Contract Publication Series 19-600

AN ARCHAEOLOGICAL SURVEY OF THE PROPOSED KY 335 HORSE CAVE CONNECTOR IN HART COUNTY, KENTUCKY (ITEM NO. 4-441.00)

by
Brian Mabelitini, RPA 989695

Prepared for

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OSA Project Registration No.: FY18-9467

ABSTRACT

On August 13 through 15, 2019, Cultural Resource Analysts, Inc., personnel conducted an archaeological survey of the proposed KY 335 Horse Cave Connector project in Hart County, Kentucky (Item No. 4-441.00). The survey was conducted at the request of Qk4, Inc., on behalf of the Kentucky Transportation Cabinet. The project is approximately 1.2 km (0.75 mi) long and will connect U.S. 31W and KY 218 (West Main Street) along the KY 355 corridor in Horse Cave, Kentucky. The purpose of the proposed project is to improve the connectivity and mobility for truck traffic from U.S. 31W, just south of Horse Cave, to I-65 by providing a route for truck traffic west of Horse Cave on KY 335, from KY 218 west of town to industrial areas south on U.S. 31W. The project area covers a total of 9.53 ha (23.5 acres), and encompasses the preferred Green Alternative route.

Prior to the initiation of field work, a records review was conducted at the Office of State Archaeology in Lexington, Kentucky. The review revealed that within a 2.0 km (1.2 mi) radius of the project area there have been 14 previous professional archaeological surveys, and 2 previously recorded archaeological sites. None of these previous survey areas or archaeological sites fall within the current project area for the KY 335 Horse Cave Connector. All field investigations were conducted in compliance with provisions of the National Historic Preservation Act of 1966 (as amended) and the Kentucky Heritage Council's *Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports* (Sanders 2006, revised June 2017).

The entirety of the project corridor was surveyed. Most of the proposed right-of-way crossed farmland and woods, but a small portion passed through rural residential and commercial areas. Land use variability in the project area and associated surface conditions necessitated that field methods include both systematic shovel testing and intensive pedestrian survey. Survey methods varied according to topographic setting as well as past and current land use practices. Approximately 60 percent of the project area was subjected to an intensive pedestrian survey supplemented with shovel probes excavated at 20 m intervals. Private residences with leveled and landscaped lawns were walked and visually inspected, but were not shovel tested. Approximately 40 percent of the project area was highly disturbed by construction or landscaping. Only occasional shovel probes were performed within previously disturbed areas to confirm the extent of ground disturbance.

The archaeological resource inventory of the proposed KY 335 Horse Cave Connector Green Alternative did not result in the discovery of any new archaeological sites; however, one historic isolated find was recorded. IF 1 consists of a single late machine-cut nail fragment that is likely associated with a demolished residence located outside of the project area of potential effect. Due to the paucity of materials and the absence of intact subsurface features, IF 1 has very limited research potential. Additional archaeological work would not produce significant information beyond that which has been collected, and no further work is recommended for this project as currently proposed.

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I. INTRODUCTION

Between August 13 through 15, 2019, Cultural Resource Analysts, Inc. (CRA), personnel conducted an archaeological survey of Green Alternative of the proposed KY 335 Horse Cave Connector in Hart County, Kentucky (Figure 1). The survey was conducted at the request of Qk4, Inc., on behalf of the Kentucky Transportation Cabinet (Item No. 4-441.00). Field work for this survey was completed by Brian Mabelitini, Nathaniel Deaton, and Gene Brock, which required 81 person hours. Office of State Archaeology (OSA) Geographic Information Systems (GIS) data requested by CRA on November 30, 2017, was returned on December 11, 2017. The results were researched by Heather D. Barras of CRA at the OSA on December 18, 2017. The OSA project registration number for this undertaking is FY18-9467.

Background

KYTC has requested that Qk4, Inc., prepare a Categorical Exclusion Level 2 for the KY 335 Horse Cave Connector in Hart County, Kentucky. The project is approximately 1.2 km (0.75 mi) in length and will connect U.S. 31W and KY 218 (West Main Street) along the KY 355 corridor in the community of Horse Cave (Figure 2). The purpose of the proposed project is to improve the connectivity and mobility for truck traffic from U.S. 31W, just south of Horse Cave, to I-65 by providing a route for truck traffic west of Horse Cave on KY 335, from KY 218 west of town to industrial areas south on U.S. 31W. The project covers a total of 9.53 ha (23.5 acres), and encompasses the preferred Green Alternative (Figure 3).

Purpose of Study

This study was conducted to comply with Section 106 of the National Historic Preservation Act. This transportation project is federally funded, and therefore considered an undertaking subject to 106 review. Any state, county, or municipal lands in the project area were surveyed under OSA Kentucky Antiquities Act Permit Number 2019-25 pursuant to Kentucky Revised Statute (KRS) 164.720.

The purpose of this survey was to assess any potential effects the new connector might have on identified cultural resources. To do this, we followed these objectives:

> Identify prehistoric and historic archaeological sites located within the project area.
>
> Determine, to the extent possible, the age and cultural affiliation of sites.
>
> Establish the vertical and horizontal boundaries of sites.
>
> Establish the degree of site integrity and potential for intact cultural deposits to be present.

For the purposes of this assessment, a site was defined as "any location where human behavior has resulted in the deposition of artifacts, or other evidence of purposive behavior at least 50 years of age" (Sanders 2006:2). Cultural deposits less than 50 years of age were not considered sites.

The following is a description of the project area, previous research and cultural history of the area, field and laboratory methods, materials recovered, and results of this study. It conforms to the *Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports* (Sanders 2006 [revised 2017]).

Summary of Findings

Prior to the survey, a records review was conducted at the OSA. The review revealed that within a 2.0 km (1.2 mi) radius of the project area, there have been 14 previous professional

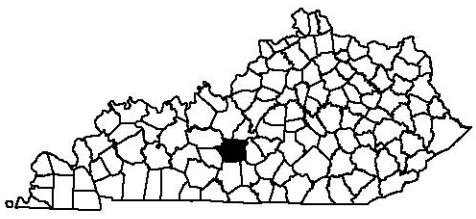

Figure 1. Map of Kentucky showing the location of Hart County.

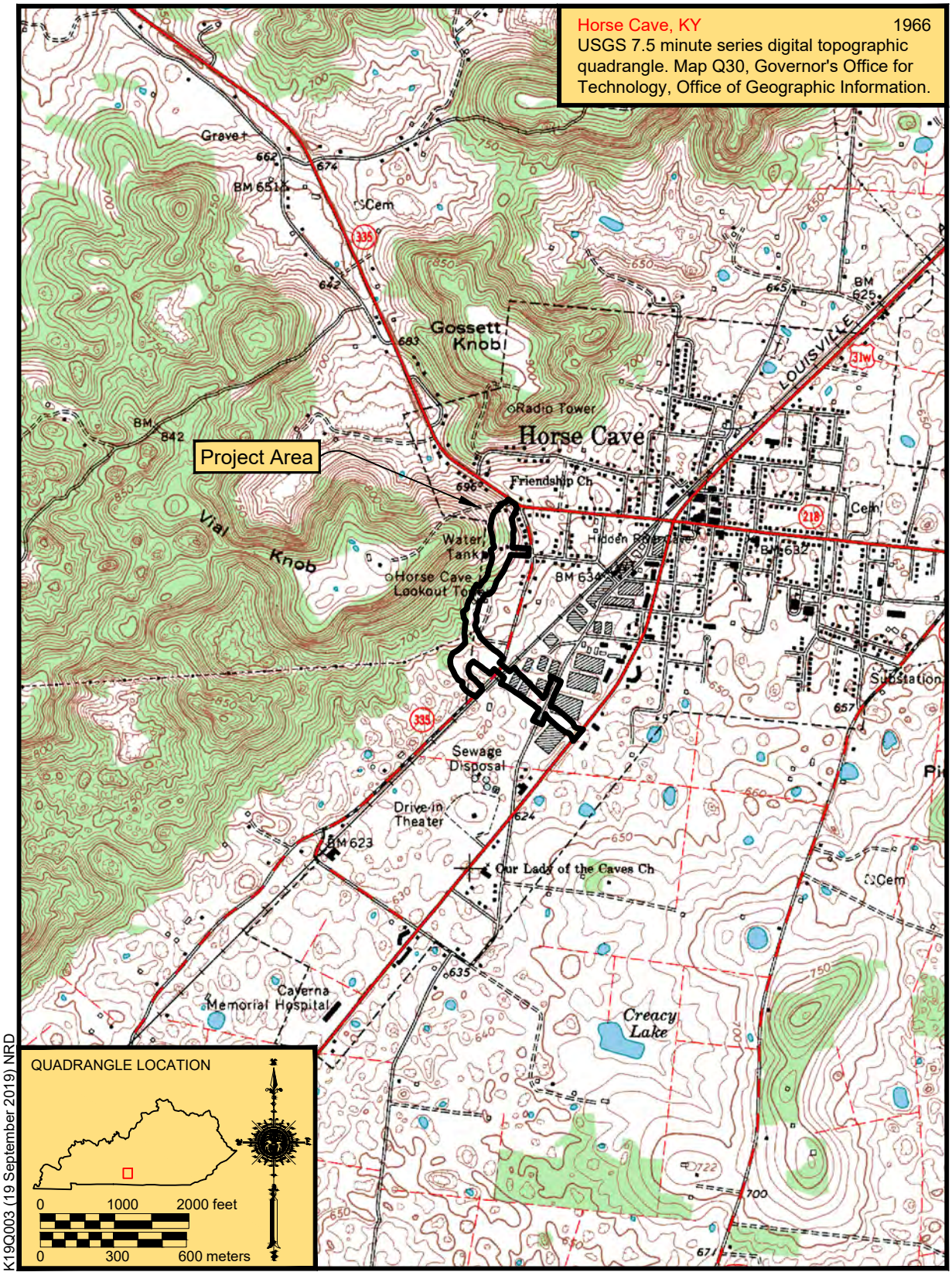

Figure 2. Location of project area on topographic quadrangle.

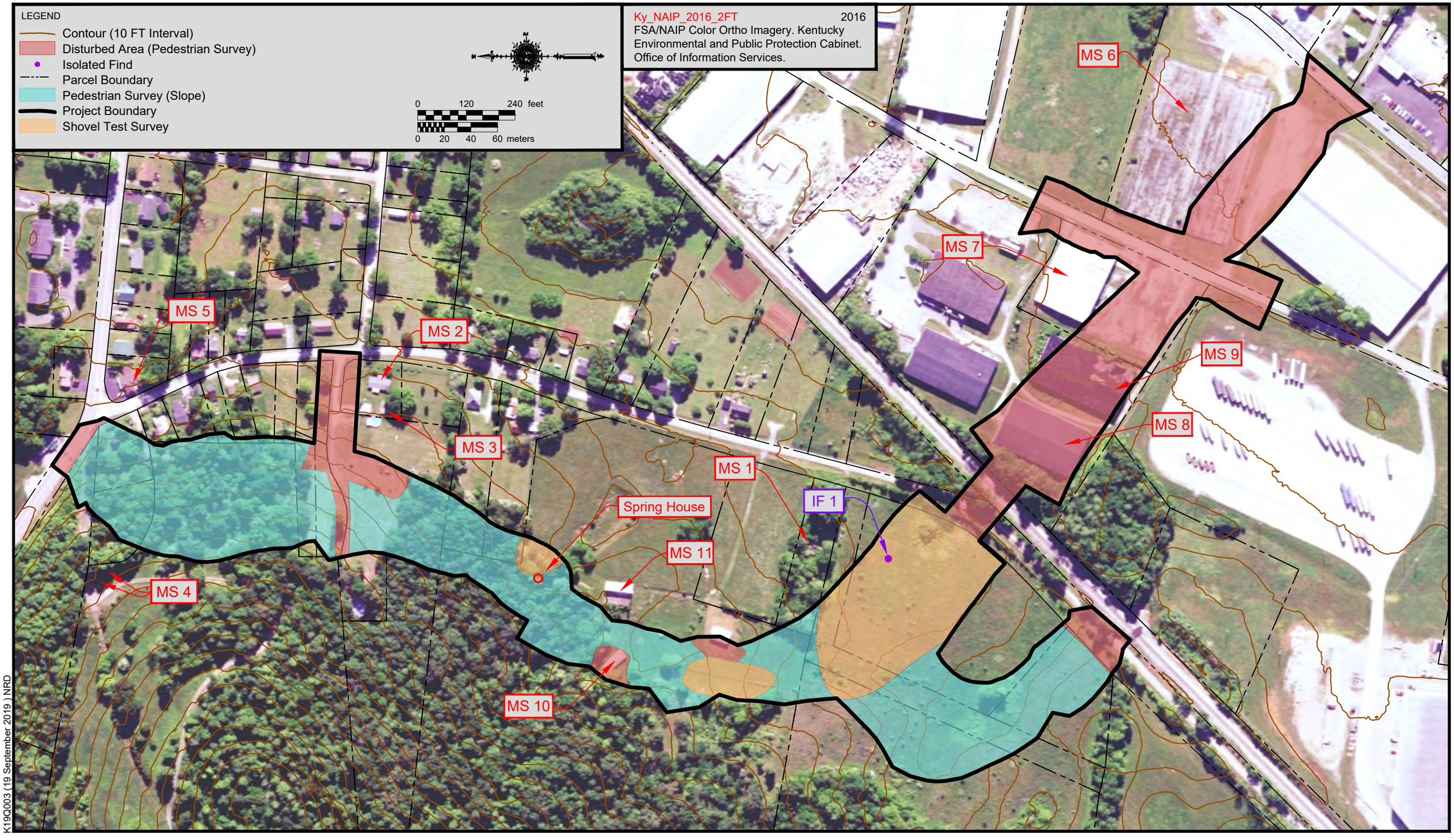

Figure 3. Project area plan map.

archaeological surveys and 2 previously recorded archaeological sites. None of these prior surveys or previously documented sites are located within the current project area of potential effect (APE).

The survey resulted in the discovery of one archaeological isolated find (IF 1). This object consists of a late machine-cut nail fragment that is likely associated with a residence depicted on historic cartography outside of the project APE, approximately 50 m (164 ft) to the north. This resource has limited research potential due the paucity of cultural remains and was not assigned a Smithsonian trinomial site number by the OSA. Additional archaeological work would not produce significant information beyond what has been collected, and no further work is recommended for this resource. The construction of the Green Alternate, as currently proposed, will have no effect on archaeological resources listed in or eligible for the National Register of Historic Places (NRHP).

II. DESCRIPTION OF THE PROJECT AREA

The project area is located in the community of Horse Cave and runs from U.S. 31W (S. Dixie Street), approximately 0.94 km (0.58 mi) southwest of its intersection with KY 218 (E. Main Street), to the intersection of KY (335 Old Dixie Highway) and KY 218 (W. Main Street) (see Figures 2 and 3). The project covers a total area of 9.53 ha (23.5 acres). Elevations range from 189 m (620 ft) above mean sea level (AMSL) in the southern portion of the project area to around 229 m (750 ft) AMSL in the northern portion near Vial Knob. The project area is drained by the Green River and its tributaries.

The project area is a slightly rolling limestone plain that is characterized by nearly level bottomlands in the southern portion of the proposed APE, which is dominated by

Figure 4. Overview of project area from U.S. 31W (S. Dixie Street) toward Cherry Street and KY 335 (Old Dixie Highway) showing extensive ground disturbance, facing northwest.

commercial construction (Figure 4), to gently rolling and moderately steep hillsides to the north and east of KY 335 (Old Dixie Highway) (Figures 5 through 7). Outcroppings of limestone bedrock are prevalent throughout the northern half of the project area. In addition to residential and commercial construction, several areas within the project APE have been heavily disturbed by the construction of underground utilities, roadways, and drainages, as well as landscaping. A line of the CSX railroad, formerly the Louisville and Nashville Railroad, crosses through the south-central portion of the project area and runs parallel with KY 335 (Old Dixie Highway).

Soil formation is dependent upon several factors, including parent material, topography, climate/weather, and time (Birkeland 1984; Soil Survey Staff 1999). This information can provide a relative age of the soils and may express the potential for subsurface archaeological deposits (Stafford 2004). Soils within the project area are comprised of the Caneyville-Fredonia-Hagerstown association. These soils are gently sloping to steep and occur on ridgetops and hillsides. Soils classified within the Caneyville-Fredonia-Hagerstown association are moderately deep and deep, well-drained and somewhat excessively drained, soils that have a clayey or loamy subsoil (Mitchell 1993).

Specific soils within the Caneyville-Fredonia-Hagerstown association that occur in the project area are composed primarily of Fredonia-Hagerstown-Vertrees silt loams, rocky, 6 to 20 percent slopes (FdC) and Caneyville silt loam, very rocky, 20 to 30 percent slopes (CaE). However, Vertrees silt loam, 2 to 6 percent slopes, eroded (VrB2) and Hagerstown-Fredonia-Vertrees silt loams, rocky, 2 to 6 percent slopes (HdB) occur at the southern end of the project area.

The FdC soils comprise approximately 50 percent of the project area, and are characterized

Figure 5. Overview of project area to the north of KY 335 (Old Dixie Highway) showing the gently rolling terrain, facing southwest.

Figure 6. Overview of central portion of project area showing the rolling terrain and bedrock outcrops, facing northeast.

Figure 7. Overview of the northern end of project area near the intersection of KY 335 (Old Dixie Highway) and KY 218 (W. Main Street) showing the steeply sloping terrain, facing east.

as moderately deep to very deep, well-drained, sloping to moderately steep soils on ridgetops and uplands. Areas where these soils occur are characterized by karst topography, generally in limestone valleys, on toe slopes, and on foot slopes. Rock outcrops occur with limited frequency. These soils are well suited to hay, pasture, and woodland. However, due to their clayey texture and slow permeability, these soils are poorly suited to most urban uses (Mitchell 1993:35–36).

A typical Fredonia profile is composed of brown (10YR 4/3) silt loam (Ap horizon) to a depth of approximately 20 cm (8 in) below ground surface (bgs), followed by reddish brown (5YR 4/4) clay (Bt horizon) that is underlain by limestone bedrock at depths ranging from 51 to 102 cm (20 to 40 in) bgs (Mitchell 1993:35, 38). The Fredonia series is classified as an Alfisol, in which archaeological deposits only occur on or near the ground surface (Soil Survey Staff 1999:163).

A typical Hagerstown profile is composed of brown (10YR 4/3) silt loam (Ap horizon) to a depth of approximately 20 cm (8 in) bgs, followed by followed by reddish brown (5YR 4/4) clay (Bt horizon) that is underlain by limestone bedrock at depths ranging from 102 to 152 (40 to 60 in) cm bgs (Mitchell 1993:35, 38). The Hagerstown series is classified as an Alfisol, in which archaeological deposits only occur on or near the ground surface (Soil Survey Staff 1999:163).

A typical Vertrees profile is composed of brown (10YR 4/3) silt loam (Ap horizon) to a depth of approximately 15 cm (6 in) bgs, followed by reddish brown (5YR 4/4) clay (Bt horizon) that is underlain by limestone bedrock at depths ranging from 102 to 152 cm (40 to 60 in) bgs (Mitchell 1993:35, 38). A typical Vertrees series is classified as an Alfisol, in which archaeological deposits only occur on or near the ground surface (Soil Survey Staff 1999:163).

The CaE soils comprise approximately 30 percent of the project area, and are classified as moderately deep, well-drained, steep soils on hillsides. Rock outcrops are somewhat common. These soils are poorly suited to row crops due to slope and surface rock. Likewise, CaE soils are poorly suited to urban uses. As such, most areas of CaE soils are used for either pasture or woodland (Mitchell 1993:26–27).

A typical Caneyville profile is composed of brown (10YR 4/3) silt loam (Ap horizon) to a depth of approximately 10 cm (4 in) bgs, followed by yellowish red (5YR 4/6) clay (Bt horizon) that is underlain by limestone bedrock at depths ranging from 51 to 102 (20 to 40 in) cm bgs (Mitchell 1993:26). A typical Caneyville series is classified as an Alfisol, in which archaeological deposits only occur on or near the ground surface (Soil Survey Staff 1999:163).

The remaining soils are classified as either VrB2 or HdB, and make up approximately 10 percent of the project area, respectively. The VrB2 soils are very steep, well-drained, gently sloping soils on upland ridgetops. However, erosion has removed between 25 to 75 percent of the original surface layer, and isolated areas of rock outcrop and boulders are common. These soils are well suited to pasture, hay, and woodland, as well as most urban uses (Mitchell 1993:57).

Similarly, the HdB soils are moderately deep to very deep, well-drained, gently sloping soils that occur in irregular positions on the landscape. Rock outcrops occur in limited frequency. These soils are well suited to pasture, hay, and woodland, as well as some urban uses. (Mitchell 1993:39).

Sediments observed in shovel probes across the project area, specifically to the north and east of KY 335 (Old Dixie Highway), generally conformed to the description of FdC silt loam or CaE silt loam. Probes revealed brown (10YR 4/3) silty loam plow zone in some areas that extended to depths ranging from approximately 5 to 20 cm (2 to 8 in) bgs. Below the plow zone, a reddish brown (5YR 4/4) clay subsoil was present to at least 30 cm (12 in) bgs. It should be noted that the plow zone (Ap horizon) was absent across much of the project area. The absence of an Ap horizon indicates that much of the project area has experienced heavy erosion and ground disturbance. Bedrock ranged from surface outcroppings to depths of 20 cm (8 in) bgs.

III. PREVIOUS RESEARCH AND CULTURAL OVERVIEW

Prior to initiating fieldwork, a search of records maintained by the NRHP (available online at: http://nrhp.focus.nps.gov/natreghome.do?searchtype=natreghome) and the OSA (FY18-9467) was conducted to: 1) determine if the project area had been previously surveyed for archaeological resources; 2) identify any previously recorded archaeological sites that were situated within the project area; 3) provide information concerning what archaeological resources could be expected within the project area; and 4) provide a context for any archaeological resources recovered within the project area. A search of the NRHP records indicated that no archaeological sites listed on the NRHP were situated within the current project area or within a 2 km radius of the project area. The 2 km radius included areas within the Horse Cave, Kentucky, topographic quadrangle (United States Geological Survey [USGS] 1966). The OSA file search was conducted between December 11 and 18, 2017. The work at OSA consisted of a review of professional survey reports and records of archaeological sites for an area encompassing a 2 km radius of the project footprint. To further characterize the archaeological resources in the general area, the OSA archaeological site database for the county was reviewed and synthesized. The review of professional survey reports and archaeological site data in the county provided basic information on the types of archaeological resources that were likely to occur within the project area and the landforms that were most likely to contain these resources. The results are discussed below. See Spurlock and Poole (2017) for detailed information regarding cultural historic resources near the study area.

Previous Archaeological Surveys

Heather D. Barras

OSA records revealed that 14 previous professional archaeological surveys have been conducted within a 2 km radius of the study area. Two archaeological sites also have been recorded in this area. The records search revealed that one of the sites within this 2 km catchment, Site 15Ht68, is an undefined Archaic period prehistoric open habitation without mounds site. The remaining site, Hidden River Cave (15Ht69)—also known as Horse Cave—is a multicomponent site with prehistoric dating from the Late Archaic and Early Woodland subperiods, as well as the historic occupations dating from the mid-nineteenth through the mid-twentieth centuries.

From the summer of 1983 to the spring of 1984, Janzen, Inc., personnel conducted an archaeological survey of proposed wastewater improvements in Barren and Hart Counties, Kentucky (Janzen 1984). At the request of Hayworth, Meyer & Boleyn, Inc., a 15,240 m (50,000 ft) of conveyance line right-of-way (ROW) and expansion areas at two sewage treatment plant sites were investigated with pedestrian survey supplemented by shovel testing. One previously documented site (15Ht44) was located just outside the survey area; one previously undocumented site (15Bn52) and an historic cemetery were identified within the survey area. None of these sites was located within 2 km of the current study area.

Between July 9 and 22, 1985, Arrow Enterprises personnel conducted archaeological testing of the Moose Miller property and the Horse Cave Livery Stable in Hart County, Kentucky (Schock and Langford 1985). At the request of Will Linder and Associates, an area of unspecified size was investigated via 1.2-x-1.2 m (4.0-x-4.0 ft) hand-excavated test units and backhoe excavation. No features or subsurface deposits were encountered, and no archaeological site numbers were given for either historic property. No further work was recommended. NRHP status was not assessed at the time.

In December 1989, Arrow Enterprises personnel conducted an archaeological survey of the proposed Horse Cave Congregate (Apartments) at Horse Cave in Hart County, Kentucky (Schock 1990). At the request of Elizabeth Rouse of Rouse and Associates, approximately 0.8 ha (2.0 acres) were

investigated via pedestrian survey supplemented with shovel testing. No archaeological sites were encountered, and project clearance was recommended.

On January 29, 1991, Arrow Enterprises personnel conducted an archaeological survey for the proposed elderly apartments at Horse Cave in Hart County, Kentucky (Schock 1991a). At the request of Rouse & Associates, 1.2 ha (3.0 acres) were investigated via pedestrian survey supplemented with shovel testing. No archaeological sites were encountered, and project clearance was recommended.

On February 2, 1991, Arrow Enterprises personnel conducted an archaeological survey for the proposed Horse Cave Family Apartments in Hart County, Kentucky (Schock 1991b). At the request of Rouse & Associates, 1.2 ha (3.0 acres) were investigated via pedestrian survey supplemented with shovel testing. One archaeological site (15Ht68) was documented during the survey.

Site 15Ht68 was a prehistoric open habitation without mounds of undefined Archaic temporal affiliation. Site designation was based on the discovery of a single projectile point and three undiagnostic lithic flakes in a cultivated field within a temporary sinkhole. Due to the lack of additional cultural material and the low likelihood for intact subsurface deposits, no further work was recommended for the site, and it was deemed ineligible for NRHP inclusion (Schock 1991b).

On April 10, 1991, Vaughan Engineering, Inc., personnel conducted an archaeological survey for a proposed housing project for the elderly in Horse Cave, Hart County, Kentucky (Foster 1991). At the request of United Development Consultants, 1.2 ha (3.0 acres) were investigated via pedestrian survey supplemented with shovel testing. No archaeological sites were identified during the survey, and no further work was recommended.

On May 6, 1991, Arrow Enterprises personnel conducted an archaeological survey of approximately 1.2 ha (3.0 acres) for the proposed Horse Cave Properties, Ltd., apartments at Horse Cave in Hart County, Kentucky (Schock 1991c). At the request of Garry D. Watkins, the project area was investigated by pedestrian survey and shovel testing. No archaeological sites were identified, and no further archaeological work was recommended.

During November and December 1999, Western Kentucky University, Anthropology Program, Department of Modern Languages, and Intercultural Studies personnel conducted an archaeological assessment of a 2-x-3 m (6-x-9 ft) area for a proposed water drainage improvement project at Hidden River Cave (Site 15Ht69), Horse Cave, Kentucky. At the request of the City of Horse Cave and the American Cave and Karst Center, the project area was investigated by the systematic excavation of a 2-x-3 m unit in arbitrary levels. The excavations resulted in the identification of five stratigraphic zones. The top four zones were disturbed, while the lowest zone was undisturbed. Artifacts recovered from the disturbed zones suggest a prehistoric occupation spanning from the Early Archaic to the early Mississippian period and a historic occupation post-dating 1800. The undisturbed fifth zone yielded a low density of prehistoric material, including a Middle to Late Archaic period Matanzas Side-Notched projectile point, and a sherd of limestone-tempered pottery that probably dates to the Woodland period. The excavations revealed that intact archaeological deposits remained at the site despite recent historical and natural disturbances. As a result, Site 15Ht69 (Horse Cave) was recommended as eligible for listing on the NRHP under Criterion D. However, because the area of the proposed project was excavated in its entirety, no further archaeological work was recommended (Applegate 2000).

Site 15Ht69 (Hidden River Cave) is located in downtown Horse Cave within the Horse Cave National Register Historic District. The site did not have an associated professional archaeological survey report on file at OSA first identifying the site, but the archaeological site form found in the OSA records indicated it was a multicomponent site with historic and prehistoric occupations. The prehistoric component consisted of an open habitation without mounds dating from the Late Archaic to Early Woodland periods and the historic component consisted of industrial use dating from the early nineteenth to the mid-

twentieth century. The site has been used as a source of water and electricity for the City of Horse Cave, and more recently has been used as a recreational and tourist attraction. Its use in historic times dates from the mid-nineteenth century to the present. Native American remains, possibly Archaic period burial pits (Applegate 2000:46), were encountered during construction on a plateau north of the cave entrance in 1908 and 1909 (Edwards 1913:97). Funkhouser identified Horse Cave (Hidden River Cave), along with other caves in Kentucky, as having been occupied by Native Americans (1928). However, a visit to the cave by Funkhouser and Webb did not identify any prehistoric artifacts, nor did they mention the discovery of the burials near its entrance (1932). An informal assessment of the cave was made in the early 1990s for a proposed development of the entrance (Brinker 1990). No subsurface excavations or surface collections were conducted. However, prehistoric artifacts were observed on the surface near the cave entrance, including a projectile point base, possibly a Late Archaic or Early Woodland Saratoga point, along with many flakes, all manufactured from Elizabethtown chert (Brinker 1990). Brinker also identified historic water and electrical machinery in the cave as a potential significant historic resource (Brinker 1990). Following Brinker's assessment, construction of an elevator shaft and a visitor's walkway in 1992 and 1993 resulted in the discovery of additional prehistoric artifacts, including chipped-stone artifacts, ground-stone artifacts, and a mica cutout (Applegate 2000). The cave was recorded as an archaeological site (Site 15Ht69) by Daniel Davis and Susan Cottingham on September 5, 1992. Based on an examination of artifacts collected on the surface near the cave entrance, as well as artifacts in the collection of the American Cave Museum, Davis and Cottingham concluded that the prehistoric occupation of the site dated from the Late Archaic to the Early Woodland, with an early nineteenth- to the mid-twentieth-century historic occupation. Applegate suggested that the cave itself is unlikely to contain archaeological deposits, other than the historic machinery, due to the active river that floods the cave frequently. However, the cave entrance in the sinkhole and the surrounding plateau may contain additional significant archaeological deposits (Applegate 2003a, 2003b, n.d.). According to the OSA records, the NRHP status of the site was not assessed at that time, but was subsequently recommended as eligible under Criterion D (Applegate 2000). The site has also been identified and recorded as a historic property and assigned resource number HT-87. It is listed on the NRHP as a contributing resource to the Horse Cave National Register Historic District (Logsdon 2001).

On October 11, 2001, BHE Environmental, Inc., personnel completed an archaeological survey of the proposed Bowling Green-Munfordville 15 cm (6 in) pipeline replacement in Hart County, Kentucky (Miller and Bergman 2001). At the request of Williams Gas Pipeline – Texas Gas, 0.2 ha (0.5 acre) was investigated by pedestrian survey and screened shovel testing. No archaeological sites were documented in the area, and no further work was recommended.

On August 11, 2003, Arrow Enterprises personnel completed an archaeological survey of a proposed pre-treatment facility in Hart County, Kentucky (Schock 2003). The survey was conducted at the request of Ashley Willoughby of the Barren River Area Development District on behalf of the Hart County Industrial Authority. The project area totaled 2.0 ha (5.0 acres) and was investigated by pedestrian survey of plowed areas. No archaeological sites were identified, and project clearance was recommended.

On November 6, 2008, TRC, Inc., personnel conducted an archaeological survey of a proposed Horse Cave cell tower and access road west of the city of Horse Cave in Hart County, Kentucky (Barrett 2008). At the request of Terracon, approximately 0.22 ha (0.55 acre) was investigated via pedestrian survey supplemented with screened shovel testing. No archaeological sites were encountered, and project clearance was recommended.

On July 29, 2009, Environmental Corporation of America personnel conducted an archaeological survey of three proposed guy anchor locations located 1.5 m (5.0 ft) beyond the existing guy anchors (area of unspecified size) for the proposed increase in height to an existing 85 m (280 ft) guyed-type telecommunications structure in Horse Cave, Hart County, Kentucky (McCarthy and Bazzill 2009). The survey was

conducted at the request of Harris & Morrison Hershfield on behalf of the Kentucky Emergency Warning System. Field methods consisted of pedestrian survey supplemented with screened shovel testing. No archaeological sites were identified, and no further work was recommended.

Between November 23 and 28, 2009, Cumberland Research Group, Inc., personnel conducted an archaeological investigation at the request of Horse Cave Water Company (Bentz and Allen 2009). An area of 8.26 ha (20.19 acres) was investigated for a proposed water transmission main, water tank, and access road south of Horse Cave to Hardyville in Barren and Hart Counties, Kentucky. Survey methods included pedestrian survey supplemented with screened shovel testing. No archaeological sites were encountered, and no further work was recommended.

On November 29, 2011, URS Corporation personnel conducted an archaeological survey of 2.13 ha (5.26 acres) for the proposed relocation of the existing Bowling Green-Munfordville 15 m (6 in) pipeline in Hart County, Kentucky (Haag and Bergman 2012). At the request of Texas Gas Transmission, LLC, the project area was investigated by pedestrian survey supplemented with screened shovel testing. No archaeological sites were documented, and no further work was recommended.

On September 21 and 22, 2015, CRA personnel conducted an archaeological survey for the proposed Seymour Tap - Kentucky Utilities Horse Cave Junction 69 kilovolt (kV) Transmission Line project in Barren and Hart Counties, Kentucky (McAlpine and Bybee 2015). Approximately 9.7 ha (24.0 acres) were investigated via pedestrian survey supplemented with screened shovel testing at the request of Josh Young of East Kentucky Power Cooperative. No archaeological sites were encountered, and project clearance was recommended.

Archaeological Site Data

J. Howard Beverly

OSA records show that 85 archaeological sites have been recorded in Hart County (Table 1). The data indicates that open habitation without mounds (n = 38; 44.71 percent), rockshelters (n = 15; 17.65 percent), and undetermined (n = 14; 16.47 percent) are the most numerous archaeological site types identified in the county. Other sites types identified include caves (n = 6; 7.06 percent), cemeteries (n = 4; 4.71 percent), historic farm/residences (n = 4; 4.71 percent), quarries (n = 2; 2.35 percent), earthen mounds (n = 1; 1.18 percent), and workshops (n = 1; 1.18 percent).

According to the OSA records, most of the sites have been documented on dissected uplands (n = 28; 32.94 percent) and floodplains (n = 18; 21.18 percent), followed by unspecified (n = 17; 20.00 percent), undissected uplands (n = 9; 10.59 percent), hillsides (n = 8; 9.41 percent), terraces (n = 4; 4.71 percent), and other (n = 1; 1.18 percent).

In terms of temporal/cultural affiliation, most of the sites in the county were identified as indeterminate prehistoric (n = 48; 42.11 percent).

Table 1. Summary of Selected Information for Previously Recorded Archaeological Sites in Hart County, Kentucky. Data Obtained from OSA and May Contain Coding Errors.

Site Type	n	%
Cave	6	7.06
Cemetery	4	4.71
Earth Mound	1	1.18
Historic Farm/Residence	4	4.71
Open Habitation without Mounds	38	44.71
Quarry	2	2.35
Rockshelter	15	17.65
Undetermined	14	16.47
Workshop	1	1.18
Total	85	100.00
Time Periods Represented	**n**	**%**
Paleoindian	4	3.51
Archaic	15	13.16
Woodland	13	11.40
Late Prehistoric	6	5.26
Indeterminate Prehistoric	48	42.11
Historic	17	14.91
Unspecified	11	9.65
Total	114*	100.00
Landform	**n**	**%**
Dissected Uplands	28	32.94
Floodplain	18	21.18
Hillside	8	9.41
Other	1	1.18
Terrace	4	4.71
Undissected Uplands	9	10.59
Unspecified	17	20.00
Total	85	100.00

**One site may represent more than one time period.*

These sites lacked the presence of temporally sensitive artifacts precluding a more precise temporal assignment. The second most common time period was historic (n = 17; 14.91 percent), followed by Archaic (n = 15; 13.16 percent), Woodland (n = 13; 11.40 percent), unspecified (n = 11; 9.65 percent), late prehistoric (n = 6; 5.26 percent), and Paleoindian (n = 4; 3.51 percent).

The study area is located within a region of strongly developed karst topography that exhibits many sinkholes, springs, and caves. The plants and animals tend to surround sinkholes, and the fresh water they provided within the prehistoric landscape are considered important factors that may have contributed to the establishment of prehistoric sites nearby (Anderson 1990; Gatus and Maynard 1978; Maggard and Stackelbeck 2008; Tankersley 1996). Historic activities throughout the area have altered the prehistoric landscape, however. The study area was largely deforested by the end of the nineteenth century and later cultivated, and because of this, erosion was widespread. Often the only indication of soil removal by erosion is the absence of topsoil or organic-rich mineral soils. However, in karstic regions where sinkholes are present, they often act as basins for the transported sediment (Cvijic 1981; Kreznor 1990) through slopewash and mass-wasting (Turnage 1993). In fact, sinkholes can be completely obscured and, subsequently, infilled with a mixture of ridge top, slope, and aeolian deposits. Due to the potential infilling of sinkholes, the interiors are less likely to contain intact archaeological deposits while the perimeter is more likely to contain them, though this probably decreases with distance from the sinkhole (Mink et al. 2009).

Map Data

In addition to the OSA site file search, a review of the available historic maps was conducted to assist with the identification of potential historic properties (i.e., structures) or historic archaeological sites within the proposed project area. The following maps were reviewed:

1935 Horse Cave, Kentucky, 15-minute series topographic quadrangle (United States Geological Survey [USGS] 1935)

1937 Highway and Transportation Map of Hart County, Kentucky (Kentucky Department of Highways [KDOH] 1937)

1938 Horse Cave, Kentucky, 15-minute series topographic quadrangle (USGS 1938)

1954 General Highway Map of Hart County, Kentucky (KDOH 1954)

1954 Horse Cave, Kentucky, 7.5-minute series topographic quadrangle (USGS 1954)

1966 Horse Cave, Kentucky, 7.5-minute series topographic quadrangle (USGS 1966)

A review of historic cartographic sources indicated that 11 map structures (MS 1–11) were in or near the project area at one time. Although the available historical mapping does not indicate the presence of any structures within the currently proposed Green Alternative prior to 1938, a residence (MS 1) is depicted approximately 30 m (100 ft) to the northeast of the project area by at least 1935 (Figure 8). Cartographic research suggests that this building was constructed prior to 1935 and was demolished sometime between 1938 and 1954.

By 1954, two residences (MS 2 and MS 3) are depicted in the northern portion of the project area to the east of the intersection of KY 335 (Old Dixie Highway) and McFerran Street, along with a barn (MS 11) to the south-southwest of the intersection of KY 335 (Old Dixie Highway) and McFerran Street, and several commercial warehouses (MS 6 through MS 9) at the southern end of the project area between KY 335 (Old Dixie Highway) and U.S. 31W (S. Dixie Street). By 1966, two additional residences (MS 4 and MS 5) are shown at the northern end of the project area near the intersection of KY 218 (W. Main Street) and KY 335 (Old Dixie Highway), and a horse stall/grooming facility (MS 10) is depicted just west of the aforementioned barn (Figure 9).

Although the location of MS 1 is outside the currently proposed Green Alternative project area, it is the closest known building in the vicinity until at least the early/mid-twentieth century. While this former residence is no longer extant, remnants of its cut limestone foundation were observed in a wooded area approximately 30 m (100 ft) northeast of the project area. As such, it is possible that this residence is associated with Isolated Find 1, which is discussed in the following sections.

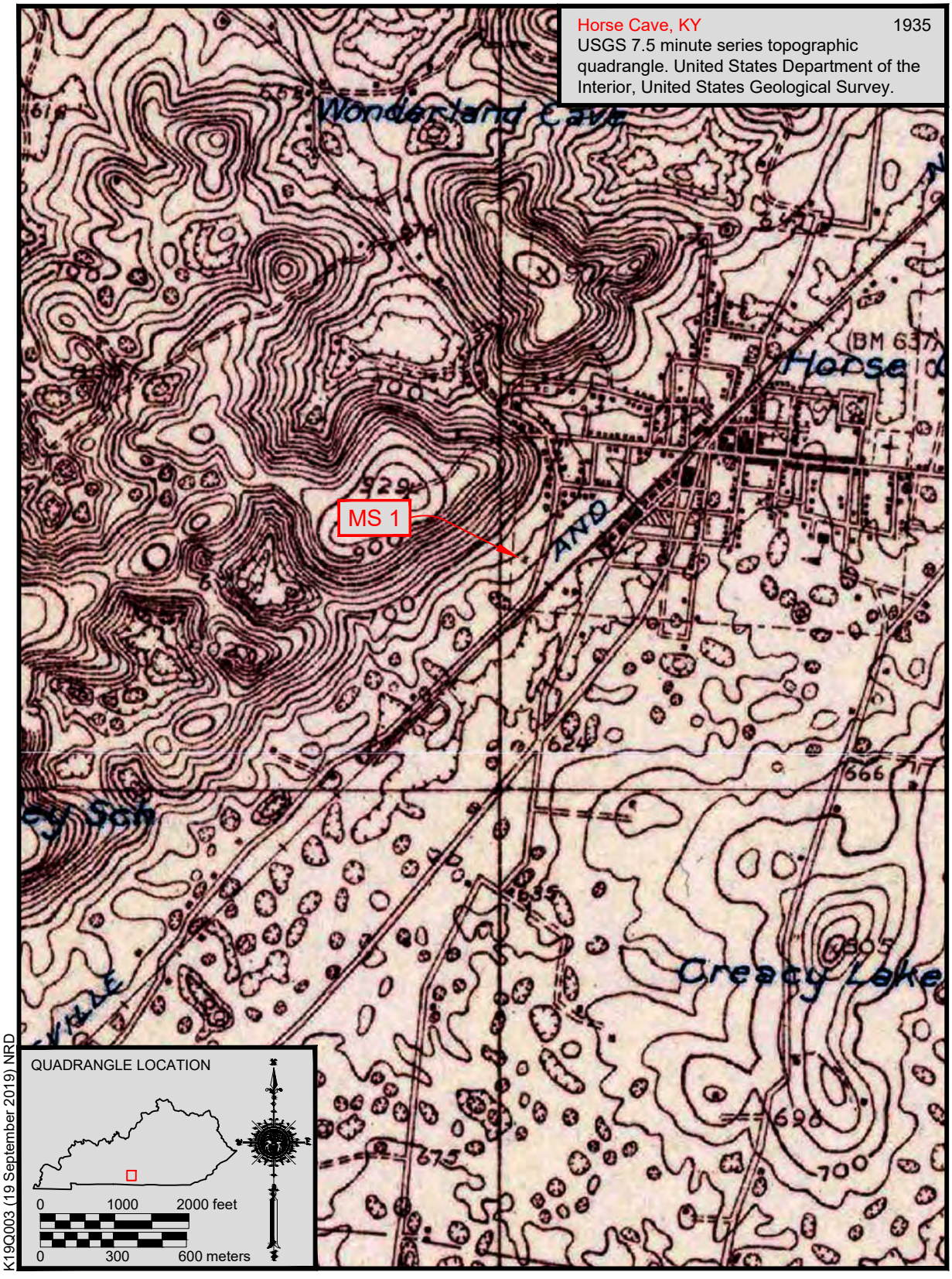

Figure 8. 1935 map (USGS 1935) showing MS 1.

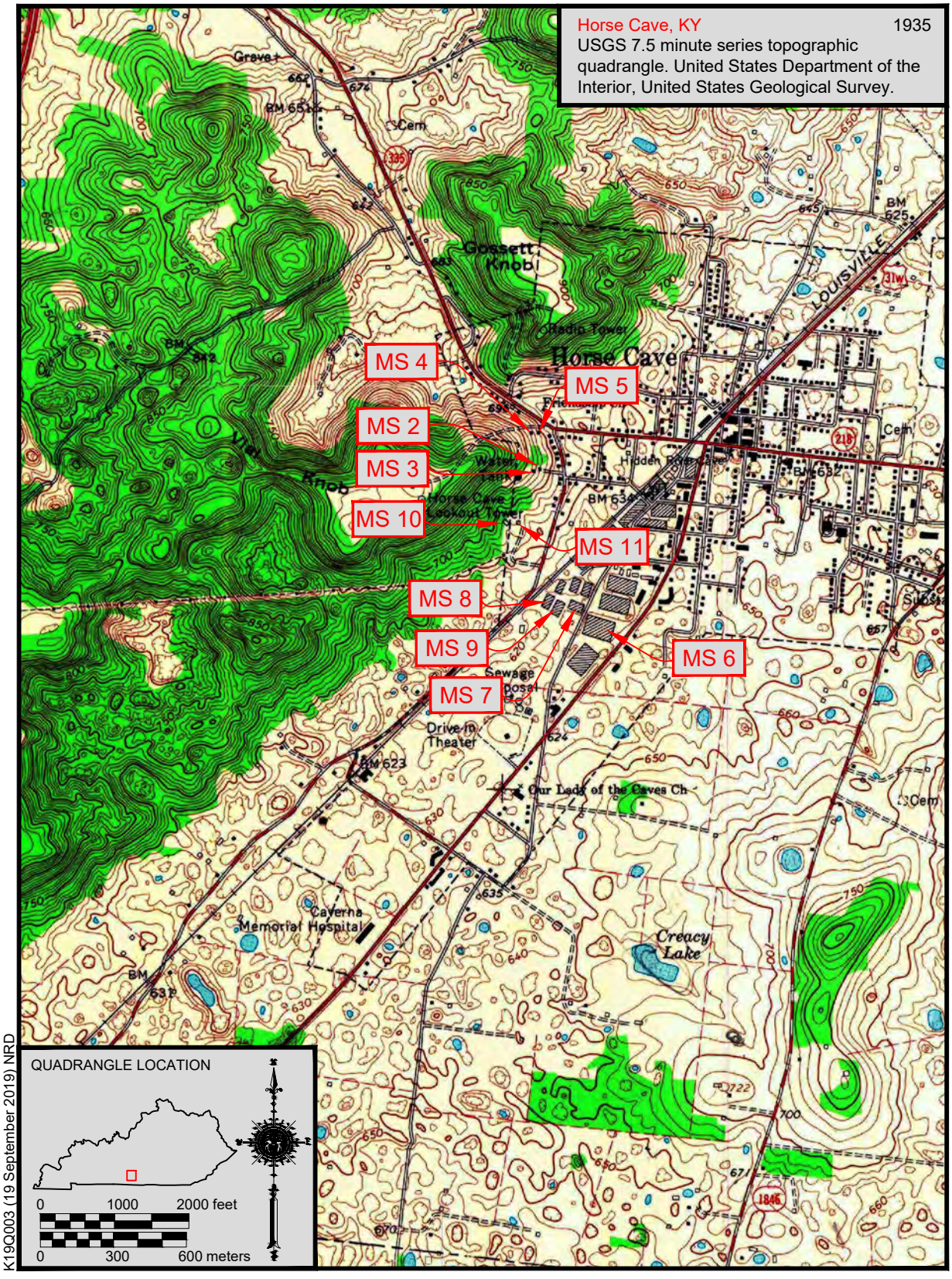

Figure 9. 1966 map (USGS 1966) showing MS 2–9.

The location of MS 2 and MS 3 is characterized by a manicured grass lawn and two-track gravel driveway associated with occupied modern residences that are situated outside of the currently proposed Green Alternative project area. These houses are positioned along a levelled and landscaped area at the edge of a gently sloping landform (Figure 10). No artifacts or archaeological features were encountered during the survey of this portion of the project area.

The location of MS 4 and MS 5 is also characterized by manicured and landscaped lawns associated with occupied modern residences (Figures 11 and 12). These houses are situated along the side slope of a moderately steep landform at the northern end of the project area. No artifacts or archaeological features were encountered during the survey of this portion of the project area.

The location of MS 6 and MS 7 is characterized by intense commercial development and warehouse construction. While the building associated with MS 6 has been demolished, the large facility associated with MS 7 is still standing (Figure 13). This portion of the project area has experienced heavy ground disturbance from the construction of structures, roadways, and underground utilities. No artifacts or archaeological features were encountered during the survey of this portion of the project area.

Similar to MS 6 and MS 7, the location of MS 8 and MS 9 is characterized by intense commercial development and warehouse construction. Although the structure associated with MS 8 is currently extant, the building associated with MS 9 has been demolished (Figure 14). This portion of the project area has experienced heavy ground disturbance from the construction and demolition of structures, as well as the placement of underground utilities. No artifacts or archaeological features were encountered during the survey of this portion of the project area.

Figure 10. Location of MS 2 and MS 3, facing east.

Figure 11. Location of MS 4, facing southeast.

Figure 12. Location of MS 5, facing southwest.

Figure 13. Location of MS 6 and MS 7, facing northwest.

Figure 14. Location of MS 8 and MS 9, facing northwest.

The location of MS 10 and MS 11 is characterized by a manicured grass lawn associated with a transverse frame barn and a horse stall/grooming facility (Figure 15). While the barn is located outside of the currently proposed project area, the horse stall/grooming facility is situated inside the project corridor. This portion of the project area is located along a moderately sloping landform and has experienced ground disturbance from the construction of the horse stall/grooming facility and the installation of underground utilities. No artifacts or archaeological features were encountered during the survey of this portion of the project area.

Additionally, a spring house was encountered within the project area that does not appear on any of the available historic cartographic sources (see Figure 3). This structure is located approximately 50 m (164 ft) to the north of the aforementioned transverse frame barn (MS 11). This spring house is constructed of dry-laid, cut limestone and was likely constructed during the late nineteenth or early twentieth century (Figure 16). However, modern alterations, including a tin roof, plastic piping, and a concrete basin were noted. This structure is located approximately 150 m (492 ft) northwest of the building associated with MS 1, which is the earliest known residence in the vicinity. Because this spring house is the nearest source of potable water to MS 1, it is possible that these two structures are related. Shovel testing was conducted at the location of the spring house in both 20 m (66 ft) intervals along the project corridor and 5 m (16 ft) intervals around the spring house itself. No artifacts or archaeological features were present in any of the excavated probes.

Survey Predictions

Considering the known distribution of sites in the county, the available information on site types recorded, and the nature of the present project area, certain predictions were possible regarding the kinds of sites that might be encountered

Figure 15. Location of MS 10 and MS 11, facing northeast.

Figure 16. Location of the spring house, facing northwest.

within the project area. Multicomponent sites with prehistoric and historic components were the most common site type expected due to the presence of previously recorded prehistoric sites and mapped historical farmsteads in the general vicinity. Prehistoric sites were also expected due to the karst topography of the area.

IV. FIELD METHODS

The project consisted of a phase I archaeological survey of the roughly 1.2 km (0.75 mi) long KY 335 Horse Cave Connector Green Alternative. The project covers an area of 9.53 ha (23.5 acres). The boundaries of the project area were determined using mapping provided by Qk4, Inc., and all survey data was recorded using ESRI ArcGIS® Collector software interfaced with a handheld Garmin® GLO global positioning system (GPS) receiver capable of real time 2–3 m (7–10 ft) horizontal accuracy.

Survey coverage across the project area is presented on Figure 3. Survey methods consisted of a combination of systematic shovel testing and intensive pedestrian survey with visual inspection. In areas where surface visibility was less than 50 percent and slope was less than 15 percent, shovel probes were positioned at 20 m (66 ft) intervals across the project corridor in linear transects spaced 20 m (66 ft) apart. Radial shovel probes were excavated at an interval of 10 m (33 ft) in each cardinal direction from positive shovel tests to more accurately determine the site boundaries within the project area.

Each shovel probe measured approximately 35 cm (14 in) in diameter and was excavated to a depth of at least 10 cm (4 in) into culturally sterile subsoil. Removed soils were screened through 0.64 cm (0.25 in) hardware cloth, with all recovered artifacts bagged and recorded by provenience. A profile of every positive shovel probe, as well as representative profiles of negative probes, was drawn and artifact contents

were recorded for all positive probes. The location of each positive shovel probe also was recorded using ESRI ArcGIS® Collector software interfaced with a handheld Garmin® GLO GPS receiver.

Bucket augering was not conducted due to the shallow surface soils throughout the current project area, as well as, the absence of alluvium or sinkholes that might contain deeply buried cultural deposits.

Survey areas in which the surface visibility exceeded 50 percent and/or slope exceeded 15 percent were subjected to pedestrian survey with visual inspection. In this case, the ground surface was inspected at the same intervals as that described for shovel testing. Pedestrian survey was conducted by walking parallel transects along natural contours. Steep sideslopes were inspected for natural benches and overhangs. Dirt roads and all exposed areas were walked and visually examined for indications of cultural material and features. Artifacts recovered during pedestrian survey, if present, would be bagged according to provenience and artifact locations and/or scatters would be mapped using ESRI ArcGIS® Collector software interfaced with a handheld Garmin® GLO GPS receiver.

V. MATERIALS RECOVERED

One historic artifact was recovered during the course of this survey. This object consists of a single late machine-cut nail fragment recovered during shovel testing at IF 1. Machine-cut nails are square nails cut from a sheet of metal that taper on two sides rather than on all four sides like the earlier hand-wrought nails. The earliest machine-cut nails were headed by hand and exhibit a pinch below the head, as well as irregularly-shaped heads. Early machine-cut nails were manufactured between the late 1700s and the late 1830s (Smith 1975; Loveday 1983; Cleland 1983:61). Late machine-cut nails were completely manufactured by machine, and lack the pinching and irregular heads of the early machine-cut nails. Late machine-cut nails were manufactured from the late 1830s until about 1900, and are still used today in masonry construction (Smith 1975; Loveday 1983; Cleland 1983:61). The specimen recovered at IF 1 is a proximal fragment that exhibits the characteristics of a late machine-cut nail.

Little interpretation can be made regarding this artifact other than that some type of historic use of this landform occurred during the mid- to late nineteenth century. As no additional artifacts were encountered, it is not likely that this location was used for domestic activities. However, a review of historical mapping indicates that a residence (MS 1) was present approximately 50 m (164 ft) northeast of IF 1 outside of the current project area. It is most likely that this nail is associated with the occupation of that building.

VI. RESULTS

During the course of the current investigation, one isolated find was documented. A description of this isolate is presented below, and its location is depicted in Figure 3 as IF 1.

Isolated Artifact Find

This class of cultural resources consists of isolated artifacts that occur as singular items with no other evidence of human activity, either prehistoric or historic. For this isolated find, shovel testing was conducted in an attempt to locate any possible related artifacts.

Isolated Find 1 (IF 1)

UTM: 16 N 4114797.74, E 596259.20
Elevation: 194 m (636 ft) AMSL
Distance to nearest water: 190 m (632 ft)
Direction to nearest water: northwest
Type and extent of previous disturbance: agricultural activities, erosion, extent unknown
Topography: upland
Vegetation: hay remnants and scrub grasses
Ground Surface Visibility: less than 10 percent
Aspect: nearly level

Description: IF 1 is the proximal fragment of a late machine-cut nail dating from the mid- to late nineteenth century. It was identified along the northeastern edge of the project area during shovel testing at a depth of 0 to 20 cm (0 to 8 in) bgs (Figure 17). In total, 25 shovel probes were

excavated at this location. Specifically, 21 probes were excavated across the landform at 20 m (66 ft) intervals along four transects spaced 20 m (66 ft) apart, and 4 additional radial probes were excavated at 10 m (33 ft) intervals in each cardinal direction around IF 1.

Shovel testing at this location revealed a soil profile that is consistent with the Fredonia-Hagerstown-Vertrees silt loams, rocky, 6 to 20 percent slopes (FdC) that are mapped for this area (Mitchell 1993). However, the soils in the project area lack a discernible plow zone (Ap) horizon. For instance, the soils at IF 1 are composed of a reddish brown (5YR 4/4) clay (Bt) horizon to a depth of 20 cm (8 in) bgs, underlain by limestone bedrock. The absence of a plow zone is likely due to erosion.

As previously discussed, IF 1 is located approximately 50 m (164 ft) southwest of MS 1 (which is outside of the current project area), and is likely related to the occupation of this structure.

Recommendation: Based on the archaeological investigations, IF 1 consists of a single late machine-cut nail fragment that is likely associated with a former residence located outside of the current project area. Due to the presence of only one artifact, no Smithsonian trinomial site number was assigned to this resource. This isolate would be unlikely to yield new and significant information pertaining to the historical development of the Mississippian Plateaus region of Kentucky. Therefore, IF 1 is not considered eligible for inclusion in the NRHP under Criteria A, B, C, or D, and no further work is recommended.

VII. CONCLUSIONS, RECOMMENDATIONS, AND TREATMENT

Note that a principal investigator or field archaeologist cannot grant clearance to a project. Although the decision to grant or withhold clearance is based, at least in part, on the

Figure 17. IF 1 location, facing southeast.

recommendations made by the field investigator, clearance may be obtained only through an administrative decision made by the Federal Highway Administration and KYTC, Division of Environmental Analysis, in consultation with the State Historic Preservation Office (the Kentucky Heritage Council).

This phase I archaeological survey of the proposed KY 335 Horse Cave Connector project in Hart County, Kentucky, consisted of a combination of systematic shovel testing and intensive pedestrian survey with visual inspection. The entire project area was surveyed, encompassing a total of 9.53 ha (23.5 acres) of agricultural fields, undissected uplands, and side slopes, as well as residential lots and commercial property.

The survey also resulted in the documentation of one previously unrecorded historic isolated find (IF 1). No archaeological sites were recorded as part of this survey. No sites listed on, or eligible for inclusion onto, the NRHP will be affected by the proposed KY 335 Horse Cave Connector Green Alternative; therefore, archaeological clearance is recommended.

If any previously unrecorded archaeological materials are encountered during construction activities, the KHC should be notified immediately at (502) 564-7005. If human skeletal material is discovered, construction activities should cease, and the KHC, the local coroner, and the local law enforcement agency must be notified, as described in KRS 72.020.

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