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PHASE I CULTURAL RESOURCES SURVEY OF DPL ENERGY'S PROPOSED DERBY-TAIT PIPELINE INSTALLATION IN MONTGOMERY COUNTY, OHIO

Lead Agency: Ohio Power Siting Board

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Section 5.0: Field and Laboratory Methods

5.1 FIELD METHODS

BHE uses standard archaeological reconnaissance methods for Phase I cultural resource surveys. The methods of reconnaissance for cultural resources vary according to the presence of previously recorded cultural resources in the survey area, the landform surveyed, and the overall visibility of the ground surface.

In areas of good visibility (greater than 80%) the ground is visually inspected by pedestrian survey along 5m parallel transects, with each 5m interval along a transect constituting a sample locus (SL). In areas of poor visibility (less than 80%) the ground is traversed by parallel transects and shovel tested at 15m intervals, with each shovel test constituting a sample locus. The depths of shovel tests vary according to when sterile sub-soils are reached. The soil from each shovel test is hand screened through ¼ inch mesh hardware cloth for artifactual evidence. If artifacts are recovered they are places in properly labeled bags and given an appropriate field sample number. A running catalog of recovered artifacts from each segment is kept as well.

In accordance with the requirements of Section 106 of the National Historic Preservation Act, BHE cooperates with the state of Ohio's Historic Preservation Office to ensure that its field methods comply with the Secretary of the Interior's guidelines.

5.2 LABORATORY METHODS

BHE Environmental, Inc.'s Cincinnati laboratory procedures dictate that artifacts be washed, labeled, and cataloged. Where appropriate, historic and prehistoric artifact assemblages are analyzed for date range, socioeconomic status, ethnicity, region-specific attributes, settlement type, and intra-site distribution.

5.3 HISTORIC ARTIFACTS

Establishing date ranges for historic artifacts is an integral part of the cataloging process. Socioeconomic ranking is possible with large assemblages of ceramics, by reference to known relative prices, popularity and the availability of data. The frequencies of occurrence of particular ceramic types within the assemblage are used to create an economic profile (Miller 1980; Spencer-Wood 1987; Thomas 1988). Socioeconomic scaling by artifact analysis is supplemented where possible by reference to tax records for the site. Ethnicity may be

approached by reference to vernacular architecture, archival reference, or folk material culture in the archaeological record.

South pioneered a method of analysis in which historical artifact assemblages are ranked within functional classes, such as architectural debris, kitchen refuse, pharmaceutical glass, etc. The functional categories so generated are then ranked by their percentage of the total site assemblage. South contends that by comparing the frequency of occurrence of particular functional classes and their percentage of the total assemblage over a wide variety of sites, the sites will display consistent assemblage patterns, which are diagnostic of particular settlement types (such as frontier sites). Diagnostic settlement types reflected in the assemblage are seen as region-specific (South 1977). South's "pattern recognition" analysis has been occasionally criticized for the ambiguity of functional categories and the statistical variability within the assemblage patterns. Sprague (1981) proposed refinements to South's functional categories, however, South's method remains a key tool in the analysis of historic assemblages. Since South's groundbreaking work, regional frontier patterns have been developed for the Carolinas (Lewis 1980; Lewis 1984) and the Ozarks (Price and Price 1977).

5.4 PREHISTORIC ARTIFACTS

The terms used to describe stone tools differ from region to region, as evidenced by the proliferation of type names for projectile points that often share similar morphologies. The terminology and accompanying definitions applied here are based on research by prehistorians in both New and Old World contexts, representing the most widely accepted nomenclature.

Prehistoric artifacts are sorted by artifact type (e.g. projectile point), based on standard references such as Bell (1958) and Justice (1987). Debitage categories are based upon classification schemes currently used by both Old and New World prehistorians (Bordes 1961; Frison 1974; Tixier et al. 1980). The first level of analysis involves separating flakes, cores, and fragments (shatter and `chunks' of raw material) and listing the presence or absence of features such as cortex. The flakes are then further subdivided, in as much as is possible, into groups that would more specifically identify the reduction sequence that they belonged to. The following terminology has been applied to the classification of prehistoric artifacts.

1. The French term debitage has two related meanings: 1) it refers to the act of intentionally flaking a block of raw material to obtain its products, and 2) it refers to those products themselves. Prehistorians commonly use the term debitage to describe flakes, blades or bladelets, which have not been modified by secondary retouch and made into tools.

2. A core is a block of raw material, other than a biface preform, from which flakes, blades or bladelets have been detached. Cores may be produced by careful preparation or consist of a block of material from which a few flakes have been opportunistically detached.

3. A flake is a product of debitage that has a length/width ratio of 1: 1. In this report there are two separate categories of flakes, the first of which is for flakes to which a specific reduction sequence cannot be assigned. With such flakes it is impossible to tell whether

they have been detached during simple core reduction or biface manufacture. For example, cortical flakes initially removed from a block of raw material can appear similar in both core and biface reduction.

The flakes, which result from biface reduction, are described as follows:

A. Biface roughout flakes are typically thick, have cortex on part of their dorsal surfaces, and have large plain or simply faceted butts. There are relatively few dorsal scars, but the scars may show removals from the opposite edge of the biface.

B. Thinning/shaping flakes result from shaping the biface, while its thickness is reduced. Thinning flakes generally lack cortex, are relatively thin, and have narrow, faceted butts, multidirectional dorsal scars, and curved profiles. Percussion flaking typically produces thinning flakes.

C. Finishing or trimming flakes result from producing the edge of a tool. Such flakes are generally small and very thin and can be indistinguishable from tiny flakes resulting from other processes such as platform preparation. Either percussion or pressure flaking may produce Biface finishing flakes. The categories used to describe biface reduction follow in a broad sense those proposed by Newcomer (1971), Callahan (1979), and Bradley and Sampson (1986). It should be noted, however, that rigidly reductive schemes (as in the references cited), which break into stages a process that is in fact an unbroken continuum from raw material selection to final abandonment of the tool, only approximate the course of manufacturing used by prehistoric knappers.

4. Retouch is a term taken from the French *retouchee* and refers to the modification of either a block of raw material (e.g. biface manufacture), a flake, a blade, a or bladelet by a single removal or series of removals, thus transforming the piece into a 'tool.' Retouch shapes the original blank and its edges, and can take the form of invasive bifacially detached flakes on a projectile point, or tiny flakes on the edge of an end-scraper.

5.5 CURATION

No cultural materials were recovered from this project.

Section 6.0: Survey Results

6.1 FIELD RECONNAISANCE

Predictions of a high probability for cultural resources in certain areas along DPL Energy's proposed pipeline guided BHE's field reconnaissance strategy. The field reconnaissance covered the entire area of proposed construction with a combination of shovel tests and pedestrian survey for areas of good visibility, slope, and wet areas (Figure 6.1-6.4).

In February 2000 the BHE team of two archaeologists completed the Phase I field reconnaissance for cultural resources at the proposed reroute locations. Since the areas to be surveyed were not continuous, the proposed relocations were divided into segments and subsequently surveyed from the westernmost reroute at the Derby Station to the easternmost reroute at the Tait Station. The Segment descriptions are provided below.

Segment 1, Derby Road.

Located in an upland area of glacial Till Plains and hummocks, Segment 1 begins in a hay field on the south side of Derby Road across from the Derby Station and travels in an easterly direction. The ROW for the proposed pipeline construction is 10.67 meters wide by 579 meters in length and was surveyed from west to east. A single transect (Transect A) consisting of 37 SL's, placed 15m apart, was recorded. Of the 37 SL's, 19 were excavated to sterile subsoil, 11 were recorded as wet with standing water as deep as 20cm, and 7 were located in a plowed corn field which in some areas offered sufficient visibility to warrant surface collection. Two glacial hummocks were encountered, the first was located at SL 1 (Appendix A), while the second, which was located in the corn field at SL20. Segment 1 terminates on the western side of a residential driveway at SL 37. Typical soil profiles for Segment 1 consist of a 10YR 4/3 silt loam to a depth of ca. 20cm, over a 10YR 5/8 silty clay loam to 30 cm. Despite intensive shovel testing and surface inspection, especially on the glacial hummocks, no cultural resources were recovered from Segment 1.

Segment 2, Frytown Road.

Located in an upland area of glacial Till Plains and hummocks which has been dissected by an ephemeral stream, Segment 2 begins on the south side of Frytown Road on the eastern edge of Opossum Creek Metro Park (Appendix A) and terminates on the western edge of West Carrollton Road (Figure 6.2). The ROW for this proposed pipeline construction is 7.62 m wide by 382 m in length. A single transect consisting of 24 SL's placed 15 m apart was recorded for Segment 2. Of the 24 SL's, 21 were excavated and 3 were located in wet areas

adjacent to an unnamed ephemeral stream, which drains into Opossum Creek. Residential yards were encountered from SL 12 to SL 24. Typical soil profiles for Segment 2 indicate a 10YR3/2 silty loam to depths of around 20 cm over a 10YR 5/8 silty clay loam. Although a previously recorded site exists on the north side of Frytown Road (33My690) at its intersection with West Carrolton Road (Baltz et al. 1994), excavated shovel tests by BHE in the area directly to the south of 33My690 (SL's 22-24) failed to recover any cultural materials. This is not suprising due to the fact that the only artifact recovered from this location consists of one undiagnostic piece of debitage and subsequent intrasite shovel tests failed to recover further material. As a result of this low density, it was suggested that 33My690 was considered to be ineligible for NRHP inclusion (Baltz et al. 1994: 48). No cultural materials were recovered from Segment 2.

Segment 3, Gettysburg Avenue.

Located in an upland area of glacial till plain Segment 3 begins at an intersection of previously existing natural gas pipeline ROW (Figure 6.3). Segment 3 parallels the west side of Gettysburg Avenue directly west of the Dayton Landfill. Segment 3 consists of a 24 m wide by 274 m length ROW that was surveyed from north to south using two linear transects (Transects A & B) which consisted of 18 SL's respectively placed at 15 m intervals. Of the 36 SL's recorded for Segment 3, 18 were shovel tested, 16 were recorded as wet and 2 were located on a blacktop driveway, which was obviously disturbed. This segment begins in a mowed field and terminates in a wooded wet area at an ephemeral stream. In addition, several low areas containing standing water were encountered in the mowed field. Typical intact soil profiles for both transects consist of a 10YR 3/2 silty clay loam which extends to a depth of 20 cm over a 10YR 5/6 silt clay loam subsoil. However, shovel testing indicated massive disturbance in portions of Segment 3 (Appendix A). Typical disturbed soil profiles consisted of 10YR 3/2 clay mottled with 10YR 5/8 and Gley Chart 1, 6/10GY. No cultural materials were recovered from Segment 3.

Segment 4, Tait Station.

Segment 4 begins on the north side of the floodwall and travels in a southerly direction over the floodwall and into DPL Energy's Tait Station (Figure 6.4). Upon cresting the floodwall the proposed ROW heads in a southeasterly direction before turning due east and crossing a raised railroad track and finally, East Miami River Road. The segment consists of a 15.24 m wide by 243 m in length proposed construction ROW. A single transect consisting of 18 SL's was recorded for Segment 4. Of these, eight were disturbed, eight were shovel tested and 2 were located on 20 percent slope. Typical soil profiles at the DPL Energy's Tait Station consist of mottled 10YR 5/8 and 10YR 6/3 clays to varying depths (Appendix A). Often rock fill was encountered which prevented further excavation. This landform was produced by numerous fill episodes for railroad, road, and industrial construction. No cultural materials were recovered from Segment 4.

Segment 5, Directional Drill.

Segment 5 begins at the eastern side of West River Road along an old terrace. A directional drill machine will be placed in a 5 foot deep hole (1.52 m) that is 20 foot in length and width (6.09 x 6.09 m) to facilitate drilling. The drill will extend approximately 1,000 feet (304 meters) at an average depth of 15 feet (4.5 m). In addition, another ca. 20 feet by 20 feet (6.09 x 6.09 meters) area will be excavated approximately 30 feet west (9.1 meters) of the CSX Railroad tracks to tie in the new pipe with existing lines. Shovel tests placed at various intervals along this transect indicate disturbance and soil profiles consist of 10YR 5/8 mottled with a 10YR 6/4 clay. Gravels and historic fill constituted 60% of the matrix of the excavated shovel tests. These findings confirmed the results of a previous survey conducted by Gray and Pape Inc. in 1994 who state that the area is an abandoned landfill (Baltz et al. 1994: 28). Interviews with local informants conducted during this survey confirmed Gray and Pape's observation. No artifacts were recovered from Segment 5.

BHE's surface pedestrian survey and subsurface shovel test failed to recover any cultural materials from the segments surveyed. In addition, no standing structures were encountered within the survey corridors.

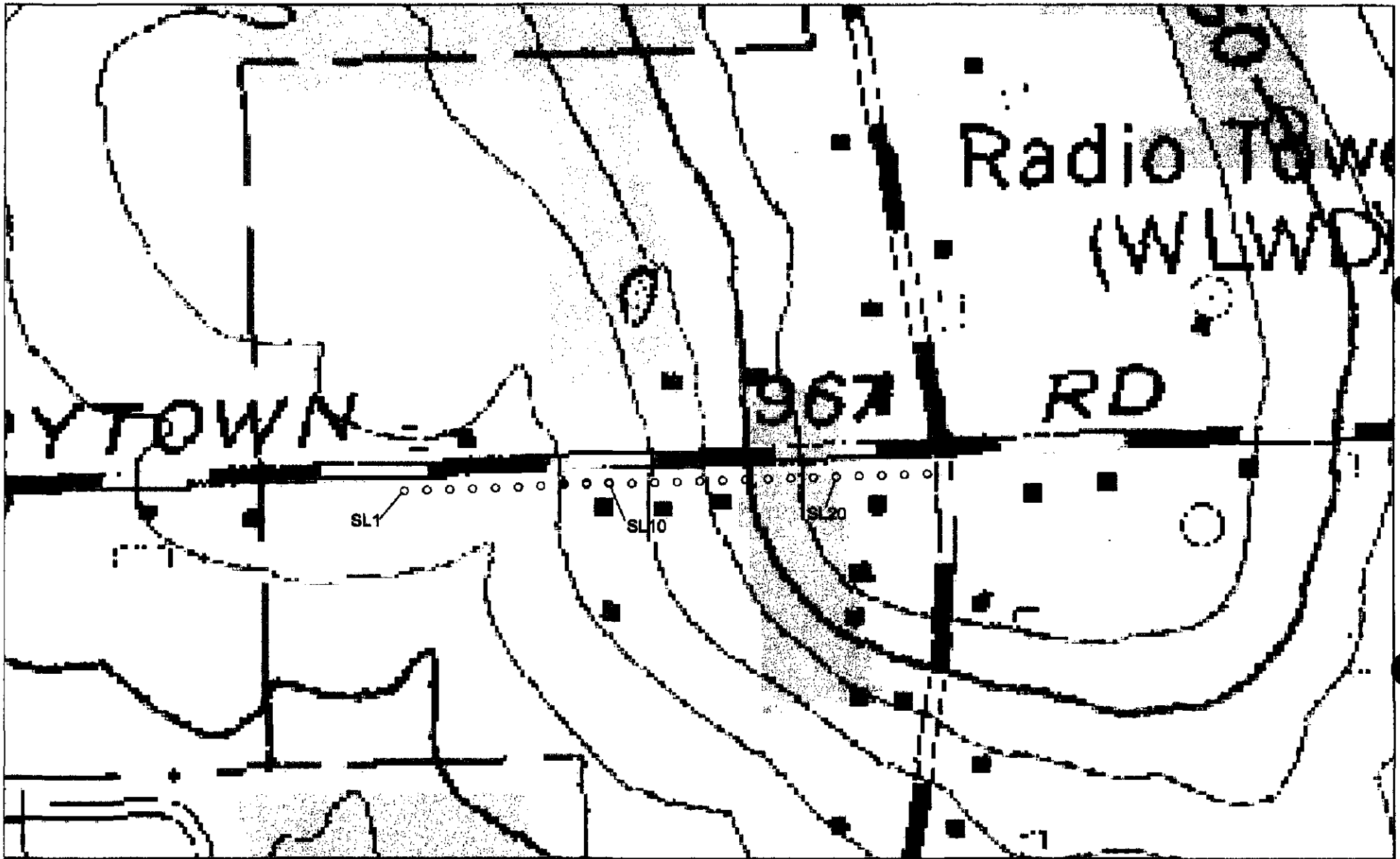

FIGURE 6.1. Archaeological Survey Coverage of Segment 2, Frytown Road.

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Base Map: USGS 7.5 Minute Topographic Maps- Miamisburg East, OH

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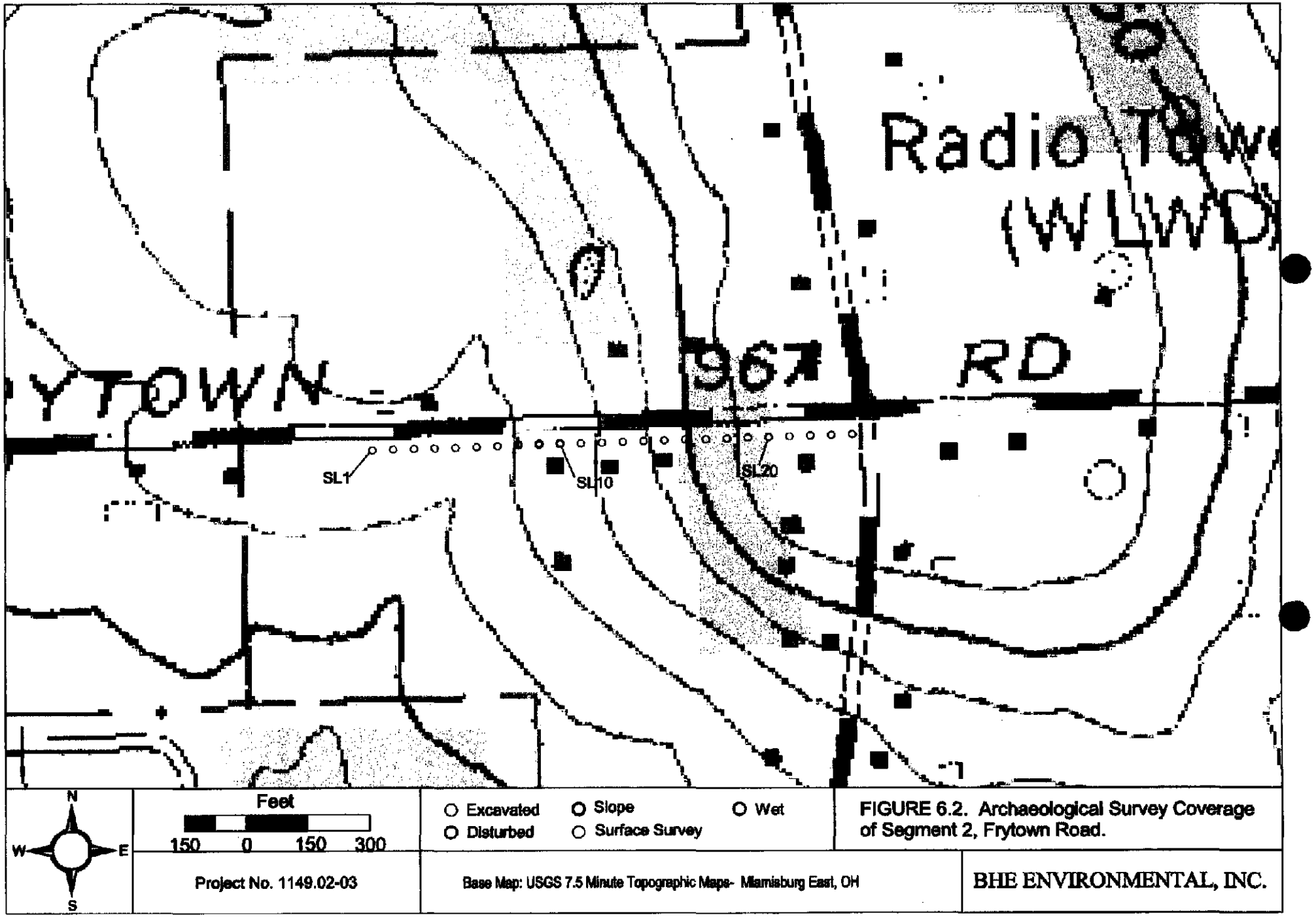

FIGURE 6.2. Archaeological Survey Coverage of Segment 2, Frytown Road.

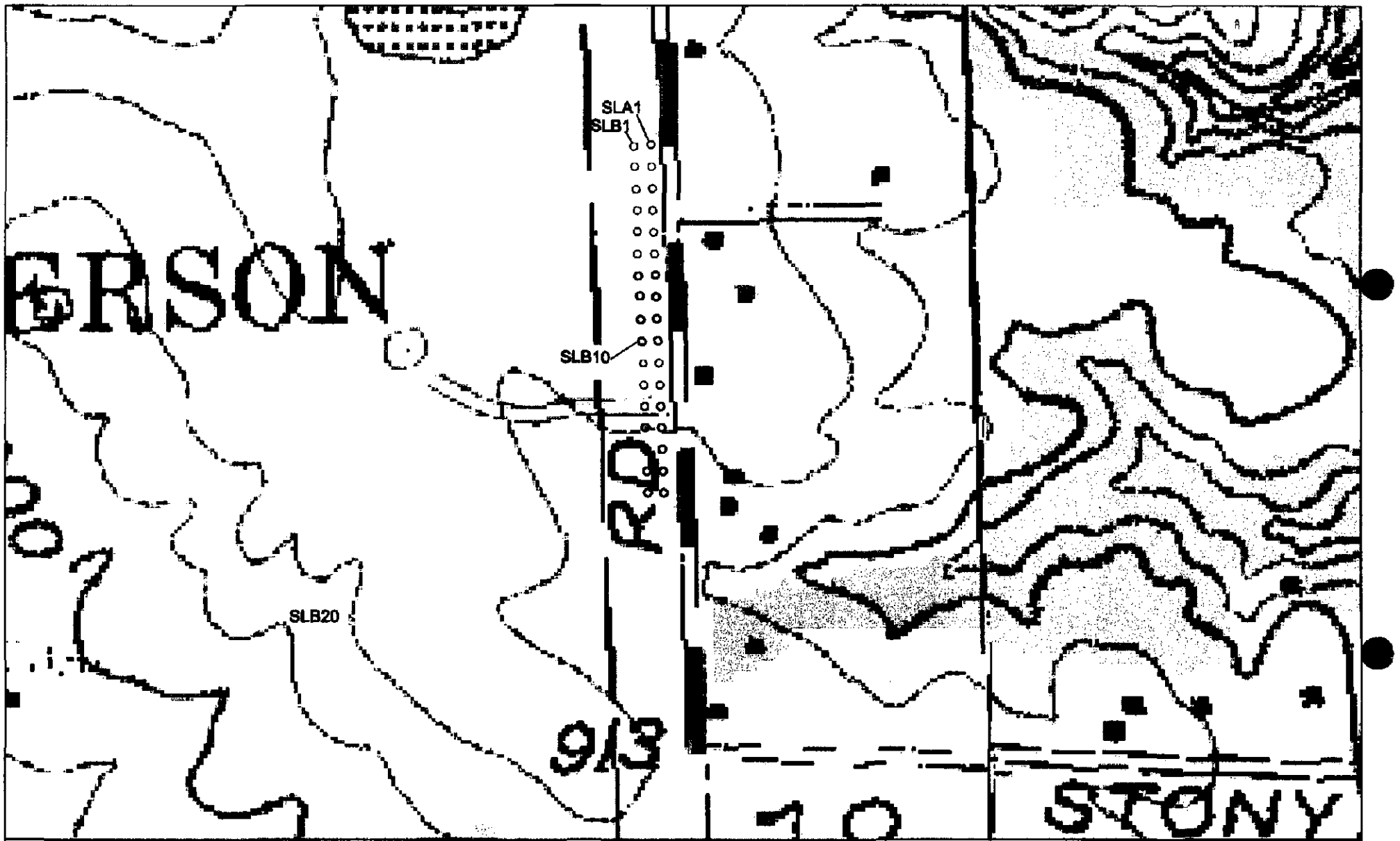

FIGURE 6.3. Archaeological Survey Coverage of Segment 3, Gettysburg Avenue.

Project No. 1149.02-03

Base Map: USGS 7.5 Minute Topographic Maps- Miamisburg East, OH and Dayton South, OH

BHE ENVIRONMENTAL, INC.

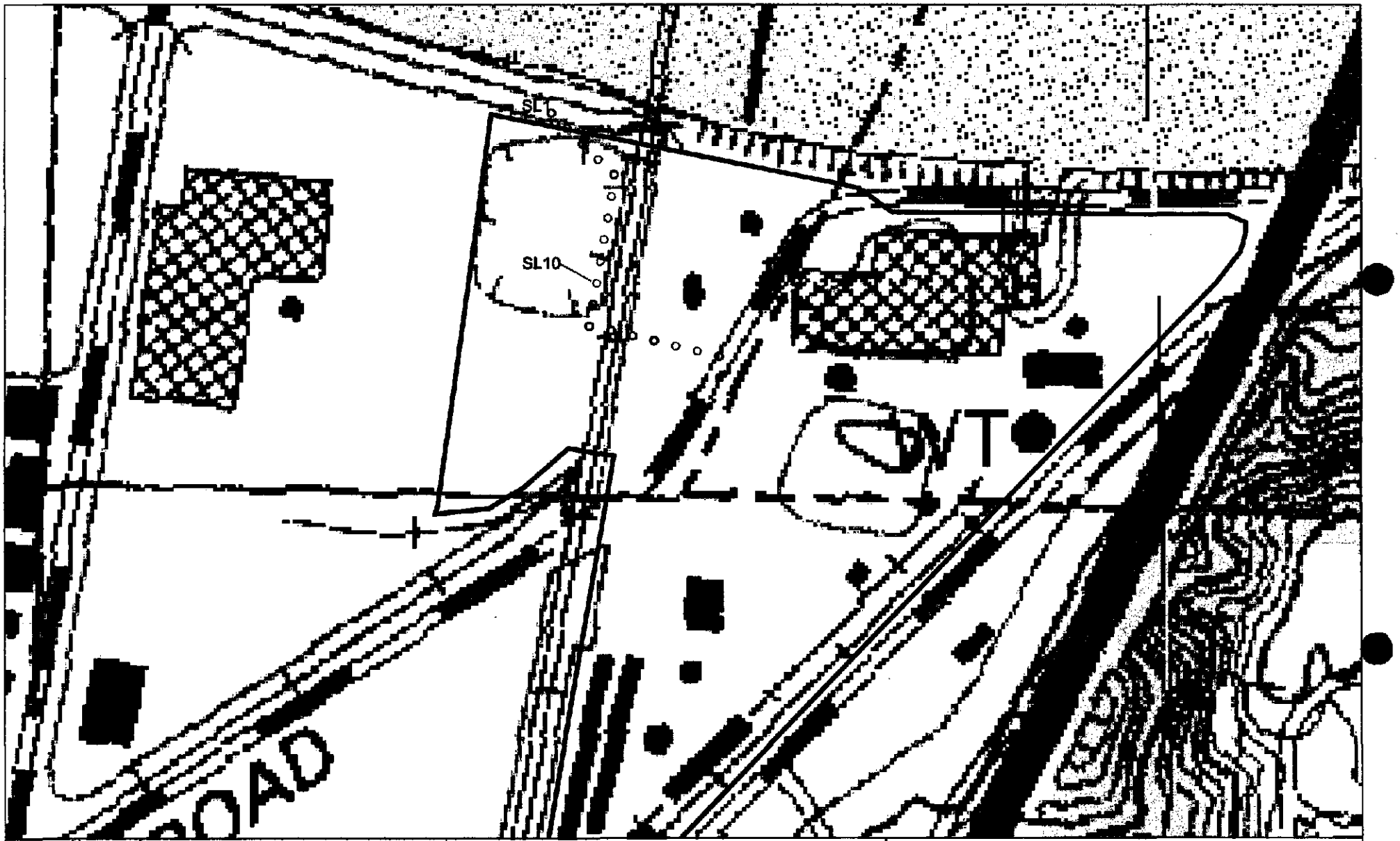

FIGURE 6.4. Archaeological Survey Coverage of Segment 4, Tait Station.

Section 7.0: Recommendations

Documentary research identified one previously recorded cultural resource within 20 m of the proposed pipeline ROW on Segment 3 (Frytown Road). Originally recorded in 1994, site 33My690 produced one piece of lithic debitage. Despite intrasite testing, no further cultural materials were recovered. Based on the paucity of artifacts, it was suggested that this site did not meet the criteria for eligibility to the NRHP (Baltz et al. 1994). The present ROW is located approximately 20 to the south of this site.

The field reconnaissance conducted by BHE in February and April 2000, consisting of shovel testing and pedestrian survey, failed to recover any cultural material from the segments surveyed. Therefore, no cultural resources will be impacted by the proposed project and clearance is recommended.

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1969 The Riverton Culture: A Second Millenium (sic) Occupation in the Centra Wabash Valley. Illinois Archaeological Survey Monograph No.1, Illinois State Museum Reports of Investigations No. 13, Springfield.

Wymer, D.A.

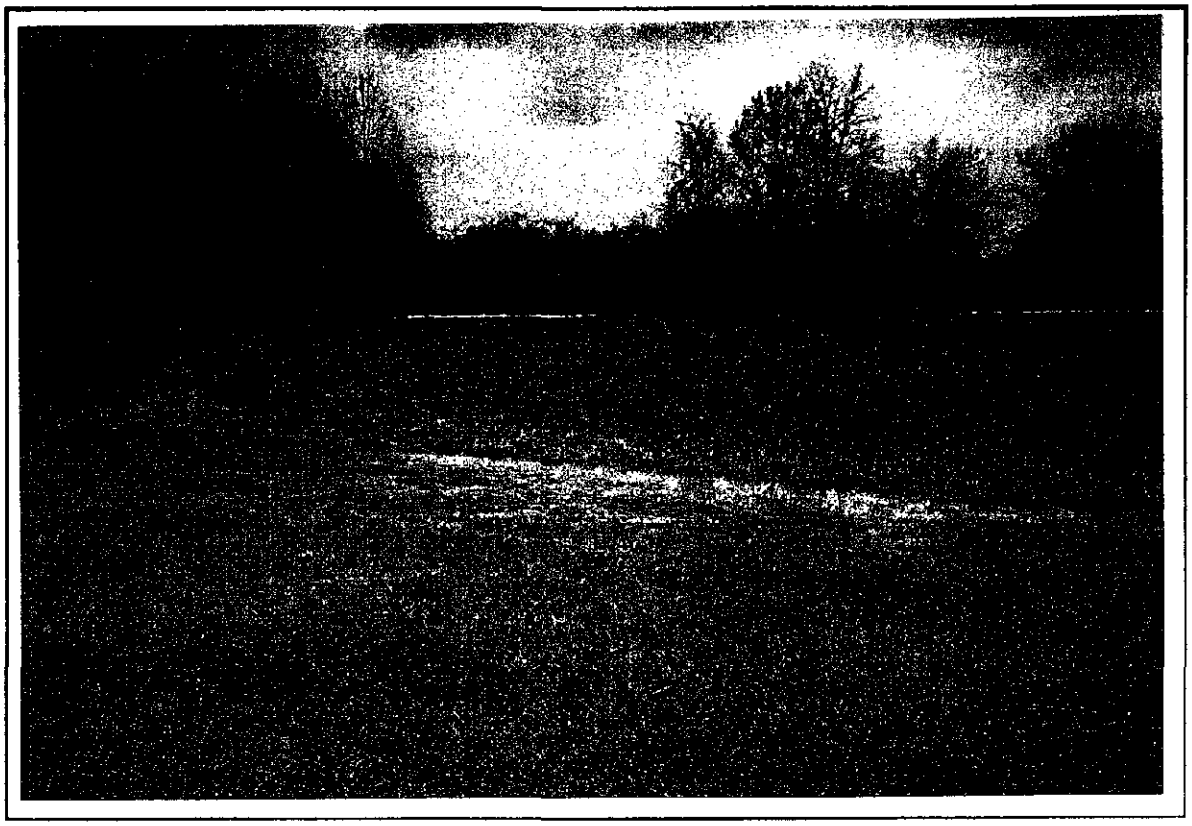
1997 Paleoethnobotany in the Licking River Valley, Ohio. Ohio Hopewell Community Organization. Pp. 153-171.

Yarnell, R.A.

1964 Aboriginal Relationships Between Culture and Plant Life in the Upper Great Lakes Region. Museum of Anthropology, University of Michigan Anthropology Papers No. 23.

1973 The Origins of Agriculture: Native Plant-Husbandry North of Mexico. Paper Presented for the IXth International Congress of Anthropological and Ethnological Sciences, Chicago, Illinois.

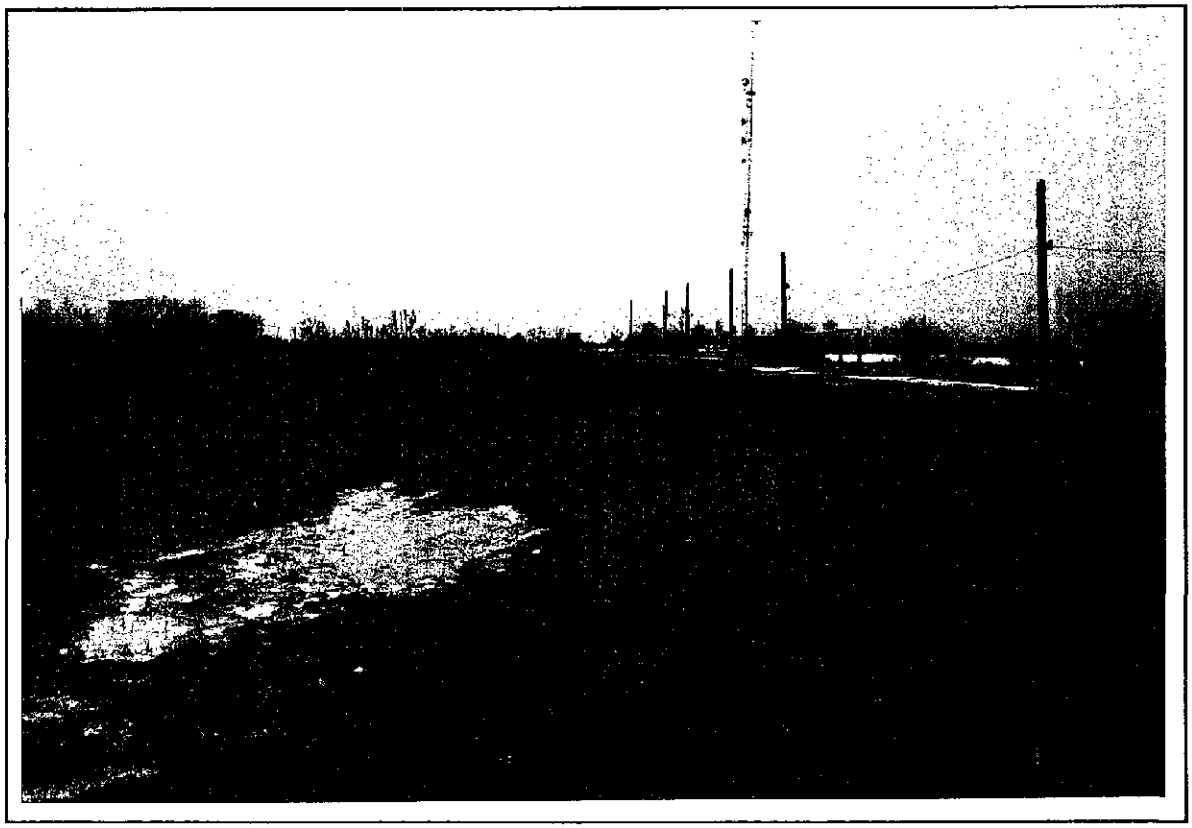
Appendix A
Project Photographs



Photograph 1—Segment 1 at SL 1 Looking East

Photograph 2— Segment 1 at SL 29 Looking West.

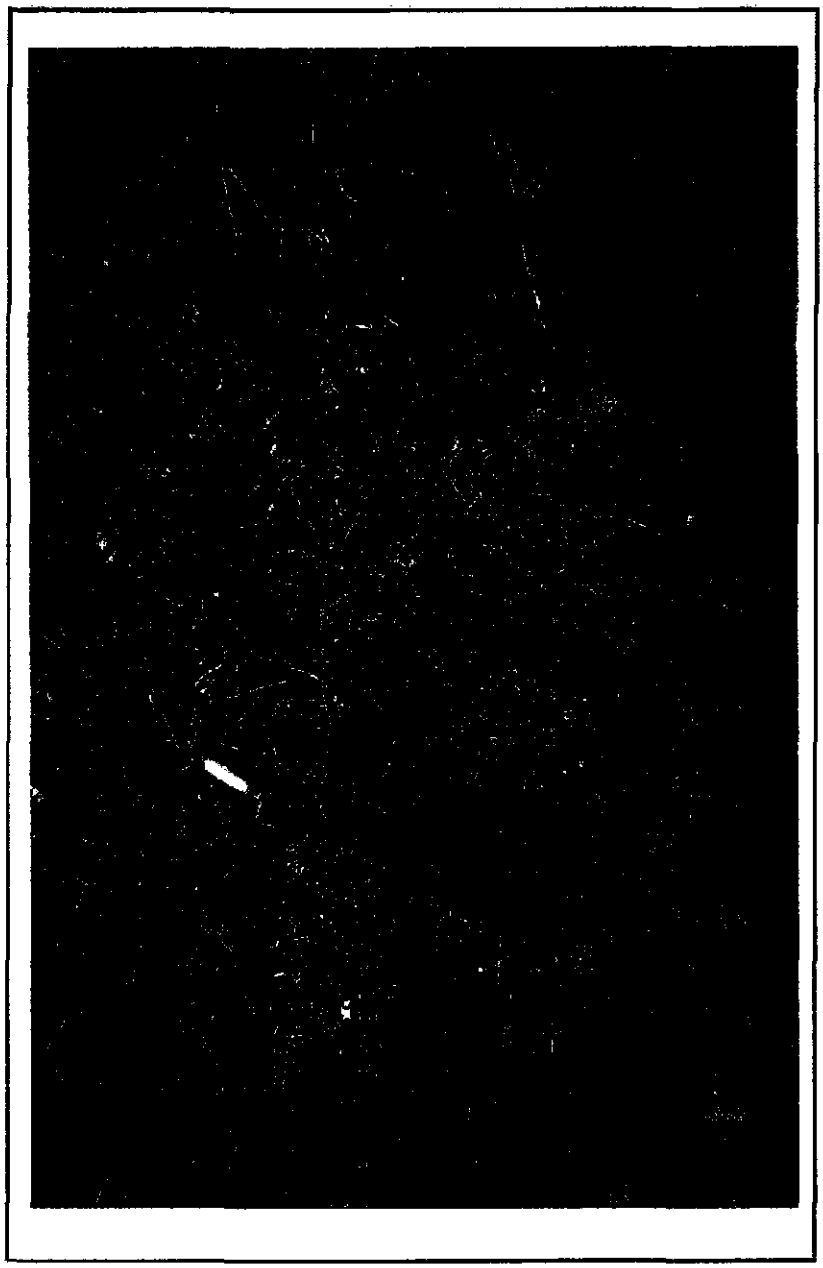
Photograph 3—Segment 2 at SL 1 Looking East.



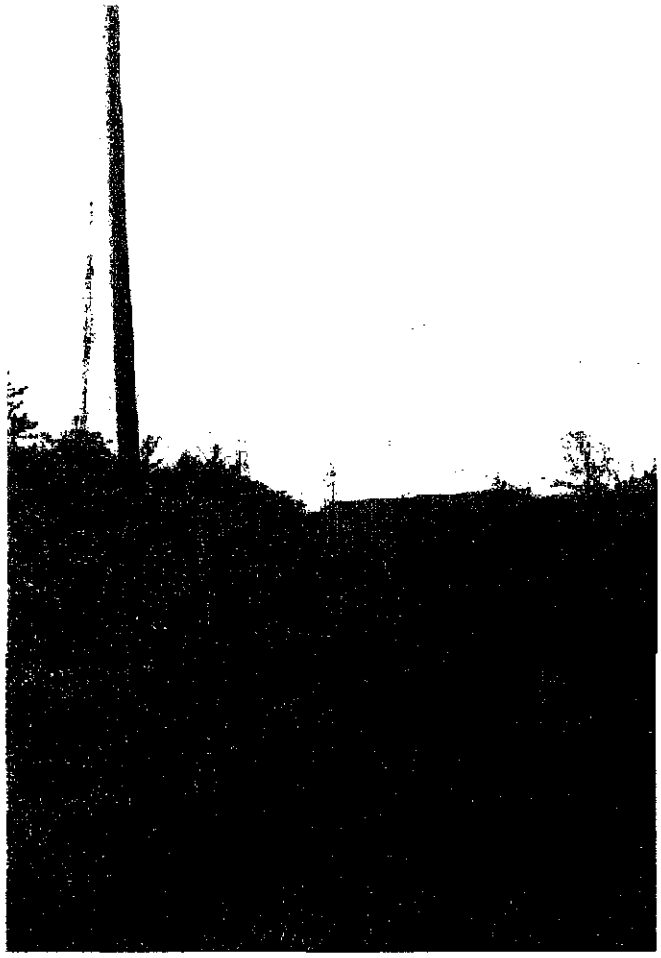
Photograph 4—Segment 3 at SL 7 Looking North.

Photograph 5—Segment 4 at SL 5 Looking Southeast.

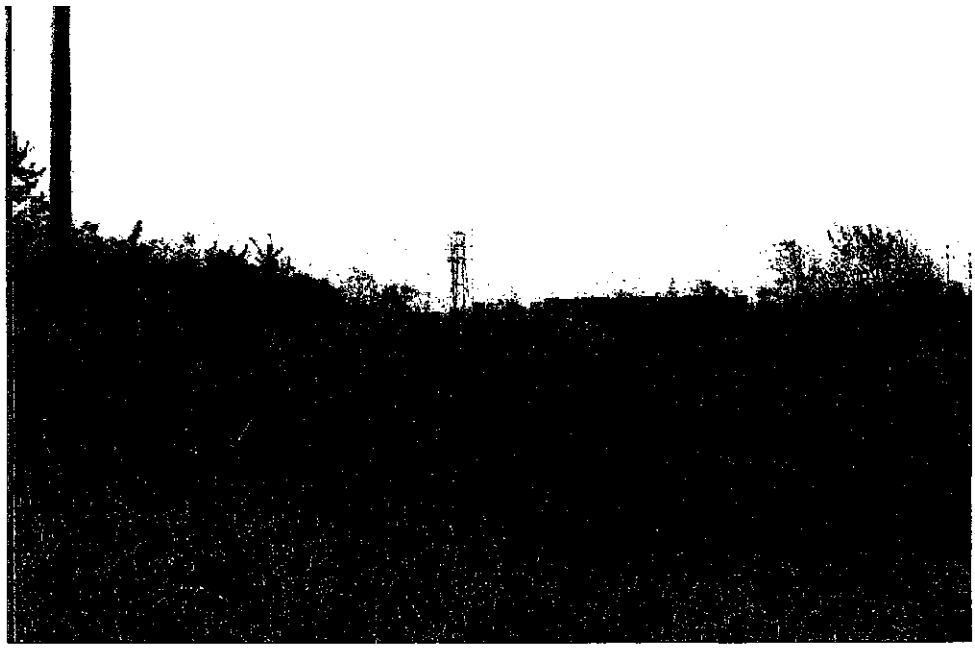
Photograph 6—Segment 4 at SL 11 Looking East.



Photograph 7—Segment 3 at SL 5 Showing Disturbed Soil Profile.



Photograph 8-Segment 5 at Approximate Location of the Area That Will Be Excavated To Tie In the Bore, Looking East.



Photograph 9-Same Photo as Above.

Photograph 10-Beginning of Segment 5 at Eastern Edge of West River Road Looking West.

Appendix B
Resumes of Key Personnel

CHRISTOPHER BERGMAN, Ph.D., RPA
Director, Cultural Resource Group

EDUCATION

Ph.D., Archaeology, 1985, Institute of Archaeology, University of London

B.A., Archaeology and Geology, 1979, American University of Beirut

REGISTRATIONS

Register of Professional Archaeologists

QUALIFICATIONS AND RELEVANT EXPERIENCE

Dr. Bergman serves as Principal Investigator on archaeological projects, and is BHE's leading specialist in lithic analysis. His duties include designing and implementing field surveys, coordinating with state and federal agencies, preparing reports, and overseeing laboratory analysis. He is responsible for assessing the significance of cultural resources found during BHE studies and for making recommendations on National Register eligibility status. In addition to the many cultural resource projects he has completed, he has directed Data Recovery excavations at major prehistoric sites in the both the Midwest and Northeast.

In addition to his experience in the midwestern and eastern United States, Dr. Bergman has also completed many archaeological projects in the Old World. His doctoral dissertation was on lithic technologies at Ksar Akil, a rockshelter near Beirut, Lebanon with over 23 meters of cultural deposits spanning 40,000 years. He participated in excavations at sites across the Near East and Europe, including most recently a series of Upper Paleolithic sites near Rio Maior in Portugal. His work has led to over 40 professional publications, including several books and edited volumes.

In 1995, he was the recipient of the 1st Annual Historic Preservation Archaeological Award for Outstanding Achievement upon completion of Transcontinental Gas Pipe Line Corporation's Sandts Eddy Archaeological Project. The award was presented by the Pennsylvania Historical and Museum Commission in Wilkes Barre, Pennsylvania. In 1997, the Sandts Eddy project was one of four projects nationwide selected for inclusion in the Secretary of Interior's Annual Report to the U.S. Congress as an outstanding contribution to research in the Federal Archaeology Program. In 1999, Dr. Bergman received a second citation in the Secretary of the Interior's Annual Report to U.S. Congress for his work on the 18th century Susan Furnace site in Cherokee County, South Carolina.

SELECTED PROJECT EXPERIENCE

Principal Investigator – **Phase II Testing** of the Chinque Site (36Al480), Leetsdale Industrial Park, Leetsdale, Pennsylvania, for the US Army Corps of Engineers, Pittsburgh District.

Principal Investigator/Lithic Analyst – **Refitting Analysis of Lithic Materials** from the Phase III investigation of 36SO106 for PennDOT's Meyersdale U.S. 219 Project in Somerset County, Pennsylvania.

Principal Investigator - Preparation of the **Historic Preservation Plan** for Tyndall Air Force Base, Bay County, Florida for the National Park Service.

Principal Investigator - Preparation of the Historic Preservation Plan for the Atchison Defense Facility for the Kansas City Corps of Engineers.

Director and Principal Investigator - **Phase III Mitigation** Excavations at two prehistoric sites, , Sandts Eddy (36Nm12) and Padula (36Nm15), in Northampton County, Pennsylvania for Transcontinental Gas Pipe Line Corporation.

Principal Investigator - Phase III Mitigation Excavations at Site 15Be391 for the Cincinnati-Northern Kentucky Airport, Boone County, Kentucky for Landrum and Brown.

Principal Investigator - Phase III Mitigation Report Preparation and Lithic Analysis for the Atterbury Site (12B815), Bartholomew County, Indiana. Data Recovery of Late Archaic/Early Woodland artifacts for Texas Gas Transmission Corporation.

Principal Investigator - Phase III Mitigation Excavations at Sites 40Ln163 and 40Ln167, Lincoln County, Tennessee on behalf of the Tennessee Department of Transportation.

Prinicpal Investigator – Phase II Testing of the Susan Furnace site (38Ck67) in Cherokee County, South Carolina.

Project Manager and Principal Investigator - Phase II Testing of a 19th century historic homestead site in Christian County, Kentucky for US Soil Conservation Service.

Principal Investigator - Phase I, II, III Cultural Resource Investigations of a 45-mile AT&T fiber optic cable corridor in Warren, Greene, Clinton and Butler counties, Ohio for Bucher, Willis & Ratliff.

Project Manager and Principal Investigator - Phase II Testing of Prehistoric Site and Native American Concern Coordination in Clark County, Indiana for Indiana SHPO and Indiana State Parks.

Principal Investigator - Phase II Testing of four sites on an 18-mile AT&T fiber optic cable corridor in Madison and St. Clair counties, Illinois for Bucher, Willis & Ratliff.

Principal Investigator - **Phase I Survey** of Transcontinental Gas Pipeline Corporation's SunBelt Expansion Project and Phase II Testing of the Susan Furnace Site (38Ck1), Cherokee County, South Carolina for Transcontinental Gas Pipeline Corporation.

Principal Investigator - Phase I Cultural Resource Survey of 103 miles of proposed natural gas pipeline and related facilities in Kentucky, Indiana, and Ohio, including deep testing at a proposed Ohio River crossing for Texas Gas Transmission Corporation.

Principal Investigator - Phase I Cultural Resource Survey of 70 miles of proposed gas pipeline in Arkansas and Mississippi for Texas Gas Transmission Corporation.

Principal Investigator – **Public hearing testimony** Silver Creek Sand & Gravel Clarksville, Indiana for the Indiana Department of Natural Resources.

Principal Investigator – Public hearing testimony Cyrus Charles Indian Cemetery Site, Montauk Long Island, New York.

SELECTED RESEARCH EXCAVATION EXPERIENCE

Orontes River, Syria: Lower and Middle Paleolithic surface survey and field mapping of sites.

Beirut, Lebanon, Middle Paleolithic preliminary archaeological investigation of a newly discovered rockshelter Field Assistant.

Le Flageolet, France: Upper Paleolithic.

Pont d'Ambon, France: Upper Paleolithic.

Hengistbury Head, England: Mesolithic.

Stoke Newington, England: Lower Paleolithic Field Assistant.

Hengistbury Head, England: Upper Paleolithic-Mesolithic Site Supervisor.

Pincevent, France: Upper Paleolithic.

Pont d'Ambon, France: Upper Paleolithic.

Hengistbury Head, England: Mesolithic Site Supervisor.

Pont d'Ambon, France: Upper Paleolithic.

Hengistbury Head, England: Upper Paleolithic Site Supervisor.

Hengistbury Head, England: Upper Paleolithic Co-Director.

Boxgrove, England: Lower Paleolithic Specialist Site Consultant.

Boxgrove, England: Lower Paleolithic Specialist Site Consultant.

Boxgrove, England: Lower Paleolithic Specialist Site Consultant.

Rio Major, Portugal Upper Paleolithic Field Assistant.

Big Bone Lick State Park, Kentucky, Director

PROFESSIONAL PUBLICATIONS

Books

Bergman, C.A. and L. Copeland (eds.) 1986. I. Azoury Ksar Akil, Lebanon: A Technological and Typological Analysis of the Transitional and Early Upper Palaeolithic Levels of Ksar Akil and Abu Halka. Volume I. BAR International Series 289 (i and ii).

Bergman, C.A. 1987. Ksar Akil, Lebanon: A Technological and Typological Analysis of the Later Palaeolithic Levels. Volume II. BAR International Series 329.

Bergman, C.A. and J.F. Doershuk (eds.) 1994. Recent Research into the Prehistory of the Delaware Valley. Journal of Middle Atlantic Archaeology 10.

Monographs

J.F. Doershuk, C.A. Bergman and D. Pollack (eds.) 1995. Current Archaeological Research in Kentucky: Volume 3. Kentucky Heritage Council, Frankfort.

Papers

Azoury, I and C.A. Bergman 1980. The Halafian Lithic Assemblage of Shams ed Din Tannira. Berytus XXVIII: 127-143.

Bergman, C.A. 1981. Point Types in the Upper Palaeolithic Sequence at Ksar Akil, Lebanon. in J. Cauvin and P. Sanlaville (eds.) Prehistoire du Levant.: 319-330.

Barton, R.N.E. and C.A. Bergman 1982. *Hunters* at Hengistbury: some evidence from experimental archaeology. World Archaeology 14:237-248.

Ohnuma, K. and C.A. Bergman 1982. Experimental Studies in the Determination of Flaking Mode. Bulletin of the Institute of Archaeology, London 19: 161-170.

Bergman, C.A. and M.H. Newcomer 1983. Flint arrowhead breakage: examples from Ksar Akil, Lebanon. Journal of Field Archaeology 10: 238-243.

Bergman, C.A. and K. Ohnuma 1983. Technological notes on some blades from Hummal la, Syria. Quartar 33/34: 171-180.

Bergman C.A., R.N.E. Barton; S.N. Collcutt and G. Morris 1983. La Fracture Volontaire dans une Industrie du Paleolithique Superieur Tardif du Sud de l ' Angleterre. L'Anthropologie 87: 323-337.

Barton, N. and C.A. Bergman 1985. The Stone Age. in C. Pepin (ed.) Hengistbury Head. Roman Press, Bournemouth: 62-65.

Bergman, C.A. and L. Copeland 1986. Editor's Preface. in I. Azoury Ksar Akil, Lebanon: A Technological and Typological Analysis of the Transitional and Early Upper Palaeolithic Levels of Ksar Akil and Abu Halka. Volume I. BAR International Series 289 (i): i-x.

Miller, R., E. McEwen and C. Bergman 1986. Experimental approaches to ancient Near Eastern archery. World Archaeology 18/2: 178-195.

Bergman, C.A. and D.R. Griffiths 1986. The Heat Treatment of Chert in Antiquity. in S. Collcutt (ed.) Recent Studies in the Palaeolithic of Britain and its Nearest Neighbors. J.R. Collis, Sheffield: 92-94.

Bergman, C.A. and R.N.E. Barton 1986. The Upper Palaeolithic Site of Hengistbury Head, Dorset, England. in S. Collcutt (ed.) Recent Studies in the Palaeolithic of Britain and its Nearest Neighbors. J.R. Collis, Sheffield: 69-72.

Bergman, C.A. 1986. Refitting of the Flint Assemblages. in M.B. Roberts et al. Excavation of the Lower Palaeolithic Site at Amey's Eartham Pit, Boxgrove, West Sussex. Proceedings of the Prehistoric Society 52: 235-236.

Griffiths, D.R., C.A. Bergman; C.J. Clayton; K. Ohnuma; G.V. Robins and N.J. Seeley 1987. Experimental investigation of the Heat Treatment of Flint. in G. de G. Sieveking and M.H. Newcomer (eds.) The Human Uses of Chert. Cambridge University Press: 43-52.

Bergman, C.A. and N. Goring-Morris 1987. Conference: The Levantine Aurignacian with special reference to Ksar Akil, Lebanon. Paleorient 13/1: 142-145.

Unger-Hamilton, R., R. Grace; R. Miller and C. Bergman 1987. Drill Bits from Abu Salabikh, Iraq. in D. Stordeur (ed.) La Main et l' Outil. Travaux de la Maison de l' Orient Mediterraneen, Lyon 15: 269-285.

Bergman, C.A. 1987. Hafting and use of bone and antler points from Ksar Akil, Lebanon. in D. Stordeur (ed.) La Main et l' Outil. Travaux de la Maison de l' Orient Mediterraneen, Lyon 15: 177-126.

Bergman, C.A. and K. Ohnuma 1987. The Upper Palaeolithic Sequence of Ksar Akil, Lebanon. Berytus XXV: 13-40.

Moloney, N., C.A. Bergman; F. Wenban-Smith and M.H. Newcomer 1988. Experimental replication of bifacial implements in Bunter Quartzite pebbles. in R.J. MacRae and N. Moloney (eds.) Non-Flint Stone Tools and the Palaeolithic Occupation of Britain. BAR British Series 189: 25-47.

Bergman, C.A. 1988. Upper Palaeolithic Point Types at Ksar Akil, Lebanon. in K. Ohnuma Ksar Akil, Lebanon: A Technological Study of the Earlier Upper Palaeolithic Levels of Ksar Akil. Volume III: XXV-XIV. BAR International Series 426: 311-328.

Barton, R.N.E. and C.A. Bergman 1988. The Upper Palaeolithic Tool Assemblage from Hengistbury Head. in M. Otte (ed.) De la Loire a l'Oder: Les civilisations du Paleolithique final dans la nord-ouest europeen. BAR International Series 444 (ii): 447-464.

Bergman, C.A. and M.B. Roberts 1988. Flaking Technology at the Acheulean site of Boxgrove, West Sussex, England. in A. Tuffereau (ed.) Cultures et Industries Lithiques: en milieu loessique. Revue Archeologique de Picardie 1-2: 105-113.

Bergman, C.A., E. McEwen and R. Miller 1988. Experimental archery: determination of projectile velocities and comparison of bow performances. Antiquity 62/237: 658-670.

Bergman, C.A. 1988. Ksar Akil and Upper Palaeolithic of the Levant. "Prehistoire du Levant 2" Paleorient 14/2: 201-210.

Bergman, C.A. 1988. Synthesis: The Upper Palaeolithic of the Levant. "Prehistoire du Levant 2" Paleorient 14/2: 223-227.

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Ohnuma, K. and C.A. Bergman 1990. A technological study of the Upper Palaeolithic levels XXV-VI from Ksar Akil, Lebanon. in P. Mellars and C. Stringer (eds.) The Origins and Dispersal of Modern Man. Cambridge University Press: 91-138.

Bergman, C.A., M.B. Roberts; P. Barlow and S. Collcutt 1990. Refitting and Spatial Analysis of artifacts from Quarry 2, Boxgrove, West Sussex, England. in E. Cziesla, S. Eickhoff, N. Arts, and D. Winter (eds.) The Big Puzzle. Holos, Bonn: 265-281.

Collcutt, S., R.N.E. Barton and C.A. Bergman 1990. Refitting in Context: A taphonomic case study from a late Upper Palaeolithic Site in sands on Hengistbury Head, Dorset, Great Britain. in E. Cziesla, S. Eickhoff, N. Arts, and D. Winter (eds.) The Big Puzzle. Holos, Bonn: 219-235.

McEwen, E., R.L. Miller and C.A. Bergman 1991. Early Bow Design and Construction. Scientific American June (Lead Article): 76-82.

Rue, D.J. and C.A. Bergman 1991. Contemporaneity of Late Archaic Piedmont Projectile Forms: The Woodward Site (36-Ch-374), Chester County, Pennsylvania. Journal of Middle Atlantic Archaeology volume 7: 127-154.

Barton, R.N.E. and C.A. Bergman 1992. Chapter 4: The Finds: Debitage, Cores, and Retouched Tool Assemblage in R.N.E. Barton (ed.) Hengistbury Head, Dorset: The Late Upper Palaeolithic and Early Mesolithic Sites. Oxford University Committee for Archaeology, Monograph 34: 96-138.

Barton, R.N.E.; C.A. Bergman and J. Cook 1992. Chapter 4.6.2 Artefacts with Engraved Cortex. in R.N.E. Barton (ed.) Hengistbury Head, Dorset: The Late Upper Palaeolithic and Early Mesolithic Sites. Oxford University Committee for Archaeology, Monograph 34: 170-174.

Barton, R.N.E. and C.A. Bergman 1992. Chapter 7: Glossary of Archaeological Terms. in R.N.E. Barton (ed.) Hengistbury Head, Dorset: The Late Upper Palaeolithic and Early Mesolithic Sites. Oxford University Committee for Archaeology, Monograph 34: 264-271.

Bergman, C.A. and J.F. Doershuk 1992. How the Data Come Together: Refitting in Lithic Analysis. Journal of Middle Atlantic Archaeology 8: 139-160.

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Bergman, C.A. 1993. The Development of the Bow in Western Europe: A Technological and Functional Perspective. in G. Peterkin, H. Bricker and P. Mellars (eds.) Hunting Techniques and Technology in the Later Palaeolithic and Mesolithic of Eurasia. Archaeological Papers of the American Anthropological Association 4: 95-105.

Bergman, C.A., J.F. Doershuk and Joseph Schuldenrein 1994. A Young Archaeologist's Summary Guide to the Deeply Stratified Sandts Eddy Site, Northampton County, Pennsylvania. in C.A. Bergman and J.F. Doershuk (eds.) Recent Research into the Prehistory of the Delaware Valley. Journal of Middle Atlantic Archaeology 10: 153-168.

Duerksen, K., J.F. Doershuk, C.A. Bergman, T. Tune and D. Miller 1995. Fayette Thick Ceramic Chronology at the West Runway Site (15BE391), Boone County, Kentucky. in J.F. Doershuk, C.A. Bergman, and D. Pollack (eds.) Current Archaeological Research in Kentucky: Volume 3. Kentucky Heritage Council: 70-88.

Wall, S., K. Russell, G. Perkins, D. Miller, L.R. Kimball, M. Jacobs, K. Duerksen, J.F. Doershuk, R. Adams and C.A. Bergman 1995. Kramer Projectile Points and Early Woodland Activity at the West Runway Site (15Be391), Boone County, Kentucky. in J.F. Doershuk, C.A. Bergman, and D. Pollack (eds.) Current Archaeological Research in Kentucky: Volume 3. Kentucky Heritage Council: 89-112.

Bergman, C.A. and J.F. Doershuk 1995. OSHA Regulations and the Excavation of the Deeply Stratified Sandts Eddy Site (36Nm12). Journal of Middle Atlantic Archaeology 11: 17-29.

Kooi, B.W. and C.A. Bergman 1997. Mathematical Approaches to the Study of Ancient Bows. Antiquity 71: 124-134.

Bergman, C.A. and E. McEwen 1997. Sinew-Reinforced and Composite Bows: Technology, Function, and Social Implications. in H. Knecht (ed.) Getting to the Point: Archaeological, Experimental, and Ethnoarchaeological Perspectives on Projectile Technology. Plenum Press, New York: 143-160.

Bergman, C.A., J.F. Doershuk, P. LaPorta, R. Moeller and J. Schuldenrein in press. The Early and Middle Archaic Occupations of Sandts Eddy in P Raber, P.E. Miller, and S.M. Nesius (eds) The Archaic Period in Pennsylvania. Pennsylvania Historical and Museum Commission: 45-75.

Bergman, C.A., J.F. Doershuk, K. Duerksen, D.A. Miller and T.W. Tune 1998. Early Woodland Occupation of the Northern Bluegrass: the West Runway Site (15BE391), Boone County, Kentucky. North American Archaeologist: 13-33.

Miscellaneous Publications

Azoury, I. and C.A. Bergman 1978/1979. in H. Seeden Sams ad-Din Tannira. Archiv fur Orientforschung XXVI: 155-156

Miller, R., C. A. Bergman and I. Azoury 1982. Additional note on aspects of archery equipment at Shams ed-Din Tannira. Berytus XXX: 53-54.

Barton, R.N.E. and C.A. Bergman 1983. The Hunters of Hengistbury. The Illustrated London News. February 1983: 42.

Bergman, C. A. 1984. Palaeolithic composite points. Journal of the Society of Archer-Antiquaries 27: 21.

Bergman, C.A. and P. Gibbs 1984. American composites in Britain. Journal of the Society of Archer-Antiquaries 28: 35-36.

Bergman, C. A. 1987. Death on the Plains. Journal of the Society of Archer-Antiquaries 30: 12-14.

PROFESSIONAL MEMBERSHIPS

American Archaeological Society

Register of Professional Archaeologists (RPA)

Member of the Florida Archaeological Council

Member of the New York Archaeological Council

Member of the Ohio Archaeological Council

Member of the Pennsylvania Archaeological Council

MISCELLANEOUS

1999-2000 President of the Middle Atlantic Archaeological Conference.

1999 Cited for Outstanding Achievement in the conduct of the Susan Furnace Project, Secretary of Interior's Annual Report to the United States Congress.

1997-1998: President-elect of the Middle Atlantic Archaeological Conference.

1997: Designed and participated in segments of the National Geographic Explorer special entitled "Mystery of the Neanderthals."

1997: Cited for Outstanding Achievement in the conduct of the Sandts Eddy Project, Secretary of Interior's Annual Report to the United States Congress.

1995: Recipient of the 1st Annual Historic Preservation Archaeological Award for Outstanding Achievement upon completion of the Sandts Eddy Archaeological Project. Award presented by the Pennsylvania Historical and Museum Commission.

1994: Collaborated on a children's book entitled Frozen Man (published by Henry Holt) about the "Iceman" discovery.

1994 to present: Reviewer for the Journal of Middle Atlantic Archaeology.

1994 to present: Midwestern Regional Advisory Editor for North American Archaeologist.

1994: Developed and presented a segment on the history and technology of bows and arrows for Newton's Apple, PBS Television, Minneapolis.

DONALD A. MILLER
Staff Archaeologist

EDUCATION

B.A. Anthropology, In Progress, Native American Studies Minor, Northern Kentucky University

Member of Lambda Alpha, National Anthropology Honor Society.

CRM RELATED COURSE WORK

1995- NAGPRA Applications and Implications, University of Reno.

1998-Section 106 and the National Historic Preservation Act, Northern Kentucky University.

1998-Legal Anthropology: Native American Law, Northern Kentucky University.

QUALIFICATIONS AND RELEVANT EXPERIENCE

Mr. Miller is BHE's Laboratory Director supervising the curation of all artifactual materials recovered from archaeological projects. His responsibilities include the preparation and cataloging of artifacts for submittal to state curation facilities and analysis of lithic materials recovered from BHE projects. Mr. Miller has curated large samples of artifacts with museums in Kentucky, Indiana, Michigan, Tennessee, Ohio and Pennsylvania. In addition, Mr. Miller curated over 30,000 artifacts from the Sandts Eddy Site (36Nm12) with the Pennsylvania Historical Museum Commission. The Sandts Eddy project was recognized by the Secretary of the Interior as an outstanding Cultural Resource Management Project. In addition, the Pennsylvania Historical Museum Commission recognized the Sandts Eddy Project with an award for outstanding achievement. Mr. Miller has been involved in all levels of Cultural Resource Management including fieldwork, deep testing, project management, report production, coordination with clients and appropriate governmental agencies, budget and proposal preparation, and background research. Mr. Miller has considerable experience in conducting analysis of prehistoric artifacts from the Northeast, Midwest, and Southeast. His own research interests include microwear, experimental replication of stone and bone tools, atlatls, bows and their performance in hunting scenarios. Most recently he has been involved in the excavation and analyses of lithic materials from several Fort Ancient sites located in Kentucky.

SELECTED PROJECT EXPERIENCE

- Lab Director-Supervised artifact cataloging and preparation of the Chinque Site (36Al480) for USCOE, Pittsburgh District.

- Lab Director/Lithic Analyst - Supervised curation of artifacts with the PHMC., and conducted lithic analyses for Phase III data recovery of the Sandts Eddy site (36Nm12) Northampton County, Pennsylvania.

- Lab Director - Supervised curation of artifacts with the PHMC for Phase III data recovery of the Padula site (36Nm15) Northampton County, Pennsylvania.

- Lab Director/Lithic Analyst - Supervised curation and conducted lithic analysis on sites 12Ve493, 494, 497, 499, 509, 510, 512, 513, 514, 515, 516, 518, 519, 520, Newport Army Chemical Facility, in Vermillion County, Indiana, for USCOE, Louisville District.

- Lithic Analyst-Conducted lithic analysis of materials from site 40Mn232 for Williams-Texas Gas.

- Filed Director-Supervised fieldwork and conducted lithic analysis for Phase II Testing of site 33Bu655 for KZF, Inc.

- Lithic Analyst-conducted lithic analysis of site 33Bu654 for KZF, Inc.

- Field Director-Supervised fieldwork for the Phase III mitigation of site 15Fr20, Franklin County, Kentucky, for Columbia Gas of Kentucky.

- Field Director-Supervised fieldwork for DPL Energy's Derby-Tait natural gas pipeline reroutes.

- Field Director-Supervised fieldwork for several cellular towers for SPRINT PCS.

- Lab Director/Lithic Analyst- Conducted analysis of lithic materials from twenty sites and supervised cataloging of materials recovered from Marathon Ashland, LLC's Cardinal Project.

- Field Director-Supervised fieldwork for portions of Marathon Ashland, LLC's Cardinal and Gatherco Projects.

- Field Director-Supervised deep testing on the Scioto River for Marathon Ashland, LLC's, Scioto River crossing, Cardinal Project.

- Field Director-Supervised deep testing for Rivercrest Marina Project on the Ohio River in Madison, Indiana.

- Lithic Analyst/Laboratory Supervisor- Supervised organization and database management of all artifactual materials including human remains and conducted analysis of lithic materials from the Arrasmith Site (15Be36) for Northern Kentucky University.

- Field Director-Supervised fieldwork and prepared report for Williams-Texas Gas Highway 1435 replacement located in Warren County, Kentucky.

- Field Director/Lab Director/Lithic Analyst – Supervised fieldwork including Phase I Survey and Phase II Testing, deep testing, prepared artifacts for curation with the University of Kentucky Museum of Anthropology, and conducted lithic analysis from sites 15Sc212, Sc213, Sc214, Sc215, Sc216, Sc217, Sc218, Sc219, Sc220, Sc221, Sc222, Fr121, Fr122, Fr123, Fr124, Fr125, Fr126,

Fr127, Fr128, and Fr20 for Columbia Gas of Kentucky's Georgetown to Frankfort natural gas pipeline project.

- Lab Director – Supervised curation of artifacts from sites 15Bc138 and 15Bc164 with the University of Kentucky Museum of Anthropology for Williams-Texas Gas.

- Lab Director/Lithic Analyst – Conducted lithic analysis on materials recovered from site 28Wa630, Transcontinental Gas Pipeline Corporation's Market Link Project, Warren County, New Jersey.

- Lab Director- Supervised curation of sites 36Ti93 through 36Ti102 from Tioga County, Pennsylvania ,with the PHMC from the Tioga Natural Gas storage facility for Market Hub Partners.

- Lab Director/Lithic Analyst- Conducted lithic analysis and supervised lab work on sites 33Ro790, 33Ro791, 33Ro792, and 33Ro793, Ross County, Ohio, for the expansion of US 35, on behalf of Kokosing Construction.

- Lab Director/Lithic Analyst - Supervised curation of artifacts and conducted lithic analysis of artifacts from 36Gr247 for Texas Eastern Transmission Corporation.

- Lab Director/Field Director/Lithic Analyst – Supervised field lab, curation of artifacts, and conducted lithic analyses from 40LN163 and 40LN167 (Middle Woodland and Terminal Archaic), Lincoln County, Tennessee, for TNDOT.

- Field Director/Lab Director - Supervised field and lab work for a Phase I waterline in Ross County, Ohio, for the Village of Bainbridge.

- Field Director/Lithic Analyst/Lab Director - Supervised field and lab work, and conducted lithic analyses on the Saxton Site material and a 20 mile pipeline project in Steuben County, New York, for CNG Transmission.

- Field Director - Supervised field work for a 1 mile powerline relocation in Montgomery County, Ohio, for Dayton Power and Light Corporation.

- Field Director/Lab Director/Lithic Analyst - Supervised field work, curation, and lithic analyses for Phase II and deep testing of site 12D430, located on a 13-acre wastewater facility for the City of Lawrenceburg, Indiana.

- Lab Director/Lithic Analyst - Supervised lab work and lithic analysis for a Phase I survey of a proposed gravel pit adjacent to 12FL1, Floyd County, Indiana, for Silver Creek Sand.

- Field Director - Supervised field work including deep testing in Clark and Madison Counties, Kentucky, and Hocking and Muskingum Counties, Ohio, for Tenneco's 1995 Pipeline Rehab. Project.

- Field Director/Lab Director/Lithic Analyst - Salvage excavation of a Late Woodland firehearth at 15Be269 in Big Bone Lick State Park, Boone County, Kentucky.

- Lab Director/Lithic Analyst - Supervised curation and conducted lithic analyses of prehistoric materials from 15Cl45 for North American Stainless water out take right-of-way, Carroll County, Kentucky.

- Lab Director/Technical Analyst - Analysis and replication of bone awls from the Chiggerville Site 15Oh1 Ohio County, Kentucky, Northern Kentucky University.

- Lab Director/Lithic Analyst - Supervised curation of artifacts of Early Woodland Site 15Be391 for Greater Cincinnati , Northern Kentucky International Airport, Boone County, Kentucky.

- Field Technician - Phase I, II, and III, excavations of Fort Ancient site 15Be6, Petersburg, Kentucky, for CRM Division of the University of Kentucky.

- Field and Laboratory Technician - Phase III excavation of 15Cp40, Dunn Village in Campbell County, Kentucky for Northern Kentucky University.

- Field Technician - Salvage excavation on a Prehistoric Mound Complex 33Ha182 Hawkins Ridge Mounds for Central Ohio Valley Archaeological Society.

- Lab Director - Supervised curation of artifacts from a 52-mile natural gas pipeline in New York for CNG Transmission Corporation.

- Lab Director - Supervised curation of artifacts from 5.1miles of natural gas pipeline in Pennsylvania and the Pedrectown Station in New Jersey for Columbia Gas Transmission Corporation.

- Lab Director - Supervised curation of artifacts from Majorsville Heard Replacement in Hardy County, West Virginia, for Columbia Gas Transmission Corporation.

- Lab Director - Supervised curation of artifacts from 356 feet of natural gas pipeline in Kanawha County, Ohio for Columbia Gas Transmission Corporation.

- Lab Director - Supervised lab work of artifacts from 42-mile natural gas pipeline in Illinois for Tenneco Gas.

- Field Technician and Lab Director - Conducted field work and curation of artifacts from natural gas pipeline construction in Boyle, Carter, Greenup, and Lincoln Counties, Kentucky, for Tenneco Gas.

- Lab Director - Supervised curation of artifacts from North Louisiana Facility Expansion for Texas Gas Transmission Corporation.

- Lab Director - Supervised curation of artifacts from Environmental Assessment Study of Leidy Station #517 for Transcontinental Gas Pipe Line Corporation.

- Lab Technician - Phase I survey, and EA for CNG Transmission, Erie City, New York

- Lab Director - Supervised curation of artifacts from temporary work areas of the Leidy Loop in Pennsylvania and New Jersey for Transcontinental Gas Pipe Line Corporation.

- Lab Director - Supervised curation of artifacts from 6.7-miles and 6.6-miles of natural gas pipeline in Lycoming County, Pennsylvania for Transcontinental Gas Pipeline Corporation.

- Lab Director - Supervised curation of artifacts from Phase II survey for Addington Coal (P & L Systems) Lawrence County, Ohio

- Lab Director - Supervised curation of artifacts from Phase I survey of Crawford Storage Yard, Hocking County, Ohio, for Columbia Gas.

- Lab Director - Supervised curation of artifacts from Phase I survey of Hardy/Randolph County, West Virginia, for Columbia Gas.

- Lab Director - Supervised curation of artifacts from Phase I survey of 391 acres (P & L Systems) of Lawrence County, Ohio for Addington Coal.

- Lab Director - Supervised curation of artifacts from Phase I survey of 320 feet of Wegee Creek, Belmont County, Ohio, for Columbia Gas Transmission.

- Lab Director - Supervised curation of artifacts from Phase I survey of .8 mile, Hocking County, Ohio, for Columbia Gas Transmission.

- Lab Director - Supervised curation of artifacts from aPhase I survey of 3.4 mile natura for l gas pipeline in Holmes County, Ohio, for Columbia Gas Transmission.

- Field Archaeologist/Lab Director - Phase I survey of a 22 mile natural gas pipeline in Hidalgo County, Texas, for Enron.

- Lab Technician - Phase III mitigation of Falls of Ohio State Park for Indiana Department of Natural Resources.

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Early Woodland Projectile Points and Site Function at Site 15BE391. Paper presented at 10th annual Kentucky Heritage Council Archaeological Conference. S. Wall, K. Russell, G. Perkins, D. A. Miller, L. Kimball, M. Jacobs, N. Haywood, K. Duerksen, J. Doershuk, R. Adams and C. Bergman.

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The Terminal Archaic Occupations of Sites 40Ln163 and 40Ln167, Two Multicomponent Localities in Lincoln County, Tennessee. Paper presented at the 8th annual Tennessee Division of Archaeology Conference. Donald A. Miller and C. A. Bergman.

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Prepared by:

Donald A. Miller
and

Christopher A. Bergman, Ph.D.
Principal Investigator

ABSTRACT

This report details the background research, field methods, and results of a Phase I cultural resource survey of the DPL Energy, Inc. (DPL Energy) proposed pipeline construction in Montgomery County, Ohio. The survey was conducted by BHE Environmental, Inc. (BHE), Cincinnati, Ohio, at the request of DPL Energy, of Dayton, Ohio. The survey was performed in order to locate any cultural resources within the proposed project area and, wherever possible, assess their eligibility for the National Register of Historic Places (NRHP) in accordance with the requirements of Section 106 of the National Historic Preservation Act.

The Derby-Tait Pipeline extends from DPL Energy's Derby Station to DPL Energy's Tait Station site, a distance of approximately 6.27 miles. DPL Energy proposes to construct a 12-inch natural gas pipeline primarily in existing and previously surveyed utility right-of-way (Balz et al. 1994). However, five segments of the proposed pipeline will be relocated outside of the existing right-of-way (ROW) (Figure 1.2). These segments include:

- Segment 1, approximately 35 feet wide (10.67 meters) by 1,900 feet (579 meters) in length along the south side of Derby Road (1.5 acres).

- Segment 2, approximately 25 feet wide (7.62 meters) by 1,250 feet (381 meters) in length along the south side of Frytown Road (.71 acres).

- Segment 3, approximately 80 feet wide (24.39 meters) by 900 feet (274 meters) in length along the west side of Gettysburg Avenue (1.65 acres).

- Segment 4, approximately 50 feet wide (15.24 meters) by 800 feet (243 meters) in length along a railroad ROW west of DPL Energy's Tait Station (.91 acres).

- Segment 5, approximately 1000 feet (304 meters) of directional-drill, one 20 foot by 20 foot (6.09 x 6.09 meters) bulkhead area for support of the directional-drill machine placed approximately 50 feet from the east side of West River Road, and a 20 foot by 20 foot (6.09 x 6.09 meters) area approximately 30 feet west (9.1 meters) of the CSX Railroad tracks to tie in the new pipe with existing lines (5.57 acres).

Documentary research identified one previously recorded cultural resource within 20 meters (m) of the proposed pipeline ROW on Segment 3 (Frytown Road). Originally recorded in 1994, site 33My690 produced one piece of lithic debitage. Based on the paucity of artifacts recovered, it was suggested that this site did not meet the criteria for eligibility to the NRHP (Baltz et al. 1994). A portion of Segment 5 is located in close proximity to Sunwatch Village (33My57) however this area is an abandoned landfill (Baltz et al. 1994), and no cultural resources were recovered.

A total of 10.34 acres were surveyed with negative results. Therefore, no cultural resources will be impacted by the proposed project and clearance is recommended.

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APPENDICIES

Section 1.0: Introduction

DPL Energy proposes to construct a 12-inch natural gas pipeline extending from DPL Energy's Derby Station to DPL Energy's Tait Station located in Montgomery, County, Ohio (Figure 1.1). At the request of DPL Energy, BHE completed a Phase I cultural resource survey in February 2000. The following report provides environmental and cultural overviews of the southwestern Ohio region, the survey strategy and methods of artifact analysis, and the survey results and recommendations concerning cultural resources at the preferred site.

The Derby-Tait Pipeline extends from DPL Energy's Derby Station to DPL Energy's Tait Station site, a distance of approximately 6.27 miles (Figure 1.2). DPL Energy proposes to construct a 12-inch natural gas pipeline primarily in existing and previously surveyed utility right-of-way (Baltz et al. 1994). However, five segments of the proposed pipeline (5,850 feet or 1783 meters) will be relocated outside of the existing right-of-way (ROW). These segments include:

- Segment 1, approximately 35 feet wide (10.67 meters) by 1,900 feet (579 meters) in length along the south side of Derby Road.

- Segment 2, approximately 25 feet wide (7.62 meters) by 1,250 feet (381 meters) in length along the south side of Frytown Road.

- Segment 3, approximately 80 feet wide (24.39 meters) by 900 feet (274 meters) in length along the west side of Gettysburg Avenue.

- Segment 4, approximately 50 feet wide (15.24 meters) by 800 feet (243 meters) in length along a railroad ROW west of DPL Energy's Tait Station.

- Segment 5, approximately 1000 feet (304 meters) of directional-drill, one 20 foot by 20 foot (6.09 x 6.09 meters) bulkhead area for support of the directional-drill machine placed approximately 50 feet from the east side of West River Road, and a 20 foot by 20 foot (6.09 x 6.09 meters) area approximately 30 feet west (9.1 meters) of the CSX Railroad tracks to tie in the new pipe with existing lines.

Construction and staging impacts will include excavation and grading of soils from pipeline construction, and compaction of soils from construction equipment staging.

The purpose of the Phase I survey of DPL Energy's proposed natural gas pipeline is to identify any cultural resources that could be affected by construction; and if cultural resources are found in the area of construction, to assess their potential for eligibility to the National Register of Historic Places, in accordance with Section 106 of the National Historic Preservation Act. The Phase I survey of DPL Energy's proposed natural gas pipeline included background research, predictive modeling, and field reconnaissance. BHE implements cultural resource surveys and reports in compliance with the guidelines of the Secretary of Interior, and in cooperation with the state of Ohio's Historic Preservation Office (OHPO).

Field reconnaissance methods included pedestrian survey and shovel testing, depending on surface visibility in the area of proposed construction and staging. Mr. Jim Wilson M.A. completed background research. Mr. Donald A. Miller and Dr. Christopher A. Bergman conducted BHE's field reconnaissance during February 2000 under good weather conditions. The report was prepared by Mr. Donald A. Miller under the direct supervision of Dr. Christopher A. Bergman. Ms. Leslie Jeffries provided administrative support. Resumes for key personnel are included in Appendix B. The results of background research, predictive modeling, and field reconnaissance enabled BHE to assess the potential for cultural resources within the pipeline ROW of DPL Energy's proposed construction. The report concludes with recommendations to DPL Energy regarding the results of BHE's Phase I survey.

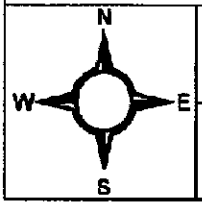

FIGURE 1.1. DPL Energy's Proposed Project Location within the State of Ohio.

Project No. 1149.02-03

BHE ENVIRONMENTAL, INC.

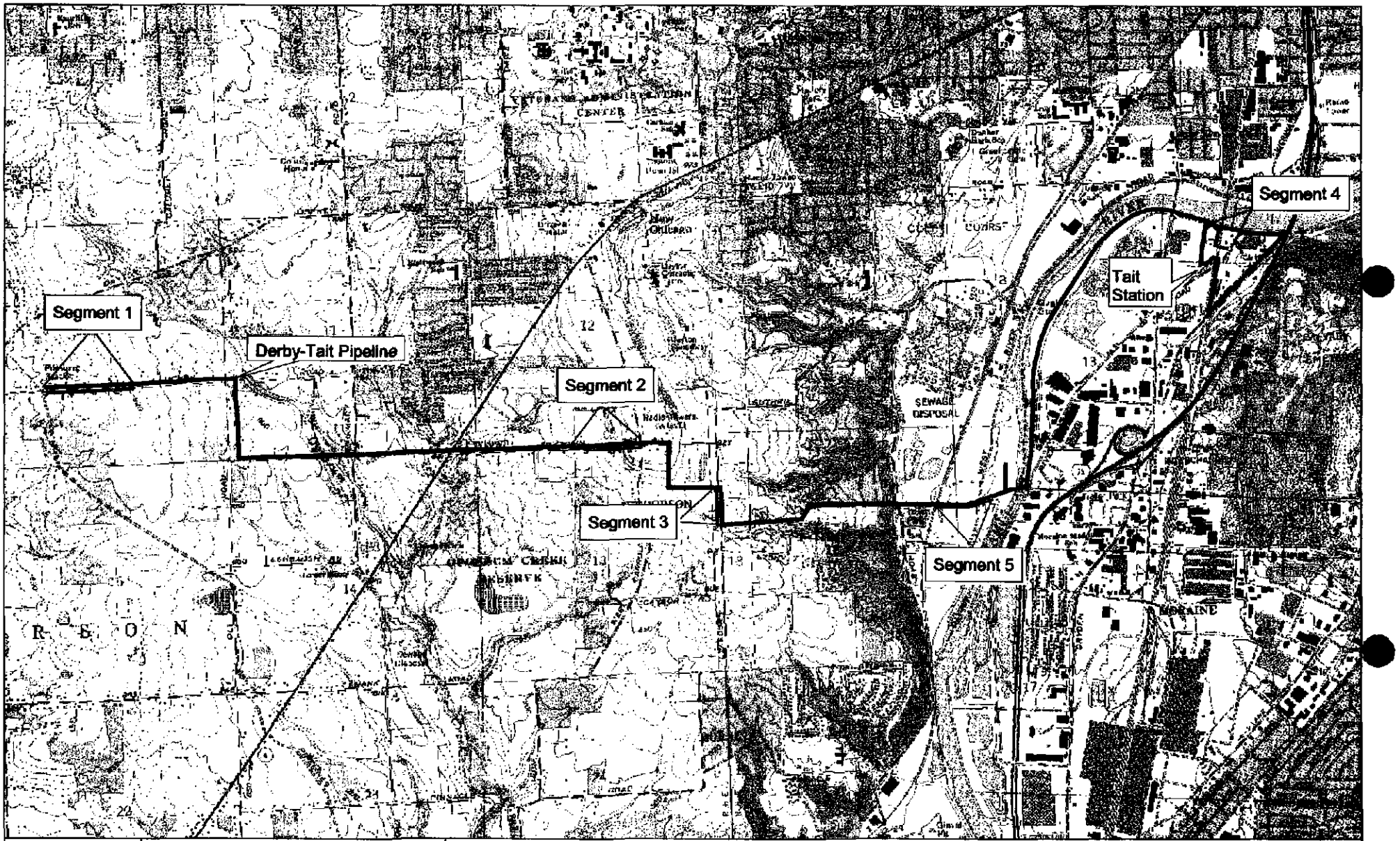

FIGURE 1.2. DPL Energy's Proposed Reroutes Depicted on 7.5 Minute Series Topographic Map.

Project No. 1149.002-003

Base Map: USGS 7.5 Minute Topographic Maps- Miamisburg East, OH and Dayton South, OH

BHE ENVIRONMENTAL, INC.

Section 2.0: Environmental Overview

2.1 INTRODUCTION

A study of human-land relationships requires an understanding of the local climate, vegetation, soils and geomorphic agencies, which provide economic resource-areas and habitable locations. An outline of the natural history of southwestern Ohio, including Montgomery County, describes how local resources and habitable locations fostered the development of human cultures over time.

2.2 PHYSIOGRAPHY AND GEOMORPHOLOGY

Physiographic features determine environmental variability and often define the boundary between biomes. Such features frequently also control routes of travel and communication. Within broad physiographic zones, specific local geomorphic features were purposely selected as settings for prehistoric and historic activity.

DPL Energy's proposed natural gas pipeline located in Montgomery County, Ohio, lies in the Till Plains section of the Central Lowland physiographic province (Fenneman 1916). This portion of Ohio owes much of its surface topography to the action of various glacial advances and retreats. For example, during the Pleistocene epoch three consecutive ice sheets crossed the present State of Ohio: the Kansan, Illinoian, and Wisconsin. The earliest of the three glacial episodes, the Kansan, covered the northern portion of Ohio, while the two subsequent advances extended into the central and southwestern parts of the state. Both the Illinoian and the Wisconsin glacial advances covered all of Montgomery County, including the project area, however the Wisconsin age glacier only reached the northern part of the county, and exerted ragged pressures rather than the intense leveling typical of areas further to the north (USDA 1976). Relief ranges from level to steep, with the level areas found along stream floodplains and terraces, or glacial out-wash valleys and plains. The steep sloped relief is primarily found along the valley walls of streams and glacial moraines. DPL Energy's proposed natural gas pipeline is located on geomorphic features formed by alluvial agents, glacial outwash, and upland moraines of glacial till.

The proposed project area is underlain by clastic and carbonate rocks. The most recent bedrock formations are Silurian in age (limestones and dolomites) and belong to the Niagra Group while the oldest are Ordovician (shale and limestone) and belong the Maysville Group (USDA 1976:105). The till deposits from glacial episodes can range from one to 300 feet in thickness. Glacial outwash varies in depth as well and is 150 feet thick in particular Montgomery County locations (USDA 1976: 105).

2.3 SOILS

Soil type plays an important role, on both local and regional scales, in determining where cultural groups can settle and secure resources, whether animal, vegetable, mineral, or hydraulic (Evans 1978:6,7). Certain types of soils were preferred over others by both American Indians and early settlers.

The proposed utility alignment crosses four separate soil series and six mapping units (USDA 1976). Each soil series along the project corridor is described below:

Celina Series

The Celina series consists of moderately well drained soil, which formed in calcareous glacial till. In some areas a loess layer caps the glacial till. Celina soils are frequent in till plain and moraine areas and are level to gently sloping (USDA 1976:63). Specific mapping units of Celina series soils encountered consist of Celina silt loam 2 to 6 percent slopes (CeB), and are located on Segment 1 (USDA 1976:64).

Fox Series

The Fox series consists of well-drained soils that were formed in loamy glacial outwash and occupy areas along major streams and terraces (USDA 1976:69). Specific mapping units from the Fox series that were encountered as a result of this survey are Fox-Urban land complex, gently sloping (FuB), and were encountered on Segment 4 at DPL Energy's Tait Station and Segment 5 (USDA 1976).

Miamian Series

The Miamian series consists of well-drained soils that formed in calcareous glacial till and often is capped by a silt or loess layer (USDA 1976:77). The Miamian series soils are level to very steep and occupy upland areas of Till Plains and moraines (USDA 1976:77). Specific mapping units encountered as a result of this survey are Miamian silt loam, 2 to 6 percent slopes (MIB), and are located on Segment 3 and Segment 1(USDA 1976:78).

Milton Series

The Milton series are described as well drained soils that formed in 20-40 inches (50.8-101.6 centimeters) of glacial till over limestone bedrock in upland areas, and are level to moderately steep (USDA 1976:80). Specific mapping units encountered are Milton silt loam, 2-6 percent slopes (MsB), Milton silt loam, 2 to 6 percent slopes, moderately eroded (MsB2), and Milton silt loam (MsC2), 6 to12 percent slopes, moderately eroded (USDA 1976:80-81). These soils were encountered on Segment 2.

2.4 CLIMATE

Knowledge of Ohio's climate in the past comes primarily from regional palynological evidence that indicates broad floral patterns, which reflect specific climatic conditions. Pollen profiles from areas in Indiana, Ohio, Pennsylvania, and New England suggest a climatic sequence that is relatively consistent throughout the Northeast. The sequence began in the Late Pleistocene around 15,000 B.C. when a moist, cool climate began to succeed a drier, colder climate. Around 9000 B.C., the climate was still considerably cooler and wetter than that of today, and was still under residual influence from receding glaciers. Sometime between 9000 and 7000 B.C., a warming trend began. Known as the Altithermal and Hypsithermal, the warming trend continued until roughly 2000 B.C., initiating a "temperate" phase of Ohio's climate. With the warming trend, deciduous forests such as the Oak-Chestnut climax forests of Ohio's area of North America's woodlands, reached their maximum extent as early as 1000 B.C.

The climate of Montgomery County is characterized as temperate or humid continental. For Montgomery County, the annual temperature can vary from -1 degrees F in the winter, to 97 degrees F in the summer. Annual variations in precipitation range from 33 to 43 inches, with the spring and summer being the wettest seasons (USDA 1976).

2.5 FLORA AND FAUNA

The following floral and faunal reconstructions are based on two types of evidence: palynological and early land survey records. The floral evidence indicates types and frequencies of floral species present in an assemblage, while the faunal evidence indicates the distribution of natural forest types prior to historic-era settlement. The earliest vegetational patterns of the post-glacial succession and succeeding shifts in climax forests are derived primarily from palynological evidence. However, the forest types present during the Woodland culture period (900 B.C. to 1000 A.D.) are assumed to be similar to those present at the time of contact. The assumption is supported by Yarnell's study, which argues that "the climate probably remained much the same for the past 4000 years and the general vegetational patterns have not changed much during this period" (Yarnell 1964: 47).

Pleistocene megafauna, a major resource of the area's earliest inhabitants, were ideally suited to the cool, moist climate along the melting glacier's edge. Mastodons and Mammoths were the largest of many species that roamed the spruce forests and grazed the open grasslands associated with glacial margins. Such environments probably also supported musk oxen, giant beavers, caribou, and ground sloths (Cleland 1966: 91-92).

At the advent of the Holocene, the ice sheet's retreat and the encroaching deciduous forests and tall-grass prairies hosted even more diverse plant and animal communities (Cleland 1966: 20-23). Deer, elk, and smaller animals, coupled with the wetland and aquatic animal resources, provided varied sources of protein for the area's first inhabitants. Acorns, nuts, seeds, berries, greens, and roots supplemented and diversified the diet. Certain grasses, reeds and trees were also utilized for making baskets, mats and shelter.

When the climate tended towards cooler and wetter conditions, woodland resources began to predominate. By 8500 years ago, the wetter environment began to produce a broad-leafed, mixed swamp-forest that replaced the spruce and fir forests of the late Pleistocene. Species such as beech, basswood, red oak and sugar maple became dominant in the better-drained, more steeply sloped areas of river and stream valleys.

When the climate warmed and dried, prairie vegetation and open-area wildlife were more plentiful (Cleland 1966: 93). By 4000 years ago, the environment of hardwood forests and savannah prairies that are typical of today's floral environment, stabilized in the area. Whether migratory hunter and gatherers, or sedentary agriculturists, the flora and fauna of such upland till plain settings provided diverse natural resources for the area's earliest cultures.

Section 3.0: Cultural Overview

3.1 INTRODUCTION

The following is a synthesis of various sources on prehistoric and historic cultures of the region of central Ohio, including DPL Energy's proposed natural gas pipeline. Pertinent regional information on cultural history provides a framework within which site significance is addressed and research questions are formulated.

In the framework, the choice of specific years for dividing one cultural period from another is somewhat arbitrary, since continuity of occupation for most areas in the east is well documented (e.g., Broyles 1971). In addition, regional variations can make such dates approximations at best. For ease of communication, however, it is convenient to use a widely accepted chronology that is based on significant distinctions among artifact assemblages.

3.2 PALEO-INDIAN OCCUPATION (14,000 B.C. TO 8000 B.C.)

Some archaeologists suggest that the initial human crossing of the Bering land bridge into the New World may have occurred as early as 40,000 years ago. Evidence to support this theory, however, is still open to debate (cf. Dincauze 1984). In the East, the earliest Paleo-Indian material is found at the Meadowcroft Rockshelter in Pennsylvania with C14 dates of between 14,555 B.C. and 13,955 B.C. (Adovasio et al. 1990).

Paleo-Indian sites are reported from the American Southwest to Nova Scotia with very little interregional variation in their material culture. The Paleo-Indian tradition in the Midwest is recognized as part of a widespread homogeneous New World culture characterized by a distinct lithic artifact assemblage. Most of what is known about the Paleoindian cultural development must be inferred from sparse surface recoveries of artifacts, particularly diagnostic fluted points (Dorwin 1966; Prufer and Baby 1963; Smail 1951; Winters 1963). The information from lithic remains can further be analyzed in conjunction with geochronological and paleoecological data to make generalized assumptions about the earliest post-Pleistocene inhabitants.

With the beginnings of the final retreat of the most recent glacial front (the Wisconsin) around 15,000 years ago, the project area would have become increasingly hospitable for aboriginal occupation (Prufer and Baby 1963:55). The region below the glacial border, just south and east of modern Fairfield County, would have been cloudy, rainy and cool, where the cold glacial atmosphere encountered the warm Gulf air masses along the Ohio River trench. The resulting climate induced a combination of open grazing lands and boreal forests which

supported a wide array of cool-climate mammals including the musk ox, woolly mammoth, giant beaver, and moose (Cleland 1966:91-92). Such mammals formed the basis of the Paleo-Indian hunting economy.

The retreat of the glacier gradually opened grazing lands that were attractive to the large herbivore mammals that the Paleo-Indians hunted (Cleland 1966:91-92). The first known human inhabitants to enter the project area were highly nomadic; migrating from the south as the glacier slowly retreated. Paleo-Indian subsistence was based upon the exploitation of large mammals supplemented by gathering. Brown and Cleland (1968) suggest that the uplands may have been borderlines between microenvironmental biomes. Biomes are units of ecological space composed of unique and complimentary constituents that are specifically adapted to the environment of the biome. The ecotones, or borders of various biomes, provide a rich diversity of floral and faunal species, and are areas that are most prolific for mammals. Since Paleo-Indian subsistence strategies relied primarily on hunting mammals, the upland ecotones would have provided an optimum setting for procurement camps.

Sites from the time period prior to 8000 B.C. are generally areas where small groups of people performed specific tasks over a very short period of time. The physical evidence is very tenuous and, except for extraordinary circumstances, goes unrepresented in the archaeological record. In the Midwest and Northeast, Paleo-Indian sites are typically located on hilltops and bluffs overlooking open portions of main river valleys and larger tributary valleys, and frequently occur at the confluence of rivers on high Wisconsin-age terraces. Prufer and Baby (1963), in their study of Ohio's Paleo-Indian projectile points, note that the maximum southward distribution of the artifacts follows a diagonal line across Ohio that corresponds roughly to the maximum Wisconsin glacial boundary. Additionally, their research reveals a marked absence of such materials in unglaciated southeastern Ohio—an area that is certainly more rugged and consequently may have been less attractive for human use and occupation than areas previously covered by, or bordering the glacier.

There are no Paleo-Indian sites located within one mile of the proposed pipeline project.

3.3 ARCHAIC OCCUPATION (8000 B.C. TO 900 B.C.)

Around 8000 B.C., climatic moderation gradually altered the glacial-boreal ecosystem in the Midwest. The warming climate and eventually drier conditions initiated an increase of deciduous forests that became the dominant forest type by 5000 B.C. (Cleland 1966:20-23). Cyclical plants developed and smaller animals filled the opening faunal ecological niches. The consolidation of resources into area-specific zones would have allowed Early Archaic groups to schedule the procurement of subsistence items as they became available. This type of strategy would not have been possible in a mosaic environment where resources occurred in undifferentiated and, thus, more random locations. Archaic inhabitants lived in this developing system, and their subsistence and settlement patterns reflected the changing environmental conditions.

During the Early Archaic period, ca. 8000-6000 B.C., the expanding deciduous forests produced a more favorable habitat for the white-tailed deer (*Odocoileus virginianus*).

Concurrently, there was a shift from the Paleo-Indian lanceolate fluted points to smaller more diversified points or knives, including the bifurcated MacCorkle, LeCroy, and Kanawha. Woodworking and milling tools, including axes, gouges, and grinding stones, were also added to the Archaic assemblages (Chapman 1975:6; Jennings 1978:12). Small mobile groups gradually became more geographically restricted as seasonally oriented hunting and gathering activities focused on smaller, more well exploited territories (Potter 1980:17). A narrow, yet nutritious, spectrum of plant foods seems to have been utilized, with deer hunting being the major subsistence activity (Chapman 1975:232-233; Cleland 1966:92). During the Early Archaic Period, sites tended to be small and scattered and usually located in uplands near secondary stream valleys. According to Prufer (1965:315), more Archaic sites are known for the tributaries of the Scioto River than for the river itself, suggesting that the more remote uplands may harbor Archaic sites.

During the Middle Archaic period, ca. 6000-3000 B.C., continuing warming of the climate led to a greater variety of available resources. The diversification of subsistence-related activities increased, and the exploitation of seasonal resources grew in importance. The Middle Archaic economy became more diverse, still with an emphasis on deer hunting, but utilizing a wider variety of plant foods (Cleland 1966:92-93). Specialization in certain activities generated a more complex social structure within the band network as evidenced by what Griffin calls the early indication of "status differentiation among the band members" (1978:229).

The material remnants of Middle Archaic culture reflect the increasingly sophisticated technology adapted to intensive exploitation of forest and riverine biomes (Brown and Vierra 1983). The Early Archaic bifurcate point types in Ohio appear to have been replaced by a widespread tradition of large side-notched points including types such as the Raddatz or Godar (Fitzhugh 1972:8; Justice 1987:60-71). There was an increase in ground and polished stone tools, full grooved axes, pendants, and winged and cylindrical bannerstones used as atlatl weights. Bone tools also appeared in the artifact assemblage (Chapman 1975:6; Griffin 1968:133).

Within the southwestern Ohio area in general, Early and Middle Archaic sites are represented in two different forms: 1) those sites from which a single or small group of diagnostic points have been recovered, and 2) those sites at which Early or Middle Archaic artifacts predominate. According to Strothers and Pratt (1980:11) the first type of site is the most common.

Cultural groups prior to the Late Archaic incorporated some seasonal patterning into their subsistence strategy. However, the scheduling of variously available resources climaxed during the Late Archaic, the trend being towards greater efficiency in the exploitation of plant and animal resources. This tendency culminated in the Late Archaic with what Caldwell (1958) defines as "primary forest efficiency." Essentially this was described as a complete and effective adaptation to, and utilization of, a forest-edge environment.

Late Archaic studies have typically focused on riverine sites of large size that apparently represent occupations over long periods of time. These sites probably represent only a small percentage of the site types in what were likely complex, yet poorly understood settlement

systems. Most settlement models hypothesized for the Late Archaic reflect the presumed need for changing locational criteria as a response to seasonal resources. During the spring and summer, the exploitation of shellfish, fish, turtles, migratory birds, and other aquatic resources produced concentrations of sites on slight knolls, which are characterized as small extractive camps. Winter campsites were situated above the valleys for the effective exploitation of upland game such as deer, other mammals, and birds. Early evidence of cultigens is also associated with this time period. In Missouri and Kentucky, they occur by 2300 B.C. (Chomko and Crawford 1978:405). At Salts Cave, chenopodium, sunflower, and gourd seed were reported dating approximately to 1500 B.C. (Yarnell 1973:20).

Northeastern Laurentian Archaic materials are not strongly represented in south central Ohio, and the temporal context of this complex is not well understood within the region (Immel-Blei and McDaniel 1987). According to Vickery (1974) the terminal Late Archaic Maple Creek phase, ca. 1750 B.C. - 1000 B.C., is a southwestern Ohio variant of the Riverton culture that has a focus in the Wabash River Valley of Indiana (Winters 1969). At the Maple Creek site, Clermont County, Merom-Trimble and McWhinney heavy stemmed projectile points were reported as important components of the Late Archaic flaked stone artifact assemblage (Vickery 1974). Recent research, however, suggests that the two artifact types are rarely associated, and that the Terminal Archaic occupations of southern Ohio and northern Kentucky share similarities with the Riverton Culture further to the west (Boisvert 1986; Duerksen and Doershuk 1994; Ledbetter and O'Steen 1992).

Skinner and Norris (1981) report that the highest percentage of Late Archaic sites in parts of the upper Ohio Valley, as well as across the rest of Ohio, occur on first terraces near major waterways, where sites are characteristically large-sized, representing occupations over long periods of time. The radiocarbon dates for the Bob Evans Rockshelter (CWRU-109; 2860+/-310 B.C.) in Gallia County, and the Wheelabout Rockshelter (OWU-259; 2620+/-240 B.C.) in Vinton County, have yielded some of the earliest Late Archaic (or perhaps latest Middle Archaic) dates in Ohio.

A single Late Archaic site (33My205) is located within one mile of the proposed project area.

3.4 WOODLAND OCCUPATION (900 B.C. TO A.D. 1000)

The Early Woodland period, ca. 900-100 B.C., appears to represent a cultural expansion of the Late Archaic, characterized by a greater tendency toward territorial permanence and an increasing elaboration of ceremonial exchange and mortuary rituals (Brose et al. 1978:67). Traits that were once believed to have been unique to the Early Woodland are now known to have their origins in the Archaic (Dragoo 1976:16).

The Early Woodland diet was supplemented by domestication of various native and non-native cultigens, like sunflower and chenopodium (Struever and Vickery 1973:11-19), which had antecedents in the Archaic period (Yarnell 1973). Although Early Woodland people did not depend heavily upon agriculture, squash and/or pumpkin, sunflower, and gourd were cultivated to supplement the hunting-gathering-fishing based economy (Brose et al. 1978:67; Potter 1980:6).

In Ohio, the predominant Early Woodland expression was the Adena culture, noted for the use of pottery and the construction of conical burial mounds (Chapman and Otto 1976:21). Ritualized status, ranked burials, and the construction of burial mounds probably had their origins in previous Late Archaic ceremonial complexes (Brose et al. 1978:66-67). Like the Late Archaic, the Adena were a semi-sedentary people but were more territorially restrictive, as partly evidenced by their semi-permanent village sites and manufacturing of pottery (Chapman and Otto 1976:21). Fine leaf-shaped blades and a variety of stemmed projectile points such as Cresap, Robbins, and Adena were manufactured (Chapman and Otto 1976:21). Copper was used to fashion ornaments such as beads, bracelets, rings, gorgets, and reels (Potter 1980:7). Other typical artifacts included tubular pipes, quadraconcave gorgets, pendants of banded slate materials, full grooved axes, hematite celts, and incised stone tablets (Chapman and Otto 1976:210).

Several types of ceramics are commonly associated with the Adena, including Adena plain and Montgomery incised. Fayette Thick ceramics, the earliest known ceramic type in the Middle Ohio Valley, has traditionally been considered an Adena artifact. Recent research, however, attributes this material to a preceding Early Woodland manifestation (Clay 1985; Duerksen et al. 1995). Recoveries of Fayette Thick pottery are rare, but when they occur they are often associated with Kramer projectile points and dates of around 700-600 B.C. Such observations have led to a shift in the temporal nomenclature of the Woodland Period south of the Ohio River. Fayette Thick/Kramer point manifestations in Kentucky are currently termed Early Woodland, while Adena has been assigned to the Middle Woodland tradition.

Several sites within one mile of the proposed project area are listed as Early Woodland sites (33My203, 33My204) and are located in till plain areas to the south of Segment 3 (Gettysburg Road).

In Ohio, the Middle Woodland culture period has been characterized as an increasingly complex integration of cultural elements including an improved economic base, social stratification, and elaborate ceremonialism manifested distinctly in artifact styles and occupational complexes. The force behind this cultural florescence was an efficient, highly productive subsistence base, possibly supplemented by maize horticulture. Middle Woodland C14 dates from across southern Ohio range from roughly 300 B.C. to A.D. 900, although these two dates represent extremes, and most dates fall between about 100 B.C. and A.D. 400.

The predominant Middle Woodland culture in Ohio is Hopewell. Elaborate geometric earthworks and enclosures characterize the Hopewell culture, including mounds that are often associated with multiple burials and a wide array of exotic ceremonial goods (Brose et al. 1978:68). Ceremonially, the Hopewell culture appears to represent a continuation of Adena, but on a more expanded and elaborate scale (Dragoo 1962:13). Hopewellian trade networks were more extensive than those of earlier periods. Materials used in the manufacture of ceremonial objects were acquired from various regions of North America: copper and silver from the Upper Great Lakes, quartz crystals and mica from the Lower Allegheny region, obsidian and grizzly bear teeth from the west, and shark and alligator teeth, marine shell, and pearls from the Gulf Coast region (Prufer 1964:75). Some of the ceremonial artifacts produced include obsidian knives and blades, stone platform pipes with human and animal

effigies, copper breast plates, ear spools, celts, mica zoomorphic and geometric shapes, and highly decorated ceramic vessels (Jennings 1978:233). Lithic types attributed to the Hopewell are Snyders points, Hopewell leaf-shaped blades, small side-notched points without basal grinding, prismatic blades and associated polyhedral cores and flake knives, most of which were manufactured from Flint Ridge chert - another important trade commodity (Chapman and Otto 1976:23; Mayer-Oakes 1955:15).

Middle Woodland subsistence was based on hunting and collecting, and on small-scale agriculture, probably more accurately described as horticulture. Wymer (1997) has posited that 60 to nearly 90 percent of seeds recovered from Ohio Hopewell sites are components of the Eastern Agricultural Complex: maygrass (*Phalaris caroliniana*), erect knotweed (*Polygonum erectum*), and goosefoot (*Chenopodium spp.*). Other significant cultigens include sumpweed or marshelder (*Iva annua*), sunflower (*Helianthus annuus*), and yellow flowered gourd squash (*Cucurbita pepo*). Significant wild species include hickory nuts (*Carya spp.*), black walnut (*Juglans nigra*), butternut (*Juglans cinera*), acorn (*Quercus sp.*), and hazelnut (*Corylus americanus*). Horticultural and plant gathering activities provided for the majority of the Middle Woodland diet, but were complimented by hunting, fishing, and gathering focused on the white-tailed deer. Other notable animal species taken include black bear (*Ursus americanus*), elk or wapiti (*Cervus canadensis*), beaver (*Castor canadensis*), various fish species and mussels (Griffin 1968).

Settlement patterns in the Middle Woodland have been described as a series of vacant ceremonial centers surrounded by outlying, inhabited farming villages (Prufer 1965). The "Vacant Center - Dispersed Agricultural Hamlet" model is based on the Mesoamerican Vacant Ceremonial Center-Dispersed Agricultural Hamlet pattern, wherein the ceremonial center is the focus of settlement, but is, itself, not a center of domestic activity (Dancey and Pacheco 1997). This model has recently been updated by Dancey and Pacheco (1997), and referred to as the "Dispersed Sedentary Community Model." The model is still based on the concept of isolated households dispersed across the landscape, usually organized around regional drainages. Small Middle Woodland settlements are widely dispersed to allow for a subsistence strategy that combines horticulture with hunting and gathering. Other components of the settlement pattern include: "outlying camps, public works, and symbolic places" (Dancey and Pacheco 1997:8). The hamlets belong to a "ritual precinct," a ceremonial center of burial mounds and earthworks that provide a focus for ceremonial activities and, possibly, trade and interaction with groups associated with other "ritual precincts."

There is evidence of distinct Middle Woodland groups living near to, and contemporaneously with, Hopewell groups, but not participating in the distinctly elaborate Hopewell ceremonialism. Kinsey (1972, for the Piedmont-Coastal Plain region), and Shane and Murphy (1967, for the central Ohio Valley), argue for an indigenous and uninterrupted cultural continuum existing with minimal participation in the "Hopewell Interaction Sphere.'

Village and mortuary sites are concentrated in the largest valleys (Asch et al. 1979:83). The regular intervals between such large sites, coupled with their obvious relation to mound-earthwork complexes, provide a basis for a 'central place' settlement hypothesis. Struever and

Houart (1972) argue that central places were integrated into larger interregional exchange networks. Ancillary sites were generally located in one of two zones peripheral to the medially located base camps: bottomland sites, which were situated to maximize quantities of selected resources, and upland sites, utilized primarily as hunting camps.

Several Middle Woodland sites are located within one mile of the proposed project area and include earthworks (33My43 and 33My44) and mounds.

The ebb of the Middle Woodland cultural florescence marked the beginning of the Late Woodland period, ca. A.D. 500 - A.D. 1000. From 100 B.C. to A.D. 500, the Scioto Hopewell had reached a cultural apex. Around the sixth century A.D., a decline and realignment took place, the exact causes of which are unknown. One theory involves a climatic fluctuation that resulted in a cold, dry period (Griffin 1960). It is, of course, possible that the shift in climatic patterns may have inhibited agricultural practices. Cleland (1966:94-95) theorized the breakdown of territories and inter-group contacts was caused by over reliance on the agricultural economy. Farnsworth (1973) suggests a similar hypothesis that the new subsistence strategy of maize agriculture resulted in greater dietary self-sufficiency and thus less reliance on an exchange-redistributive network. Regardless of the reasons, it is evident that by A.D. 700, major changes in subsistence and settlement were occurring, and that there was more diversity in occupation patterns. Ceremonial centers were abandoned, trade networks dissipated, and less emphasis was placed on burial ceremonialism. This decline marked the beginning of the Late Woodland Period and a return to the more generalized characteristics of the Woodland Tradition, with an increased reliance on domesticated plants, supplemented by hunting and intensive gathering. Regional variants of this pattern became focused within major drainages throughout the region. Several Late Woodland phases have been defined in the central and upper Ohio Valley: Newtown (Oehler 1973), Peters (Prufer and McKenzie 1966), Chesser (Prufer 1964), and Watson Farm (Mayer-Oakes 1955).

Much of the characterization of the central and southern Ohio Late Woodland has been based on ceramic assemblages (Murphy 1975:232). Several different pottery types, distinguished by their primary tempering technique, are used to define these assemblages (Murphy 1975). Central Ohio is represented by the Cole series, which was first identified from the Cole site in Delaware County and consists mainly of cordmarked, grit-tempered ware (Murphy 1975). Southern Ohio ware is characterized by the Peters series, which is primarily cordmarked and flint/chert tempered, and the Chesser series, which is cordmarked and limestone-tempered (Prufer 1964:12; Prufer and McKenzie 1966:241). The Late Woodland lithic assemblage is represented by Jack's Reef and Raccoon notched, Chesser notched, and triangular projectile points.

The Newtown Late Woodland phase is used to denote a cultural complex that succeeded the Hopewell and preceded the Fort Ancient culture in southern Ohio and part of northern Kentucky. Newtown sites show a marked preference for elevated land surfaces above floodplains. Newtown artifact assemblages are characterized by Chesser and/or Lowe projectile points, chipped stone celts, shale or limestone discs, rectangular slate or bone gorgets, and ground stone celts (Seeman 1981). In addition, some Newtown sites have a well-

developed bone industry with awls, needles, projectile points, flaking tools and flutes. Typical Newtown pottery was grit tempered with cordmarked exteriors. Rims were usually flattened and squared. Angular shouldered pots are also found on many Newtown sites. Later Newtown ceramics include pieces with cambered rims, collared rims, and notched lips.

Many southern Ohio rockshelters have yielded cultural material that is predominantly Late Woodland (Ormerod 1983), evincing an intensified use of the uplands during this period. The Raven Rocks site in Belmont County, for example, has yielded evidence of between 47 and 59 distinct Peters Phase Late Woodland levels. Considerable continuity was exhibited at Raven Rocks, with a decreasing frequency of Hopewell manifestations evident in the lower levels, and an increasing frequency of Mississippian manifestations evident in the upper levels. The upper levels were ascribed to the Late Woodland occupation and dated to roughly A.D. 860. Chesser Cave, the earliest known example of an Ohio site demonstrating the transition from Late Woodland Peters Phase to Fort Ancient, exemplifies continuity within the Scioto River Valley Tradition despite the occurrence of extra-local Mississippian influence (Prufer 1965).

There are no previously recorded Late Woodland sites (per site forms) located within 1 mile of the proposed project area.

3.5 LATE PREHISTORIC OCCUPATION (A.D. 1000 TO A.D. 1600)

Beginning around A.D. 1000, a new cultural complex, the Mississippian Tradition, developed on the highly productive economic base of the fertile Mississippi River Valley and major tributaries such as the Ohio. This period witnesses the climax of systemic structures that had been developing throughout Woodland times. Social, economic, and political systems reached a developmental complexity unparalleled in eastern North America. Most Mississippian settlements were located in the central Mississippi Valley, but their sphere of influence extended for hundreds of miles in all directions, including the Ohio Valley.

The distribution of Whittlesy, Fort Ancient, and Monongahela influences is not well understood in most of Ohio (Brose 1978). The Fort Ancient culture appeared in southern Ohio between A.D. 960 - A.D. 1000, its emergence from a Late Woodland base being stimulated by an increasing reliance on maize agriculture, an increase in sedentism, and the influx of southern Mississippian influences (Brose et al. 1978; Essenpreis 1978). The stylistic diffusion of ceramic attributes such as thick strap handles, incised guilloche designs, and the use of shell-tempering were probably the earliest Mississippian influences to enter the Ohio Valley (Brose et al. 1978). New architectural styles, new crops (beans), and Mississippian ceremonialism were also introduced after this time (Brose et al. 1978:71).

According to Prufer and McKenzie (1966:79), a "potential cultural lag situation in the hill country" may be responsible for the persistence of the Late Woodland tradition until late in prehistory. They suggest that "Fort Ancient never really penetrated the southern Ohio Appalachian highlands proper", because of the lack of extensive bottoms in wide valleys, a requisite for Fort Ancient settlement. As a result, Fort Ancient remains "occur only very

sporadically in the rock shelters characteristic of the dissected plateau" suggesting that aboriginal groups in the area found a Late Woodland lifestyle more adaptive.

The Kramer Village site in Ross County, a late Baum phase Fort Ancient site, is a good example of an intense but short-term southern Ohio Mississippian-influenced settlement. Evidence exists that suggests that the Baum, Anderson, and Feurt Phases of Fort Ancient partially overlap in the region drained by the Scioto River. Prufer (1965) also notes Madisonville Phase remains for the area. Further east in southeastern Ohio, a Fort Ancient phase coeval with Baum has been defined as the Philo Phase (Seeman 1981). Several sites such as Canter Caves in Jackson County, Ohio has been radiocarbon dated to A.D. 1620 + /- 200 (M-467), Blain Village in Ross County anywhere from A.D. 760 to A.D. 1695, the Morrison site also in Ross County from A.D. 1435 to A.D. 1790, and Wheelabout Rockshelter in Vinton County to A.D. 1180 +/- 215 (OWU-258).

Recent research conducted at numerous Fort Ancient sites in Kentucky, have gleaned information regarding social organization, community plans, and diachronic trends in "Fine Triangular" point types (Henderson et al. 1992). According to Henderson et al. (1992), Fort Ancient cultures of the Ohio Valley differ from Mississippian polities in several aspects. For example, in regards to subsistence, beans are a staple in the Fort Ancient community but are virtually absent from contemporary Mississippian sites. In addition, Fort Ancient peoples discontinued their consumption of starchy-oily seeds, while Mississippian communities continued to exploit these resources. Finally, wapiti and bear were an important part of the Fort Ancient diet, but were exploited to a lesser degree by Mississippians. Furthermore, Henderson argues that the Fort Ancient culture developed independently of the Mississippian polities to the southwest and never achieved the level of social stratification, which is so evident in Mississippian culture (Henderson 1992).

Significant Fort Ancient villages in the area include the Seibenthaler site (33My127) which is located on the Stillwater River and Sunwatch/Incinerator site (33My57), which is located near the current project area on the Great Miami River.

Sunwatch represents the most extensively excavated and interpreted Fort Ancient Village in the region. According to Heilman, a middle Fort Ancient occupation dating to the 12th century A. D. is suggested for this location (Heilman et al 1988) and is based on a series of C^{14} dates. The occurrence of Type 3 Fine Triangular projectile points, and decorations on ceramics such as curvilinear and rectilinear guilloche, and mixed grit and shell tempering seemingly corroborate these findings. In addition, astronomical alignments have been recorded at Sunwatch (Heilman et al. 1988).

3.6 PROTOHISTORIC AND HISTORIC INDIAN OCCUPATION

Before the latter part of the 17th century, the Indian tribes living in the area of present-day Ohio included the Mosopela of the southwest, the Oniassenthe of the southeast, and possibly the Erie who, though primarily centered in the western New York and northern Pennsylvania areas, may have held territory in northeastern Ohio (Wheeler-Voegelin 1974: 2-4; 63-64).

Other groups, such as the Wyandot, moved into the Ohio valley as the result of warfare with Iroquois and European colonial groups to the east.

The Wyandot Indians had originated somewhere on the southern shore of Georgian Bay in Canada. They practiced agriculture as well as hunting and gathering, and lived in settled villages protected by log palisades. Because the Wyandot were at war with the Iroquois Confederacy after 1648, and because new European diseases harmed them, the Wyandot population greatly decreased. By the mid-1600's they abandoned their sedentary way of life, and eventually settled in northern Ohio in the mid 1700's (Vogel 1975). Upper Sandusky in Wyandot County became their tribal center from which they aided the British during the Revolutionary War years. One of their major towns was at the site of present day Columbus and they reportedly cultivated large quantities of corn on the bottoms opposite the village (Howe 1900).

Two other displaced groups, the Shawnees and Delawares, were both of Algonquin linguistic stock and shared a common settlement history. The Shawnee probably have their origins in southern Ohio, but the cultural volatility of the Protohistoric Period makes this very difficult to ascertain. The Shawnees' conflict with the Iroquois in the late 17th century "brought them into association with a variety of different tribes," such as the Delawares and Creeks (Callender 1978:622). In 1689, a band of Shawnee settled with the Munsee and Delawares in eastern Pennsylvania, following a fortuitous encounter with a French-led trading expedition on the Illinois River. Later, both groups moved into the Ohio Valley, shifting to western Pennsylvania and central Ohio between 1720 and 1745.

Shawnee villages were typically semi-permanent settlements composed of bark-covered lodges, sweathouses, and communal structures used for ritual and secular celebrations (Clark 1974:85-90). During the summer months, crops were tended in fields near the towns and, in the fall, the inhabitants dispersed to winter camps in sheltered valleys to hunt and trap (Clark 1974). Lower Shawnee Town was settled at the mouth of the Scioto near present day Portsmouth, Ohio sometime between 1729 and 1739 (Henderson and Pollack 1989). A large flood in 1758 prompted many of the Shawnees to move up the Scioto to one of the five villages in Ohio known as Chillicothe. In 1764 they established the town of "Old Chillicothee" on the Little Miami, about three miles north of Xenia. A town was also established 12 miles north on the Mad River at Piqua, where Tecumseh was born. Both Old Chillicothe and Piqua were destroyed in 1780 by an expedition led by George Rogers Clark. The Shawnees then retired to the fifth Chillicothe, on the Great Miami River.

In 1794, General Anthony Wayne defeated the Shawnee at the Battle of Fallen Timbers, south of modern-day Toledo. Most of the Shawnees agreed to the Treaty of Greenville at which they ceded all lands south of the Ohio River and most of Ohio and southern Indiana to the United States. A few joined Tecumseh and resisted until after the War of 1812. A small group of Shawnee fought for the United States during the war and received lands near Wapakoneta and Hog Creek (Lima) in northern Ohio. By 1830 the Shawnee were confined to the small Wapakoneta and Hog Creek reservations. By 1832 all Shawnee lands east of the Mississippi River were ceded to the U.S. Government, and all the Shawnee were removed to west of the Mississippi River.

3.7 HISTORIC ERA OCCUPATION

At the beginning of the 18th century, most of what is now the United States, from the Mississippi River east, had been explored. The Atlantic seaboard was held under the British crown, Spain controlled Florida, and the French were established along the Mississippi and St. Lawrence River Valleys. Relative to the Mississippi and St. Lawrence valleys, however, the upper Ohio Valley remained relatively poorly known.

Throughout the first half of the 18th century, colonial land agents as well as traders maintained steadily growing interests in the Ohio area, interests that served to further strain Anglo-French relations. In the latter half of the 18th century, Indian groups governed by the Iroquois once again populated the area. Consequently, it became apparent to colonial powers that control of the mid-continent would rest with whomever controlled its primary east-west thoroughfare through the Ohio Valley. As a result, in the late 1740's, the Ohio Land Company was organized, and subsequently requested a grant of 500,000 acres from the British crown, including south central Ohio.

Fort Pickawillany was established by the English as a major western trading center sometime between 1747 and 1750, in the midst of the large village of a pro-British faction of the Miami tribe. This trading fort, located on the banks of the Great Miami River a short distance to the north of modern Piqua, Ohio, was a direct affront to French claims on the region. French retaliatory actions included sending Celeron de Blanville to the upper Ohio Valley in 1749 in an attempt to diplomatically reassert French authority, and the launching in 1752 of an attack by French-allied Indians under Charles du Langlade, which precipitated the abandonment of Pickawillany by the English and Miamis.

Prior to the formal declaration of war between England and France in 1756, relationships between the two countries continued to deteriorate. Various skirmishes broke out in the early 1750's, culminating in the French and Indian wars of 1756-1763. The Treaty of 1763 granted the victorious English both Canada and the eastern seaboard. The Royal Proclamation Line of 1763 attempted to mitigate persistent post-war conflict between settler and Indian by prohibiting colonization west of the Allegheny Mountains, although land agents and woodsmen largely ignored it. The authority of the British over the area was, however, relatively short-lived. The upper Ohio Valley was soon embroiled in the American Revolution, which led to a general uprising of most of the Ohio tribes. Because Ohio remained largely unsettled by Euro-Americans, however, Indian hostilities were directed primarily against white strongholds in neighboring states. Although the 1783 Treaty of Paris finalized the American colonists' victory, it did not end the British-inspired Indian raids. Indian territorial rights, although nominally protected by the government, were openly ignored by the citizenry as the frontier was continually being forced north and west by land speculators, traders, woodsmen and settlers—a major reason for enduring Indian-American hostilities.

Following the American Revolution, the peace treaty signed with the British granted the new American nation a boundary that extended beyond the Appalachians, all the way to the Mississippi River. Along with the territory, the British abandoned their native allies, forming

the context of post-war Indian policy. The treaty signed at Fort Stanwix in 1784, for example, reflected the notion that the Iroquois had forfeited all claims to their land by fighting with the British against the emerging American nation (Johnson et al. 1978:80). Prior to the Treaty of Fort Stanwix, the area was still claimed by the Iroquois Confederacy.

In the aftermath of the Revolutionary War, several of the original colonies pressed claims on the Ohio territory. In 1794, Virginia relinquished her rights to Eastern Ohio, but retained her privilege over the land between the Scioto and Little Miami Rivers, much of which was divided into Virginia Military District grants. Congress purchased Indian title to the balance of the territory in 1787, although not until General "Mad" Anthony Way's 1794 victory at the Battle of Fallen Timbers were Indian-settler conflicts reduced. Wayne's triumphant march defined the Indian treaty boundary spelled out in the 1795 Treaty of Greenville. The line ran roughly on the diagonal from Lake Erie to a point opposite the mouth of the Kentucky River.

The Greeneville treaty formally marked the beginning of permanent American and Euro-American occupation of most of the lands north and west of the Ohio River, although several settlements like Marietta and Losantiville (Cincinnati) were founded as early as 1788. Likewise, the Land Ordinance of 1785 and the 1787 Northwest Ordinance had already delineated how the western lands would be surveyed and governed. In fact, as early as 1785 a survey of the first seven ranges (vertical rows of townships) of eastern Ohio was undertaken, tracts of which were sold in 1787 (Sherman 1925:52).

Sporadic historic-era settlement of American migrants had already begun in the Northwest Territory during the late 18th century, but gained much greater impetus once the formal jurisdictions of the state of Ohio, its counties and townships, were organized in 1802. By 1832, removal of the Shawnee left most of Ohio relatively free to American settlement.

Though original settlers and transients successfully used the Ohio and its tributaries, as a means of gaining access to the new territory, road building got an early start following various Indian trails. Zane's Trace, which primarily connected Wheeling, West Virginia, and Maysville, Kentucky, ran partially across Ohio through Zanesville on the Muskingum River, Lancaster on the Hocking River, and Chillicothe on the Scioto River. In addition to roads, canals were also constructed to transport people, livestock, and goods. The canal building heyday was primarily limited to the 30-year span between 1825 and 1855, when two major systems, the Miami and Erie, were excavated totaling over 800 miles of canal (Powell 1975:121). Although canals encouraged a burgeoning agricultural and commercial market, they ultimately failed because their operations were parochial and seasonal, and because their capacity was soon outstripped by railway transport.

Water transportation networks along Ohio's lakes, rivers and streams, were augmented over the historic era by canal and lock and dam technologies. Completed in 1828, The Miami Canal was located between Dayton and Cincinnati and connected to the Wabash and Erie Canal in 1845. Subsequently this canal was renamed the Miami-Erie Canal (Smith and Smith 1964).

Montgomery County was organized in 1803 from Ross and Hamilton Counties following Ohio's admission into statehood. The subdivision of Ross and Hamilton counties also created other counties such as Warren, Butler, and Greene (Montgomery History Planning Committee 1990:1). Jackson and Van Buren Townships were formed from the larger Dayton Township around 1808 (Montgomery History Planning Committee 1990).

In 1795, Israel Ludlow mapped out the town of Dayton in what was then a low area formed by the Great Miami, Mad, and Stillwater Rivers. Brown and Southerland, an Indian trading company, had existed in Dayton since 1789. A gristmill and a carding machine were erected between 1806-1809 (Beers 1882 557-560). A military depot was established in Dayton during the war of 1812 and by 1825 numerous factories produced a variety of goods (Smith and Smith 1964: 197-198).

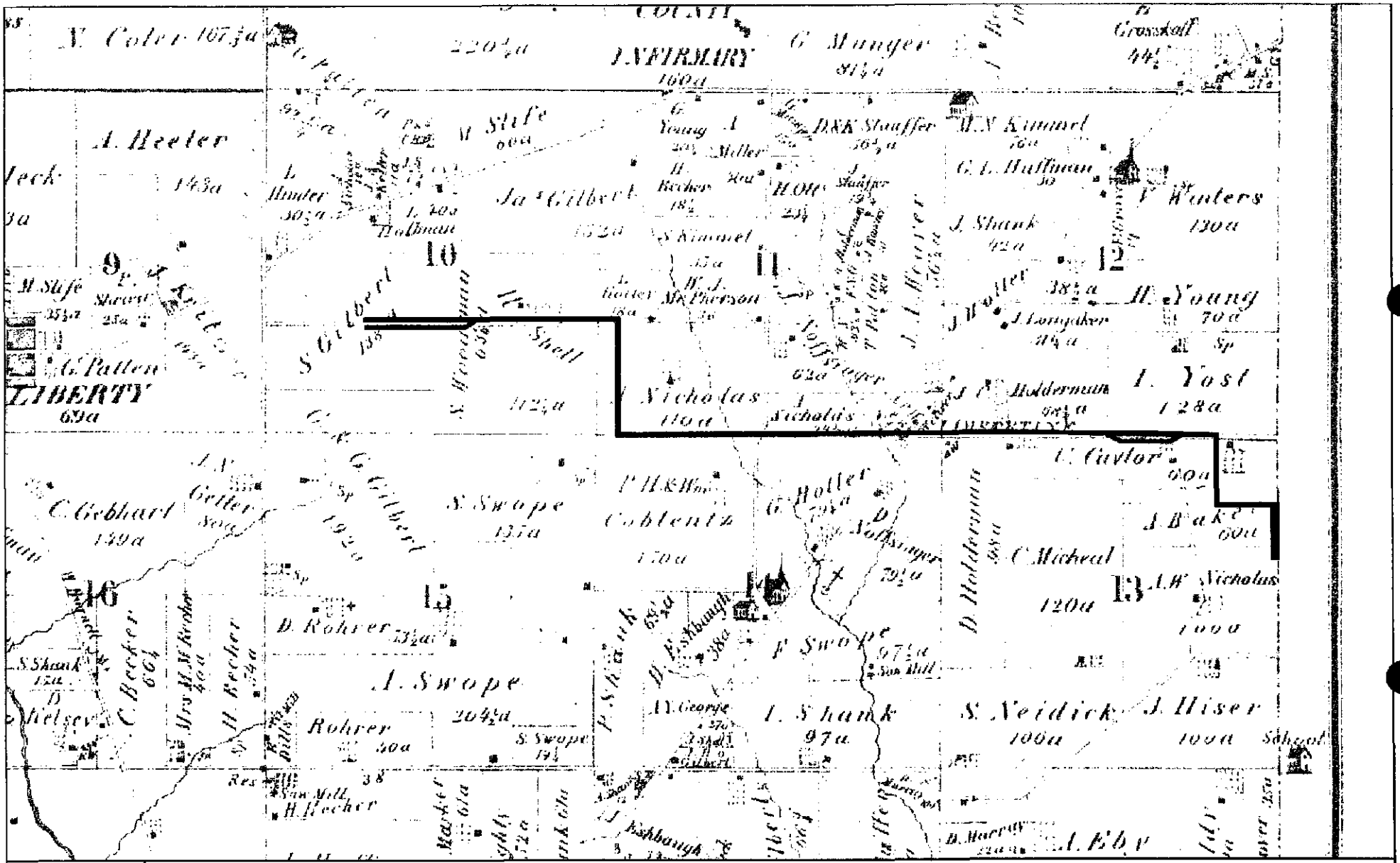

FIGURE 3.1. Portion of Everts 1875 Combination Atlas Map of Montgomery County, Ohio Showing Jefferson Township.

Project No. 1149.02-03

Preferred Route

Surveyed Reroute

BHE ENVIRONMENTAL, INC.

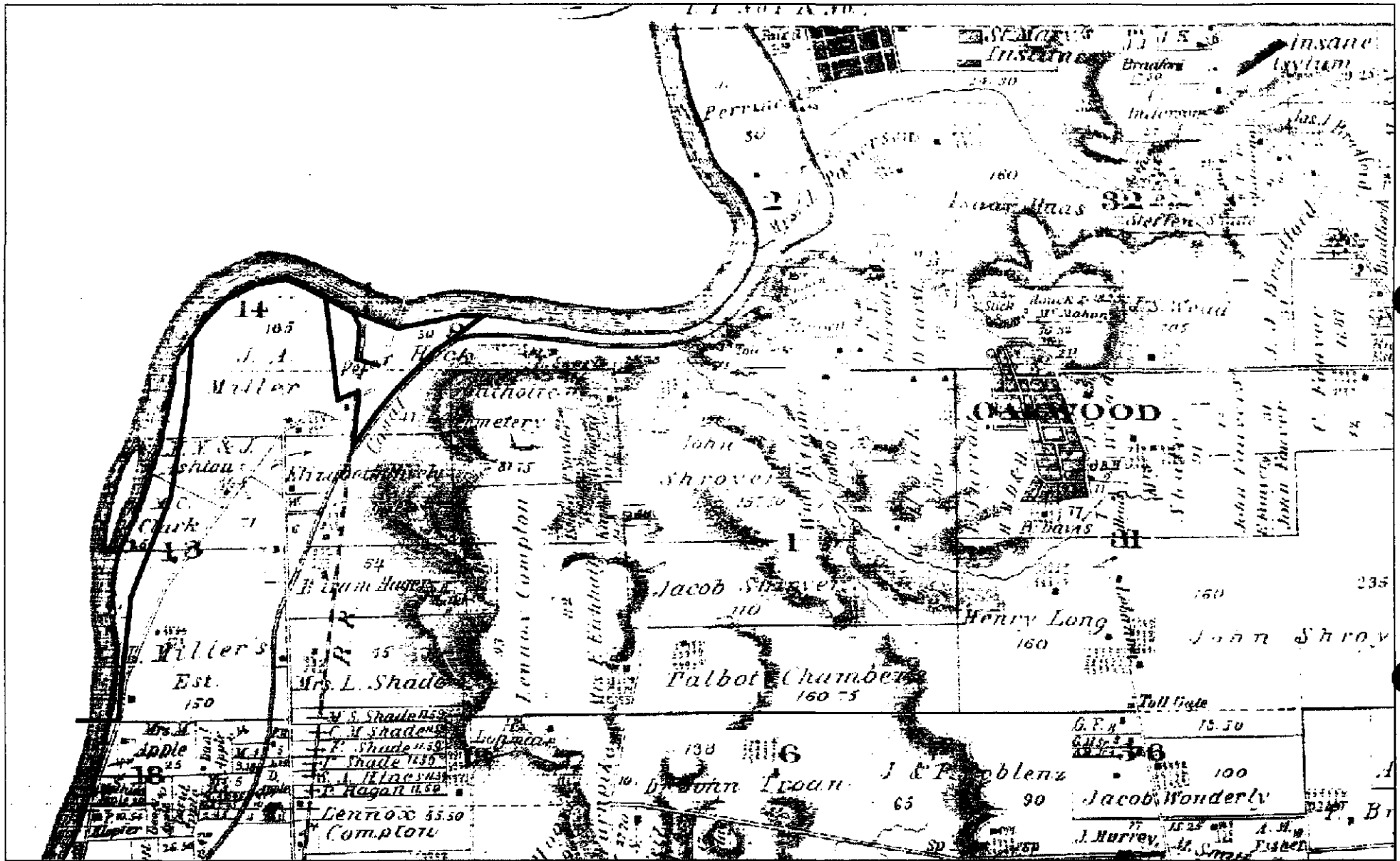

FIGURE 3.2. Portion of Everts 1875 Combination Atlas Map of Montgomery County, Ohio Showing Van Buren Township.

Project No. 1149.02-03

Preferred Route

Surveyed Reroute

BHE ENVIRONMENTAL, INC.

Section 4.0: Survey Strategies

4.1 CULTURAL RESOURCE SURVEY

At the request of DPL Energy, BHE conducted a Phase I cultural resource survey of DPL Energy's proposed pipeline, In February 2000. The survey included archival research and predictive modeling (Phase Ia), coupled with archaeological field reconnaissance (Phase Ib). BHE's Phase Ia archival research accounted for previously recorded sites of cultural resources within one mile of the proposed pipeline. The archives at the Ohio Historic Preservation Office (OHPO) in Columbus include sites listed on the National Register of Historic Places (NRHP), and prehistoric and historic sites listed by the State of Ohio. BHE's field reconnaissance along the proposed pipeline consisted of surface pedestrian inspection and subsurface shovel testing. **The site-location data from BHE's background research for cultural resources are submitted to DPL Energy and the OPSB for planning purposes only, and are not for public disclosure.** BHE's survey of DPL Energy's proposed pipeline was done in compliance with the Secretary of the Interior's guidelines concerning Section 106 of the National Historic Preservation Act, and in cooperation with the OHPO.

4.2 BACKGROUND RESEARCH AND PREDICTIVE MODELING

Previously recorded cultural resource sites within one mile of the proposed pipeline provided historical and geographical data for cultural resources in the vicinity. Correlating site data with significant geomorphic features in the project area allowed BHE to construct a predictive model for cultural resources. These resources are presented in Table 4.1.

A total of 27 sites are located within one mile, or 1609.35 meters (m) of the proposed project areas. Prehistoric sites account for 66.67% of the total (N=18), historic sites comprise 29.63% (N=8) and sites containing prehistoric and historic components account for 3.70% (N=1). Of the prehistoric sites represented, unidentified prehistoric sites dominate the sample at 61.11% (N=11). Woodland sites are the second most frequent and account for 27.78% (N=5), followed by Late Archaic sites at 5.56% (N=1), and Late Prehistoric sites at 5.56% (N=1).

The high percentage of unidentified prehistoric sites is possibly the result of several factors. First, small upland lithic scatters associated with glacial Till Plains are well documented in many areas of southwestern Ohio. These sites may reflect ephemeral occupations of small groups for short periods of time and diagnostic projectile points or other tool types may not have been discarded at these locations. Finally, survey strategies often effect artifact recovery. For example, freshly plowed areas will obviously increase artifact recovery especially after rains when compared to shovel tested areas. In addition, diagnostic artifacts

TABLE 4.1. Previously Recorded Sites Within One Mile of the Proposed Project Area.

Site	Topo Setting	Dist H20 (m)	Chronology (e.g. Paleo, LW, Hist.)
33My43	Ridgetop	150	Woodland
33My44	Terrace	130	Alexandersville Works/Woodland
33My57	Floodplain	10	Late Prehistoric
33My133	Ridgetop	300	Woodland
33My187	Ridgetop	121	Unidentified Prehistoric
33My203	Ridgetop	304	Early Woodland
33My204	Ridgetop	120	Early Woodland
33My205	Ridgetop	50	Late Archaic
33My218	Ridgetop	60	Unidentified Prehistoric
33My231	Ridgetop	60	Unidentified Prehistoric
33My233	Ridgetop	40	Unidentified Prehistoric
33My234	Ridgetop	60	Unidentified Prehistoric
33My286	Stream Valley	10	Historic
33My431	Ridgetop	150	Unidentified Prehistoric
33My432	Ridgetop	125	Unidentified Prehistoric
33My433	Ridgetop	150	Unidentified Prehistoric
33My681	Dissected upland	300	Historic
33My682	Floodplain	50	Unidentified Prehistoric
33My683	Terrace	70	Unidentified Prehistoric /Historic
33My684	Dissected Upland	80	Historic/Early 20th century
33My690	Dissected Upland	580	Unidentified Prehistoric
33My691	Dissected Upland	290	Historic/Early 20th century
33My692	Terrace	70	Historic/Early 20th century
33My693	Terrace	130	Unidentified Prehistoric
33My694	Dissected Upland	470	Historic/Early 20th century
33My695	Dissected Upland	270	Historic
33My696	Dissected Upland	350	Historic

may not have been recovered at the time of initial survey for some of these sites but repeated plowing episodes could bring them to the surface in subsequent seasons or years.

The single Late Archaic site (33My205) is recorded as being located on a "ridgetop" however careful examination of the topographic map for this location indicate that this site is located at the headwaters of a drainage to Opossum Creek in the Till Plains.

Several earthworks are recorded in the area and are included in the Woodland site data. These sites overlook the Great Miami River, which is a typical phenomenon for Early, Middle, and Late Woodland mounds and earthworks.

The single Late Prehistoric site recorded is located on the floodplain of the Great Miami River, which again is a typical placement for Fort Ancient villages.

The majority of the sites in the area are located in upland Till Plains or "ridgetops" which is not surprising due to the glaciated nature of this part of Ohio and the fact that the majority of the proposed pipeline is located in a large till plain area. Landforms such as glacial hummocks would have provided raw materials for stone tool manufacture and fire hearths. In addition, these hummocks would have provided a higher elevation from which water would have drained rather quickly thus providing a dry area in which to camp as opposed to the surrounding low areas which could hold water for some time. A variety of floral and faunal resources would have been easily exploited from the areas surrounding these hummocks as well.

Distance to water for the 27 sites located within a mile of the proposed pipeline averages 167 m. However this data is somewhat misleading due to the fact that significant draining of wetland areas in Ohio has taken place since European settlement. It is unlikely that sites were located great distances from water sources.

Given the geologic and geographic nature of the area, the existence of numerous previously recorded sites in the vicinity and near the proposed project area, the model predicted a high probability of cultural resources being located within the area of DPL Energy's proposed construction limits. Especially sensitive landforms are glacial hummocks, till plain areas overlooking streams, and floodplains along the Great Miami River.

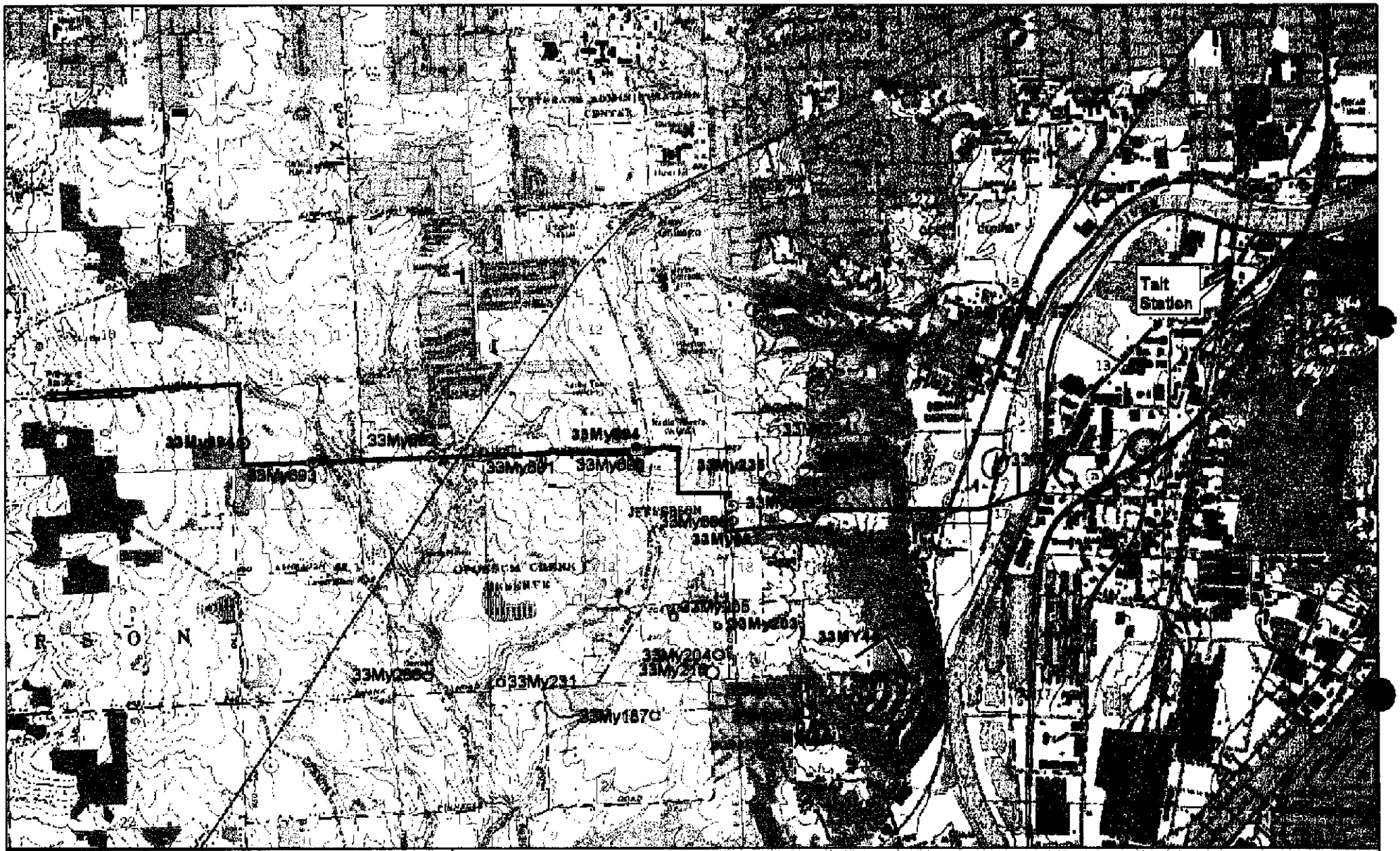

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FIGURE 4.1. Previously Recorded Cultural Resources Sites Located within One Mile of DPL Energy's Proposed Reroutes.

Base Map: USGS 7.5 Minute Topographic Maps- Miamisburg East, OH and Dayton South, OH

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