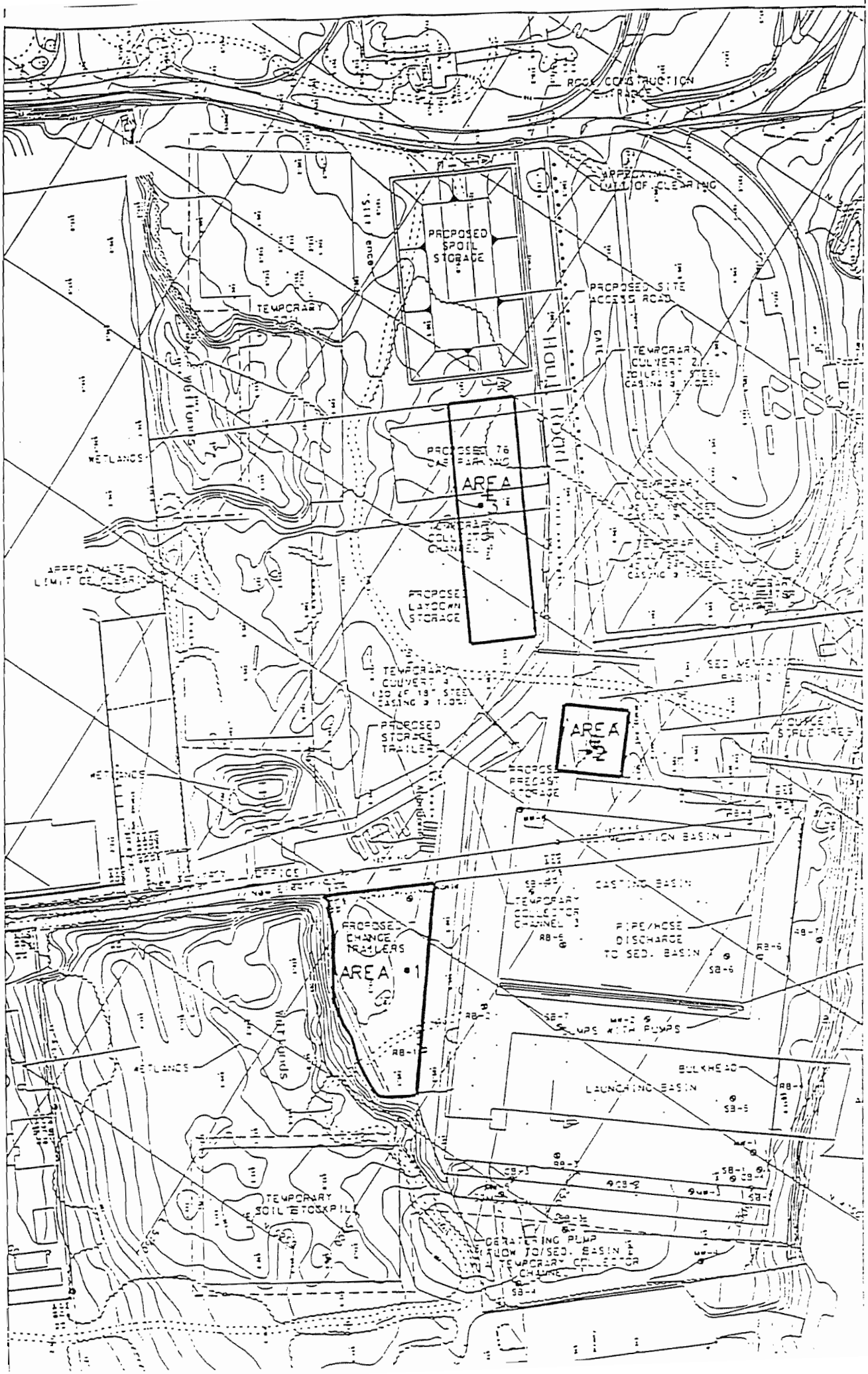
ROCK CONSTRUCTION
PROPOSED SPOIL STORAGE
PROPOSED SITE ACCESS ROAD
TEMPORARY
WETLANDS
AREA #2
AREA #1
PROPOSED LAYDOWN STORAGE
PROPOSED STORAGE TRAILERS
PROPOSED CHANGE TRAILERS
CASTING BASIN
PIPE/HOSE DISCHARGE TO SED. BASIN
LAUNCHING BASIN
BULKHEAD
TEMPORARY SOIL STOCKPILE

FIGURE 7

Exhibit D

Spatial Analysis and Sampling Considerations

SPATIAL ANALYSIS, SAMPLING CONSIDERATIONS, AND ARCHAEOLOGICAL DATA RECOVERY AT 36AL480, LEETSDALE CASTING FACILITY

by
Keith W. Kintigh
Department of Anthropology
Arizona State University

March 30, 2000

Introduction

This report has been prepared for the US Army Corps of Engineers to aid in the development of its data recovery plan. It is specifically intended:

1) to provide some general guidance on the depositional conditions that provide opportunities for the productive use of formal, intrasite spatial analysis;

2) to outline the consequences of (1) with respect to the data recovery plan; and

3) to suggest analytical strategies that might be employed in analyzing the resultant data.

Because of the great potential significance of the results, the large horizontal area under consideration, and the considerable depth of many of the most important deposits, it will be a serious challenge to allocate effort in a way that maximizes the information return within a framework of responsible expenditures of public funds.

While I do not have the expertise in Pennsylvania archaeology or a sufficient knowledge of the site to develop a detailed recommendation for the excavation strategy, my expertise in spatial analysis and the use of quantitative and formal methods permit me to offer a set of more abstract recommendations. *These recommendations must be adapted to the local setting using appropriate archaeological and geological information and informed judgment.* Finally, I should note that much of what is said below is common-sensical (at least for archaeologists). However, in an attempt to keep the argument coherent, I will be explicit in laying out some of the obvious considerations that need to be taken into account.

Assumptions About 36AL480

Intensive archaeological investigations of 36AL480 have enormous potential to yield highly significant information about the prehistory of the area. It appears that numerous short-term habitation areas (camp sites) dating to the Archaic and Woodland periods are preserved within the top 4m of deposits within a 10 acre portion of the Leetsdale Casting Facility project area. Systematic investigation of these areas will permit the reconstruction of the seasonal activities of the prehistoric inhabitants and will allow us to assess both the diversity of occupational poses during any one period and to look at changes over a long period of time.

The importance of these archaeological deposits, the large areal extent (2000m^2) of the project area, and especially the substantial depth in which these living surfaces occur (up to 4m) indicate the use of a tiered sampling strategy oriented to the research goals. What seems appropriate is a sampling strategy that is *horizontally* and *vertically* stratified to devote most of the excavation energy to the deposits containing buried habitation surfaces, with a lesser investment in deposits that appear to result from less intensive use or are poorly preserved. It also seems reasonable to adjust the resolution of the archaeological recovery based on preliminary analyses of deposits subjected to fine scale recovery in a limited set of pilot excavations.

Data Requirements of Intrasite Spatial Analysis

Here, I will discuss formal spatial analysis, which can be distinguished from what might be called *ad hoc* spatial analysis (informal interpretations of observed spatial distributions). Formal analysis of spatial patterning entails use of a suite of formal (generally quantitative) methods that are effective both in searching for patterning that may not be visually obvious and in assessing whether apparent patterning is likely to be a result of random processes instead of structured human behavior (Kintigh and Ammerman 1982). There is no fixed protocol for intrasite spatial analyses, instead the analytical path will depend upon archaeologists' expectations about the archaeological record and the results of previous analyses (Whallon 1984; Kintigh 1990).

Vertical Resolution. Even within a three dimensional volume, intrasite spatial analyses are ordinarily accomplished on (vertically collapsed) two dimensional "analytical" surfaces. The most informative analyses will be done on artifact distributions that represent a single, structured occupation or episode of use of the site. In some cases, the distribution will represent only a few days or weeks of use (Yellen 1977).

In other cases, the two dimensional distribution may be the result of repeated uses of a site (perhaps seasonal reoccupation over a number of years). If the repeated human activity is spatially structured in a similar way, it may be possible to extract information about the behavior. However, if subsequent occupations are essentially independent spatially of previous ones, the effect will be that it is impossible to reconstruct much about the spatial components of the behavior because the analyzed deposit is so mixed.

The ability to do meaningful intrasite spatial analyses on deposits that are not visibly stratified is quite limited unless one has pretty strong reasons to believe that the deposition occurring at the site is flat and is strictly horizontal. This seems rarely to be the case, especially in the absence of topographic features which tend to strongly structure the human behavior (e.g., the walls and opening of a rock shelter). Where deposits are not detectably stratified (in ways that make it possible to follow the strata during excavation), one generally has no choice but to dig in arbitrary vertical levels. In these cases, greater vertical precision of the excavation may actually detract from the ability to extract any patterning. This is because, even in a mildly undulating landscape, the thinner the horizontal slice, the more likely it is to capture within a single analytical surface, spatially discrete pieces of depositionally *distinct* soils. While one can always combine thinner levels, there are so many possible combinations of adjacent levels and such weak methods to justify any particular combination (especially with limited sample

sizes), that there are severe limits to the analytical utility of fine vertical discrimination within poorly stratified deposits.

The flip side of this, of course, is that where there is stratigraphic discrimination, the analytical potential is increased, and the finer the vertical scale, the more useful an analysis is likely to be. This is because the vertically collapsed "analytical surface" will more nearly approximate a surface used prehistorically.

Horizontal Resolution. Intrasite spatial analysis is usefully done on both point provenience data and on grid count data. To the extent that an artifact's precise horizontal position directly reflects a human activity, then the finer the resolution the better, with point proveniencing being ideal. To the extent that there is secondary deposition (e.g., trash being collected and systematically discarded) or that natural or cultural processes displace the artifacts, then digging in grid units is likely to be a more appropriate expenditure of effort. Even with grid units, the size of the grid should be reasonably adjusted to the scale of the patterning exhibited.

While smaller grid units can always be combined into larger ones, there are quite real limits to the analytical utility of small grids. Most methods of grid analysis use as primary data the counts or proportions of different artifact classes observed in the unit. As the grid size decreases, the sample size in each grid unit necessarily decreases. Thus, depending on the artifact density in a deposit, one will often have to combine smaller grids into larger ones for analytical purposes, in order to get reasonable sample sizes.

Thus, what represents a reasonable scale of both horizontal and vertical resolution will depend upon the kinds of behaviors represented, the stratigraphic precision that can be achieved, and the analytical methods that will be used.

Archaeological Sampling

The purpose of archaeological sampling is, for a given amount of effort, to improve the results of an investigation with respect to stated research goals. Sampling is generally most effective when it uses information about the structure of the phenomena being investigated to vary the intensity of investigation among different strata (subsets of the units being sampled). (The potential danger of ending up with a self-fulfilling prophecy is reduced if all strata are sampled, because the investigation has the potential to show that the initial assumptions were wrong.)

For a site with the depth of 36AL480, it makes sense to stratify the sampling of archaeological deposits both horizontally and vertically. Further during the course of the excavation, one can adjust the spatial precision of the recovery to accommodate, but not greatly exceed the spatial scale of the archaeological patterning.

Based on the testing carried out at 36AL480, relatively large and well-preserved archaeological deposits are scattered unevenly across a large area and appear at a range of depths (up to 4m). These circumstances enhance the importance of investigations to be undertaken because it is possible to observe the spatial structure of entire prehistoric camps, to observe their variability, and see changes through time. However, these same circumstances also present a serious challenge for archaeological sampling in attempting to match the information return with the level of expenditures.

Sampling and Deposit Types

At a basic level, archaeological investigations are almost always stratified. For example, horizontal stratification ordinarily takes into account the property boundaries and limits of the impact areas. At a more refined level, it is critical to consider the archaeological and geological information that can contribute to an effective sampling strategy.

Sampling of the deposits should be based on the nature of the geological deposition (gradual accretion, flood event, or whatever) and on the nature of the archaeological deposits within each geological setting. It is also important to insure that deposits of all ages and in different topographic settings are effectively sampled. The archaeological and geological factors are, of course, not independent. Certain geological contexts will permit the preservation of single occupational episodes. In contrast, slowly forming geological contexts will provide the opportunity to observe a longer term, and perhaps repeated use of the landscape. Water borne artifacts found within deep alluvial deposits resulting from a major flood event will be of little interest.

This suggests development of a classification, based on the testing results, of deposits based on: 1) their geological deposition type; 2) their archaeological characteristics in terms of both artifacts and features; 3) their age; and 4); their topographic situation. One would then decide, based on archaeological grounds, what level of effort is warranted for each combination of these factors. An excavation strategy would combine these sampling considerations with the logistical considerations involved in performing the work.

As indicated above, the most useful deposits from the standpoint of intrasite spatial analysis are those that represent single occupational episodes. Also useful will be deposits that represent repeated, structured use of the landscape over longer periods of time. Further, some spatial patterning may be revealed in within deposits that contain artifacts but within which there is little or no geological discrimination vertically. In each case, the resolution of the recovery procedures–from point provenience, to large and relatively thick grid units–should be adjusted to suit the kinds of patterning that could conceivably be preserved and to the methods that can productively be employed.

Each deposit excavated, of course has costs and benefits. The benefits are in what we learn; the cost is in the effort expended in obtaining the information, both in the field and in the lab. Overall, we wish to apportion our costs to the different strata in a way that provides benefits in both intensive and extensive information, appropriately scaled to the research goals. From the standpoint of intrasite spatial analysis, the highest priority would be deposits that reflect a single episode or longer-term or repeated occupation that appears to represent relatively short span of time. Among these, one would want to be sure to intensively investigate deposits of all available ages and topographic settings.

Resolution of Recovery

The resolution of the method of excavation is also a cost-benefit issue. The benefits are the increments in what is learned from increased resolution. The costs are in

the additional effort in obtaining the higher resolution data.

For the different classes of deposits sampled, recovery with different levels of screening and different spatial resolution may be desirable. Of course, screening soils though a finer screen tends to take longer but to recover smaller artifacts. It is usually not sensible to screen 100% of the excavated deposits through a fine mesh. There are two obvious ways to reduce the costs, which can be employed together or separately: to increase the mesh size, or to screen only a portion of the dirt (e.g. 25% would be one out of four buckets). Not all deposits need to be screened in the same manner. However, if differing screening strategies are used within the site, it will be much easier to maintain comparability in analytical units if the fraction of the dirt screened is varied and not the mesh size. Of course, this necessitates systematic records of the screened fraction.

Nonetheless, it may make sense to consistently treat certain types of features such as hearths differently or to screen a small systematic sample of each deposit (e.g. 10%) with a fine mesh screen. It must be kept in mind that increasing the screen size will diminish the sample sizes for some classes of artifacts which may hamper subsequent analysis. If the samples are already large, this may not be an issue of consequence.

Similarly, the greatest spatial resolution is obtained by point proveniencing each object. However this, in itself, is time consuming and necessitates methods of excavating that are very precise and expensive. It does not seem warranted to 3-D point-provenience every object through 4m of depositionally differentiated deposits over an area of 2000m^2. The remedies are to point provenience only a portion of the objects (which still entails the cost of painstaking excavation) or to provenience items to larger units, e.g. 25x25x5cm units, 50x50x10cm units, or 100x100x20cm units. Generally, point proveniencing is analytically most useful when all objects on an entire surface (or at least all objects of reasonable size) are located in that way. There is likely to be little analytical utility to point-proveniencing only a portion of the items on a single analytical surface and to do this would entail high costs.

So long as systematic records are kept, it is feasible to use differing resolutions (point provenience and different grid sizes) when excavating different sorts of deposits. However, analysis will be facilitated if the grid units employed are even subdivisions of one another. (By combining four 50x50 cm units into a m^2 grid one can do an analysis combining units of both sizes; however, 60x60cm units would not be easily useable with a m^2 grid.)

This discussion, of course begs the question of how we make these tradeoffs. The minimum screen size is a function of the size of the smallest artifacts that are of major interpretive consequence, difference in time required for screening at different mesh sizes (which will depend on the soils and the screening equipment), and the artifact densities (which will determine sample size). There is no universal optimum solution. Instead these questions are probably best settled by experimentation on different deposit types identified prior to beginning large scale field work.

The spatial resolution of the minimal excavation provenience depends on the characteristics of the archaeological deposits and on methodological factors–for example, how much longer does it take to dig eight 50x50x10 cm units than it does to dig one100x100x20cm unit? These questions lend themselves to experimental answers

obtained in a limited pilot phase of excavation.

One or more blocks, situated to sample all of the major types of deposits with archaeological remains, could be excavated at a very high horizontal and vertical resolution. The results of those excavations would then be subjected to rigorous spatial analysis to assess the scale of archaeological patterns. If adjacent 5cm levels are generally similar in the proportions of artifact classes represented, then perhaps 10cm levels are adequate. If 25cm squares usually have only a very few artifacts perhaps 50cm squares may be preferable. Knowing the time it takes a constant crew to excavate a 100x100cm unit and a 25x25cm unit 5 and 10 cm deep would provide very useful data in making those strategic tradeoffs.

Note that based on experience elsewhere (e.g. Howell 1993), it appears that trash deposits can show considerable, fine-scale (sub meter) spatial structure. While the patterning is real in the sense that it is a product of human behavior, it remains to be seen how far one can go interpretively with that information. At best, one may be able to get to the mechanics of prehistoric cleaning and dumping.

This project has the potential to develop answers to questions relating the nature of the deposits to the degree of spatial resolution that is analytically productive. Assuming the pilot excavations show some spatial structure (as expected), it might be extremely useful to dig substantial portions of one or two of these large dense deposits at as fine scale as is feasible, and then to do an intensive spatial analysis to understand the spatial scale of the patterning.

With a limited pilot study, one could get a sense of the appropriate tradeoffs in screen size, screened fraction, minimal unit size, and unit depth for each of the sampling strata defined. From that, it would be possible to translate the proportion of effort into projections of numbers of units of each type to be excavated and develop a sensible sampling scheme to achieve reasonable coverage of the entire area and depth. However, it should be emphasized that use of the pilot excavations to adjust excavation precision *requires* intensive and sophisticated analyses of these deposits using the methods that will be employed in the full analysis.

Spatial Analysis

While many sorts of analyses will be extremely interesting, this project provides a remarkable opportunity to pursue intrasite spatial analysis on Archaic and Woodland campsites. The primary spatial data analyzed will almost certainly be proportions or counts of artifact classes for individual grid units. The analytical tool of choice here is probably the grid-based variant of unconstrained clustering (Whallon 1984, Kintigh 1990, Gregg et al. 1991). My experience has been that while grid units with very low counts must be dropped from the analysis, unconstrained clustering is remarkably robust in the face of small sample sizes. Also, Papalas and Kintigh (Clark et al. in prep.) have recently developed a Monte Carlo method of assessing the significance of patterning indicated by the assignment of contiguous units to the same cluster.

If there are point provenienced deposits, a wide array of spatial analysis techniques are applicable, including pure locational clustering, unconstrained clustering, local density analysis and nearest neighbor analysis (Kintigh 1990; Gregg et al 1991)

These sorts of data will also be amenable to contouring and related graphical approaches of interpretation (Cowgill et al. 1984). Correspondence analysis of the frequencies might also be illuminating (Blankholm 1991; Nielsen 1988). A grid-based version of local density analysis (Johnson 1984) and Robertson's (1999) empirical Bayesian approaches could provide useful complements to the other methods. Boone's (1987) approach to examining midden homogeneity might also prove interesting. Many of these techniques are available in Kintigh's Tools for Quantitative Archaeology (1998).

Conclusion

A project of this scale provides a valuable opportunity to explore substantive questions about the prehistory of the Northeast and methodological questions that can have a substantial impact on this and future research (but that are economically warranted by their benefits to the Leetsdale Casting Facility mitigation).

This report summarizes some of the considerations that should be taken into account in designing an excavation strategy intended to reveal meaningful intrasite patterning. It suggests stratifying the effort according to different classes of deposits, based on their archaeological and geological characteristics, age, and topographic setting. Further, it suggests that different recovery resolutions, in terms of the minimal provenience (point provenience; grid size and depth) and screening intensity, may be warranted for different deposit types. Finally, it suggests use of some pilot excavations and analyses to help determine a level of resolution that is productive.

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