A Pit Investigation: Historical Archeology at the Historic Entrance of Mammoth Cave, Kentucky

A Thesis
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with a
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by
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Abstract

Mammoth Cave, located in Kentucky, is the longest cave in the world as well as a significant archeological site. This project sought to investigate a pit at the Historic Entrance of the cave and evaluate its archeological significance by using archival research, pedestrian survey, and test excavation. This study clearly demonstrated the existence of historical archeological materials in the pit specifically and the Historic Entrance more broadly. The pit has been found eligible for the National Register of Historic Places under Criterion A, because of its association with the development of tourism in America. Additionally, it is eligible under Criterion D because of its potential to provide information about historic period use of the cave. Due to the dynamic geology of the cave, the pit is currently in the process of opening back up. This poses a severe risk to the cultural deposits in the pit, so the recommendation is to excavate the pit to recover as much information as possible before the archeological materials are destroyed by erosion.

Acknowledgments

This project would have been impossible without the enthusiastic support of the staff at Mammoth Cave National Park. I want to particularly thank Cave Resource Specialist, Rick Toomey, and Cultural Resource Program Manager, Ed Jakaitis for their advice, assistance, and friendship. I would also like to thank the small army of volunteers that assisted with the fieldwork.

I owe a huge debt of gratitude to Jamie Dougall, undergraduate anthropology student at University of Idaho, for digitizing the huge amount of data collected during our pedestrian survey. I also am eternally grateful to my fellow graduate student Ally Gerlach for digitizing the profile drawings.

Joe Douglass and Kate Algeo both were extremely kind in pointing me in the right direction in terms of historical research. Thank you to the wonderful archivists at the National Archives at Philadelphia for their support.

I would also like to thank the Cave Research Foundation and the Cave Conservancy Foundation for providing funding for this project.

And finally, thank you to my committee: Dr. Mark Warner, Dr. Grant Harley, and chair Dr. Kat Eichner.

Dedication

Thank you to Mom and Dad for all the support, and to Nicki for giving up part of her summer to hang out with me in a cave.

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Statement of Contribution

Mitchell Barklage, PhD, and Lianne Rosario of the Illinois State Geological Survey provided their invaluable expertise for the geophysical portion of this project. They collected the raw data, processed it, and provided the initial interpretation. I combined their geophysical data with the archeological data I collected to create a more robust interpretation of how human activity created the anomalies seen in the ground penetrating radar results.

Chapter 1: Introduction to the Project and Area of Potential Effect (APE)

Project Sponsors, Permit, Agency, Regulatory/Statutory Authority

This research took place at the Mammoth Cave Historic Entrance (15 ED 1, MACA 215.1), Mammoth Cave National Park (MACA[1]), Kentucky. It was conducted in partial fulfillment of the requirements for the MA degree in Anthropology at the University of Idaho. This research was done in accordance with the Archeological Resources Protection Act of 1979 and Section 106 and Section 110 of the National Historic Preservation Act of 1966. The permit number is MACA 2022-01. Artifacts collected, field notes, photographs, and maps are held at the Mammoth Cave National Park curation facility under accession number MACA-00991.

Project Description

Mammoth Cave is the longest known cave in the world, with 426 miles of mapped passages. The cave is a geological wonder and serves as a natural laboratory for geological, paleontological, biological, and archeological investigations. It has been under the stewardship of the National Park Service since 1936, with MACA officially being established in 1941 (figure 1). Portions of the cave were listed on the National Register of Historic Places (#91000503) in 1991 on account of their significance in the history of industry, recreation, and medicine (Lally 1991).

[1] National Park Service unit acronyms are assigned based on the first two letters of the park name, in this case "Mammoth Cave" becomes "MACA"

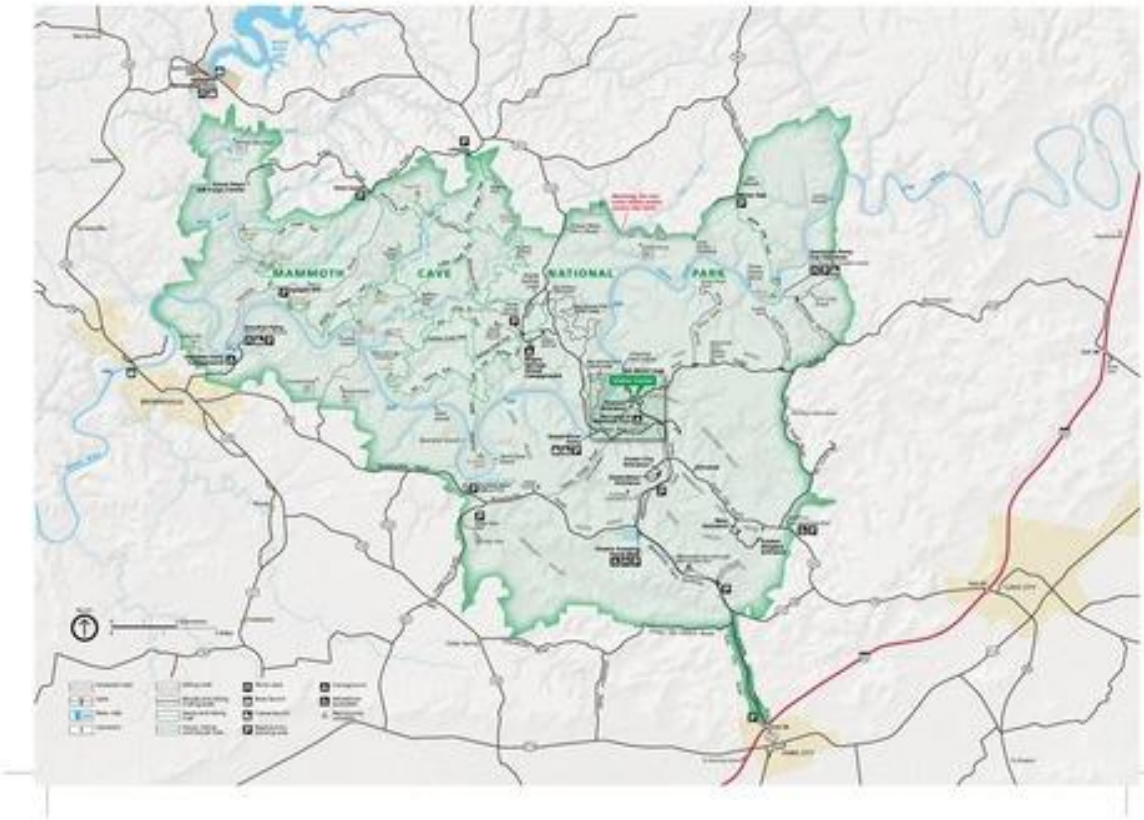


Figure 1: Mammoth Cave National Park (NPS 2018)

The Historic Entrance of Mammoth Cave (figure 2) is a known prehistoric archeological site, which dates to roughly 5,000 years ago (Nelson 1917, Trader et al. 2008). However, the Historic Entrance is also a historical archeological site. The Historic Entrance went through numerous modifications over the years from saltpetre[2] mining in the early 1800s to the development of tourist infrastructure throughout the nineteenth and twentieth centuries (Panamerican Consultants et al. 2021).

[2] Also spelled "saltpeter." I use the spelling "saltpetre" because that is the historical spelling used in many of the early documents pertaining to the cave (Meriam 1844; Martin 1851). Both spellings are used in documents produced today.

Figure 2: This Historic Entrance of Mammoth Cave in 2022. Photograph by Kailey Alessi.

This project is the first to investigate the historical archeology of the Historic Entrance (figure 3). The park is currently considering making modifications to the walkway at the Historic Entrance, making this project an important first step in cultural resource compliance work required ahead of modifications. Specifically, this project investigates the pit north of the walkway. The pit was filled with debris, most likely during the 1960s when construction was done along the walkway (NPS 1968). Volunteers from the National Speleological Society removed concrete and other construction debris from the pit in November of 2021.

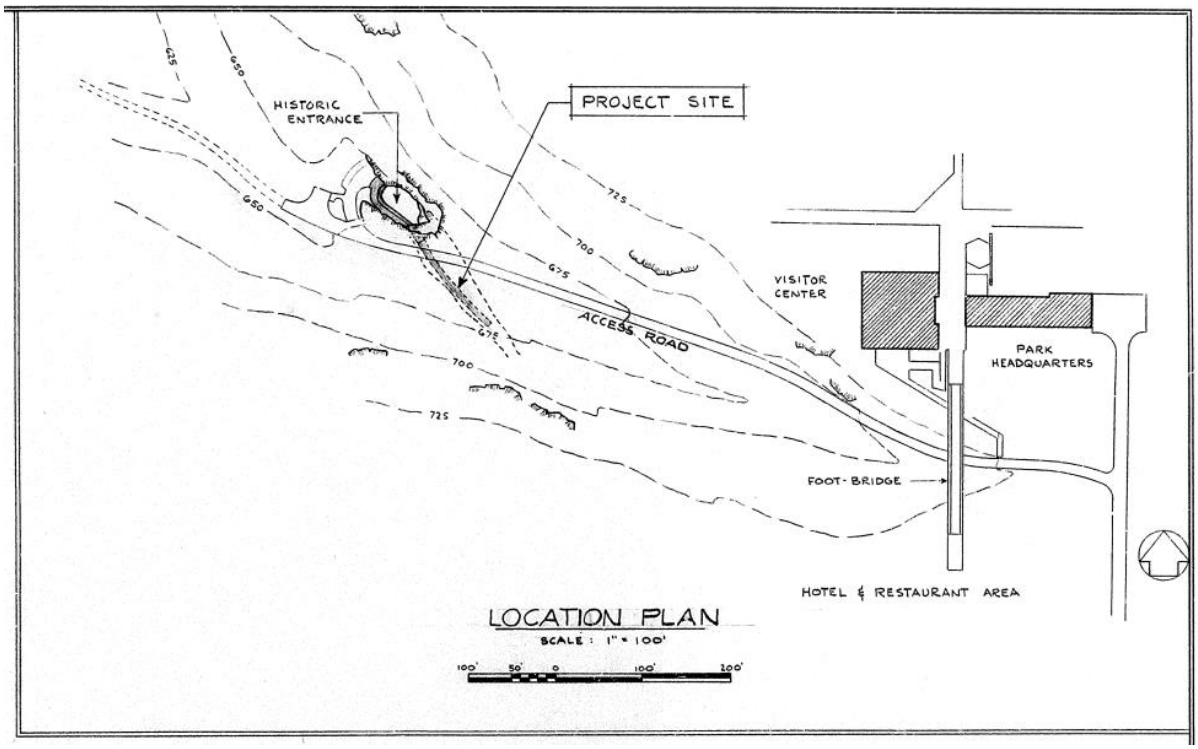


Figure 3: Map of Project Area, the Mammoth Cave Historic Entrance (NPS 1968)

This project assesses the uncovered pit's significance. Per 36 CFR 60.4, the pit meets National Register Criterion A and Criterion D for significance. In terms of Criterion A, the pit is significant because of its association with the saltpetre industry during the early nineteenth century and the subsequent development of cave tourism. Additionally, since this is a preliminary study, the pit is also significant under Criteria D, potential to yield information on the past. The pit is said to be 50 feet deep (15.24 meters) in historical documents[3] (Lee 1835). This study only investigates the first meter of pit deposit, and clearly demonstrates that there is the potential for additional archeological materials located beneath the study area. This pit provides information about human use of Mammoth Cave over time,

[3] Throughout this thesis, imperial measurements are only used when referencing historical documents. All archaeological work during this project was conducted using metric measurements.

and helps to further flesh out the chronology of infrastructure developments during the historic period, particularly the mid-twentieth century.

This project provides several benefits to MACA. First, it provides baseline data that can be used to determine necessary cultural resources compliance measures for planned work at the Historic Entrance. Second, it provides more information about both the cultural and natural resources at the Historic Entrance. The National Park Service's mission is to protect and interpret resources for the public, and this project provides the park with information that can be used to further these goals.

Pedestrian survey covered an area of 150 feet by 50 feet (46 meters x 15 meters) and was used to identify artifacts as well as to determine where excavation units would be placed. We set up a 2 x 2 meter grid in the vestibule from the dripline to the end of the rail to guide our survey of the site. Following pedestrian survey, we hand excavated two 1 x 1 meter units, one in the pit itself and the other about two meters north, on the edge of the pit. The survey and excavation took place over two weeks, from June 27 to July 9, 2022. Artifact analysis took place at MACA from July 10 to July 23, 2022.

Project Boundaries and APE

MACA is located in south central Kentucky, within parts of Edmonson, Barren, and Warren counties (figure 4). The blue star on the map below (figure 5) indicates the approximate location of the Mammoth Cave Historic Entrance. Figure 6 gives a more a detailed view of the area surrounding the Historic Entrance.

Figure 4: Mammoth Cave National Park Context Map (not to scale) (Mammoth Cave National Park Core Visitor Services Area CLR)

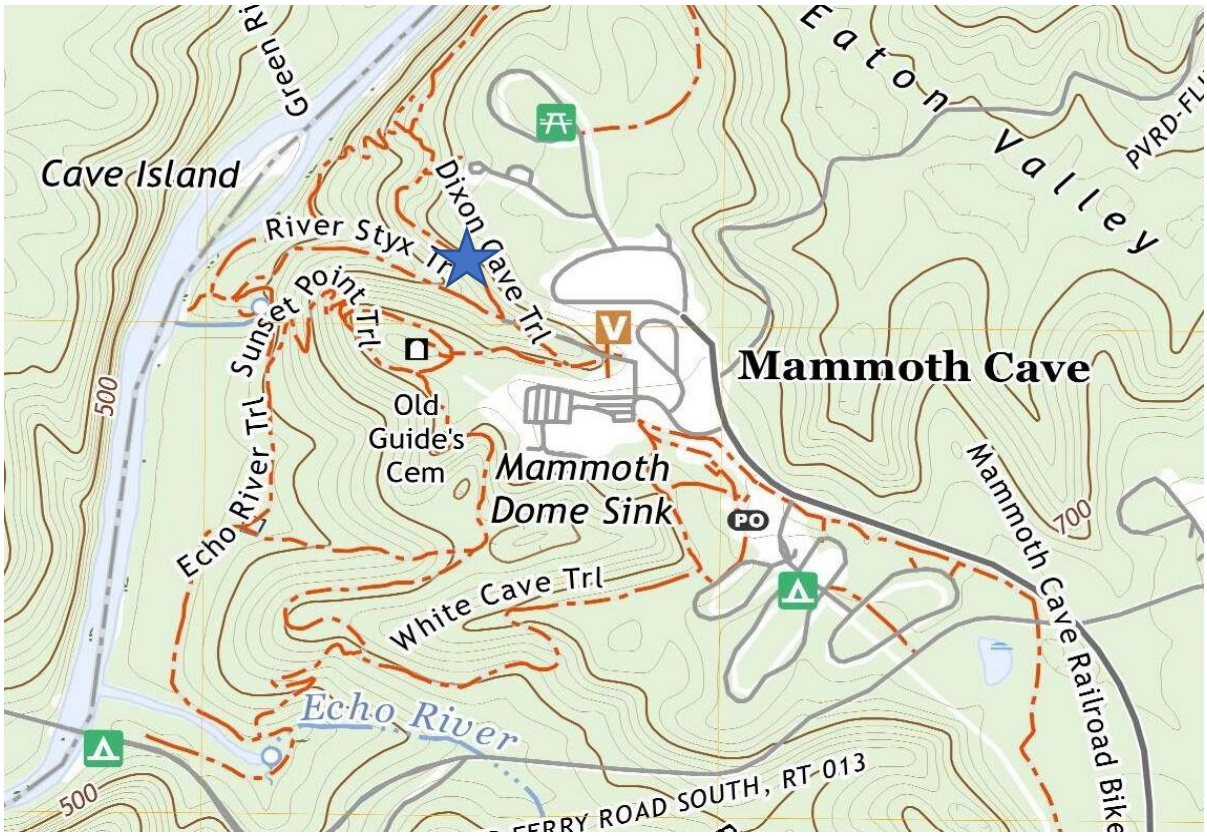


Figure 5: Detail of USGS Topographic Map, Mammoth Cave, KY, 2022. The blue star indicates the location of the Historic Entrance.

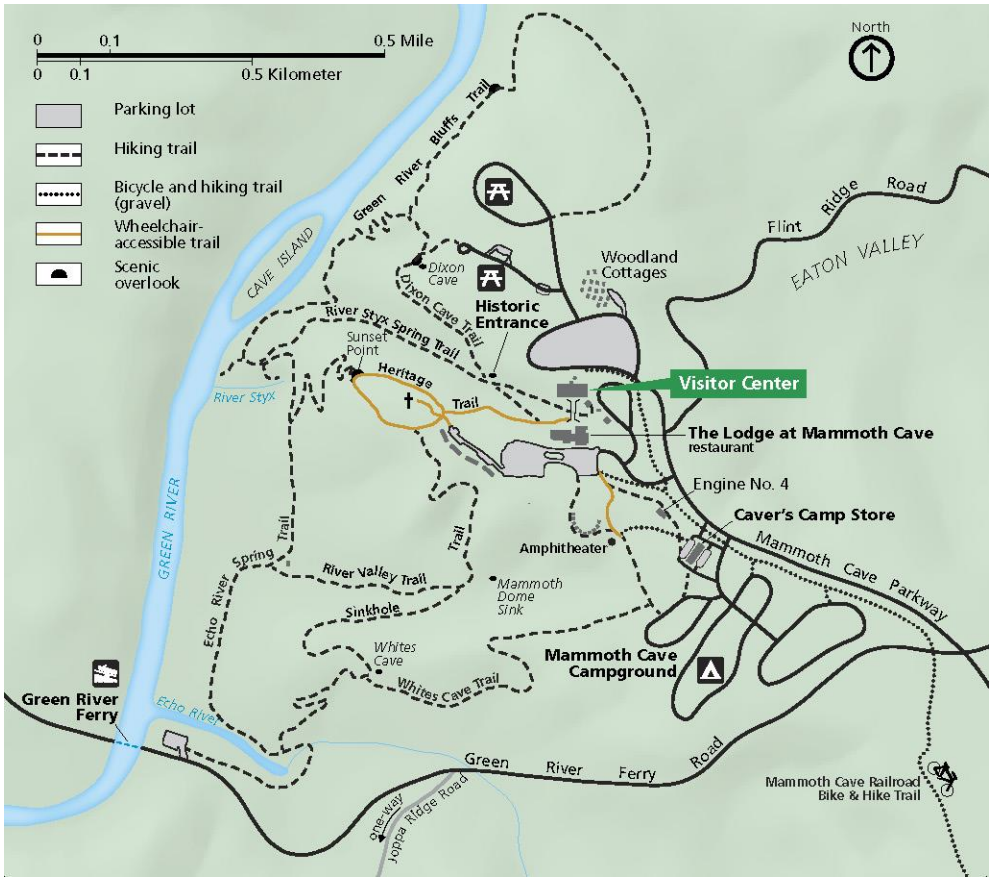


Figure 6: Visitor Center Detail Map - Mammoth Cave National Park (NPS 2018)

This study only investigated one tiny portion of Mammoth Cave: the Historic Entrance (figure 7). The area is approximately 46 meters by 15 meters (150 feet by 50 feet). The main focus was on a naturally occurring depression, which geologically is called a subsidence feature, and which historically has been called a pit. This pit has historically been used as a dumping ground for various types of human refuse. The pit is directly north of the concrete walkway, with a small portion of the pit actually being underneath the walkway (figure 8). Excavation Unit 1 is located in the pit, while Excavation Unit 2 is located approximately 4 meters (12 feet) north of the walkway, in line with the pit.

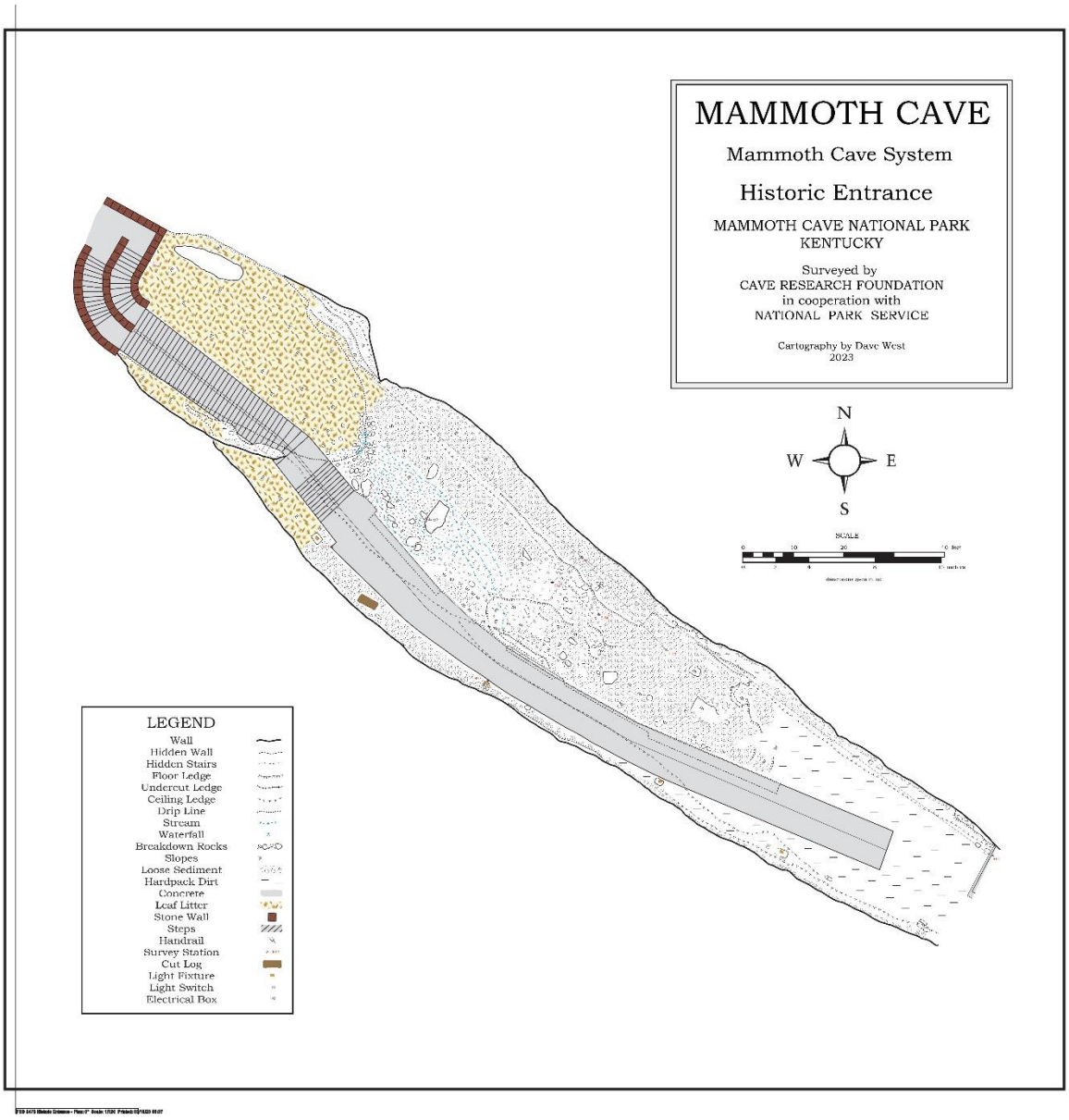


Figure 7:Map of the Mammoth Cave Historic Entrance. Surveyed by Ed Klausner, Dave West, Karen Wilmes, and Glenn Osburn. Cartography by Dave West, 2023.

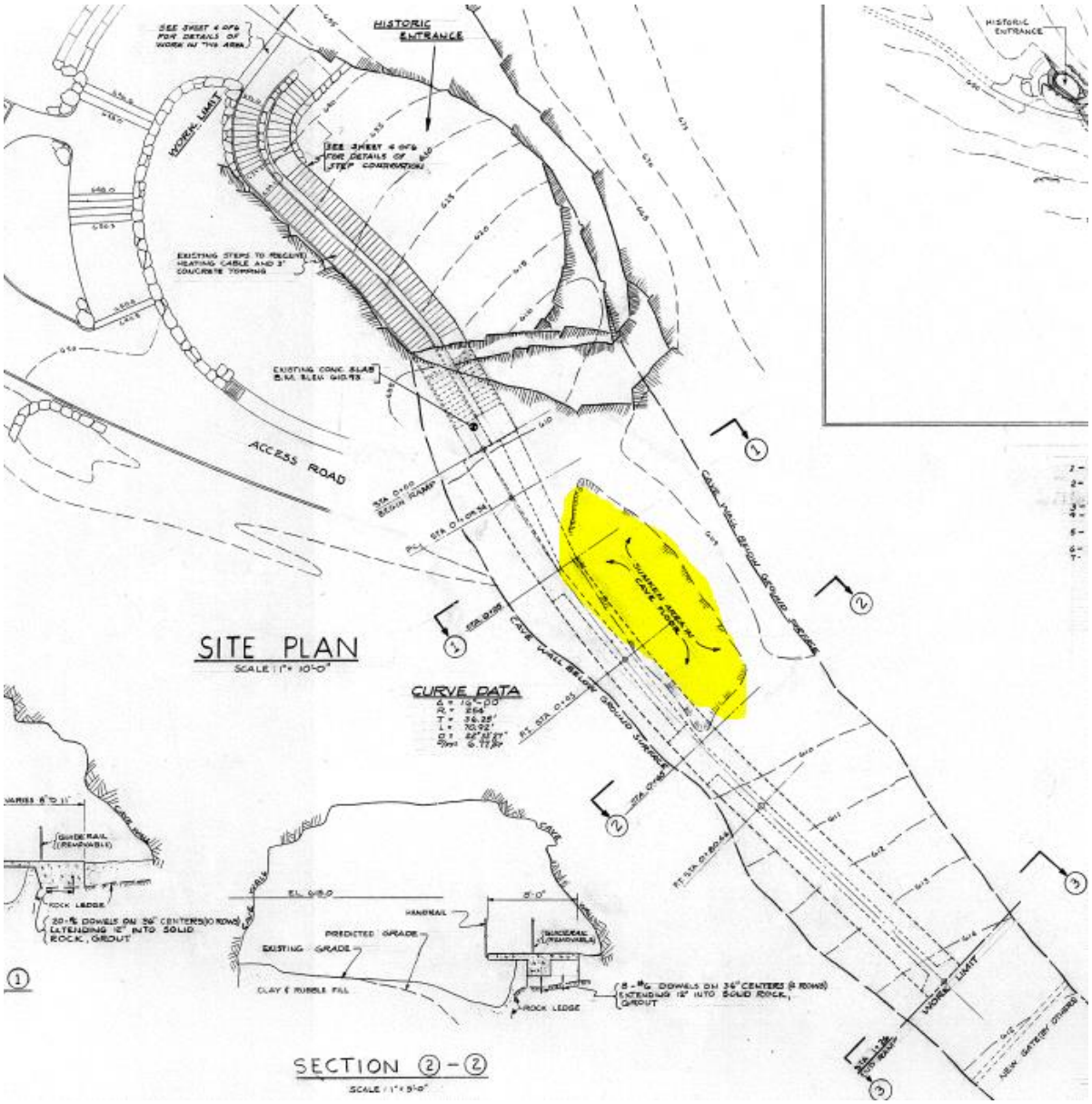


Figure 8: Plan showing Mammoth Cave Historic Entrance (NPS 1968). The highlighted area is the location of the pit.

Purpose of Report and Scope of Work

The National Park Service is a federal agency of the U.S. government and is required to fulfill its obligation to protect historic properties, as defined by Section 106 of the National Historic Preservation Act of 1966. This project defined an area of potential effect (APE) that requires field identification of any resources, and those resources must be evaluated for

significance as defined by the National Register of Historic Places eligibility criteria (NPS 1997). The pit within the Historic Entrance of Mammoth Cave has been filled with cave sediment and rock, as well as known historic and possible prehistoric material displaced by activity in the early 19th century and later. This investigation provides a preliminary understanding of the nature of the deposits within the pit, which is recorded as extending to a depth over 50 feet below the floor of the cave entrance. Geophysical and surface survey covered an area of 46 meters x 15 meters (150 feet by 50 feet), or 0.0697 hectares (0.1722 acres). Geophysical methods extended to 15 meters (50 feet) below the surface. Surface survey did not penetrate the ground. Excavation units extended to a maximum depth of 1 meter (3 feet) below the surface. While the geophysical survey provided a broad picture of the dimensions of the pit, the surface survey and excavation identified what specific types of cultural material are in the pit and the surrounding area.

The results of the study will support the National Park Service's efforts to conserve and protect cultural materials at the Historic Entrance of Mammoth Cave for future generations. The park requires information on the archeological materials from the pit specifically, and the Historic Entrance more broadly, to mitigate both human and environmental impacts to the site. The park is considering making modifications to the concrete walkway that goes through the entrance and is also considering removing the concrete from the pit to restore it to a more natural appearance. Both of these projects will affect the archeological deposits in the Historic Entrance, thus archeology is necessary to determine what deposits are present and how they will be affected.

Additionally, this project provides the park with a unique opportunity for public education and outreach. The National Park Service's mission is to "[preserve] unimpaired the

natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations" (National Park Service 2014:1). The Historic Entrance is one of the most heavily trafficked areas of Mammoth Cave National Park, and thus this archeological project is highly visible to the visiting public. Most people have not seen an archeological project in person, and this project shows them how archeologists work and what sort of cultural resources are present in our National Parks. The hope is that through this archeological project we were able to educate people on archeology, on the cultural and natural resources at Mammoth Cave, and inspire them to care about cultural heritage on our public lands. The basis of this project is the belief that understanding leads to stewardship.

Fieldwork

Fieldwork was conducted from June 27, 2022 to July 9, 2022. Kailey Alessi of the University of Idaho was the Field Director, assisted by Ed Jakaitis, Cultural Resource Program Manager at MACA. Fieldwork consisted of geophysical survey, pedestrian survey, and test excavation. I then worked in the lab cleaning, tabulating, and photographing all artifacts recovered. Additionally, I conducted archival research and publicly disseminated some of the results. Table 1 summarizes the different components of this project the cumulative hours spent on each part of the project.

Findings and Recommendations

The archival research, pedestrian survey, and test excavation clearly demonstrated the existence of historical materials in the pit specifically as well as the Historic Entrance. The artifacts dated from 1840 to the present, with the bulk of materials dating between 1900 and 1979. Under the Archeological Resources Protection Act, anything older than 50 years is

considered potentially archeologically significant, thus these resources do meet the criteria for significance. The pit has been found eligible for the National Register of Historic Places under both Criterion A and D.. The pit has already demonstrated that it yields information about the history of Mammoth Cave and it has the potential to provide even more information about historic period use of the cave. Due to the dynamic geology of the cave, the pit is currently in the process of opening back up. Water from the waterfall at the entrance is flowing into the pit, and this erosional force is making the pit grow deeper. This poses a severe risk to the cultural deposits in the pit. This erosion can cause the loss of stratigraphy, as in situ deposits are damaged.

Table 1: Project, dates of work, and man hours for the Historic Entrance archeological project.

Project	**Dates**	**Man Hours**
Geophysical Survey	June 27-28, 2022	56
Pedestrian Survey	June 29-July 2, 2022	236
Test Excavation	July 3-July 9, 2022	304
Artifact Cleaning, Tabulation, and Photography	July 11-July 23, 2022	85
Archival Research	July 1, 2022-February 28, 2023	40
Public Dissemination	July 6, 2022-May 11, 2023	30
Grand Total	**-**	**751**

The recommendation is to excavate the pit to recover as much information as possible before the archeological materials and context of the pit are further destroyed by erosion. While the artifacts recovered during this study are relatively recent, they are over 50 years

old and thus archeologically significant according to National Register standards. The pit can provide us with information about how the National Park Service has managed the cave over the last eighty years. Archival research has shown that there is not a clear record of all management actions, so data from the pit excavation can potentially help to fill the gaps in the record. Additionally, the excavation of this pit will provide an opportunity for public education and outreach, fitting with the NPS's mission.

Chapter 2: Environmental Setting of Mammoth Cave

Geology and Geography

Mammoth Cave Geography

Mammoth Cave is located in south central Kentucky, stretching across Edmonson, Hart, and Barren counties. Mammoth Cave is in the Interior Low Plateau physiographic division. The cave sits on the intersection between the Chester Upland and the Pennyroyal Plateau. It is a karst landscape dominated by sedimentary rock, primarily limestone and sandstone. Climatically, summers are humid and warm and winters cool (Thornberry-Erlich 2011:7). The park supports a wide variety of plants and animals. It includes prairie, forest, and aquatic ecosystems (Groves et al. 2021:11). The cave is located in the Upper Green River basin, with the river being less than a kilometer from the site.

Mammoth Cave Geology

The first step to understanding this site is understanding its geology. This includes how the rock was originally deposited, how the cave formed, and finally how the pit itself formed. A couple of terms will be useful for this discussion. One is “karst,” which refers to a landscape in which the rocks are highly soluble in water. Several different types of rocks are soluble, but for Mammoth Cave the dominant rock type is limestone, which is a carbonate. Karst landscapes have unique landforms such as caves, sinkholes, and springs. The high solubility of the rock leads to speleogenesis, or the formation of caves (Gillieson 2021:7-9).

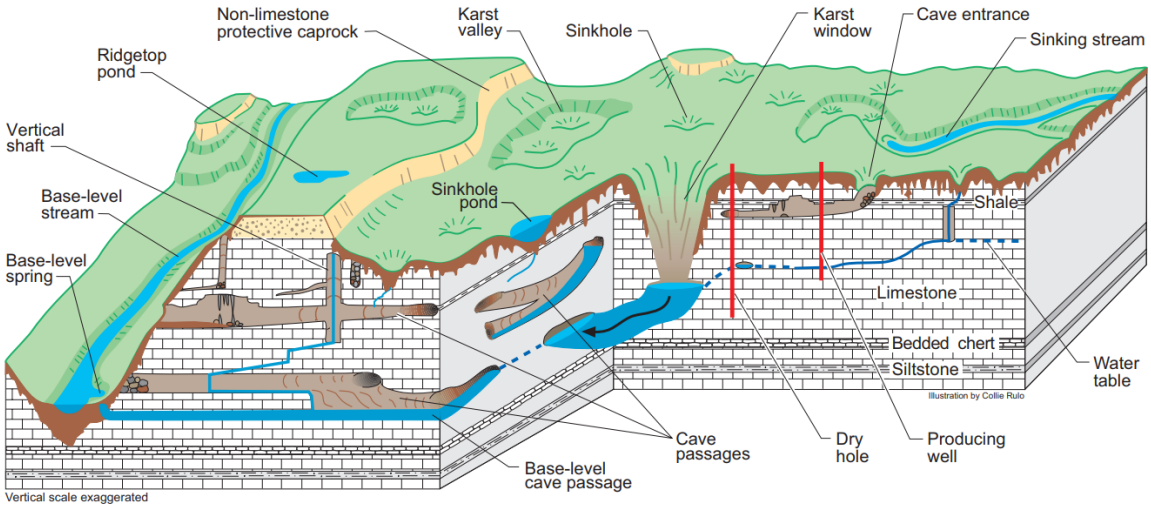


Figure 9: Diagram showing the generalized geology of the Kentucky karst landscape (Currens 1995)

Limestone is a sedimentary rock, meaning that it is deposited in layers over time. It is made up of a combination of calcite crystals and fossils, with the exact ratio varying based on location (Gillieson 2021:57-58). The limestone of central Kentucky was originally deposited about 325 million years ago, when a shallow sea covered this part of the country. Today, the remains of the corals, sharks, and other creatures that called this area home can be seen in the form of fossils inside the cave. After the limestone was deposited, a layer of more insoluble sandstone was deposited on top of it (Thornberry-Erlich 2011:37-41). By the Tertiary period, which lasted from seventy million to two million years ago, the shallow sea was gone (Palmer 1981:129). The Green River flowed through the area around Mammoth Cave, both on the surface and below ground. Slowly, the carbonic acid in the ground water started to dissolve the limestone creating bigger and bigger passages. Over time, the Green River eroded at the bottom and started to drop down. This drop in river level is preserved in the different levels of the cave passages. The passages closest to the surface are the oldest, while the deeper passages are younger. This process of water dissolving limestone formed the

massive labyrinth of underground passages that cavers are still exploring today (Thornberry-Erlich 2011:37-41). See figure 9 for a generalized diagram of the Kentucky karst landscape.

The first passages in the Mammoth Cave system began to form about ten million years ago, however the area of the cave that would become the Historic Entrance did not begin to form until about one million years ago (Palmer 1981:135). The Historic Entrance formed when a tributary of the Green River began to cut into the existing cave passage. This caused the ceiling of the passage to collapse and gave us the Historic Entrance (Palmer 1981:152-156). The sediment at the entrance of a cave is known as entrance talus and is composed of breakdown from the ceiling of the cave, weathering, downslope movement, and organic debris (White 2007:77).

The pit was formed through a similar process as the rest of the cave. Water flowed through small cracks in the rock and slowly dissolved it. This formed what is technically called a shaft, though for purposes of this project this feature will be referred to as a pit in keeping with the historical documentation. Since the pit is not filled with water, it is clear that the water is draining out somewhere (Panamerican Consultants et al. 2021:100-101, 110). It is unknown at this point the number, depth, or size of the drain(s) in this pit.

Rick Toomey, MACA Cave Resource Specialist, believes that the pit keeps sinking because it is connected to a previously undiscovered cave passage. There is no cave passage underneath the Historic Entrance on the maps of the cave, and the closest passage to the entrance is Pensacola Avenue. Pensacola is interesting because the wall at the end of the passage becomes wet, and the source of this water is not clear. Toomey thinks that it is possible that this water is actually entering the cave through the pit, and I agree with this interpretation (Toomey 2022, personal communication).

Present Environment

South-central Kentucky has a temperate climate, with temperatures ranging from a low of -2.2ºC in January and a high of 31.7ºC in July. The average annual precipitation is 132.7 cm, with January being the driest month and May being the wettest (Groves et al. 2021:7).

Mammoth Cave National Park contains multiple ecosystems, including forests, prairies, rivers, springs, and of course, caves. There are dozens of species of tree within the park, including various oaks (*Quercus*), maple (*Acer*), tulip poplar (*Liriodendron tulipifera*), hickory (*Carya*), eastern red cedar (*Juniperus virginiana*), and Virginia pine (*Pinus virginiana*). Mammals such as white-tailed deer (*Odocoileus virginianus*), fox (*Vulpes vulpus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), and squirrel (*Sciurus carolinensis*) are common (Groves 2021 et al.:12). There are also dozens of species of birds and reptiles. The riverine ecosystems are especially rich in fauna with many species of fish and over 50 species of mussels (Groves et al. 2021:12).

The cave itself is home to over 160 species of animal, including salamanders, crickets, fish, crayfish, and bats. (Groves 2021 et al.:12). Early historic records talk about the thousands of bats that called the cave home, and presumably they would have also existed in large numbers in the prehistoric period. However, a deadly disease called White Nose Syndrome has decimated the bat population. It was first documented in the park in 2013, and has led to over a 90% decline in the bat population in the park (Groves et al. 2021:202). This has undoubtedly had an impact on the cave environment, since less bats means less guano. Currently, the caves provide habitat for 13 species of bats, including the endangered gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalist*) (Groves et al. 2021:226).

Since at least 1816, the Mammoth Cave Historic Entrance has been a site of tourism. People have installed tourist infrastructure over the years, including steps, walkways, handrails, and gates. There is an intermittent waterfall at the dripline, that most likely was also present during the prehistoric era. The pit is mostly filled in with sediment and concrete, with the bottom being about 2 meters (6 feet) below the bedrock ground surface of the cave.

The Historic Entrance has a varied topography, which made fieldwork a bit of a challenge. We had to carefully watch our step to avoid tripping on the uneven ground. There is a concrete walkway that runs along the south wall of the entrance. This walkway is approximately 8 feet wide and 100 feet long. Since this area is heavily trafficked by tourists, we only surveyed the area north of the walkway. Our biggest challenge during the pedestrian survey was laying out units. The changing topography, coupled with the unwieldly size of a 2 x 2 meter square, meant that our collection units were not exactly the same size. Additionally, there is a 60 to 20 degree angle from the bottom of the pit to the surface of the vestibule, with the angle being steeper to the west, towards the entrance of the cave.

Another challenge we encountered was related to water. I was excavating in the pit when a huge rainstorm blew in. The water slowly made its way past the dripline and took the path of least resistance. Which meant that it started trickling into the pit. The next morning, the excavation unit was intact, but there was water along the north side of the unit.

Prehistoric Environment

Archeological studies (to be discussed in the next chapter) show that indigenous people were using the cave during the prehistoric period, with the Historic Entrance seemingly being a camp site. There are thirteen federally-recognized tribes associated with this site: the Cherokee Nation, Eastern Band of Cherokee Indians, United Keetoowah Band

of Cherokee Indians, Chickasaw Nation, Shawnee Tribe, Eastern Shawnee Tribe of Oklahoma, Absentee Shawnee Tribe, Muscogee (Creek) Nation, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, The Osage Nation, Poarch Band of Creek Indians, and Thlopthlocco Tribal Town (Edward Jakaitis, 2022, personal communication).

Table 2: Archeological Periods and Climate in the Southeast Region. Adapted from Sutton 2011:276.

Date (BP)	**Archeological Period**	**Climate**
400 to present	Historic	Comparable to today
1,200 to 400[4]	Late Woodland	Comparable to today
2,000 to 1,200	Middle Woodland	Comparable to today
2,700 to 2,100	Early Woodland	Comparable to today
5,750 to 2,700	Late Archaic	Comparable to today
8,000 to 5,750	Middle Archaic	Cooler winters, warmer summers, drier inland conditions
11,000 to 8,000	Early Archaic	Temperatures comparable to today
To ca. 11,000	Paleoindian	Temperatures lower than today

[4] The exact dates for archaeological periods are always changing as archaeologists conduct new research. These dates are also regionally specific. For this chronology, I adapted the dates from Sutton's chronological sequence of the southeast (2011:276). The period from 1,200 to 400 BP is known by numerous names archaeological, including the Mississippian, the Late Woodland, and the Late Prehistoric. I use the term Late Woodland because Mississippian is associated with a very specific culture that was not present in the Mammoth Cave area.

People have lived in this region for at least 11,000 years. The climate has fluctuated over time, and table 2 shows how the climate corresponds with archeological periods. However, the landscape has remained consistently dominated by hardwood forests and by fauna such as white-tailed deer and turkey (Panamerican Consultants et al 2021:26).

Chapter 3: Previous Investigations and Summary of Known Sites

Cultural Context

Prehistoric

People have lived in the area now known as Kentucky for at least 11,000 years. The Green River Valley was rich in natural resources, particularly shellfish, whitetail deer, and nuts. The earliest evidence of humans visiting Mammoth Cave comes from the Historic Entrance, where charcoal samples have been radiocarbon dated to 3,638 to 3,370 years old, firmly in the Archaic Period (Trader et al. 2008:60). It appears that at this early period people were using the cave as a camp site, as well as exploring it. Beginning about 3,000 years ago, people began mining minerals such as gypsum, mirabilite, and epsomite from the cave. The exact reason for this mining is unknown and hotly debated, but the current thinking is that the mining of these minerals was connected to male coming-of-age rituals (Crothers 2017:37). The mining coincides with the Early Woodland Period, the time when plant domestication started to ramp up in eastern North America. The cave was most intensively used during this time period, with ample evidence of mineral mining as well as cave art. Mineral mining abruptly ends about 2200 years ago. Whether this was due to it becoming a longer journey to find minerals or the rise of the Hopewell Culture, or a combination of these factors, is unknown (Crothers 2017). Table 3 presents an overview of the various archeological periods and what was happening at Mammoth Cave during each period.

Table 3: Human activity at Mammoth Cave by Archeological Period. Adapted from Sutton 2011:276 and Crothers 2017.

Date (BP)	**Archeological Period**	**Mammoth Cave**
400 to present	Historic	Tourism Saltpetre Mining
1,200 to 400	Late Woodland	
2,000 to 1,200	Middle Woodland	
2,700 to 2,100	Early Woodland	Intensive Mining
5,750 to 2,700	Late Archaic	Camp 5650 to 5380 (Historic Entrance) Cave exploration Mining begins
8,000 to 5,750	Middle Archaic	
11,000 to 8,000	Early Archaic	
To ca. 11,000	Paleoindian	

Historic

After indigenous people stopped using the cave about 2,200 years ago, there is very little evidence for human use of the cave until Mammoth Cave enters the current historic record in 1798. In that year, Valentine Simons registered 200 acres of land with the Warren County survey book. This land contained two saltpetre caves, one of which was Mammoth (Panamerican Consultants et al. 2021:32-33). Saltpetre is one of the main components in black powder and was an important commodity in late eighteenth and early nineteenth century America. Saltpetre mining involved collecting cave sediment and leaching it. The

labor was done by about seventy enslaved laborers (Olson 2017:41). Saltpetre mining continued throughout the early 1800s, particularly during the War of 1812 (Lally 1991).

With the end of the War of 1812 came an end of demand for saltpetre at Mammoth Cave and its transition into a full-time tourist cave. Dr. John Croghan bought the cave in 1839. He operated the cave as a tourist attraction, as well as a brief stint as a tuberculosis hospital (Panamerican Consultants et al. 2021:39-41). After Croghan's death in 1849, the ownership of the cave passed to Croghan's nieces and nephews, forming the Mammoth Cave Estate. The cave would be held in trust until the death of Croghan's last niece or nephew (Panamerican Consultants et al. 2021:41). Throughout the remainder of the nineteenth century, the cave grew in popularity and fame as a tourist attraction.

Interest in having Mammoth Cave added to the National Park system grew during the 1920s (Panamerican Consultants et al. 2021:60). Croghan's last surviving niece, Serena Rogers, died in 1926, at which time the cave was legally allowed to be sold (Olson 2017:48). President Calvin Coolidge signed a bill in 1926 allowing the creation of Mammoth Cave National Park once 45,310 acres of land were acquired. The Mammoth Cave National Park Association was in the process of buying up land around the cave from the farmers who lived in the area. During the Great Depression, the Civilian Conservation Corps (CCC) completed numerous projects at the park, both above and below the surface. These projects included road building, tree planting, and the construction of buildings for administrative and public use on the surface. The CCC also constructed trails inside the cave itself (Panamerican Consultants et al. 2021:62). The National Park Service officially established Mammoth Cave National Park on July 1, 1941 (Panamerican Consultants et al. 2021:74).

Throughout the remainder of the twentieth century, Mammoth Cave continued to be a major tourist attraction in Kentucky. In 1972, cavers discovered a connection between the Mammoth Cave System and the Flint Ridge Cave System, officially making Mammoth Cave the longest cave system in the world (Palmer 1990:34). This distinction still holds true today.

Previously Recorded Archeological Sites

While there are hundreds of archeological sites within the boundaries of Mammoth Cave National Park, this project only examines one: the Historic Entrance. This site is listed in the Kentucky Office of State Archeology as 15 ED 1, and in the NPS's CRIS database as MACA 215.1. There have been many archeological studies conducted in various places in the Mammoth Cave System over the last century, and these studies have provided invaluable information about how people were using the cave before written records (table 5).

It is important to note that the Historic Entrance is a dynamic archeological site. Construction and development activities around the entrance to the cave over the last 100 years have uncovered both prehistoric and historic cultural materials. N. C. Nelson conducted excavation in the Mammoth Cave vestibule in 1916 (Nelson 1917a,b). His main goal was to investigate Native American archeology at the Historic Entrance. He uncovered multiple midden deposits, made up of ash, charcoal, faunal remains, charred sunflower seeds, and human remains dating to the Middle Archaic period, approximately 5,000 years ago (Trader et al. 2008:55). He concluded that the vestibule included two locations of intensive occupation. He also concluded that the bone, stone, and shell artifacts are similar to those elsewhere in the region but that there is no evidence of maize, pottery, or polished stone tools which are characteristic of the Moundbuilders (Nelson 1917b: 68).

Human remains were discovered in the vestibule of the cave in 1946 during repair work on the trail. Regional Archeologist J. C. Harrington visited the site and determined that both human and faunal remains were present. There were no cultural materials found with the remains (Harrington 1946).

The Historic American Engineering Record (HAER) documented the Mammoth Cave saltpetre works during the summer of 1986. This project involved photographing and diagraming the intact saltpetre works in the cave, including the Historic Entrance. It also involved substantial historical research on the saltpetre industry at Mammoth Cave.

In 2003, the University of Kentucky (UK) excavated three units at the Historic Entrance ahead of updates to the cave lighting system (figure 10). They recovered biface fragments, faunal remains, hickory nutshells, and charred wood. Wood charcoal was radiocarbon dated to 3370 BCE, which is firmly in the Middle Archaic period. In regards to historical archeology, UK researchers recorded various materials including bottle glass, snack wrappers, jewelry, and matches. They also found faunal remains from various species of domesticated animals. Most of the historic artifacts were found in the upper 1.5-2.0 feet of sediment (Trader et al. 2008:56-60). The information from this study in particular shows that there is a historic component to this site and that historic and contemporary artifacts are present in the top meter of sediment. The most important conclusion that came out of this study is that intact prehistoric deposits can still be found in the Historic Entrance (Trader et al. 2008:60). Figure 10 shows the locations of both the UK excavation and Nelson's original 1916 excavation.

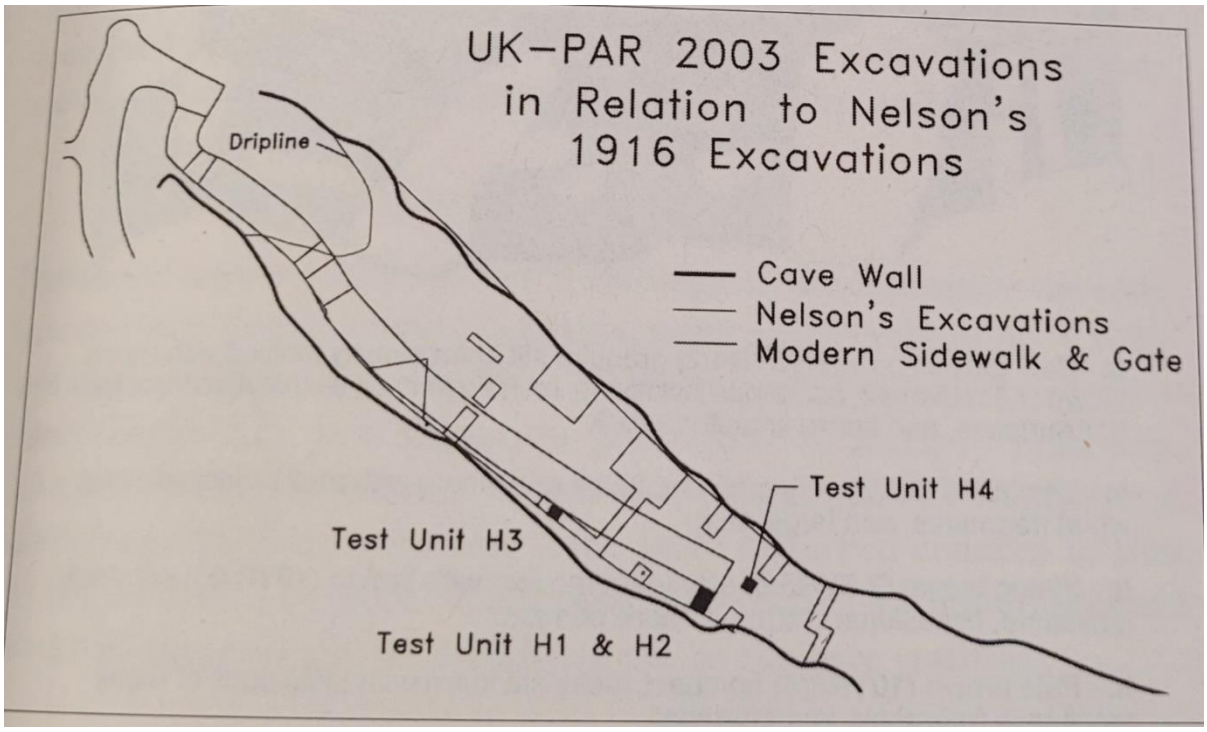


Figure 10: Map of 2003 UK excavation and Nelson's 1916 Excavation. From Trader et al. 2008.

Panamerican Consultants, Inc., Wiss, Janney, Elstner Associates, Inc., and Liz Sargent HLA were hired under contract (IDIQ P16PC00097) to complete a cultural landscape report for the Mammoth Cave Historic District. This document was completed in March 2021. Its purpose is to provide long-term guidance for the management of the Mammoth Cave Historic District. This study includes an overview of the history and prehistory of Mammoth Cave, documents the existing conditions of eight different sections of the cave, and provides a suggested treatment plan for this historic district. It suggested expanding the Historic District to include Criterion C, engineering, for the infrastructure at the cave entrances, and also including Criterion D, archeology, for both the prehistoric and historical archeological components of the cave. This report also recommends extending the period of significance to 1798–1969, to encompass all historic period use of the cave (Panamerican Consultants et al. 2021: 276).

There have been a total of three archeological studies and two historical studies at the Historic Entrance (not including this thesis). Table 4 presents a summary of each project.

Table 4: Summary of Previous Archeological and Historical Work at the Historic Entrance

Date	**Investigator**	**Focus**	**Report**
1916	Nelson	Prehistoric	Nelson 1917
1946	Harrington	Prehistoric	Harrington 1946
1986	HAER	Historic (Saltpetre)	Mullin 1986
2003	University of Kentucky	Prehistoric	Trader et al 2008
2021	Panamerican Consultants, Inc.; Wiss, Janney, Elstner Associates, Inc.; Liz Sargent HLA	Historic Cultural Landscape	CLR 2021

National Register

The Historic Entrance is considered a contributing resource for the Mammoth Cave Historic District, which was listed on the National Register of Historic Places in 1991 (#91000503). This listing was based on archival and historical research. Mammoth Cave Historic District is considered nationally significant under Criteria A, which means that it "is associated with events that have made a significant contribution to the broad patterns of our history" (NPS 1997:2). This Historic District is just that – historic. It covers resources from 1806 to 1941 (Table 5).

Table 5: National Register Areas and Periods of Significance for the Mammoth Cave Historic District Under Criterion A

Area of Significance	**Period of Significance**	**Significant Dates**
Entertainment/Recreation	1816-1941	1816
Industry	1806-1814	1806
Health/Medicine	1842-1843	1842

Previous Cultural Resource Management Recommendations

The HAER report gives several recommendations for topics that require additional historical and archival research. Additionally, it suggests that a historical archeological survey be conducted both within and outside the cave (Mullin 1986:24). Neither the 2003 or 2021 study used this study as justification.

The Mammoth Cave Historic District Cultural Landscape Report recommends rehabilitation for the Mammoth Cave Historic District. Rehabilitation is defined as "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values" (Panamerican Consultants et al. 2021:320). This allows for a balance between making improvements to the cave to further the interpretive experience for visitors while at the same time protecting the cultural and natural resources of the cave.

Chapter 4: Research Design

Relevant Research Questions

The Historic Entrance of Mammoth Cave has been used by humans for centuries. However, the focus of this project was investigating the historic period occupation of the cave, which spans a little more than the last two centuries.

Phase I survey consisted of the geophysical and pedestrian survey. There were several research goals. The first, most basic question we asked was what material evidence have humans left behind during the nineteenth and twentieth century historic periods? The archeology at the Historic Entrance has by and large focused on the precontact period and early saltpetre mining, so this research filled a gap in the archeological record. In particular, we wanted to see what material traces were present from the development of Mammoth Cave as a tourist destination and national park during the twentieth century. This question applied to the entire Entrance, not just the pit. To that effect, I conducted extensive archival research and used historical documents to build up a chronology of human modifications of the Historic Entrance. Another goal of the Phase I testing was to find the perimeter of the pit, and identify viable locations to place the two 1 x 1 meter excavation units for the Phase II testing. We can see the pit from the surface, but the actual edges of the pit are not clearly defined so we sought to better determine where the pit actually starts.

The Phase II testing process focused on the pit itself. Our goal was to determine if the pit is historically significant and eligible to be registered on the NRHP as well as assess the stratigraphy of the pit. Since there has never been a historical archeology study of the pit, we did not know exactly what would be found there. Historical documents indicated that there was an ice house in the pit during the 1840s, as well as other historic refuse. However,

we did not know how close to the surface these deposits were. This project helped us to examine the stratigraphy of the pit and get a better sense of the sequence of depositional events.

The third goal of this project was public education and outreach. As educating the public is an integral part of the National Park Service's mission, we sought to communicate what we were doing to the hundreds of visitors who tour Mammoth Cave every day. We wanted to be able to use this site, which is located in a very heavily trafficked area of Mammoth Cave National Park, to help the public learn about the both the history and archeology of the cave as well as the importance of protecting our natural and cultural resources. This project allowed us to give the public a glimpse into the scientific research that goes on in our national parks all the time and that people normally don't get to see. This was a unique opportunity to show the public how science and archeology is done and demonstrate how preservation and conversation in our national parks allow us to continue advancing our understanding of the past and the world around us.

The final goal of this project is to help the park with the management of the pit by providing data to be used for the mitigation of future development and the potential emptying of the pit.

Management Issues

This project addresses resource preservation. The pit is both a natural, geologic resource and an archeological resource. The park is planning on making modifications at the Historic Entrance, so this project will provide necessary information on both the natural and cultural resources at the Entrance. This information will assist park managers in planning for mitigation measures regarding construction and development.

The Historic Entrance is always in use, with at least half a dozen tours entering the cave through it every day. Since it is so heavily trafficked that means that it is one of the places where the park puts a lot of their time, energy, resources, and money into managing it. Some of those management concerns include making updates to the concrete steps and walkway that go into the cave as well as the railings and lighting and infrastructure that allows visitors to safely visit the cave.

The biggest management issue related to the geology of the pit itself is that it is sinking. This is evidenced from historical photographs as well as from first hand observations of park staff over the last decade. This poses a safety issue for the public, as the deeper the pit gets the farther someone could fall. While there is a handrail along the walkway, accidents do happen. Another big issue is that the pit was used for dumping concrete at some point in the past. While this concrete is unsightly, it is likely historic. By examining the deposits around the concrete, we can get a better estimation of when this concrete was deposited, and begin to consider the long term management of this resource.

Chapter 5: Field Methods

Historical Research

I conducted research at the Mammoth Cave National Park library from July 11 to July 21, 2022. The library contains primary and secondary sources about the park both from the last eighty years, when it has been in the care of the National Park Service, as well as prior to NPS ownership. I relied very heavily on first-hand accounts of cave visitation, especially visitations during the nineteenth century. My main focus was on documents pertaining to the Historic Entrance of the cave and the pit. Additionally, I reached out to Dr. Joe Douglass and Dr. Katie Algeo who have done extensive historical research on Mammoth Cave. They were able to introduce me to primary sources about the cave that I had been unable to find elsewhere, and I am eternally grateful to them for their help.

I also traveled to the National Archives at Philadelphia to view records from the Civilian Conservation Corps (CCC) and Mission 66 occupations of the site. This research was conducted from February 21 to February 24, 2023. The CCC worked at Mammoth Cave during the 1930s and 1940s as the park was in the process of being transferred from private ownership to the federal government. My archival research on the CCC was focused narrowly on the projects the CCC completed in Mammoth Cave itself, specifically at the Historic Entrance, and whether there was any record of the CCC modifying the pit. Additionally, I also investigated the Mission 66 program. This was a program started by the National Park Service in 1955 to revitalize, modernize, and expand the national parks, primarily through improvements in infrastructure. This included new and improved visitor centers, trails, campsites, administrative buildings, utilities, and more. The name “Mission 66” was chosen to signify the importance of the project, which was to be completed by 1966, the fiftieth anniversary of the National Park Service (Panamerican Consultants et al.

2021:74). There was an intense Mission 66 building program at Mammoth Cave, and thus I investigated the Mission 66 records to see if there was any record of work being done at the Historic Entrance, and if so, what that work entailed.

One of the biggest problems I ran into during my historical research was that I was looking for a needle in a haystack or I guess it is more appropriate to say that I was looking for a pit in a 420 mile cave. It was very difficult to find documents that specifically mentioned the pit. I will discuss this further in the section on the historical data but to summarize there are a lot of things that are not clear about this pit because they are not in the historical record, or at least not in any of the historical records that I looked at.

Geophysical Survey

Mitchell Barklage, PhD, and his team from the Illinois State Geological Survey conducted a geophysical survey at the Historic Entrance June 27 and June 28, 2022. The total surveyed area is roughly 46 x 15 meters. The original plan was to conduct multichannel analysis of surface waves (MASW) survey, a method that uses small seismic waves generated by a sledgehammer or similar tool to show what is below ground. Unfortunately, equipment failure prevented this MASW survey from happening. Instead, the team set up an electrical resistivity tomography survey. This method is non-destructive and is used to identify subsurface features. Electrical resistivity is a process in which metal electrodes, less than an inch in diameter, are placed so that they penetrate the ground about 6 to 12 inches. These electrodes are then hooked up to an electrical wire. The electrodes conduct the electricity from the wire into the ground and measure how the soil resists electricity. This technique was used to image the pit instead of ground penetrating radar (GPR). GPR is a very common geophysical technique in archeology, however it does not work well on uneven

surfaces. The entire Historic Entrance, besides the concrete walkway, is very uneven so electrical resistivity was a better option for this site.

The electrodes were placed about a meter apart from the dripline to the end of the rail. The electrodes were placed closer together, about 50 centimeters apart, at the pit. This allowed for more precise imaging of the pit itself. There were some technical challenges at first, with the wet soil affecting the electrical currents. To combat this, the team moved the electrodes and cables away from the water and closer to the north cave wall. This worked much better and allowed for data collection.

This electrical resistivity study was part of my permit. However, post-processing the data turned out to be unusable. This is due to differences in the ground moisture, with the west side of the pit being moist and the east side being dry. This meant that the electrical current did not conduct into the ground evenly and thus garbled the data, an issue that only came to light post-data processing.

The electrical resistivity failed, but the geophysical team also conducted ground penetrating radar on the concrete walkway from the base of the stairs to Audubon Avenue in the cave. While we originally did not have high hopes that this survey would provide data about the pit, we were happily surprised to get usable data, which will be discussed later.

Surface Survey Techniques

The pedestrian survey was conducted from June 28 to July 3, 2022. The purpose of the pedestrian survey was twofold- to identify the best area to place excavation units and to assess the status of archeological resources in the vestibule. Ed and I supervised the survey, assisted by a group of nine volunteers. We set up a grid of 2 x 2 meter squares in the vestibule from the dripline to the end of the rail to guide our pedestrian survey of the site, an

area measuring a bit less than 150 feet by 50 feet (46 meters x 15 meters). We only surveyed the area north of the walkway, since there was not much soil visible south of the walkway. We used the geophysical team's original electrode line as a baseline to aid in setup and later data processing. The grid setup process that would be very simple on the surface turned out to be quite challenging in the cave environment. Essentially, we used a standardized grid system that became arbitrarily delineated 2 x 2 meter grid squares when laid across the uneven vestibule floor. The ground was sloped and there were many large rocks which meant that we struggled with getting our grid units measured correctly. We started out using tape measures, but I became dissatisfied because the tape often sagged or bent over rocks, not giving an exact two meters. So I tried using wooden rules, but these also sagged. Therefore, we ended up using wooden rules for the relatively flat areas and tapes for sloped areas. Additionally, once we did have our measurements there often was solid rock right where we had to put the pin flag. These challenges mean that the grid was not even and should be better thought of as approximate divisions to help organize the survey rather than exact 2 x 2 meter squares. The grid units were not identical, but were similar in size and allowed us to record artifacts on the surface and evaluate their distributions. All the pin flags were recorded using a total station, thus the grid itself is not super important. However, I provide this description for the reference of future researchers.

We labeled the southwest flag for each unit with a letter and number (e.g., A1, B5, etc.). We decided to lay out the grid in 2 x 2 meter sections and blanket that over the vestibule area. We calculated that at the widest point the area between the walkway and the north wall of the cave was about 12 meters wide. We divided that by two (our grid size), which meant that there were 6 grid squares in each north/south row. We named our squares 1

through 6, with 1 being the southernmost square and 6 being the northernmost. For ease of locating and referring to the units we named the east to west rows after letters. A is the westernmost row and the closest to the dripline, while W is the easternmost and farthest into the cave (figure 11). We only surveyed from the drip line to the so there are only squares A to W.

Figure 11: Overview of Pedestrian Survey Grid

Squares were named based on their north/south and east/west row. For example, the westernmost row was A, and the southernmost grid in that row was A1. This row continued with A2, A3, A4, A5, A6 and then the next row to the east was B1, B2, B3, et cetera. Table 6 shows how many units we surveyed. There were 138 units total, and out of those 100 were inventoried, in that we completed field notes and counted and recorded the artifacts present in those squares. This table shows a summary of our grid units. The grid was laid out so that

parts were inaccessible for survey. A total of 25 squares were covered by the cave wall. Our imaginary 2 x 2 meter grid that was 12 meters wide was too wide for some parts of the cave. In those cases, the last couple meters were actually in the cave wall so we could not survey those. Another nine squares were covered by the concrete walkway, and three more were covered by the stairs, so they were not surveyed. K3 was not surveyed because of safety concerns. It was located on a slope going into the pit, so as a safety precaution I asked my volunteers not to survey that square. I meant to go back and do that survey myself, but it did not happen due to lack of time. There were 138 squares total that we set up through the vestibule area (see table 6). Rather than using transects, as is typical in pedestrian survey, we used a 100% ground coverage method in each square, meaning we attempted to record all artifacts present on the surface.

Table 6: Overview of Pedestrian Survey Units

Survey	**Number of Units**
Inventoried	100
Wall	25
Walkway	9
Stairs	3
Omitted	1
Grand Total	**138**

Once the grid was set up, we were able to begin pedestrian survey. During this phase, artifacts were not collected, and instead, catch-and-release survey was used. In this survey method, the researchers mark each artifact by a pin flag and record diagnostic attributes such as material and color. Then the researcher records artifact locations via a sketch map, leaving the artifacts in situ.

Artifacts were recorded using a basic field form that included information such as material type, item count, and comments. Looking back on it, these field forms could have been more robust but even still they provided us with a general overview of the material culture present at the Historic Entrance. Volunteers filled out a checklist for each square where they listed all of the artifacts that they saw. For the purposes of this study, we recorded anything left behind by humans as an artifact, even if it was less than fifty years old. We wanted to get a picture of how humans are using the cave in 2022 as well as how they were using it in the past. These contemporary artifacts give us a picture of what 21st century tourism looks like and this could prove useful for future archeologists who are doing work on tourism in the future. Additionally, volunteers filled out a grid survey form for each square. This form included a sketch map showing locations of artifacts as well as any notable features within the square such as rocks, concrete, wires, etc. I took photographs of particularly diagnostic artifacts, diagnostic meaning that they had a clear start and end date for manufacture. We also took a plan view photo of each square. We marked each artifact with a nail that had a piece of orange flagging tape attached to it. The overhead images allowed us to see the visual distribution of artifacts.

Visibility was poor closer to the dripline owing to the large amount of leaf cover. However, visibility improved greatly the deeper into the cave we went. Artifacts tended to be concentrated along the walkway and cave walls, as well as in the pit itself. Most artifacts dated from the twentieth and twenty-first centuries, though a small number of nineteenth century artifacts and prehistoric lithics were observed. The results of the pedestrian survey will be discussed in greater detail in the following chapter.

Test Excavation Units

The results of our pedestrian survey showed that there were artifacts all over the Historic Entrance. I consulted with Ed to decide where to place our excavation units for the Phase II portion of this study. Our permit allowed for two 1 x 1 meter units. The pit was our main feature of interest, so we decided to place a unit in the pit itself. This unit, called Excavation Unit 1 (EU1), was in the current bottom of the pit, where we hoped we would be able to get a sense of the stratigraphy and depositional history of the pit. Our goal with EU1 was twofold: to see what kinds of artifacts were present in the pit, and to get a stratigraphic view of the process of pit filling. Additionally, we placed another unit, Excavation Unit 2 (EU2) above the pit. EU2 was roughly 2 meters north of EU1, and it was located on the edge of the pit. We decided on this location because we wanted to get a sense of how the stratigraphy in the pit differed from the stratigraphy outside the pit. For EU2, we wanted to get a profile so that we could compare it to EU1. EU2 was basically our control unit, since it showed us what the typical archeological deposits were outside of the pit (figures 12 and 13).

EU2 was also located farther away from the walkway, while EU1 is directly adjacent to the walkway. We expected to find a lot of debris from tourists in EU1 and we were interested to see how the types of artifacts would differ in EU2, which was located a bit farther away from the walkway and thus from the tourists. EU2 was also at a higher elevation than EU1. We hypothesized that EU1 would have a greater amount and density of material than EU2, both because it was located right next to the walkway and because it was located in the pit.

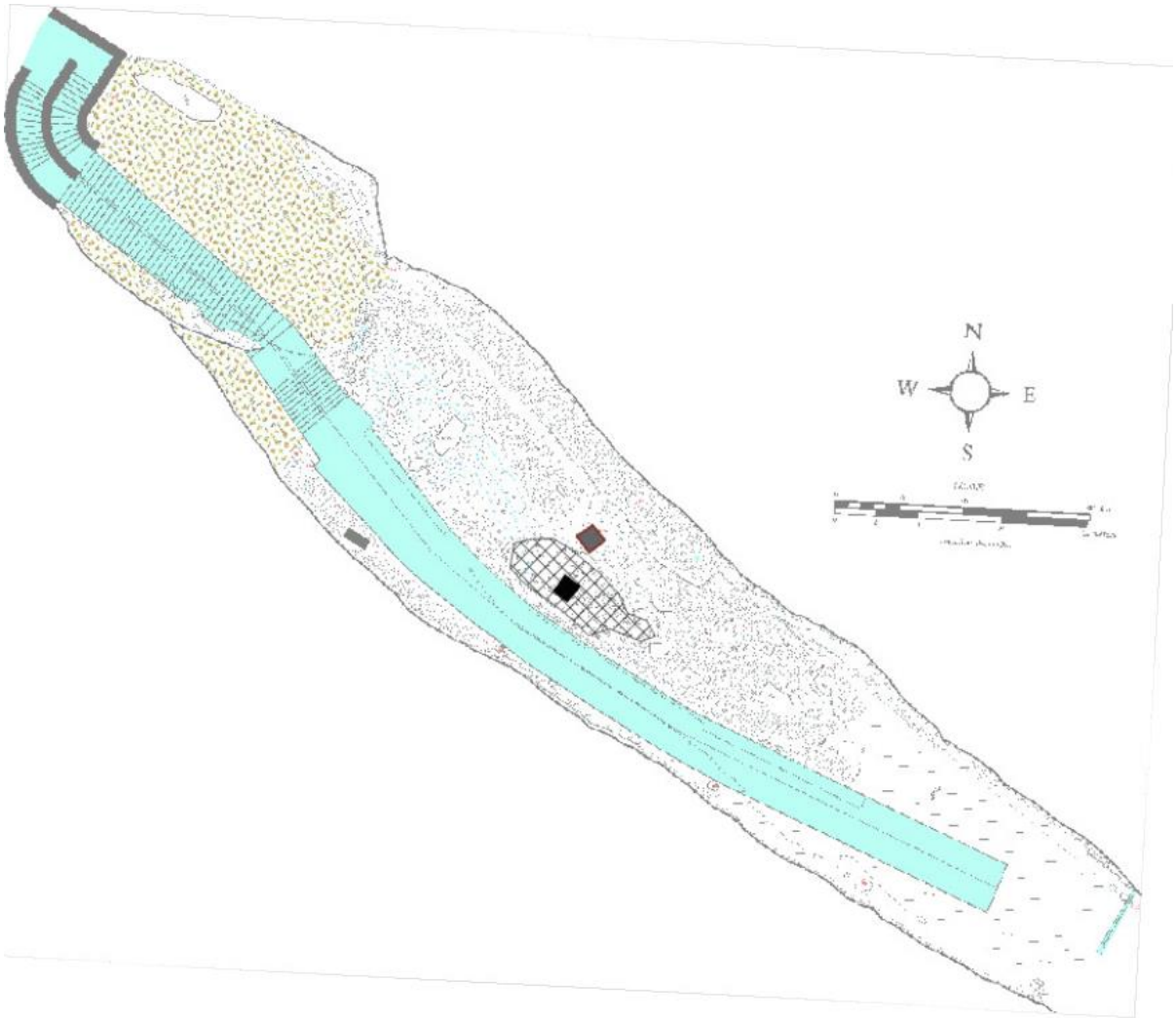


Figure 12: Map of Excavation Units. EU1 is located within the pit, indicated by the crosshatching. EU2 is north of the pit.

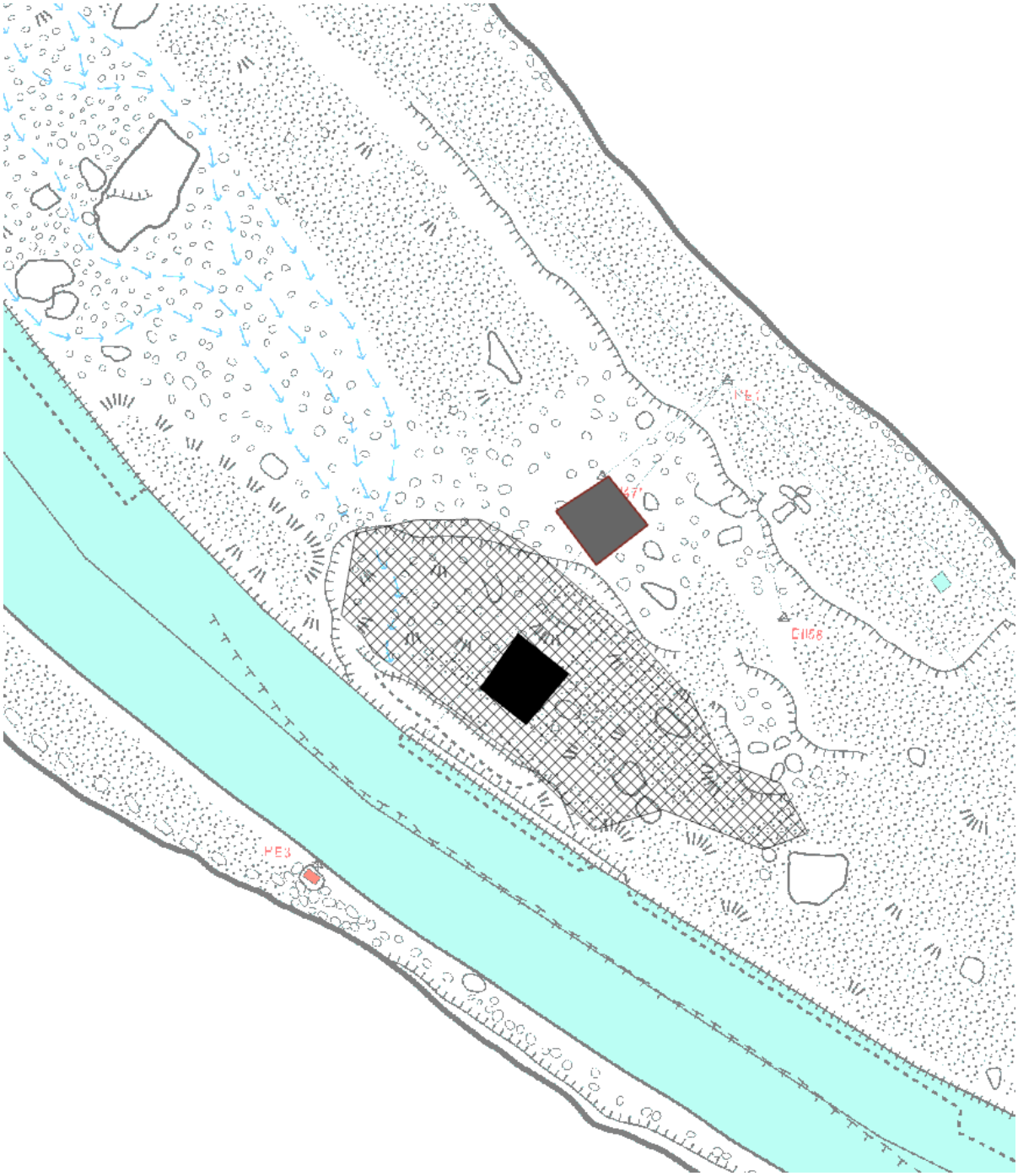


Figure 13: Close up of Excavation Units.

Excavation ran from July 3 to July 9, 2022. Most days we had at least five volunteers. In the morning, I would give everybody their assignments for the day. We dry screened all sediment through 1/8 inch mesh screens, which were handmade by Ed. The screens were set up on saw horses over a tarp to aid in backfilling. Both units included a fair amount of rock and concrete. We put the large rocks and concrete on the tarp off to the side to avoid damaging the screens.

Ed and I were in charge of the bags of artifacts. We collected all artifacts in paper bags that we labeled with black sharpie marker. Labels included the site name, date, accession number, collector initials, and the material type. We kept separate bags for faunal material and non-faunal material since we wanted to prevent the delicate bones and shells from being crushed by heavier artifacts. We also had a handful of bags that contained botanical material such as wood, charcoal, seeds, and nuts. We collected three charcoal samples for radiocarbon dating. Those samples were removed from the soil with trowels and gloves, wrapped in aluminum foil, and then put into a labeled plastic zip top bag. There were normally two to four bags going at a time on each unit. The excavator would have a paper bag that they could put any artifacts they saw as they were excavating directly into it so as not to risk being overlooked in the screen. The screeners had a bag as well where they could put artifacts. Both the screener and excavator had bags for general material and faunal material.

Level forms were completed for each level. These forms included the depth and dates of the level opening and closing as well as a sketch map at the base of the level that showed any features, rocks, artifacts, charcoal, etc. These forms also recorded a general overview of the artifacts collected in each level. We took a photo at the close of the level so that we could

have a record of what the base of that level looked like. At the end of each day of excavation, we covered the unit with a plastic tarp to protect it.

Below, I will discuss EU1 and EU2 individually.

Excavation Unit 1

There was only room for one excavator to work on EU1, since it was located in the pit itself. One or two people worked at the screen. It was difficult for the excavator to get out of the pit because of the uneven topography, so one of the volunteers at the screen would come over to the excavation unit and collect the bucket of sediment that the excavator had filled. Then they would take that back to the screen. The screen was set up about 3 to 4 meters east of the excavation unit because there was not a flat surface closer to the pit. The original plan was to excavate in natural levels, in accordance with natural changes in the stratigraphy. However, this did not end up being feasible for EU1.

The pit had a severe slope, so the southwest corner of EU1 was 71 centimeters below the northwest corner, which we used as our datum. Ed and I discussed the best way to excavate this unit and decided that it wouldn't make much sense to try to preserve the angle of slope as we went down. Our main goal for this unit was to see the stratigraphy in profile, which hopefully would reveal the different depositional events that contributed to the deposits in the pit. We decided that the best way to go about this would be to create a level ground surface, in effect getting rid of that slope to create a 90 degree stratigraphic profile. Excavation consisted of us taking down the north side of the unit so that it was level with the south side of the unit.

Leveling out this unit turned out to be much more difficult than we anticipated. There were large chunks of concrete throughout the entire stratigraphic column, which made the

excavation process difficult. Traditionally, archeological excavation levels are natural, which means that a new level is started when a change in soil is detected, or arbitrary, which means that a level is started every ___ centimeters, usually 10. However, since we were trying to level out the unit we used a combination of arbitrary and natural levels. Hindsight being 20/20, an arbitrary level system probably would have been better, and is what I would recommend to any future researchers.

Additionally, we ran into an issue where Ed and I were measuring the depth of the unit differently. I was measuring from the center of each quadrant, which was how I had been taught during my field school. But Ed was measuring from the corner of the unit. This meant that our measurements were quite different. Table 7 shows the opening and closing depth below datum (in centimeters) for EU1. The northwest corner of the unit was used as the datum, since it was the highest part of the unit. Note the areas highlighted in red, where the closing level is higher than the opening level. The reason for this discrepancy is probably that Ed and I were measuring from different places inside the unit. We discovered this discrepancy near the end of Level 2, and for the remainder of the unit we used my measuring system, where we measured the depth from the center of each quadrant.

Table 7: Level depths for EU1

Level 1		SW	NW	NE	SE	Center
	Top	70	0	0	50	43
	Bottom	71	46	39	50	44
Level 2	Top	71	46	39	50	44
	Bottom	62	60	49	45	53
Level 3	Top	62	60	49	45	53
	Bottom	70	74	81	75	78

Excavation Unit 2

There were usually two people excavating EU2 one or two people on the screen. The screen was located a couple meters north of the excavation unit, only about half a meter south of the cave wall. Like EU1, this unit was excavated using a combination of arbitrary and natural levels. This unit was also on a slope, with the northwest corner being the highest and thus being used as the datum.

The table below (table 8) shows the opening and closing depth below datum (in centimeters) for EU2. Note that the southeast corner of level two had a higher opening depth than closing depth for unknown reasons.

Table 8: Level depths for EU2

		SW	NW	NE	SE	Center
Level 1	Top	23	0	20	35	21
	Bottom	25	20	21	37	27
Level 2	Top	25	20	21	37	27
	Bottom	35	22	32	35	37
Level 3	Top	35	22	32	35	37
	Bottom	50	45	38	40	42
Level 4	Top	50	45	38	40	42
	Bottom	59	53	42	49	54
Level 5	Top	59	53	42	49	54
	Bottom	61	62	62	59	62

We discovered what appeared to be a possible hearth feature in the northeast corner of EU2. We excavated that as a separate feature. We excavated the rest of the unit while leaving the feature intact. Once we had reached sterile soil in the unit, we drew the profile of the feature. We then excavated the feature, collecting all soil from it in a 5 liter plastic zip

lock bag. The analysis of this soil sample is beyond the scope of this thesis, but the sample is stored in the curation facility at Mammoth Cave National Park for future researchers. It is important to note that metal artifacts were found throughout EU2, so wet screening or flotation could cause some degradation of these artifacts.

End of Excavation

We drew profiles of the units at the end of the excavation. We only profiled the north wall of EU1 because that was the only significant wall that we had. The east and west walls were both severely angled and thus deemed not useful to profile, and the South wall too short. We drew profiles of the walls of EU2. We also drew a profile of the potential hearth feature in the northeast quadrant of the unit. All the feature profiles were drawn on 10 millimeter graph paper. We also recorded Munsell soil color on the profile drawings. We also determined soil texture through a tactile process where we evaluated the grittiness of the soil as well as how well it stuck together. The corners of each unit were mapped in with a total station at the end of the excavation.

Table 9: EU1 excavated levels and natural strata.

EU1 Level	**EU1 Strata**	**Soil Description**
1	1	10YR 3/2 (very dark grayish brown) Silt
1	2	7.5YR 4/6 (strong brown) Loam
1 and 2 and 3	3	10YR 4/2 (dark grayish brown) Silty Loam
1 and 2 and 3	4	10YR 3/3 (dark brown) Silty Loam
1 and 2 and 3	5	7.5YR 4/6 (strong brown) Loam
2 and 3	6	10YR 4/4 (dark yellowish brown) Silty Clay
2 and 3	7	10YR 4/3 (brown) Silty Clay

It is important to note that since we excavated in arbitrary levels and since the soil profiles were completed at the end of excavation, the excavation levels do not correspond to

a stratigraphic layer. For example, Strata 1 on the profile does not necessarily correspond to Level 1 as was excavated. The soil description and the corresponding strata and excavation level are shown in table 9 for EU1 and table 10 for EU2.

Table 10: EU2 Excavated Levels and Natural Strata

Level	Strata	**EU2 North Wall**	**EU2 South Wall**	**EU2 East Wall**	**EU2 West Wall**
1	1	10YR 3/3 Sandy Loam (dark brown)	10YR 3/3 Sandy Loam (dark brown)	10YR 3/3 Sandy Loam (dark brown)	10YR 3/3 Sandy Loam (dark brown)
2	2	7.5YR 4/6 Silty Loam (strong brown)	7.5YR 4/6 (strong brown) Silty Loam (absent of limestone pebble inclusions)	7.5YR 4/6 (strong brown) Silty Loam with rounded limestone pebble inclusions	7.5YR 4/6(strong brown) Silty Loam
2	3	N/A	N/A	10YR 4/3 (brown) Sandy Loam mottled with 7.5YR 4/6	N/A
2 and 4 and 5	4	2.5YR 3/6 (dark red) Silt	N/A	2.5YR 3/6 (dark red) Silt	N/A
2	5	N/A	N/A	10YR 2/2 (very dark brown) Ash Layer	N/A
2	6	N/A	N/A	10YR 6/3 (pale brown) Sand	N/A
3 and 4	7	N/A	N/A	N/A	Silty Loam 10YR 4/1 (dark gray)
3 and 4	8	Silty Loam 10YR 4/4 (dark yellowish brown)	N/A	N/A	Silty Loam 10YR 4/4 (dark yellowish brown)
4	9	Silty Loam 2.5Y 4/3 (olive brown)	N/A	N/A	N/A
5	10	Charcoal	N/A	N/A	N/A

We drew profiles for all four walls of EU2, as well as for feature E-F. The table shows the strata present in each wall profile. Feature E-F was excavated separately, with all sediment being put in a plastic zip-top bag for future analysis, so it does not have levels associated with it. There are no strata shared between the two units. The strata and corresponding soil description are shown in table 11.

Table 11: EU2 Feature E-F Strata and Soil Description

Strata	Soil Description
1	7.5YR Silty Loam
2	10YR 3/2 (very dark grayish brown) Silty Loam with Isolated Carbon Content
3	10YR 5/6 (yellowish brown) Sand
4	7.5YR 3/1 (very dark gray) Loam

We backfilled both units at the end of the project. We started backfilling with the rocks and ended with the sediment piles from the screens. We tried to restore the cave to what it had looked like before we started excavating, which involved some artfully placed rocks. We did leave a black tarp in the bottom of EU1 because Ed suspected that they would want to continue the excavation at some point. The tarp provided an easy way of marking where this excavation had ended.

This excavation uncovered just over 175 pounds of concrete. We removed this concrete from the cave and weighed it. Ed and I conferred and decided to discard most of the concrete due to space concerns in the Mammoth Cave curation facility and the questionable archeological utility of the concrete. We did keep a couple representative samples of the concrete.

Artifact Cleaning and Cataloging

I processed the collected artifacts in the Science and Resources Management lab at MACA from July 11 to 23, 2022. I cleaned the collected artifacts using water and a toothbrush. Fragile materials such as plastic and aluminum foil, as well as metal, were dry brushed with a toothbrush. Copper brushes were used, when necessary, on metal artifacts to remove stuck-on dirt. I placed artifacts on metal screens to dry.

Once dry, I bagged artifacts in plastic resealable bags and labeled them with the project information. In addition to the artifacts recovered from EU1 and EU2, I also processed artifacts that were collected by Magnus Cleveland, Mammoth Cave National Park cultural resources intern, during the NSS removal of concrete from the surface of the pit in November 2021.

After all artifacts were cleaned, they were tabulated using the standard MACA artifact tabulation sheet. Data recorded included artifact class, count, and weight in grams, as well as any other diagnostic information. The diagnostic information collected differed based on the artifact itself or the artifact class. For example, for glass artifacts I recorded color, part of vessel, and decoration while for ceramics I recorded ware, decoration, makers marks, color, and part of vessel.

I completed this information on paper forms that were kept in a binder for the reference of curation as well as in an Excel sheet. I tabulated and bagged artifacts by context. All artifacts were cleaned and tabulated together to preserve the context of artifacts. All materials from this excavation are curated at the curation facility at Mammoth Cave National Park and will be cataloged into ICMS.

I photographed all artifacts after I finished tabulation. The photography was done with a DSLR camera. In total, I cleaned, tabulated, and photographed 2,202 artifacts. The number of artifacts from each collection unit is presented in table 12. All artifacts were bagged in labeled zip top plastic bags along with the original paper label from the excavation. A handful of large artifacts such as concrete and metal step guards were not bagged but they were labeled with paper bags. All bagged artifacts were stored in acid free cardboard curation boxes.

Table 12: Number of Artifacts by Collection Unit

Collection Unit	**Number of artifacts**
EU1	1146
EU2	938
Surface Collection	107
Grand Total	**2191**

Public Engagement

We had a small army assisting with these excavations. I was field director and Ed assisted me. This project would not have been possible without a dedicated team of volunteers. Twenty one volunteers assisted with this project. Eight (8) volunteers had an archeological background, while thirteen (13) were volunteers who were trained and

supported in archeological excavation methods by the team leaders. The field portion of this project consisted of almost 600 man hours of work.

We had several volunteers from the local community. We also had members of the Cave Research Foundation volunteer as part of the CRF's 4th of July cave expedition. Ed put out a call to some universities and archeology groups in the southeast region and we had a couple archeology students volunteer on this project. These students had been getting their degrees in anthropology over the course of 2020 and 2021, when the COVID-19 pandemic meant that most field schools were unavailable. This project allowed these students to get some field experience in archeology that they would not have been able to get otherwise. I do want to stress this was not a field school. We provided training in basic field methods for people who needed it, but this project was at its core an academic and cultural resource management excavation, and it was not meant to be an intensive archeological field school.

The project area was highly visible to visitors to the cave, and I, Ed, and the volunteers answered visitor questions. I kept a tally of how many visitors I personally talked to, and in total I communicated with 573 visitors (figure 14). There was also outside media coverage of this project. The *Bowling Green Daily News* did a story on the project entitled "Digging deep: Archeology team uncovers Mammoth Cave's past" (Michels July 10, 2022), and that story was picked up by *USA Today* as "Mammoth Cave: Coke bottles, ticket stubs, pre-historic debris discovered in world's longest-known cave system" (Fine July 10, 2022).

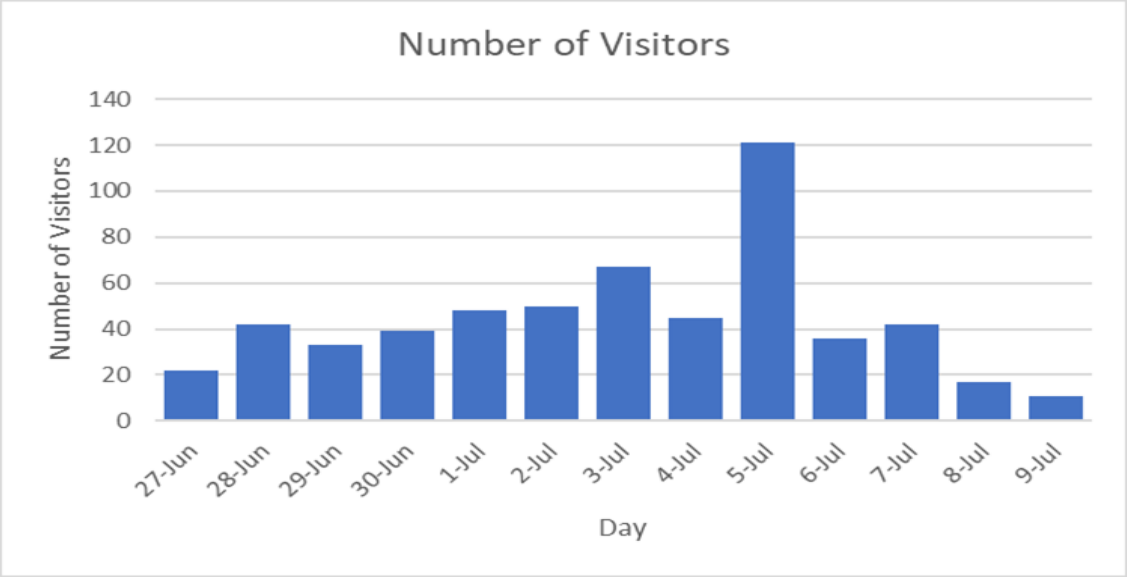


Figure 14: Number of Visitors Alessi Talked To By Day

Chapter 6: Historical Background

Archival Research: Pit History

The pit has gone through periods of naturally opening and then being filled in by humans. The history is long and complicated, so I compiled a table summarizing the major developments, which is included in Appendix D. In the following discussion, I will use historical documents to reconstruct this process.

Early documents take a dramatic view of the pit. A passage from an 1855 newspaper rather poetically states, "A rivulet runs noiselessly at the base of a hundred steps, hewn in the rock by the hand of man, and its waters disappear in an abyss dug by the Great Architect of the world" (*Ballou's Pictorial* May 19 1855:n.p). E. Meriam, a manager heavily involved in the 1812 saltpetre operation. He recorded his experiences in the *New York Municipal Gazette* in 1844, based on his recollections from the 1810s. He gives a clear description of the pit, saying, "Near the mouth of the Cave is a pit of water, of some fifty or sixty feet deep, made by the continued wear from falling water, for centuries" (Meriam 1844a:n.p). In a later issue, he corrects his statement: "In speaking of the Pit at the mouth of the Cave, there should be a transposing of the paragraph; the Pit is fifty or sixty feet, and contains water, and not a Pit of water, fifty or sixty feet deep," (Meriam 1844b:n.p.). Since Meriam makes no mention of digging out the pit, it seems safe to assume that the pit is a natural geologic feature.

Edmund Lee produced a map of Mammoth Cave in 1835. Of particular relevance to this project is the map of the entrance, which indicates a fifty-foot pit that was filled (Lee 1835). In the notes that accompany the map Lee states "…there is a pit, which was formerly sixty feet deep, but is now nearly filled with rubbish" (Lee 1835:11). It seems likely that this rubbish is from saltpetre mining, but nowhere is that stated definitively. Besides the reference

on the map, the pit was also mentioned often in traveler's accounts of Mammoth Cave. The description by Bird is typical "the pit immediately under the spring of the arch, loosely choked with beams, planks, earth and stones" (Bird 1838:76). This description is enough to make my little archeologist heart flutter. Beams! Planks! Stones! And while the documents don't give many more details, it is likely that the pit contains many other artifacts as well. Horace Martin provides the first detailed illustration of the Historic Entrance in his 1851 book "Pictorial Guide to the Mammoth Cave." This illustration shows what appears to be an irregularly shaped pit at the entrance of the cave (figure 15).

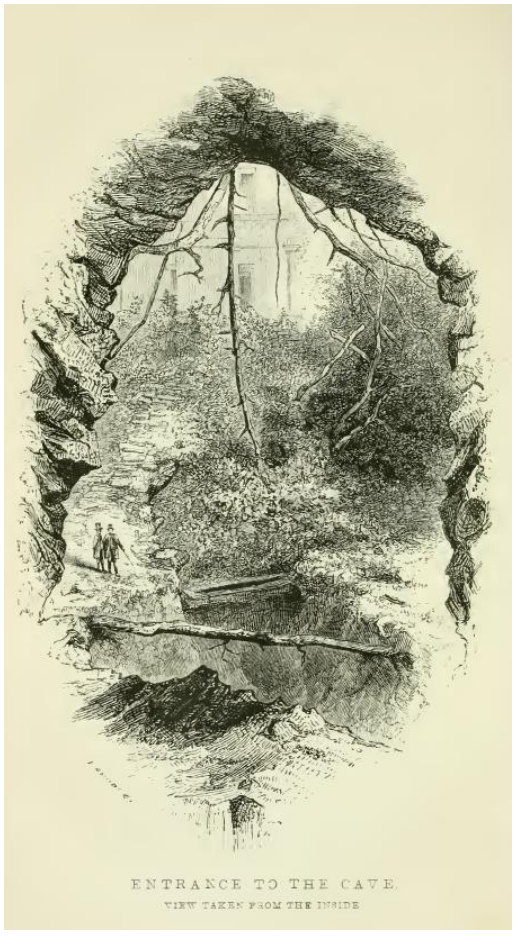


Figure 15: "Entrance To The Cave: View Taken From the Inside" (Martin 1851:18)

Besides references to the pit during the 1830s, this is also when the first reference to an ice house appears. Harriet Martineau was one of the first women visitors to publish an account of her visitor to the cave. “The entrance of the cave serves as an ice-house for the family of the guide. They keep their meat there, and go to refresh themselves when relaxed by the heat” (Martineau 1837:229). Now, she specifically says “serves,” so it isn’t clear if there was an actual structure that meat was stored in or not, though it would be very odd for meat to be stored outside of a structure. This passage is important because it clearly states that the cave was being used for food storage. According to William Newnham Blane, an English gentleman who visited the cave in 1822 or 1823, there was deep snow at the cave during the winter. The cold even led to the waterfall at the mouth of the cave becoming “one enormous pillar of ice” (Blane 1824:266). This little detail is important because it indicates that the climate was cold enough at that period to produce ice, which possibly could have been harvested and stored in an ice house.

Several other documents also reference the ice house. Thomas Kite, who visited the cave in 1847, reports that "On our left is a deep pit in which are the ruins of an ice house, undermined by the water from the spring close by." (Kite 1943:10). According to Horace Hovey, the ice house was built by Dr. Croghan. In his 1882 book *Guide Book to the Mammoth Cave,* he states that "The prevailing coolness and uniformity of temperature led the late Dr. Croghan to excavate a deep hollow here to serve as an ice-house" (Hovey 1882:19). If Hovey correct in saying that Croghan was the one who had the ice house built, then this structure did not stand for long. Croghan only acquired the cave in 1839, so he would have had to build the ice house sometime after that. Since the ice house was in ruins by the time of Kite’s visit in 1847, it was standing for less than a decade. However, in

Alexander Clark Bullitt's 1845 book *Rambles in the Mammoth Cave During the Year 1844, By a Visiter* [sic] he says "... a small stream of water falling from the face of the crowning rock, with a wild faltering sound, upon the ruins below, and disappearing in a deep pit, - behind you, all is gloom and darkness!" (Bullitt 1845:11). It is not clear if the ruins he references are those related to the saltpetre mining or the ice house. If it is the ice house, that would be interesting because it would imply that the ice house was in ruins by 1844 and thus stood for less than five years.

Another part of Hovey's description should be addressed: the part where he says that Croghan "excavated a deep hollow" (ibid). This description does not fit into the fact that the pit is presumably natural. However, what I think this might be referring to is that the pit was filled with rubbish and Croghan had to remove that rubbish to build his ice house. It is also possible that Croghan did dig an actual pit which was separate from the naturally occurring, fifty-foot pit. Hovey makes it seem like the ice house was just a pit, while Kite's description implies that the ice house was an actual structure. Possibly, Kite and Hovey were both correct and the ice house started out as just a pit but then a formal, more substantial structure was added later. It is also worth noting that Hovey's account was written over forty years after Kite's, so his information should be taken with a grain of salt.

One of the most useful descriptions of the ice house comes from G. S. Bailey's account, where he says "You at once commence descending…keeping near the rocks on the right to avoid a yawning pit seventy feet deep right at the mouth. It is partly filled with the ruins of an old ice house once constructed in it, but which allowed all the ice to melt" (Bailey 1863:21). This solves the mystery of why the ice house was only used for a short amount of time – it didn't work! Right after the description of the ice house he describes "a log cabin

constructed within it for the preservation of fresh meat for the Hotel" (Bailey 1863:22). The hotel was located outside of the cave to cater to tourists, and the cave managers operated this hotel. So it seems that the cave managers moved their food storage farther into the cave where conditions were more stable. It is interesting that Bailey says "log cabin" and not "ice house." Does this indicate that ice was not used to chill the meat in the cabin? The existence of a log structure to store food is corroborated by a slightly earlier account by Thomas Butler Gunn. In his diary, he describes a larder at the mouth of the cave, "From the arches centre, issuing forth from the pendant verdure and tree shrubbery, plashes down a spring of bright water into a long trough below, behind which, and partially closing the entrance is a rough log hut. (Tis used for a larder during the summer's heat.)" (Gunn 1853). It is unclear if the log hut Gunn discusses is the same structure as the log cabin Bailey references a decade later, but in either case it seems that food storage is no longer taking place in the pit itself.

Figure 16: Mammoth Cave, Ky. - looking backward. Photograph by Frances Benjamin Johnston, c. 1891

The last reference to the pit during the nineteenth century is Bailey's 1863 account. Then there is a century-long gap in which the pit is not mentioned at all in writing. There are, however, photographs of the entrance that hint at what was happening with the pit. A circa 1891 photograph by Frances Benjamin Johnston shows the Historic Entrance. The pit is not

visible, but there are clearly a set of steps along the south side of the cave. This implies that the pit is still there, since they kept the same walkway pattern that was established to avoid the pit in the first place.

N. C. Nelson's 1917 report indicates that leveling work had been done at the Historic Entrance during the early twentieth century. He says:

> … it is to be specifically noted that the present condition [of the vestibule] is at least partly artificial, because the floor level has been raised very considerably at the front of the chamber and excavated for passage at the rear, through the so-called "narrows" … the cave management informed me that the slope was graded not many years ago and that the vestibule floor had been raised and leveled by the addition of rock and cave earth brought from the interior (Nelson 1917:47).

While Nelson does not specifically mention a pit, it seems plausible that this leveling was done in order to fill in the pit.

Jumping ahead to the 1930s, the Civilian Conservation Corps had completed all cave improvements by March of 1939, but it is unknown if these improvements included work at the pit (Hoskins March 31, 1939). During my historical research I tried to find information about what the CCC was doing at the Historic Entrance of the cave however I was unable to find anything definitive. There is one photo that appears to show some sort of ramp or device at the Historic Entrance but it isn't clear what they are using that for if they are working on the stairs or if they are using it to help transport stuff. I currently do not know if the CCC completed work at the Historic Entrance or if they only completed work farther into the cave. However, there are several photos dating from between 1940 and 1942 which show a completely level vestibule. What is unclear is if this is the same leveling that Nelson discusses in 1917 or if this area was leveled again sometime in the 1920s or 1930s. It is possible that the CCC completed this leveling in the 30s or 40s.What we don't know is how

many levelling of events or capping events of the pit were conducted in the 20th century. There are at least two levelings that Nelson mentions in 1917 and the capping with concrete that happened probably in the 60s it seems plausible that more leveling or was done in the 20th century but right now we do not have the evidence to say that definitively.

There is no further hint of whether the pit was open or filled until 1964, when the silence is broken by a letter from Meloy to the park superintendent where he mentions the sinking of the floor at the entrance. In 1986, the Historic American Engineering Record (HAER) conducted a survey of the saltpetre works at the Historic Entrance. This report includes photos of the entrance which appear to show a mostly filled in pit (figure 17). In the text of the report, there is reference to "a filled-in sinkhole" under the waterfall, which is most likely referring to the pit (Mullin 1986:2).

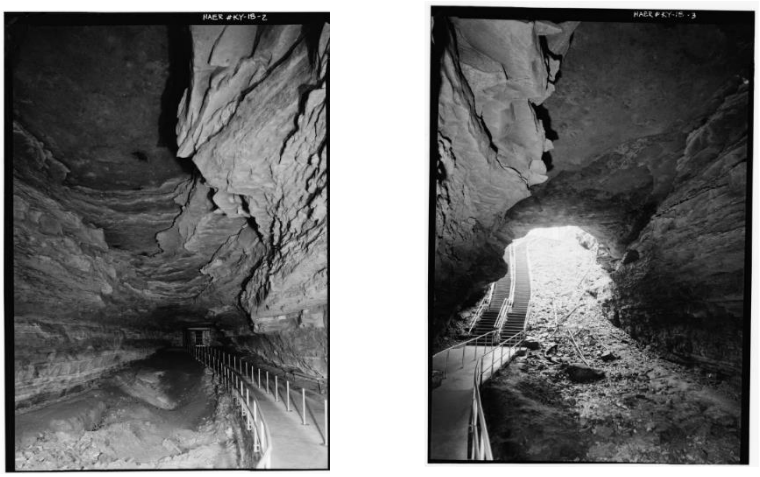


Figure 17: Photos of the interior of the Historic Entrance. Taken during the HAER survey in 1986.

After that reference the pit sinks back into obscurity [pun intended] until the initiation of this project in 2021. While there were projects going on at the Historic Entrance during the twentieth century, most notably the construction of new steps and handrails in 1968, the pit is not mentioned (NPS 1968). Currently, the pit is in the process of opening back up.

Volunteers with the National Speleological Society removed concrete and metal handrails from the pit in November of 2021, in anticipation of the archeological study happening in the summer of 2022.

I have attempted to compile a chronology of the human modifications over the past two hundred years. Table 13 presents the results of my research. Additional historical research regarding other parts of the Historic Entrance, such as the steps and gate, is presented in Appendix D.

Table 13: Pit Chronology. The bolded entries indicate potential pit capping events.

Date	**Status**	**Source**	**Format**
1812	**Open**	**Meriam 1844**	**Document**
1835	Filled	Lee 1835	Map
1838	Filled	Bird 1838	Document
1844	Partly Filled	Bullitt 1845	Document
1847	Open	B. 1847	Document
1855	Open	Ballou's Pictorial 1855	Document
1863	Partly Filled	Bailey 1863	Document
1916	**Filled**	**Nelson 1917**	**Document**
1964	Sinking	Meloy 1964	Document
1968	**Filled?**	**NPS 1968**	**Map**
1986	Filled	Mullin 1986	Document
2022	Excavation	Alessi 2023	Document

Chapter 7: Description and Analysis of Materials Recovered

Typology

One of the biggest challenges of this project is that many of the artifacts dated to the mid to late twentieth century. The archeological scholarship on this era is still in its infancy. At MACA, most of the historical archeology has focused on nineteenth and early twentieth century homesteads, which consist mostly of glass, ceramics, and building materials. The documents MACA uses for tabulating archeological materials are geared towards this type of material culture, not the plastics that compose such a huge part of material culture from the mid-twentieth century onwards. Thus, a large portion of the artifacts ended up in the "other" category according to the MACA tabulation chart.

The MACA tabulation chart breaks artifacts down by material and function. These two categories are sometimes combined. For example, glass is broken down into tableware, flat glass, bottle glass, and container glass. But that category is then broken down into functional and decorative categories, such as embossed bottle base, machine made bottle, embossed body of bottle, etc. This poses a bit of a challenge for analysis because typically in historical archeology things are broken down by material type not functional type. During my tabulation, I put artifacts in the most specific category possible. However, since I was crunched for time, I followed the standard MACA tabulation sheets in this, which also led to a lot of the artifacts being put in the "other" category.

An "other" category is not very useful for analysis so I broke down the original tabulation data into more specific categories. I assigned each artifact a material and a functional category (table 19). I tailored these categories to the materials from this site, which

is why I have unique functional categories such as “photography,” “plastic artifact,” and “wrapper.”

Table 14: List of Material and Functional Categories used for Cataloging Artifacts. Developed by Kailey Alessi based on MACA tabulation chart and ICMS.

Material	**Functional**
Bark	Architectural
Bone	Container/Vessel
Building Material	Fashion
Ceramic	Faunal
Charcoal	Hardware
Fibers	Lamp/lighting
Glass	Lithic
Metal	Photography
Nut	Plastic Artifact
Seed	Unknown
Shell	Wrapper
Soil	
Stone	
Synthetic	
Wood	

Results

Ground Penetrating Radar (GPR)

This section was co-authored by Mitchell Barklage, PhD, and Lianne Rosario.

The Electrical Resistivity Tomography survey did not collect any usable data. However, the GPR survey did have some interesting results. The geophysical team took a GPR transect on the concrete walkway. GPR works by detecting boundaries between layers of rock and sediment. Areas of high contrast are indicated by bright amplitude reflectors. Generally, areas with continuous reflections indicate that an area has not been disturbed. figure 18 shows a GPR transect from Audubon Avenue. Note the highlighted area of flat reflectors. This shows what a typical cave passage looks like when not disturbed. Areas with discontinuous reflections indicate that an area has been disturbed. A transect from the GPR survey at the Historic Entrance is shown in figure 19. A package of discontinuous, high amplitude reflections starts at 3 meters below the walkway. This package is interpreted as a pocket of loose, airy, unconsolidated material. GPR data can only extend about 8 meters below the surface, so it is unclear what the base of this feature looks like. However, this data does show that a cavity extends beneath the walkway. Three meters below the walkway is about a meter below the current base of the pit. I suspect that the anomaly showing up in the GPR data is broken concrete from the stairs, similar to the concrete found during the excavation of EU1.

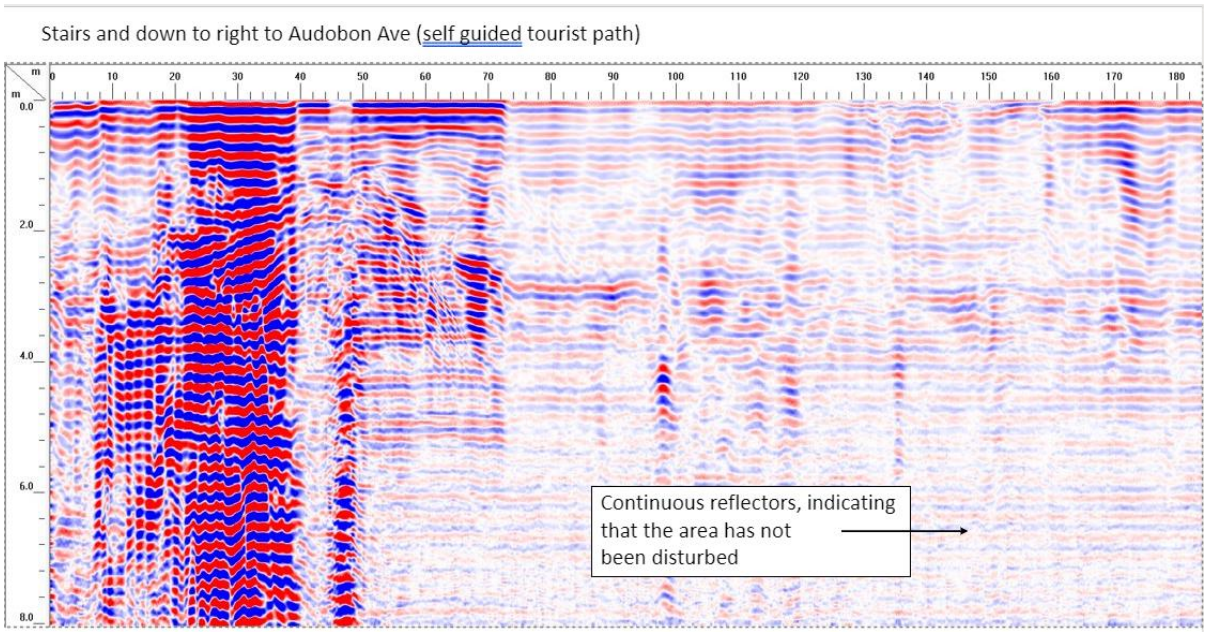


Figure 18: Control GPR Transect, Audubon Avenue, Mammoth Cave, 2022

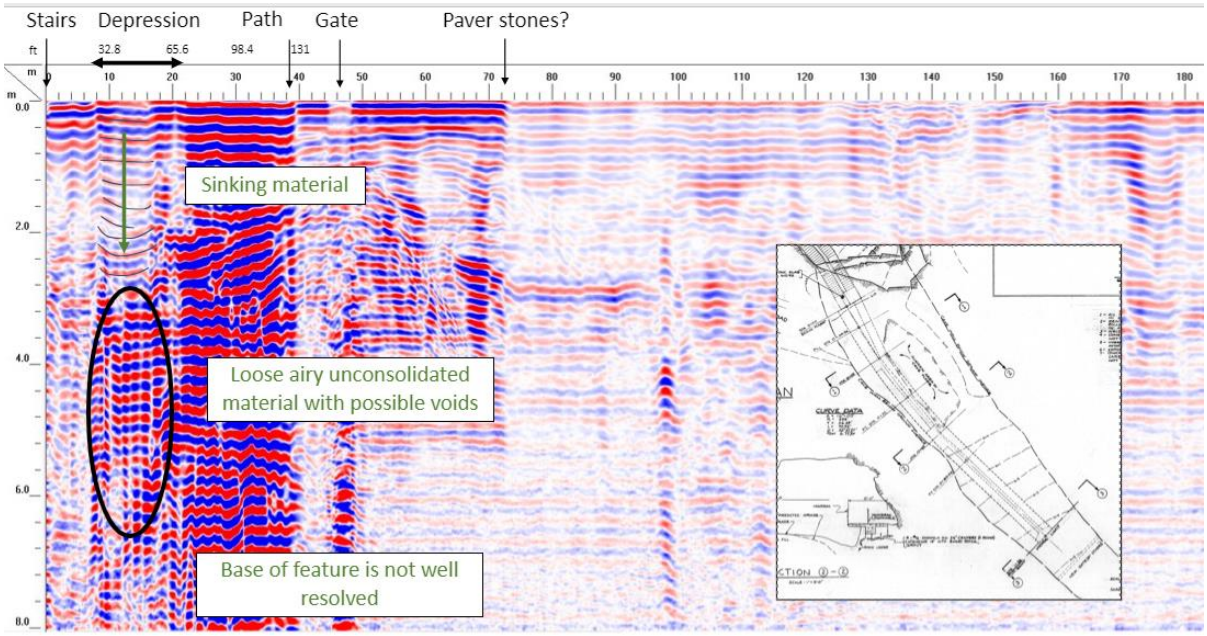


Figure 19: Historic Entrance GPR Transect, Mammoth Cave Historic Entrance, 2022

Surface Collections

2021 Surface Collection

Magnus Cleveland, MACA Cultural Resources Intern, collected a total of 107 artifacts in November of 2021, when NSS volunteers removed concrete and metal handrails from the pit (table 15). The vast majority of the artifacts recovered were from the historic period. A full catalog of these artifacts is presented in Appendix A and photographs of representative artifacts are in figure 20.

Table 15: 2021 NSS Surface Collection Assemblage Materials

Material	**Count**	**Percentage of Assemblage**
Ceramic	1	1.27%
Fibers	1	1.27%
Glass	18	15.19%
Metal	24	20.25%
Shell	1	1.27%
Stone	4	5.06%
Synthetic	57	54.43%
Unidentified	1	1.27%
Grand Total	**107**	**100%**

There are several artifacts that I will discuss because they give a good sense the material culture that is present in the entrance. First, this assemblage contained three lithics: one chert biface, one chert uniface, and one piece of limestone that is possibly burned and

worked. Both chert and limestone are materials native to this area. These artifacts were found on the surface, which is exciting because it implies that there are still prehistoric artifacts in the vestibule of Mammoth Cave despite the two centuries of intensive use by European and African Americans. However, these surface finds are probably not in situ, and have most likely been uncovered through water erosion or historic construction in the vestibule.

There were also several glass bottle fragments collected during this survey. I was able to date these bottles via color, decoration, and manufacture technique. The majority of bottle sherds were found to be machine made, which means that they are post 1904. The most interesting sherd was the colorless glass bottle with the white applied color label. This is a bottle from the Sunrise Beverage Company that was based in the southeast US and was in business from approximately 1960 to 1970. This is interesting because it shows that regional soda was being consumed at Mammoth Cave, not just national brands such as Coca-Cola.

Another datable artifact was a Fresca soda can which dates between 1964 and 1970. This can is very fragmentary, only having part of the rim and part of the body. I was able to date it by a small piece of writing on the body that says “cyclamate.” This was an artificial sweetener that was banned in the US around 1970 because of possible cancer concerns (Chedd 1974:299). Additionally, there were many flash cubes which firmly date to between 1965 and 1979.

From this quick summary of some of the major artifacts from the surface collection, we can draw a couple conclusions. There is material cultural throughout the Historic Entrance, ranging in age from thousands of years old to contemporary trash. The presence of lithics indicates that there has been substantial soil movement in this area of the cave. Most of this movement is probably related to human activity during the last two centuries. As

discussed in the historical background section, there have been multiple waves of construction during the historic period, that have no doubt affected the artifactual deposits at this site.

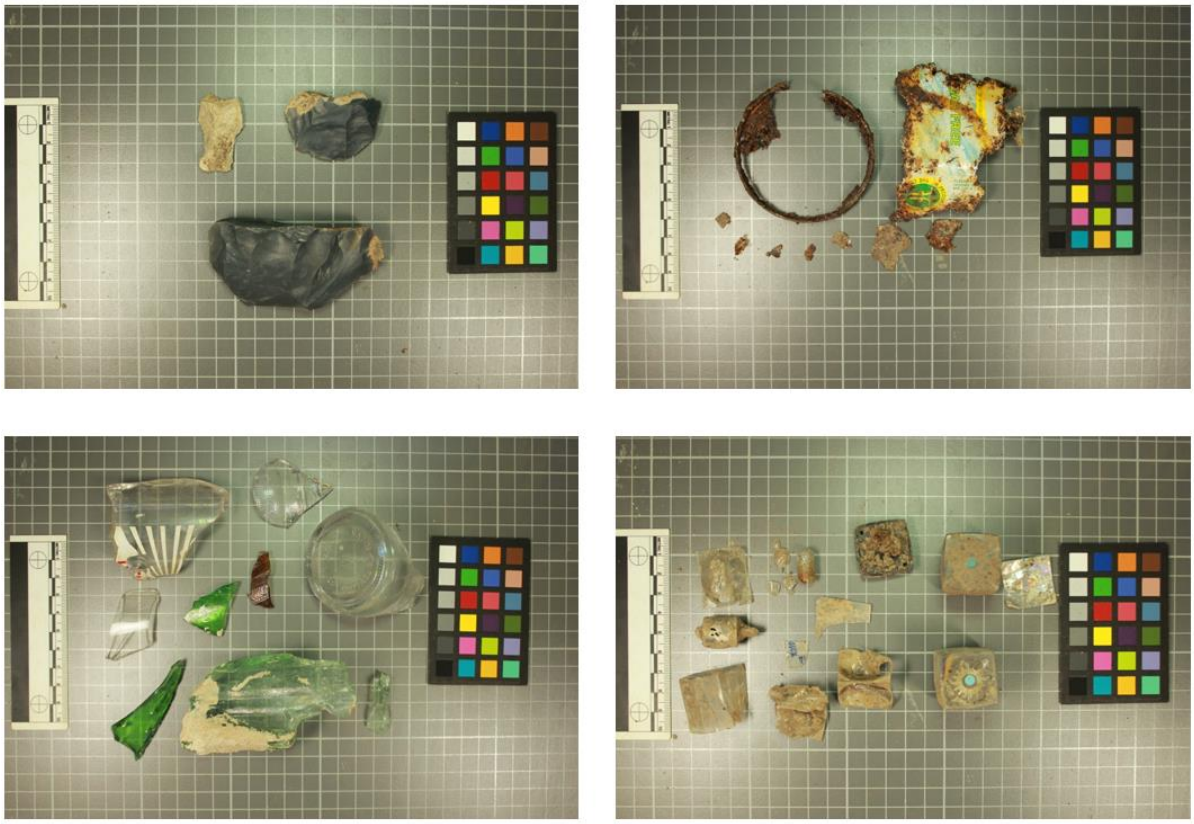


Figure 20: Representative artifacts from 2021 surface collection. Clockwise from top left: two bifaces and one piece of possibly worked limestone, Fresca soda can, dating between 1964 and 1970, Flash/Magic Cubes, dating between 1965 and 1979, glass bottle sherds.

Pedestrian Survey

878 artifacts were recorded during the pedestrian survey. These artifacts ranged in time period from prehistoric to contemporary. Jamie Dougall, University of Idaho undergraduate student in Anthropology, digitized the hand-written field notes into an Excel spreadsheet. A full copy of this data can be found in Appendix B.

Table 16 shows a summary of the material types found. Overall, this survey turned up mostly contemporary trash associated with tourists. Some of the most common artifacts

found were plastic wrappers that date to the latter half of the twentieth and first part of the twenty-first centuries. Another common artifact was soda bottle glass, most of which was from brands such as Coca-Cola, Dr. Pepper, and 7-Up.

Table 16: Pedestrian Survey Material Types

Material	**Count**	**Percentage**
Bone	7	0.80%
Ceramic	16	1.82%
Charcoal	28	3.19%
Fibers	43	4.90%
Glass	206	23.46%
Lithic	4	0.46%
Metal	145	16.51%
Paper	24	2.73%
Seed	2	0.23%
Shell	21	2.39%
Stone	5	0.57%
Synthetic	304	34.62%
Wood	73	8.31%
Grand Total	878	100%

Due to the fragmentary nature of these glass sherds, it was very difficult to track down exact dates. There were several historic artifacts recorded, including a hole-in-cap can and ironstone and stoneware body sherds. Additionally, a handful of lithics were found,

including a substantial midsection from a biface. Photos of representative artifacts are presented in figure 21.

Figure 21: Representative pedestrian survey artifacts, clockwise from left: Grid E5, whiteware sherd with partial makers mark and aqua glass sherd, Grid A2, In-situ hole-in-cap can, c. 1820-1930, Grid I3, biface midsection (4.25cm x 3 cm)

The most illuminating part of this survey was that it showed how artifacts are distributed throughout the Historic Entrance (shown in figure 22). Artifacts tended to cluster along the north wall of the cave and along the walkway. This makes sense because people can drop things easily from the walkway, either intentionally or unintentionally. Artifacts along the wall of the cave are less likely to be disturbed by water and construction, which explains the high density of artifacts in this area. There were also a lot of artifacts in the pit itself and along the edges of the pit. The artifacts from the 2021 surface collection were also found in the pit. This area of high artifact concentration fits in with how water affects this site. Water flows into the pit and it is a powerful force that could easily move things into the pit. Artifacts also clustered around E4 and E5. These squares are located at the base of the slope going into the cave, which is probably why there were so many artifacts. Another place

artifacts clustered was around U2 and U3. This is where the cave starts to narrow and creates a bottlenecking effect, which presumably leads to artifacts building up.

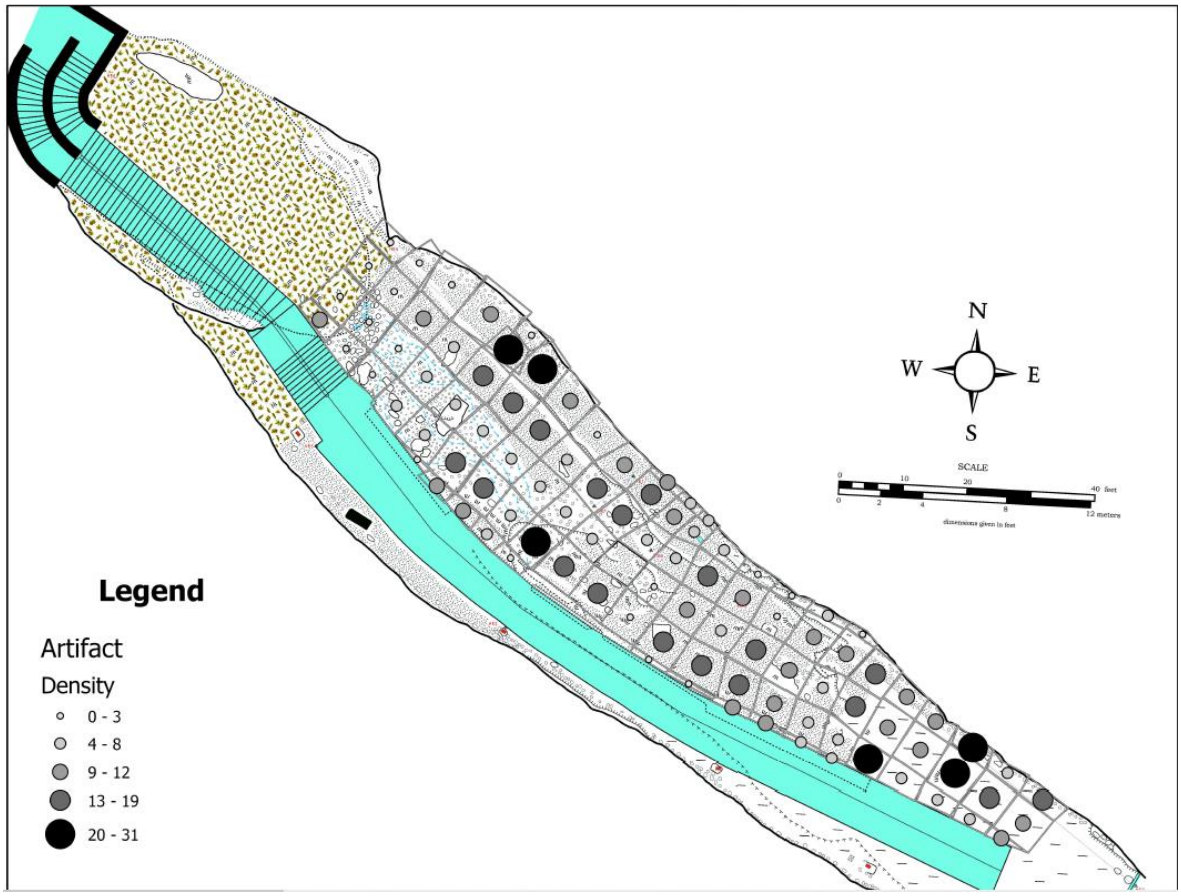


Figure 22: Artifact Density from 2022 Pedestrian Survey

Overall, this pedestrian survey shows the archeological signature of twentieth century tourism. Artifacts such as flash cubes, cave tour tickets, and souvenirs such as keychains and polished rocks are all typical of recent tourism. It is interesting to note that there is some temporal differentiation in spatial distribution of artifacts. Generally, more recent artifacts were mostly found close to the walkway, while older artifacts tended to be found closer to the wall of the cave. This suggests that areas farther away from the walkway have been less disturbed by modern tourism.

Excavation Unit 1

Excavation Unit 1 (EU1), located in the pit, was excavated in three levels. These levels are arbitrary, but for analytical and cataloging purposes we kept the artifacts in the level they were excavated in. For example, artifacts excavated in Level 1 were kept together as a group, however these excavation levels do not correspond to the stratigraphic layers in the profile drawings. Level 1 contained 301 artifacts. Level 2 contained 309 artifacts. Level 3 contained 536 artifacts. In total, 1146 artifacts were recovered from EU1. We see that artifacts from the historic period make up the vast majority of total artifacts.

For all historic or contemporary objects, I divided them into either the diagnostic or non-diagnostic category. I considered to be diagnostic anything where I could get a start date, also called a TPQ. If I could find an estimate of when the artifact was first produced, I considered it to be diagnostic. There were many artifacts, such as rusty pieces of metal or string, that I could not place to a specific date. I could only say that they were not prehistoric, so I put these items in non-diagnostic category. I calculated the mean dates only from the diagnostic artifacts.

I also recorded the latest possible date, the TAQ, when possible. For example, certain types of ceramic have clear start and end dates for their manufacture. However many of the artifacts recovered are still being manufactured today. I assigned a TAQ of 2022 because that was when we collected it then I calculated the average TPQ/TAQ for each level, and averaged all three means to get a total average date for the unit. The mean date was 1963. This indicates that out of all of the historic, diagnostic artifacts collected, most of them were probably produced around 1963. This is significant because anything over fifty years old is considered to be archeological both according to the ARPA as well as the Kentucky State

Historic Preservation Office. These artifacts, and by extension the pit they came out of, are technically historic and thus potentially eligible for the National Register.

A full 33% of the assemblage from EU1 was not dateable because it was either animal or floral. Due to time constraints I did not analyze the faunal remains besides dividing them between shell and bone. However, we suspect that most of the faunal remains are probably bat, as bats have historically heavily used this cave environment. Additionally, many bones are very thin and fragile, which is consistent with bat anatomy. As with the surface collection, this excavation unit shows a clear twentieth century tourism signature. Additionally, there is a lot of architectural material in this unit, especially concrete, nails, and mortar. This architectural material is most likely related to the steps that used to go into the cave. These steps were removed sometime in the 1960s. We know that the concrete is probably from steps because some pieces were preserved in a rectangular form where it was very clearly a step. Additionally, we recovered a metal step guard from this unit that would have been placed on the edge of a step.

This unit gives us a glimpse both into the tourist experience and the management of Mammoth Cave. Table 17 summarizes the materials from the three different levels of EU1. The three largest categories of material were building material (17.80%), bone (15.79%), and synthetics (13.61%). Synthetics are plastics and indicative of the twentieth and twenty-first centuries. Relatively recent trash was found in all three levels, and most artifacts dated to the mid-twentieth century or later. Table 18 summarizes the artifacts by functional category for each level.

Table 17: EU1 Materials by Levels

Material	Level 1	Percentage Level 1	Level 2	Percentage Level 2	Level 3	Percentage Level 3	Total	Percentage Total
Bone	7	0.61%	14	1.22%	160	13.96%	181	15.79%
Building Material	62	5.41%	88	7.68%	54	4.71%	204	17.80%
Ceramic	2	0.17%	1	0.09%		0.00%	3	0.26%
Charcoal	5	0.44%	14	1.22%	35	3.05%	54	4.71%
Fibers	6	0.52%	4	0.35%	13	1.13%	23	2.01%
Glass	55	4.80%	27	2.36%	22	1.92%	104	9.08%
Metal	24	2.09%	27	2.36%	82	7.16%	133	11.61%
Nut	2	0.17%	1	0.09%	2	0.17%	5	0.44%
Other Plant Materials	1	0.09%		0.00%		0.00%	1	0.09%
Seed	2	0.17%		0.00%		0.00%	2	0.17%
Shell	31	2.71%	7	0.61%	23	2.01%	61	5.32%
Stone	9	0.79%	20	1.75%	24	2.09%	53	4.62%
Synthetic	65	5.67%	41	3.58%	50	4.36%	156	13.61%
Unknown	22	1.92%	1	0.09%	6	0.52%	29	2.53%
Wood	8	0.70%	64	5.58%	65	5.67%	137	11.95%
Grand Total	**301**	**26.27%**	**309**	**26.96%**	**536**	**46.77%**	**1146**	**100.00%**

Table 18: EU1 Functional Category by Levels

Functional Category	Level 1	Percentage Level 1	Level 2	Percentage Level 2	Level 3	Percentage Level 3	Total	Percentage Total
Architectural	66	5.76%	88	7.68%	62	5.41%	216	18.85%
Botanical	18	1.57%	79	6.89%	101	8.81%	198	17.28%
Chewing Gum	11	0.96%	7	0.61%	4	0.35%	22	1.92%
Coin	1	0.09%		0.00%		0.00%	1	0.09%
Container/Vessel	18	1.57%	10	0.87%	9	0.79%	37	3.23%
Fashion	9	0.79%	5	0.44%	13	1.13%	27	2.36%
Faunal	39	3.40%	25	2.18%	184	16.06%	248	21.64%
Hardware	12	1.05%	5	0.44%	58	5.06%	75	6.54%
Lamp/lighting	40	3.49%	20	1.75%	17	1.48%	77	6.72%
Lithic	3	0.26%		0.00%	1	0.09%	4	0.35%
Photography	29	2.53%	15	1.31%	20	1.75%	64	5.58%
Plastic Artifact	3	0.26%	10	0.87%	10	0.87%	23	2.01%
Unknown	26	2.27%	17	1.48%	28	2.44%	71	6.20%
Wrapper	26	2.27%	28	2.44%	29	2.53%	83	7.24%
Grand Total	**301**	**26.27%**	**309**	**26.96%**	**536**	**46.77%**	**1146**	**100.00%**

Excavation Unit 2

We recovered 938 artifacts from Excavation Unit 2 (EU2). EU2 contained similar artifacts to EU1: bottle glass, flash cubes, concrete, etc. EU2 was the control unit, since it was located outside of the pit and farther away from the tourist walkway. We stopped excavation of this unit at 60 centimeters because of the low density of artifacts in the bottom level, in addition to time constraints. The artifacts are presented in table 24 broken down by material and level. The two largest material categories from this unit were building material and glass, with 181 and 179 artifacts, respectively. Note that the glass assemblage is primarily made up of light bulb glass, not container glass. Table 25 presents the same artifacts broken down by functional category and level. The two largest categories, after botanicals, are architectural and lamp/lighting.

EU2 gives some insight into the formation processes of this site. Only 6% of the EU2 assemblage was plastics, while in EU1 16% was plastic. The smaller percentage of plastics in EU2 is probably due to its location farther away from the tourist walkway. As with EU1, most artifacts dated to the twentieth century. However, in EU2 there were no artifacts that could be reliably dated to after 1979. Figure 23 shows a Pepsi can dating between 1959-1971. Most of the artifacts dated to the 1960s or 1970s.

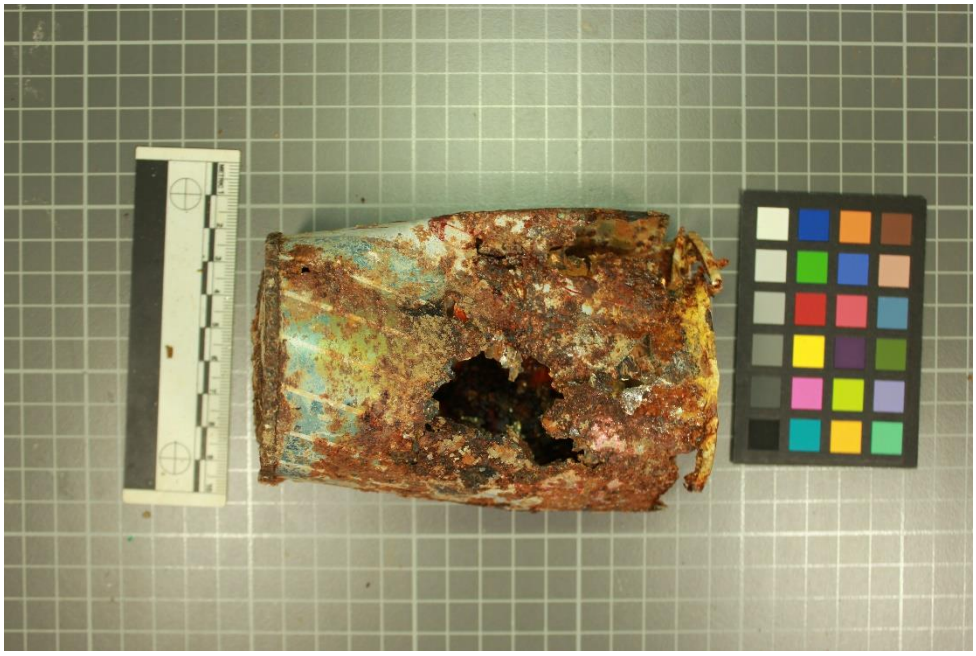


Figure 23: Pepsi Can 1959-1971

Table 19: EU2 Materials by Levels

Material	Level 1	Percentage Level 1	Level 2	Percentage Level 2	Level 3	Percentage Level 3	Level 4	Percentage Level 4	Level 5	Percentage Level 5	Clean-Up	Percentage Clean Up	Total	Percentage Total
Bark		0.00%		0.00%		0.00%		0.00%	2	0.21%		0.00%	2	0.21%
Bone	3	0.32%	6	0.64%	11	1.17%	5	0.53%	24	2.56%	10	1.07%	59	6.29%
Building Material	10	1.07%	73	7.78%	12	1.28%		0.00%	64	6.82%	22	2.35%	181	19.30%
Ceramic	1	0.11%		0.00%	1	0.11%		0.00%		0.00%		0.00%	2	0.21%
Charcoal	14	1.49%	6	0.64%	2	0.21%		0.00%	12	1.28%	3	0.32%	37	3.94%
Fibers	1	0.11%		0.00%		0.00%	1	0.11%	1	0.11%	2	0.21%	5	0.53%
Glass	31	3.30%	60	6.40%	12	1.28%	6	0.64%	5	0.53%	65	6.93%	179	19.08%
Metal	32	3.41%	24	2.56%	17	1.81%	2	0.21%	7	0.75%	13	1.39%	95	10.13%
Nut	7	0.75%		0.00%	3	0.32%		0.00%		0.00%		0.00%	10	1.07%
Seed	1	0.11%		0.00%		0.00%		0.00%		0.00%		0.00%	1	0.11%
Shell	9	0.96%	12	1.28%	23	2.45%	5	0.53%	7	0.75%	15	1.60%	71	7.57%
Soil		0.00%		0.00%	1	0.11%		0.00%		0.00%		0.00%	1	0.11%
Stone	13	1.39%	18	1.92%	12	1.28%		0.00%	4	0.43%	31	3.30%	78	8.32%
Synthetic	11	1.17%	18	1.92%		0.43%	4	0.43%	1	0.11%	20	2.13%	58	6.18%
Wood	5	0.53%	5	0.53%	30	3.20%	1	0.11%	12	1.28%	106	11.30%	159	16.95%
Grand Total	**138**	**14.71%**	**222**	**23.67%**	**128**	**13.65%**	**24**	**2.56%**	**139**	**14.82%**	**287**	**30.60%**	**938**	**100.00%**

Table 20: EU2 Functional Categories by Levels

Functional Category	Level 1	Percentage Level 1	Level 2	Percentage Level 2	Level 3	Percentage Level 3	Level 4	Percentage Level 4	Level 5	Percentage Level 5	Clean-Up	Percentage Clean Up	Total	Percentage Total
Architectural	10	1.07%	74	7.89%	12	1.28%	0	0.00%	64	6.82%	22	2.35%	182	19.40%
Botanical	27	2.88%	9	0.96%	35	3.73%	1	0.11%	26	2.77%	109	11.62%	207	22.07%
Chewing Gum	0	0.00%	3	0.32%	2	0.21%	1	0.11%	0	0.00%		0.00%	6	0.64%
Coin	0	0.00%	1	0.11%	0	0.00%	0	0.00%	0	0.00%		0.00%	1	0.11%
Container/ vessel	7	0.75%	10	1.07%	8	0.85%	3	0.32%	1	0.11%	2	0.21%	31	3.30%
Fashion	1	0.11%	3	0.32%	0	0.00%	1	0.11%	1	0.11%	2	0.21%	8	0.85%
Faunal	12	1.28%	18	1.92%	34	3.62%	10	1.07%	31	3.30%	25	2.67%	130	13.86%
Hardware	23	2.45%	14	1.49%	10	1.07%	2	0.21%	7	0.75%	10	1.07%	66	7.04%
Lamp/ lighting	28	2.99%	57	6.08%	9	0.96%	3	0.32%	4	0.43%	66	7.04%	167	17.80%
Lithic	0	0.00%	2	0.21%	0	0.00%	0	0.00%	0	0.00%	2	0.21%	4	0.43%
Photography	5	0.53%	3	0.32%	1	0.11%	0	0.00%	1	0.11%	1	0.11%	11	1.17%
Plastic Artifact	3	0.32%	4	0.43%	0	0.00%	1	0.11%	0	0.00%	14	1.49%	22	2.35%
Unknown	16	1.71%	18	1.92%	13	1.39%	0	0.00%	4	0.43%	30	3.20%	81	8.64%
Wrapper	6	0.64%	6	0.64%	4	0.43%	2	0.21%	0	0.00%	4	0.43%	22	2.35%
	138	**14.71%**	**222**	**23.67%**	**128**	**13.65%**	**24**	**2.56%**	**139**	**14.82%**	**287**	**30.60%**	**938**	**100.00%**

Radiocarbon Dating

We submitted three samples of charcoal to Beta Analytic for radiocarbon dating. One sample was from EU1 and the two others were from EU2. The results of the dating are presented in table 26. Sample EU1-15 dated to 1961-1977 AD. This was unsurprising, as the artifacts found in this unit primarily dated to the mid to late twentieth centuries. What was surprising was the dates from EU2. EU2-14 dated to 3160 +/- 30 BP (1502 to 1323 BC). This is firmly prehistoric, in contrast to the artifacts found in association, which were from the twentieth century. The historic period disturbance and construction in the vestibule explains how this prehistoric charcoal ended up mixed in with modern deposits. This is evidence of significant sediment movement in the Historic Entrance during the twentieth century. The other sample was EU2-17, which was taken from a suspected hearth feature. This dated to 130 +/- 30 BP (1798-1942 AD). This fits in better with the materials recovered from this level, which included metal fragments and parts of lightbulbs.

Table 21: Radiocarbon Dating Results

Sample ID	Context	Calendar Year	Before Present (present is 1950 AD)
EU1-15	EU1 Level 2	1961-1977 AD	-12 to -28 BP
EU2-14	EU2 Level 3 SW quadrant	1502-1323 BC	3451 to 3272 BP
EU2-17	EU2 Level 3 NE quadrant	1798-1942 AD	276 to 8 BP

Discussion

All four assemblages are primarily comprised of artifacts that are from the recent past. Many of the artifacts, such as flash cubes, chewing gum, and plastic wrappers are indicative of twentieth and twenty-first century tourism.

EU1 had more artifacts than EU2 (1146 to 938, respectively), though because the volume of sediment excavated was not the same between the units this difference should be interpreted with caution. It does makes sense that EU1 would have more artifacts, since it was located in the pit directly adjacent to the walkway. Humans like throwing stuff in holes, and when the hole is already there even better. So it is no surprise that the pit became a dumping ground for both historic and contemporary refuse.

We also excavated EU1 to a greater depth than EU2. We hit sterile sediment by about 62 centimeters in EU2, while we had to stop excavation at 81 centimeters in EU1 just because we were out of time. At the bottom of the unit was more concrete, so it is clear that we did not even get close to the end of archeological deposits in the pit. We know that the pit has gone through cycles of opening up and being filled in. This fill is anthropogenic in nature, while the opening seems to be caused by natural erosional processes.

These artifacts help us to better understand the stratigraphy of the site and the various depositional events that have occurred over the past century. The flash cubes have a pretty tight date range from 1965 to 1979 and because they were being found in association with concrete, that suggests that the concrete was deposited some time before or possibly contemporaneous with the flash cubes. The concrete was thus probably deposited between 1965 and 1979.

Both the excavation units show mixing of material from different time periods. In a typical archeological site, the law of superimposition means that older stuff on the bottom and younger stuff on the top. This is not the case in these two units. In these two units we are seeing the mixing of time periods, lithics in the same levels as flash cube. This demonstrates that this archeological site is in a state of flux. The mixing of artifacts from different time periods shows that the recent history of the cave has been characterized by consistent movement of soils.

It is unclear how much of this deposition was intentional and how much was unintentional. It seems that the concrete was put in the pit intentionally because there is so much of it. It is hard to say if the wrappers were deposited intentionally or not. It is possible that some of them fell out of people's pockets, but it is also possible that it was intentional littering where people just wanted to get rid of their trash so they just threw it over the railing. This seems to be the most likely scenario for the flash cubes. Each flash cube could only take four photos with them, so it would make sense that people would discard them on the way out of the cave.

These materials are archeologically significant because they are over fifty years old and provide information about the historic use of Mammoth Cave as a place of tourism. This means that any work that will be done in the future at the Historic Entrance has to include archeological monitoring at the very least, if not more intensive mitigation. There has not been much archeological work done on twentieth century cave tourism. Unfortunately, that means that it is next to impossible to compare this site to other archeological sites and how other people have interpreted those sites. But we do know that archeology at the Mammoth Cave Historic Entrance shows evidence of tourism.

The archeological data shows that there are two main components related to the depositional history of this site: management of the cave and tourism of the cave. Artifacts associated with management include concrete, lime/sand mortar, various types of hardware, and lightbulb glass. All of these artifacts are related to infrastructure.

Artifacts associated with tourism include flash cubes, fibers/lint from clothing, bottle glass, plastic wrappers, and small personal items such as buttons.

EU1 had a total of 1146 artifacts, while EU2 only had 938 artifacts. However, EU1 was excavated to a depth of 81 cm and EU2 was only excavated to 62 cm. So this difference in artifact numbers is not as significant as it appears at first glance. The number of artifacts might be comparable, but the material composition of the assemblage is quite distinct between the two units. Plastics make up 13.61% of EU1's artifacts, but only make up 6.18% of EU2's assemblage. This difference implies that EU2 has not be affected by contemporary tourism as much as EU1, probably because of its distance from the walkway.

The concrete is probably from the 1960s stair replacement project. MACA put in a new set of concrete steps leading into the cave. I suspect that they broke up the old concrete steps and threw the concrete into the pit. It is unclear when these old concrete steps, the ones that ended up in the pit, were initially installed. It is possible that they were installed in the 1930s or 40s by the CCC. Figure 27, a 1934 photograph shows what appears to be a ramp and cable system at the Historic Entrance. I have not been able to find further information on what project they were working on, but materials were being moved into and/or out of the cave. This lends weight to my theory that the concrete we found in the pit could have been originally installed in the CCC era.

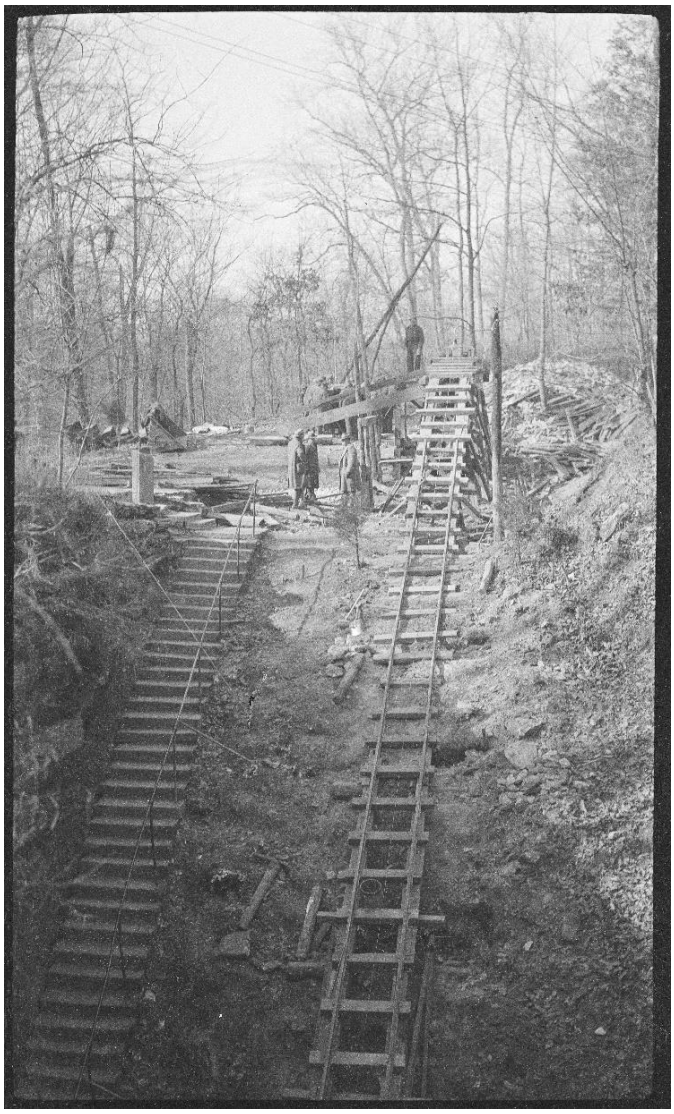


Figure 24: Photograph of CCC workers at the Historic Entrance of Mammoth Cave, 1934. Note the concrete steps on the left.

The stratigraphy of EU2 suggests that it has been relatively undisturbed since circa 1970. There were two artifacts in from the unit that gave specific dates. There was a penny from 1968, and a Pepsi can from between 1959-1971. This implies that the artifacts in EU2 was deposited in the late 1960s or early 1970s and have not been disturbed significantly since then.

Chapter 8: Site Description and Results

Site Description

Narrative Description

The site measures 150 feet by 50 feet (46 meters x 15 meters), or 0.1722 acres. It is the Historic Entrance of the Mammoth Cave (figure 25). Our primary focus during this project was the pit feature, located north of the concrete walkway leading into the cave. This pit has an amorphous shape. Its walls are made up of limestone breakdown, concrete, and sediment. The western edge of the pit sharply drops down from the level of the cave floor by about two meters. The eastern edge of the pit has a more gradual slope to become level with the cave floor. The pit is directly adjacent to, and partially underneath, the concrete walkway. A total of 107 artifacts were recovered during the 2021 surface collection, and 2,095 artifacts were recovered during the 2022 excavation. Another 878 artifacts were recorded during the pedestrian survey, though they were not collected (i.e. they are still in the cave) because this was a catch and release survey.

The depositional history of both units is very complicated. There are no clear capping events between layers. Concrete showed up in all three excavated levels of EU1. This implies that the concrete was all dumped at or around the same time. The sediment we are seeing around the concrete accumulated after it was deposited, which means this excavation revealed relatively recent sediment, from the last 50 years. EU1 also had clear ash layers where there are little pieces of charcoal mixed into the soil. These are called charcoal lenses. We do not know when or why this ash and charcoal were deposited, but clearly there was at least one, if not several, burning events at some point in the past. I suspect that this burning event was probably historic, because it is near the top of the unit, however that is just a guess.

The pit is affected by water erosion. When it rains, water comes into the cave and runs along the northern side of the walkway. This water then percolates and seeps through the soil until it is in the pit itself. During the last two days of excavation, we had a heavy rainstorm and I saw this hydrological process in action. I could see the water coming in from the west wall of the pit, and I could hear water underneath where I was excavating. It was flowing over the rock and concrete it like babbling brook. The next morning water was along the northern side of the unit. This made it very difficult to do any additional excavating because I was digging up mud, which was very hard to screen. This water observation suggests that there is natural soil formation happening at in the pit.

Methods

The geophysical electrical resistivity survey spaced electrodes 50 centimeters apart. For the pedestrian survey, we set up a grid that was 2 x 2 meters and laid it out over the entire site north of the walkway. We put in two Excavation Units, EU 1, which was in the pit, and EU 2, which was on the edge of the pit. The stratigraphy is complex, representing multiple depositional events. We identified one feature, named Feature E-F, which was located in the northeast corner of EU2. At first, we thought it might be a hearth feature based on the presence of charcoal and possible fire-cracked rock, so we excavated it separate from the rest of the unit. However, excavation did not reveal any signs that it is actually a feature. When we excavated E-F we collected a 5 liter soil sample. The analysis of this soil is beyond the scope of this report, but it is held in the Mammoth Cave Curation Facility for future analysis.

Figure 25: 15 ED 1, the Mammoth Cave Historic Entrance. Clockwise from top left: View of the cave entrance, looking west, view of the cave entrance looking east, the pit.

Stratigraphy

There were seven different strata in EU1 (figure 26). Strata 3, 4, 5, and 6 are complicated, probably because they are most being affected by water coming into the pit. The stratigraphy is also difficult to interpret in EU2, because it was also located on a slope and each wall contained slightly different strata. The east wall alone contains six different strata. Remember, that EU2 was only excavated to 62 centimeters, so this is quite a lot of strata for such a short unit. The profiles for EU2 are presented in figure 27.

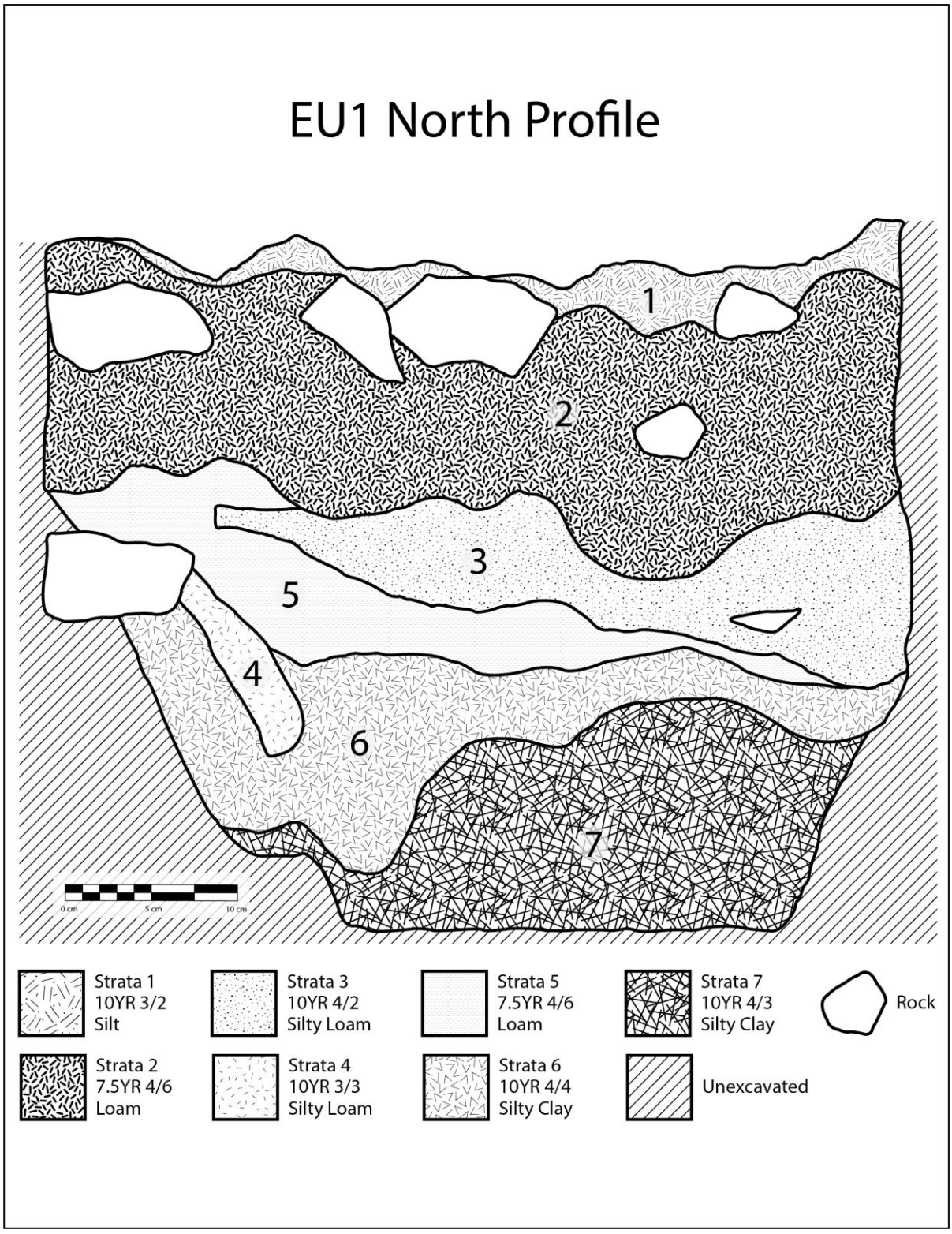


Figure 26: EU1 North Profile

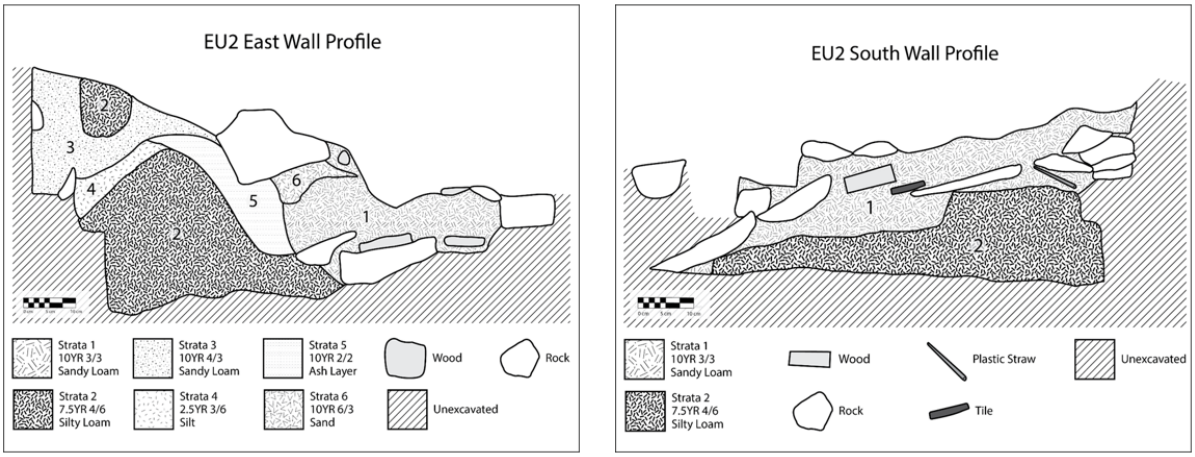
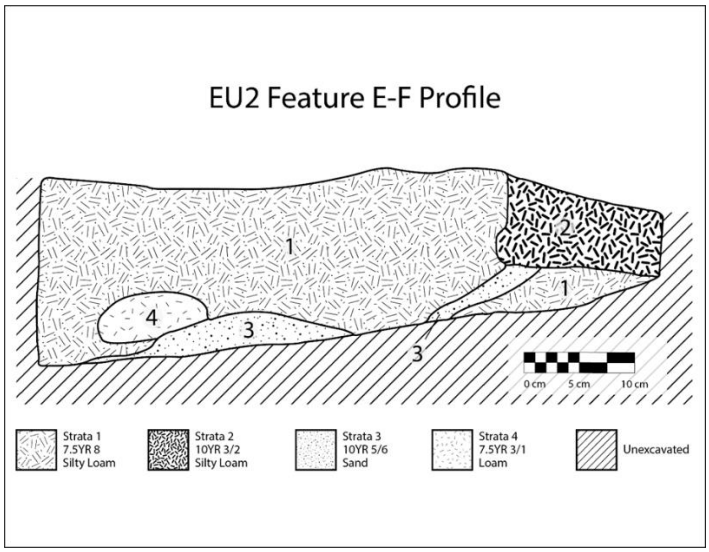


Figure 27: EU2 East Wall Profile (left); EU2 South Wall Profile (right), EU2 Feature E-F (bottom)



The stratigraphy by itself is complicated, but archival data helps with interpretation. Historical photographs show that filling in the pit is not a long term solution. In short, the pit does not stay filled. The photo from 1939 clearly shows a level entrance. But then the 1986 photo shows an entrance that anything but level (see figure 28). There have been continual attempts at capping the pit during the twentieth century. EU1 revealed a bunch of material culture from the 1960s and later. EU1 was about two meters below the walkway. For the purposes of this calculation, we will assume that the walkway has been at a consistent level over this time, because it is on a ledge of bedrock. If we know that the entrance was

completely level in 1940, that means that the pit has sunk at least two meters over the past eighty years. If we assume that the rate of sinkage has been consistent, that means that the pit is sinking at a rate of 2.5 centimeters per year. That means that by 2050, the pit will be 75 centimeters deeper than it is today.

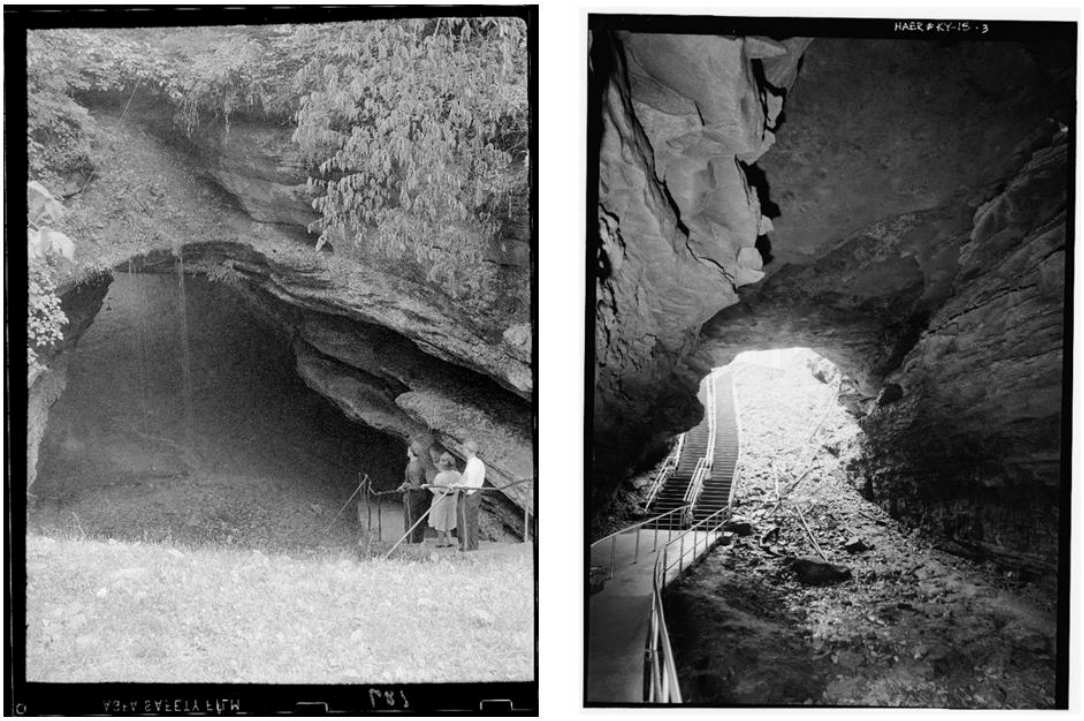


Figure 28: The flattened Historic Entrance, 1939 (left); The Historic Entrance in 1986 (right)

Summary of Artifacts

Most of the artifacts recovered were not dateable However the artifacts that we were able to take are historical (as defined by the National Register) or close to being historical the flash cubes are a prime example because they stopped being manufactured in 1979. This means that the flash cubes are just a little younger than 50 years old. However, by 2029 all those flash cubes will be 50 years old and thus be considered historic. In addition to the historic material, there were several prehistoric artifacts present as well, all of which were lithics.

National Register Evaluation

The Historic Entrance is considered a contributing resource for the Mammoth Cave Historic District, which was listed on the National Register of Historic Places in 1991 (#91000503). This study has shown that the Historic Entrance is indeed a site of historical significance. Under the 1991 document, the Historic District is listed as significant under Criterion A, association with significant events. However, I argue that this should be amended and the Mammoth Cave Historic District should also be listed as significant under Criterion D, important information. This excavation has shown that the Historic Entrance contains archeological material of both the prehistoric and historic variety. This archeological material provides information about historic use of the cave, including tourism during the twentieth century and changes in management of the cave by the National Park Service.

Additionally, the Historic District only covers the time period from 1806-1941. There is a substantial precontact component to this site, so I suggest that the start date for significance be pushed back to approximately 5,000 years ago. In the historic period, Mammoth Cave is an exemplary example of cave tourism. Mission 66 was extremely influential across the Park Service, including at Mammoth Cave. Mission 66 was a huge building program that fundamentally shaped the national parks that we have today. These construction projects are just entering the archeological record as over fifty years old and they have not yet received protection. By expanding the period of significance to include the Mission 66 modifications at the cave, we are preserving a part of history that is only now starting to be acknowledged.

Archival research clearly shows that there is a long and complicated history of development at the Historic Entrance. The archeological excavation turned up thousands of

artifacts. The two sources in combination gives us a unique opportunity to investigate how the management of the cave has changed over time.

People have been intentionally filling the pit, starting with the saltpetre miners in the early 1800s. Archeologically, we should be able to see these various filling events in the pit's stratigraphy. There are three events in particular that are probably capping events, those which clearly mark a new stratigraphic layer. The first one is the filling of the pit during saltpetre mining. Most likely this material was taken from Houchin's Narrows in the cave to widen the passageway for the mining operation. The second one is the leveling of the cave floor during the 1910s that is mentioned by Nelson in his 1917 report. In this case, the leveling was done with rock and sediment from farther inside the cave. The final, most recent capping event is the deposition of concrete and metal handrails in the. pit during the 1960s or 1970s. The historical record is unclear about exactly when and why the concrete was deposited. However, the large amount of flashcubes recovered during excavation suggest that the concrete was deposited sometime in the late 1960s or 1970s. This event is archeologically significant because it shows how humans were managing their environment during this time. Attitudes towards geological and cultural heritage have changed over the past 50 years and so the park service would probably not dump concrete into a natural pit nowadays but during that time period it seems that there was not an issue with doing that which mirrors changing ways of thinking in the environmental movement including the leave no trace campaign

Further research will be able to shed light on early periods of cave tourism, allowing us to better understand the changing nature of tourism, as well as the changing relationship between humans and the underground environment. For example, the concrete in the pit is now considered an eye sore, mirroring changing attitudes towards the cave environment.

Project Impacts

This project sought to create as little disturbance as possible to the entrance however some disturbance is unavoidable. One form of disturbance was the placing of the electrode probes during the receptivity survey these did not penetrate the ground a huge amount but they did go into the ground additionally our excavation moved two square meters worth of sediment from its original place and though we backfilled it you can never really create the soil exactly has how it was

Future construction at the Historic Entrance will have numerous impacts on this archeological site. First and foremost, any construction which disturbs the soil will, by definition, change the stratigraphy. Excavation showed that this has already occurred historically, with prehistoric lithics being found in the same layer as contemporary refuse. The two excavation units both show clear disturbance of soils from erosion and human actions. Additionally, previous archeological investigations have found indigenous human remains in the Historic Entrance. This means that any type of soil disturbance runs the risk of inadvertently uncovering human remains. As the National Park Service is a federal agency and is bound by NAGPRA, this possibility must be thoroughly considered before any soil disturbance is done. The high amount of disturbance at the Historic Entrance means that we cannot definitively rule out the possibility of there being human remains in the pit though it does seem unlikely.

Another huge impact regards the pit itself. As the archival research presented demonstrates, the pit has a long history of being filled with refuse and then opening back up again. This is a natural geological process. Filling the pit is not a long term solution to the problem of it sinking. If NPS decides to fill the pit, not only will it cover up all of the

archeological material that has been deposited since the last filling, but it will also only prolong the inevitable. The pit will start sinking again, and then even more stuff will have to be dumped in to level it out. The addition of more material in the pit will add a massive amount of weight which can potentially crush the archeological material are very likely still in the pit.

Constraints

Cave Archeology

Cave archeology presents the archeologist with a bunch of unique challenges. First, there a numerous logistical issues. You need to provide your own light to work, which means that equipment failures can stop your research. Caves are topographically diverse, meaning that more often than not the surface you are excavating is going to be sloped in some way. In the pit, the slope was around 45 degrees. We decided to create a flat surface through our excavation, basically cutting out a "wedge" of sediment to create a level surface. I don't know whether or not this is the right methodological choice, as there are next to no resources on methods of historical cave archeology. Most archeological work in caves which do not have the sheer amount of human disturbance that is present at the Historic Entrance. Future research might incorporate methods from urban or even industrial archeology, since these sub-disciplines have more experience working with complicated historical filling episodes.

Twentieth Century Archeology

The most surprising finding was the sheer amount of material from the last sixty years. I was expecting to find mostly nineteenth century material during the excavation, but that's not what happened. Instead, what this excavation revealed is an archeological signature for twentieth century tourism. The quintessential artifact for this is the flashcube. Flashcubes made photography accessible in poorly lit places such as caves for the average American. It

is easy to imagine a happy family visiting the cave in the 1960s or 1970s with a few flashcubes to document their vacation, and then the flashcubes being thrown into the pit as they were exiting the cave.

We have now reached a point where over half of the twentieth century is considered historic (i.e. more than 50 years old). However, archeology has not kept up with these developments. One of the main issues I ran into throughout this research is a lack of standardization in typologies for mid and late twentieth century material culture. The forms used to record artifacts at MACA are geared towards pre-1900 material culture. This poses some issues when most of my artifacts dated to the 1950s or later. I had to place plastic in the catch-all "other" category, which is not particularly helpful for analysis.

Site Typology

Another issue is that the catalog forms focus on domestic sites. This is unsurprising, as most archeology investigates at the household level, but led to challenges. This site is not domestic. It is touristic. And while archeology has started to engage with tourist sites, it has not engaged with cave tourist sites.

What is fascinating about Mammoth Cave is that while it is one geologic structure, humans have used it in a myriad of ways over the past five thousand years. There are places in the cave with material culture thousands of years old, and there are places with material culture from yesterday. If we were to categorize these various activities, we would have ritual (gypsum mining, rock art), industrial (saltpetre mining), domestic/medical (TB huts), and tourism (CCC structures, contemporary infrastructure). All of these different activities have left their own archeological signature, and these signatures interact with each other. We as archeologists need to consider Mammoth Cave as a whole. Not just the prehistoric stuff, not

just the historic stuff, but how they fit together to create the underground landscape we experience today.

Archeology of the Mundane

The things that we pulled out of the ground during our excavation were, frankly, trash. Old snack wrappers, burned out flashcubes, broken bottles. Many of the visitors who stopped to ask us what we were doing seemed taken aback by our answer. A typical interaction would go like this:

Visitor: “What are you guys looking for?”

Archeologist: “Anything humans have left behind over the last couple hundred years.”

Visitor: “Oh, have you found anything?”

Archeologist: “Yeah, lots of nails, bottle glass, concrete, chewing gum.”

At this point, the visitor would often laugh (with pity).

Their reaction makes sense. Popular depictions of archeology are all about finding buried treasure and unearthing ancient secrets. Historical archeology isn’t as well represented, and contemporary archeology even less so.

Archeology often looks at the mundane. The traces of human behavior that build up day-by-day, year-by-year. This project allowed us to see the site formation process in action. The chewing gum and candy wrappers both showed us how contemporary tourists are interacting with their environment. I was excavating in the pit, and suddenly saw a drop of water drip down in front of me. I was confused, since it does not rain in the cave. A second later I realized that that wasn’t rain: it was spit. Somebody had spit into the pit. I don’t know

if they knew I was down there or not, since I was partly under the walkway. But this showed me how easy it is for people to treat the cave like any other natural place. People spit outside all the time and it's no problem. But in a cave, one person's spit becomes another person's shower. The spit also explained why we found so much chewing gum. After spending a couple hours in the cave chewing gum, it makes sense that people would want to get rid of it unobtrusively. The pit is next to the walkway, outside of the cave gate but still dark. The perfect place to get rid of gum.

This is the archeology of the mundane in action. A person carrying out an everyday activity, and it leaving a permanent mark on the world.

Chapter 9: Summary and Recommendations

National Register Listed or Eligible Sites Present

The Mammoth Cave Historic Entrance is a contributing resource to the Mammoth Cave Historic District which was listed on the National Register of Historic Places as #91000503 in 1991. As it has been over thirty years since this registration was approved, it is time for an update. I echo the recommendations of the 2021 CLR: the time period of significance needs to be expanded to include both the very beginnings of historic use of the cave to the end of the Mission 66 program. I agree with the recommendation to expand the period of significance to 1798-1969 (Panamerican Consultants et al. 2021:276). This will ensure that historic cultural resources, from the cave's 1798 discovery to the end of the Mission 66 projects in 1969, are protected. The suggested expansion of the areas and periods of significance is presented in table 23.

Table 23: Areas and Periods of Significance for the Mammoth Cave Historic District. The italicized text indicates the proposed expanded period of significance.

Area of Significance	**Period of Significance**	**Significant Dates**
Entertainment/Recreation	1816-1941	1816
Industry	1806-1814	1806
Health/Medicine	1842-1843	1842
Entertainment/Recreation	*1816-1969*	*1816* *1941*

Recommendations for Future Investigations

Archival

There are several places that could contain documents about the Historic Entrance. The Huntington Library in San Marino, CA and the Historical Society of Washington, DC

both contain letters to and from Albert Janin, who was involved in the management of Mammoth Cave between 1900 and 1910 (Algeo 2008:11). We know that the first set of concrete steps were installed sometime prior to 1905, so Janin's documents are a good place to start to figure out what sort of construction was happening during this time period.

The National Archives at College Park are also worth checking out. They have a lot of documents related to the National Park Service's tenure over the park. Specifically, College Park has other documents from the CCC and Mission 66 that might help to better explain what sorts of modifications were happening at the historic entrance from the 1930s-1960s.

Legacy Collections

Previous archeological excavations should also be compared with this one. The material collected by the University of Kentucky in 2003 included some historic artifacts which have not yet been analyzed in depth. Due to time constraints, I was not able to visit the University of Kentucky to conduct this analysis but I think this would be very interesting to see what sort of artifacts they found and how those compared to the assemblage collected during this excavation The stratigraphy from their excavation could also be useful in to compare to this excavation to look at depositional history.

While N.C. Nelson's excavations primarily focused on the prehistoric period, it might be fruitful to examine his field notes and artifacts. The main thing I would look for in Nelson's notes would be maps of the Historic Entrance and any mention of a pit or of how people were entering the cave. The historical record is not very clear about what the Historic Entrance was like during the 1910s, so by examining Nelson's notes we might be able to better fill in that gap in our chronology. His notes might clarify if there was a formal

walkway into the cave and where it was, as well as what kinds of steps were present. Nelson's artifacts could help us determine if the lithics we found during our excavation are related to the same occupation that Nelson was seeing or if we are seeing a different occupation. By looking at these previous archeological excavations we can compare this stratigraphy to better understand the depositional history of this site and how that depositional history might vary based on the location within the Historic Entrance itself

Excavation

Finally, excavating the pit is strongly recommended, both to further our knowledge of this site as well as to mitigate the erosional processes that are damaging the underlying strata. According to multiple historic sources (e.g. Lee 1835, Meriam 1844, Kite 1943), the pit was at least fifty feet deep during the early nineteenth century. There have been multiple cycles of filling and sinking, so at this point we do not have a great idea of how deep this pit may be. However, we do know that below the twentieth century debris is probably nineteenth century debris. And most likely there are prehistoric deposits also present. This pit gives us the unique opportunity to see how human occupation in the cave has changed over the millennia. This pit provides us the opportunity to better define the last two hundred years of industrial and tourism-based development in the cave. The top layer of concrete is possibly crushing the older artifacts below it. This concrete is historically significant, but what is underneath it could offer valuable insight into an under-documented period of the cave's history. Thus, future excavation would allow us to examine the Mammoth Cave in a novel way, as well as provide an opportunity to teach the public about both archeology in general and the archeology of Mammoth Cave specifically.

Possible Mitigation Measures

One of the biggest challenges in cultural resources management is balancing the protection of cultural resources with that of natural resources. In the case of national parks, the additional challenges of protecting these resources for the American public, fulfilling federal regulations, and contending with the often limited funding, further complicates the process. The pit is a geologic, historical, and archeological resource. Mammoth Cave National Park will need to decide how they want to manage this unique feature. I suggest that there are three options that the park should consider: leaving the pit as it is, restoring the pit to its natural appearance, or only removing some of the material from the pit.

Leaving the pit alone is the simplest option. This would not mean that it would be ignored, but rather it would be monitored. This is the lowest cost option and the easiest, but not necessarily the best for the resource. From historical documentation (Meloy 1964), and the observations of park staff, we know that the pit is sinking. This sinking is likely to continue into the future. As material sinks, it presses down on the material below it. That means that it is conceivable that sinking correlates with the crushing and destruction of archeological resources. Moreover, deposits are subject to admixture and comingling due to the sinking phenomenon and water erosion. This is already happening, as shown by the lithics found in the same levels as mid-twentieth century deposits. We know that the pit contains archeological material from the nineteenth century, including the remains of an ice house and material related to the saltpetre operation. Below these levels there is almost certainly an indigenous presence. Paleontologically, it is quite possible that there are fossils from extinct fauna. It the pit is left alone, these resources run the risk of being severely damaged or destroyed by the sheer weight of the material above.

At the very least, a monitoring program needs to be put in place to monitor the rate of sinking of the pit. It is very important that the archeologist working at the pit is familiar with historic materials, so that they are able to tell if the artifacts are historically significant or not. If archeology is not done, water will continue to act on the deposits in the pit. Frankly, this means that we are losing potentially valuable archeological information, and this loss will continue unless we mitigate it. It will be up to the park to decide what is an acceptable level of information loss.

Aside from the potential resource damage from this geological process, the pit's sinking also presents a safety hazard. The walkway is right next to the pit. While there is a handrail, during our excavation we had some rangers express concern about a child possibly slipping under the handrail and falling into the pit. It is only about a ten foot drop now, but that is still enough to be dangerous. And as the pit sinks, that drop will only get farther. It is better to take action now and add a more substantial barrier between the walkway and the pit before there is an accident. This is something that should be done no matter what direction the park decides to take regarding the pit itself.

The second option is attempt to restore the pit to its original geological appearance, before humans modified it. This option will be more challenging, but will be better for the resource in the long run. As discussed above, the pit has the potential to contain a huge treasure trove of information on how humans have been interacting with the cave at least over the last 50 years, and potentially even farther back in time. Archeological excavation of the pit provides the best chance to recover this data before it is destroyed.

The final option is a combination of the two. In this scenario the park would remove the 1960s concrete from the pit to alleviate the weight on any archeological materials below. The rest of the pit would be left intact.

The excavation of the pit also offers a powerful and unique opportunity for public outreach. The general public almost never gets to see archeology in action. Thousands of people visit Mammoth Cave every day and pass right by the pit. This means that we have a chance to expose thousands of people to archeology. It also offers an opportunity to show them the results of littering in the cave. Nothing inspires responsible behavior quite like knowing that archeologists will be begrudgingly collecting your trash!

The excavation of the pit would be challenging. The sides are not clearly defined and are made up of loose sediment, rock, and concrete. The walls will have to be shored up for excavator safety. Additionally, as the pit gets deeper, vertical caving gear such as harnesses and ropes might be required.

There is also the issue of not knowing what will happen when the fill is removed from the pit. How will erosion work? Will the water just keep going down, making the pit deeper, or will it start to break down the sides of the pit? It is possible that removing that fill will compromise the pit's integrity and the pit will start to widen horizontally. We still do not have a great idea of what the walls of the pit look like, so it is unclear if there will be limestone walls, as is typical in karst pits and caves, or not. If the pit does have limestone walls, we do not know where those walls start. The park should consult with geologists and engineers if they decide to move forward with removing any fill from the pit. The pit is basically a funnel. The stuff in the center of the funnel is sinking faster than the stuff on the

sides of the funnel. But the stuff on the side is still sinking. The question is how removing fill from the pit will affect this funneling process.

Another logistical challenge would be what to do with all of the sediment removed from the pit. Keeping it in the vestibule would mean changing the floor surface, which is not ideal. It is also not feasible to use heavy equipment in this area, so excavation will involve a lot of hauling of concrete out of the pit and out of the cave.

Another factor to consider is the labor investment. Archeological excavation takes a long time and is costly. To speed up the process of excavation, it might be that an archeologist monitors the removal of the twentieth century concrete, with archeological excavation only beginning once all the concrete has been removed. However, this would lead to the loss of archeological data from the mid-twentieth century, which is considered historic. So, a better plan might be to screen all sediment before it is removed from the cave.

Disposition

All field notes, artifacts, map, and photos are located at the Science and Resource Management Division at Mammoth Cave National Park under accession number MACA-00991.

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Appendix A: 2021 Surface Collection Catalog

Classification Line 2 (time period)	Classification Line 3 (material class)	Classification Line 4 (specific class of material)	Description	Field Specimen Number	Historic/Cultural Period	Item Count	Functional Category	Object Name
Historic	Composite	Glass	2 colorless body sherds, 1 is quite large and has a white and red applied color label design and the letters "K // H // RE" enclosed by a circle.	1	20TH C	2	Container/Vessel	BOTTLE, BEVERAGE, NON-ALCOHOLIC
Historic	Composite	Glass	aqua body shard	1	20TH C	1	Container/Vessel	BOTTLE, BEVERAGE, NON-ALCOHOLIC

Historic	Composite	Glass	7-up green body sherds, 1 of which has the painted letters "YOU LI // A"	1	20TH C	2	Container/Vessel	BOTTLE, BEVERAGE, NON-ALCOHOLIC
Historic	Composite	Glass	light amber body shard with banded embossing.	1		1	Container/Vessel	BOTTLE
Historic	Composite	Glass	1 large aqua bottle fragment, "TERED // FL. OZS.".	1	20TH C	1	Container/Vessel	BOTTLE, BEVERAGE, NON-ALCOHOLIC
Historic	Composite	Glass	Colorless body shard with banded and dotted embossing.	1	20TH C	1	Container/Vessel	BOTTLE, BEVERAGE, NON-ALCOHOLIC

Historic	Composite	Glass	1 colorless bottle base with embossing on base and body, "NOT TO BE REFILLED 73 1139 L 68"	1	20TH C	1	Container/Vessel	BOTTLE, BEVERAGE, NON-ALCOHOLIC
Historic	Composite	Synthetic	flash cube sticker "GE MAGICUBE"	1	20TH C	1	Photography	FLASH CUBE
Historic	Composite	Synthetic	intact GE flash cube	1	20TH C	1	Photography	FLASH CUBE
Historic	Composite	Synthetic	intact W flash cube	1	20TH C	1	Photography	FLASH CUBE
Historic	Composite	Synthetic	flash cube with missing top	1	20TH C	1	Photography	FLASH CUBE
Historic	Composite	Synthetic	flash cube bases	1	20TH C	3	Photography	FLASH CUBE
Historic	Composite	Synthetic	colorless flash cube side	1	20TH C	1	Photography	FLASH CUBE
Historic	Composite	Synthetic	blue flash cube side	1	20TH C	1	Photography	FLASH CUBE

Historic	Composite	Glass	light bulb glass	1	20TH C	1	Lamp/lighting	BULB, LIGHT
Historic	Composite	Synthetic	Procell by Duracell AAA battery	1		1	Lamp/lighting	BATTERY
Historic	Composite	Synthetic	white plastic bead	1	20TH C	1	Fashion	BEAD
Historic	Composite	Synthetic	Colorless plastic comb "MADE IN USA"	1	20TH C	1	Fashion	COMB PART
Historic	Mineral	Metal	Metal can rim with a bit of the top	1	20TH C	1	Container/Vessel	CAN PART
Historic	Mineral	Metal	Aluminum can body with blue, green, yellow, and white label	1	20TH C	1	Container/Vessel	CAN PART
Historic	Mineral	Metal	Wire nails	1	Post 1885	1	Hardware	NAIL
Historic	Composite	Synthetic	plastic screw on piece	1	20TH C	1	Hardware	PLASTIC ARTIFACT
Historic	Composite	Metal	Aluminum foil	1	Post 1947	2	Wrapper	WRAPPER
Historic	Composite	Metal	large yellow aluminum foil	1	Post 1947	1	Wrapper	WRAPPER

Historic	Composite	Synthetic	Nifda SALTINES	1		1	Wrapper	WRAPPER
Historic	Composite	Synthetic	Kroger "Purified Drinking Water	1		1	Wrapper	WRAPPER
Historic	Composite	Synthetic	Plan[missing]	1		1	Wrapper	WRAPPER
Historic	Composite	Synthetic	BRACH'S // BUTTERSCOTCH	1		2	Wrapper	WRAPPER
Historic	Composite	Synthetic	zip bag top	1		1	Wrapper	WRAPPER
Historic	Composite	Synthetic	colorless plastic wrappers	1		6	Wrapper	WRAPPER
Historic	Composite	Synthetic	black plastic pieces	1		2	Unknown	PLASTIC ARTIFACT
Historic	Composite	Synthetic	toothpick/staw wrapper	1		1	Wrapper	WRAPPER
Historic	Composite	Synthetic	two compartment plastic snack tray	1		1	Container/Vessel	PLASTIC ARTIFACT
Historic	Composite	Synthetic	barcode fragment	1	Post 1973	1	Wrapper	LABEL

Historic	Composite	Metal	2 iron nails in piece of wood, one small piece of wood broke off of the larger piece.	2		2	Hardware	NAIL
Historic	Composite	Glass	aqua scalloped body sherds, probably coke bottle	3	20TH C	2	Container/Vessel	BOTTLE, BEVERAGE, NON-ALCOHOLIC
Historic	Composite	Glass	colorless with patina	3		1	Container/Vessel	SHERD
Historic	Mineral	Metal	light bulb base	3	20TH C	1	Lamp/lighting	BULB, LIGHT
Historic	Composite	Synthetic	"SYLVANIA BLUE DOT" flash cubes	3	20TH C	2	Photography	FLASH CUBE
Historic	Composite	Synthetic	flash cube base	3	20TH C	1	Photography	FLASH CUBE
Historic	Composite	Synthetic	flash cube sides	3	20TH C	2	Photography	FLASH CUBE
Historic	Composite	Synthetic	"Amplex" flash cube side	3	20TH C	1	Photography	FLASH CUBE
Historic	Composite	Synthetic	flash cube interiors	3	20TH C	3	Photography	FLASH CUBE

Historic	Composite	Synthetic	flash cube sticker	3	20TH C	1	Photography	FLASH CUBE
Historic	Composite	Glass	pieces of light bulb glass	3	20TH C	4	Lamp/lighting	BULB, LIGHT
Historic	Composite	Synthetic	plastic sd card case	3		1	Photography	PLASTIC ARTIFACT
Historic	Composite	Synthetic	plastic ring purple with orange plastic gem	3		1	Fashion	FINGER RING
Historic	Mineral	Metal	can top	3	20TH C	1	Container/Vessel	CAN PART
Historic	Mineral	Metal	pull tab can top	3	post 1962	1	Container/Vessel	CAN PART
Historic	Mineral	Metal	body fragment with green and white striping	3	20TH C	1	Container/Vessel	CAN PART
Historic	Mineral	Metal	wire nails and iron wire twisted together, possibly been in a fire?	3	20TH C	6	Hardware	NAIL

Historic	Composite	Synthetic	plastic cap	3		1	Unknown	PLASTIC ARTIFACT
Historic	Composite	Synthetic	colorless plastic wrappers	3		2	Wrapper	WRAPPER
Historic	Composite	Synthetic	colorless straw wrapper	3		1	Wrapper	WRAPPER
Historic	Composite	Synthetic	Austin "Toasty Crackers with Peanut Butter" wrapper,	3		1	Wrapper	WRAPPER
Historic	Composite	Synthetic	"ARTIFICIALLY FLAVORED MADE IN U.S.A // [OR?] ANGE STIX // Jolly Rancher candies	3		1	Wrapper	WRAPPER
Historic	Composite	Synthetic	"F [illegible] // Kings" "[] CLASS // CIGARETTES	3		1	Wrapper	WRAPPER

Historic	Composite	Synthetic	"FreshLock // Zipper" wrapper.	3		1	Wrapper	WRAPPER
Historic	Composite	Metal	aluminum body, plastic cap dry erase marker	3		1	Plastic Artifact	PEN
Historic	Composite	Synthetic	colorless plastic cap "TWIST OPEN"	3		1	Unknown	PLASTIC ARTIFACT
Historic	Composite	Synthetic	yellow plastic straw	3		1	Plastic Artifact	PLASTIC ARTIFACT
Historic	Composite	Synthetic	red plastic straw	3		1	Plastic Artifact	PLASTIC ARTIFACT
Historic	Composite	Synthetic	white woven bracelet	3		1	Fashion	BRACELET
Historic	Composite	Synthetic	cloth hairtie	3		1	Fashion	HAIR ORNAMENT
Historic	Composite	Synthetic	stretchy black band	3		1	Unknown	HAIR ORNAMENT
Historic	Composite	Synthetic	white plastic wire	3		1	Unknown	PLASTIC ARTIFACT

Historic	Mineral	Metal	silver pieces of aluminum foil	3	Post 1947	2	Wrapper	WRAPPER
Historic	Mineral	Metal	yellow piece of aluminum foil	3	Post 1947	1	Wrapper	WRAPPER
Historic	Unidentified Material	Unidentified	White substance, unclear what it is. Possibly chewing gum?	3		1	Unknown	UNKNOWN
Historic	Mineral	Stone	Black rock with green stripe, polished like from a gift shop	3		1	Unknown	STONE, WORKED
Historic	Mineral	Metal	metal step guard, "4718-5" on back	4	20TH C	1	Architectural	ARCHITECTURAL ACCESSORY
Historic	Mineral	Ceramic	Ceramic pipe fragment	1		1	Architectural	ARCHITECTURAL ACCESSORY
Historic	Composite	Fibers	Twine	1		1	Hardware	CORDAGE
Prehistoric	Mineral	Stone	chert	1		1	Lithic	UNIFACE
Prehistoric	Mineral	Stone	chert	1		1	Lithic	BIFACE

Prehistoric	Mineral	Stone	limestone, possibly worked	1		1	Lithic	LITHIC
Historic	Mineral	Metal	Iron bracket	1		1	Hardware	BRACKET
Historic	Composite	Glass	olive green wine bottle base shard	3		1	Container/Vessel	BOTTLE, WINE
Unknown	Animal	Shell	mussel	3		1		SHELL

Appendix B: Pedestrian Survey Data

The following table contains all artifacts recorded during the pedestrian survey (879 artifacts total). Grid ID indicates where the artifact was found, material is what the artifact is primarily made of, and comments are a description of the artifact. Count gives the number of artifacts observed. TPQ is the earliest possible manufacture date while TAQ is the latest possible manufacture date. Note that because this data was collected primarily by volunteers who did not have an extensive background in historical archeology, some items are not labeled as specifically as possible. For example, there are several entries for "nails" where the type of nail is not recorded.

Grid ID	Material	Comments	Count	TPQ	TAQ	Source
A2	Metal	Hole-in-cap can	1	1820	1920	California Department of Transportation 2018
A2	Metal	mesh, wire 15 cm x 6 cm	1			
A2	Metal	wire nails (one bent)	2	1850	2022	Miller et al 2013:14
A2	Synthetic	cigarette butt	1	1880	2022	The Editors of Encyclopedia Britannica 2023
A2	Building Material	lime mortar	1			
A2	Glass	Colorless shard	1			
A2	Glass	dark purple shard	1			
A2	Glass	aqua green, coke bottle	1	1916	2022	Lockhart and Porter 2010:47
A3	Synthetic	colorless plastic mint wrapper	1	1933	2022	Plastic Packaging History 2018
A4	Synthetic	elastic hairtie	1	1958	2022	PONY-O 2021
A5	Synthetic	flash cube	1	1965	1979	Harriss 2021
B3	Synthetic	glowstick	1	1973	2022	Dubrow and Guth 1973
B3	Ceramic	Porcelain rim	1			
B3	Fibers	blue string	1			

C2	Glass	olive, probably from wine bottle	1			
C2	Synthetic	Starlight mint wrapper	1	1906	2022	Spangler n.d.
C3	Synthetic	Wrapper with "G" symbol; Gru from Despicable Me	1	2010	2022	IMDb 2010
C4	Wood	plank, 17 cm long	1			
C4	Synthetic	old plastic flagging with wire, white	1			
C4	Glass	colorless shard	1			
C4	Glass	brown shard	1			
C4	Glass	green shard	1			
C4	Glass	green shard, rounded, like a Coke bottle	1	1916	2022	Lockhart and Porter 2010:47
C4	Synthetic	cliff bar wrapper	1	1992	2022	Clif Bar n.d.
C4	Synthetic	hairtie	1	1958	2022	PONY-O 2021
C4	Ceramic	ironstone with white lead glaze	1	1842	1930	Miller et al 2013:13
C5	Wood	Plank, 63 cm x 11 cm x 4 cm, 2 nails on side facing up	1			
C5	Lithic	Primary decortication chert flake with cortex	1			
D2	Stone	Quartz, 5 cm, looks like came from a gift shop	1			
D2	Metal	quarter	1	1992	1992	

D2	Synthetic	green wire. Wrapper, colorless				
D2	Glass	olive green, base of wine bottle	1			
D2	Fibers	T-shirt tag "Made in El Salvador // 85% cotton"	1			
D2	Building Material	concrete	1			
D3	Fibers	rope encruste in calcite	2			
D3	Metal	nickle	1	1994	1994	
D3	Synthetic	1 blue. 1 candy wrapper, yellow	2	1933	2022	Plastic Packaging History 2018
D4	Glass	colorless shard	1			
D4	Glass	aqua shard	1			
D4	Synthetic	1 colorless wrapper. 1 white wrapper	2	1933	2022	Plastic Packaging History 2018
D4	Synthetic	flash cube	1	1965	1979	Harriss 2021
D4	Metal	Nail	1			
D4	Ceramic	ironstone, white, base	1	1842	1930	Miller et al 2013
D5	Glass	2 Dr. Pepper bottle sherds	2	1891	2022	Stingley n.d.
D5	Glass	aqua shard	1			
D5	Glass	beer glass shard	1			
D5	Glass	colorless sherds	3			
D5	Fibers	cotton gloves	1			
D5	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018

E2	Synthetic	1 tube 15 cm. 1 strip 13 cm.	2			
E2	Fibers	woven necklace	1			
E2	Synthetic	hairtie	1	1958	2022	PONY-O 2021
E2	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
E2	Glass	colorless shard	1			
E2	Glass	colorless with rings	1			
E2	Glass	green shard	1			
E3	Building Material	mortar, found on top of ceramic pipe	5			
E4	Glass	4 aqua sherds (two marked as coke body), (one inscribed with "cola, mark resgistered GFL 02)	4	1916	2022	Lockhart and Porter 2010:47
E4	Glass	colorless shard	1			
E4	Glass	olive green, body shard	1			
E4	Glass	rim shard, coke bottle	1	1916	2022	Lockhart and Porter 2010:47
E4	Glass	large coke bottle body shard	1	1916	2022	Lockhart and Porter 2010:47
E4	Glass	colorless	1			
E4	Metal	iron nail	1			
E4	Metal	lead fragment	1			
E4	Synthetic	broken comb	3	1915	2022	Miller et al 2013:16
E4	Synthetic	cylindrical white	1			

E4	Synthetic	white strip	1			
E4	Synthetic	thin, white	1			
E4	Building Material	concrete (possibly)	2			
E5	Glass	amber	3			
E5	Glass	aqua	8			
E5	Glass	aqua bottle rim	1			
E5	Glass	colorless bottle neck	1			
E5	Glass	colorless	8			
E5	Glass	green body shard	1			
E5	Glass	large coke bottle body shard	1	1916	2022	Lockhart and Porter 2010:47
E5	Paper	paper	1			
E5	Metal	lightbulb base	1	1879	2022	Miller et al 2013:15
E5	Synthetic	colorless bag	1			
E5	Synthetic	colorless	1			
E5	Ceramic	body sherds, "don't scratch", one with unicorn head maker's mark	3			
E5	Synthetic	cigarette butt	1	1880	2022	The Editors of Encyclopedia Britannica 2023
E6	Glass	olive green, wine bottle base	1			
F1	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
F1	Synthetic	small piece	1			
F1	Synthetic	round, green sticker	1			
F1	Fibers	teal string	1			

F1	Fibers	red string	2			
F1	Fibers	blue string	1			
F1	Metal	silver twist ties	4	1939	2022	twist-ems® n.d.
F1	Metal	blue wire	1			
F2	Metal	twist ties	4	1939	2022	twist-ems® n.d.
F2	Metal	string/cord	1			
F2	Synthetic	orbit gum wrapper	1			
F2	Synthetic	snickers	1	1930	2022	Snickers n.d.
F2	Synthetic	green	1			
F2	Synthetic	blue	1			
F2	Synthetic	round, colorless	1			
F2	Synthetic	hairtie	1	1958	2022	PONY-O 2021
F2	Fibers	green string	1			
F2	Synthetic	ziptie	1	1958	2022	Zip Ties 2016
F2	Synthetic	Band-Aid	1	1924	2022	J&J 2018
F2	Fibers	rope	1			
F3	Fibers	stone tied with string	1			
F3	Synthetic	crunch	1	1938	2022	Nestlé 2013
F3	Ceramic	drainage pipe pieces	3			
F3	Metal	lightbulb base	1	1879	2022	Miller et al 2013:15
F4	Synthetic	rubber, colorless strip	1			
F4	Glass	amber shard	1			
F4	Glass	colorless shard	1			
F4	Glass	dr. pepper	1	1891	2022	Stingley n.d.
F4	Glass	aqua sherds	3			

F4	Wood	sawn timber	2			
F4	Synthetic	white	1			
F4	Synthetic	colorless	1			
F4	Synthetic	colorless tape	1			
F4	Paper	small	1			
F5	Ceramic	stoneware with bristol glaze	1	1880	1925	Maples 1998
F5	Glass	colorless bottle rim	2			
F5	Glass	Colorless with applied color label Dr. Pepper logo	1	1935	2022	Stingley n.d.
F5	Glass	colorless sherds	8			
F5	Glass	green sherds	5			
F5	Glass	aqua sherds	3			
F5	Glass	aqua bottle neck	1			
F5	Glass	amber	1			
F5	Glass	lightbulb glass		1879	2022	Miller et al 2013:15
F5	Synthetic	socket	1			
F5	Metal	lightbulb base	1	1879	2022	Miller et al 2013:15
F5	Metal	iron sheet, small	1			
G1	Synthetic	string cheese, low moisture skim mozzarella wrapper	1			
G1	Synthetic	green	1	1933	2022	Plastic Packaging History 2018
G1	Synthetic	colorless	1	1933	2022	Plastic Packaging History 2018
G1	Synthetic	colorless plastic wrap	1	1933	2022	Plastic Packaging History 2018

G1	Synthetic	colorless label ("XXL")	1			
G1	Synthetic	purple plastic wrap	1	1933	2022	Plastic Packaging History 2018
G1	Metal	Aluminum foil	1	1947	2022	Miller et al 2013:17
G1	Shell	fragmented, mussel	1			
G1	Glass	green, bottle base	1			
G2	Synthetic	camera sticker	1			
G2	Synthetic	yellow straw	1			
G2	Synthetic	yellow wrap	1	1933	2022	Plastic Packaging History 2018
G2	Synthetic	twist tie, silver	1	1939	2022	twist-ems® n.d.
G2	Synthetic	black	1			
G2	Synthetic	colorless wrap	1	1933	2022	Plastic Packaging History 2018
G2	Synthetic	white	1			
G2	Synthetic	white cord	1			
G2	Synthetic	duct tape	1	1943	2022	Steven 2018
G2	Glass	green	1			
G2	Metal	wire	1			
G2	Synthetic	floss	1	1882	2022	Oral-B n.d.
G2	Paper	white	1			
G2	Paper	other	1			
G3	Paper	ice cream wrapper	1			
G3	Synthetic	rubber, colorless	1			
G3	Synthetic	camera sticker	1			
G3	Synthetic	white	1			
G3	Synthetic	duct tape	1	1943	2022	Steven 2018
G3	Glass	coke shard	1	1916	2022	Lockhart and Porter 2010:47

G3	Synthetic	keychain	1			
G4	Glass	rim	1			
G4	Glass	green	2			
G4	Glass	amber shard	1			
G4	Glass	colorless	1			
G4	Glass	aqua bottle rim	1			
G4	Glass	aqua shard	1			
G4	Synthetic	black	1			
G4	Synthetic	strip	1			
G4	Synthetic	colorless	1			
G4	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
G4	Synthetic	"Black + Mild (or & Bold?) (B+M) plastic tip	1			
G4	Synthetic	lightbulb socket	1	1879	2022	Miller et al 2013:15
G4	Fibers	string, black	1			
G5	Metal	Aluminum foil candy wrapper	1	1947	2022	Miller et al 2013:17
G5	Glass	green	1			
G5	Glass	aqua (possibly Coke bottle)	6	1916	2022	Lockhart and Porter 2010:47
G5	Synthetic	blue flash bulb	1	1965	1979	Harriss 2021
G5	Synthetic	black wire coating	1			
H1	Metal	Aluminum foil	1	1947	2022	Miller et al 2013
H1	Metal	clip	1			
H1	Glass	colorless	1			
H1	Glass	green pebble	1			
H2	Metal	pin	1			
H2	Metal	mesh/screen	1			

H2	Bone	fragment (animal)	1			
H2	Synthetic	end of umbrella handle	1			
H2	Wood	small plank	1			
H3	Metal	joke coin	1			
H3	Synthetic	cinnamon candy wrapper	1	1933	2022	Plastic Packaging History 2018
H3	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018
H3	Wood	plank	1			
H3	Glass	colorless sherds	3			
H4	Glass	green	2			
H4	Glass	aqua	1			
H4	Glass	colorless	4			
H4	Synthetic	pink chewing gum	1			
H5	Building Material	Concrete	1			
H5	Synthetic	Plastic	1			
H5	Synthetic	Band-Aid	1	1924	2022	J&J 2018
I1	Synthetic	string, corkscrew shape	1			
I2	Synthetic	washer	1			
I2	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
I2	Synthetic	bottle cap	1			
I2	Synthetic	yellow wrapper	1	1933	2022	Plastic Packaging History 2018
I2	Synthetic	pipe going into rock	1			
I2	Synthetic	silver tie	1			
I2	Synthetic	small wrapper	1	1933	2022	Plastic Packaging History 2018
I2	Synthetic	zip tie	1	1958	2022	Zip Ties 2016
I2	Metal	iron nail	1			

I2	Metal	red twist ties	2	1939	2022	twist-ems® n.d.
I2	Metal	piece of Iron (on slope not drawn)	1			
I2	Fibers	blue string	1			
I2	Fibers	black string	1			
I2	Glass	colorless bottle rim	1			
I2	Bone	long bone fragment	1			
I2	Wood	small worked timber	1			
I2	Metal	Penny	1			No date recorded
I2	Lithic	prehistoric flake	1			
I2	Synthetic	green chewing gum	1	1848	2022	Pandolfi 2018
I2	Fibers	rope	1			
I2	Synthetic	flash cube base	1	1965	1979	Harriss 2021
I3	Synthetic	black strap	1			
I3	Glass	amber "beer bottle" sherds	2			
I3	Metal	iron nail	1			
I3	Metal	metal wire ~15 cm	1			
I3	Building Material	cement	1			
I3	Synthetic	flash cube	1	1965	1979	Harriss 2021
I3	Lithic	biface midsection (4.25 cm x 3 cm)	1			
I4	Charcoal	fragments	4			
I4	Glass	brown	2			
I4	Glass	thick aqua	1			

I4	Glass	light bulb	3	1879	2022	Miller et al 2013:15
I4	Metal	light bulb base	1	1879	2022	Miller et al 2013:15
I4	Synthetic	black flagging tape	1			
I4	Synthetic	black	1			
I4	Synthetic	colorless	1			
I4	Fibers	white string	1			
I4	Synthetic	black rubber block with two holes, "LY" written	1			
I5	Metal	wire bundle covered with electrical tape	1	1946	2022	3M n.d.
I5	Metal	bent wire nail	1	1885	2022	Miller et al 2013:14
I5	Glass	light bulb	3	1879	2022	Miller et al 2013:15
I5	Ceramic	pearlware shard	1	Post 1779		
I5	Synthetic	colorless	1			
I5	Synthetic	blue flash cube	2	1965	1979	Harriss 2021
I5	Wood	small block/plank	1			
I5	Metal	orange pin flag "7"	1			
I5	Building Material	lime mortar	1			
J2	Charcoal	scattered throughout square	2			
J2	Ceramic	redware, albany glaze interior,	1			

		green glaze exterior				
J2	Synthetic	colorless wrappers	4	1933	2022	Plastic Packaging History 2018
J2	Synthetic	dental floss, 5 inches long	1	1882	2022	Oral-B n.d.
J2	Glass	small	1			
J2	Synthetic	vinyl fabric tie with overhand knot in middle, decorative	1			
J2	Metal	aluminum foil wad	1	1947	2022	Miller et al 2013:17
J2	Metal	iron wire	1			
J2	Metal	unidentified metal piece	1			
J2	Metal	iron pipe	1			
J2	Wood	worked timber piece	1			
J3	Synthetic	food wrapper	1	1933	2022	Plastic Packaging History 2018
J3	Synthetic	colorless	1	1933	2022	Plastic Packaging History 2018
J3	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018
J3	Synthetic	flash bulb and cube base	2	1965	1979	Harriss 2021
J3	Synthetic	flash cube piece	1	1965	1979	Harriss 2021
J3	Wood	fragment	1			
J4	Glass	light bulb	1	1879	2022	Miller et al 2013:15
J4	Glass	colorless with white stripe	1			
J4	Metal	wire nails	2	1850	2022	Miller et al 2013:14
J4	Wood	block	1			

J4	Wood	round fragments	3			
J4	Synthetic	black block	1			
J4	Synthetic	old yellow flagging tape "EI47"	1			
J4	Synthetic	base of flash bulb, green	1	1965	1979	Harriss 2021
J4	Charcoal		1			
J4	Metal	dime		1968	1968	
J5	Synthetic	colorless	2	1933	2022	Plastic Packaging History 2018
J5	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018
J5	Glass	colorless shard	1			
J5	Glass	blue sherds	2			
J5	Glass	colorless lightbulb	1	1879	2022	Miller et al 2013:15
J5	Charcoal	fragments	5			
J5	Metal	metal bundle wrapped in electrical tape	1	1946	2022	3M n.d.
J5	Metal	aluminum foil wrapper	1	1947	2022	Miller et al 2013:17
J5	Wood	fragment	1			
J6	Charcoal	chunks/fragments	4			
J6	Glass	lightbulb	1	1879	2022	Miller et al 2013:15
J6	Glass	textured colorless shard	1			
J6	Glass	colorless with white applied color label writing	1	Post 1935		
J6	Synthetic	asphalt	1			

J6	Synthetic	black, wire coating	1			
J6	Paper	wrapper	1			
J6	Metal	wire bundle with electrical tape	1	1946	2022	3M n.d.
K2	Wood	worked timber	2			
K2	Building Material	concrete	1			
K2	Synthetic	Mammoth Cave keychain (front: MACA keychain, back: 100% Angel)	1			
K2	Synthetic	colorless	1			
K2	Synthetic	pink	1			
K2	Synthetic	colorless Starburst wrapper	1	1967	2022	Parrill 2022
K2	Synthetic	blue wire	1			
K2	Synthetic	yellow "for a shiny smile"	1			
K2	Synthetic	small white	1			
K2	Metal	black electrical wire	1			
K2	Metal	iron fragment	1			
K2	Metal	crushed aluminum foil	1	1947	2022	Miller et al 2013:17
K2	Synthetic	flash cube	1			
K2	Synthetic	earloop from mask	1	2020	2022	
K2	Fibers	small white string	1			

K2	Synthetic	Band-Aids still in wrapper	3	1924	2022	J&J 2018
K4	Wood	Blocks	2			
K4	Wood	plank fragment	1			
K4	Glass	colorless shard	1			
K4	Metal	wire nail, bent	1	1885	2022	Miller et al 2013:14
K4	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
K4	Synthetic	Black	1			
K5	Wood	fragment, tongue in groove	1			
K5	Wood	Plank	1			
K5	Synthetic	black, wire coating	1			
K5	Synthetic	old orange flagging tape	1			
K5	Metal	Wire nail with orange flagging tape	1	1885	2022	Miller et al 2013:14
K5	Glass	aqua shard	1			
K5	Glass	colorless, light bulb	1	1879	2022	Miller et al 2013:15
K5	Glass	colorless, textured	3			
K6	Glass	colorless, textured	2			
K6	Glass	Colorless	1			
K6	Glass	textured colorless with red & white (or pink?) writing	1			
K6	Metal	coated wire	1			

L4	Glass	colorless, light bulb	1	1879	2022	Miller et al 2013:15
L4	Charcoal	fragment	1			
L4	Synthetic	yellow flagging tape "E II 58"	1			
L4	Wood	splintered wood fragment, numerous pieces	1			
L5	Ceramic	stoneware fragmented with glaze	1			
L5	Glass	colorless, light bulb	1	1879	2022	Miller et al 2013:15
L5	Glass	brown	1			
L5	Glass	colorless, textured with red	1			
L5	Metal	square nail	1			
L5	Metal	lightbulb base	1	1879	2022	Miller et al 2013:15
L6	Glass	colorless shard	1			
L6	Glass	aqua sherds	2			
L6	Glass	olive bottle shard	1			
L6	Charcoal	fragments	1			
M2	Shell	mussel	1			
M2	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018
M2	Synthetic	small, red piece	1			
M2	Synthetic	orange sticker "Pizza Café"	1			
M2	Synthetic	Lifesavers candy wrapper	1	1912	2022	Chargin Falls Historical Society and Museum 2017
M2	Synthetic	King Leo candy wrapper	1			

M2	Fibers	white string	1			
M2	Wood	thin plank	1			
M2	Metal	purple twist tie	1	1939	2022	twist-ems® n.d.
M2	Synthetic	green chewing gum	1	1848	2022	Pandolfi 2018
M2	Synthetic	blue chewing gum	1	1848	2022	Pandolfi 2018
M2	Wood	river cane	1			
M2	Synthetic	asphalt chunk	1			
M2	Synthetic	barcode	1	1973	2022	Miller et al 2013:17
M3	Metal	lightbulb base	1	1879	2022	Miller et al 2013:15
M3	Glass	aqua	1			
M3	Glass	colorless, light bulb	1	1879	2022	Miller et al 2013:15
M3	Metal	Gold aluminum foil wrapper	1	1947	2022	Miller et al 2013:17
M3	Wood	thin plank fragment	1			
M3	Synthetic	green chewing gum	1	1848	2022	Pandolfi 2018
M3	Shell	mussel	1			
M4	Glass	light bulb	1	1879	2022	Miller et al 2013:15
M4	Metal	light bulb base		1879	2022	Miller et al 2013:15
M4	Synthetic	colorless	2			
M4	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018
M4	Wood	wood fragments	3			
M4	Charcoal	wood fragments with charcoal	2			
M4	Synthetic	Band-Aid	1	1924	2022	J&J 2018
M4	Metal	angled, hardware	1			

M4	Metal	wire	1			
M5	Glass	aqua	1			
M5	Glass	green sherds	2			
M5	Glass	colorless, light bulb	1	1879	2022	Miller et al 2013:15
M5	Synthetic	yellow, safety tep.	1			
M5	Metal	wire nail stuck in wood	1	1850	2022	Miller et al 2013:14
M5	Building Material	square post of concrete	1			
M5	Charcoal		1			
N1	Paper	tour ticket "Historic 4/4/2018"	1	2018	2018	
N2	Glass	colorless shard, possibly bottle	1			
N2	Synthetic	yellow/green chewing gum	1	1848	2022	Pandolfi 2018
N2	Synthetic	green chewing gum	1	1848	2022	Pandolfi 2018
N2	Synthetic	sticker, red & white "Go Gift Yourself"	1			
N2	Synthetic	blue sticker	1			
N2	Synthetic	blue	1			
N2	Synthetic	round white bead	1			
N2	Synthetic	colorless candy wrapper	1	1933	2022	Plastic Packaging History 2018
N2	Synthetic	yellow Band-Aid	1	1924	2022	J&J 2018
N2	Shell	mussel fragments	2			

N2	Metal	aluminum foil	1	1947	2022	Miller et al 2013:17
N2	Metal	coated wire	1			
N2	Metal	bolt	1			
N2	Fibers	white string	1			
N2	Paper	green	1			
N2	Wood	plank fragment	1			
N2	Metal	Penny	1	1972	1972	
N3	Paper	white	1			
N3	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018
N3	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
N3	Wood	large plank	1			
N3	Wood	fragment	1			
N3	Shell	mussel fragment	1			
N3	Glass	colorless, light bulb	1	1879	2022	Miller et al 2013:15
N4	Glass	colorless, light bulb	2	1879	2022	Miller et al 2013:15
N4	Glass	aqua sherds	2			
N4	Glass	aqua shard "Coca - Trademark 028"	1	1916	2022	Lockhart and Porter 2010:47
N4	Shell	mussel fragments	2			
N4	Charcoal		1			
N4	Synthetic	yellow flagging tape "E II 73"	1			
N4	Stone	crystal stone, probably from a gift shop	1			
N4	Metal	pile of wire	1			
N4	Bone	Faunal, possible rib fragment	1			

N5	Glass	colorless, light bulb	1	1879	2022	Miller et al 2013:15
N5	Glass	olive shard	1			
N5	Charcoal		1			
O1	Synthetic	blue and gold candy wrapper	1	1933	2022	Plastic Packaging History 2018
O1	Synthetic	colorless wrapper "Parle"	1	1933	2022	Plastic Packaging History 2018
O1	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
O1	Synthetic	sponge bob sticker	1	1999	2022	IMDb 1999
O1	Metal	strip	1			
O1	Metal	sherds	3			
O1	Synthetic	green chewing gum	1	1848	2022	Pandolfi 2018
O2	Synthetic	colorless circle	1			
O2	Synthetic	tooth pick wrapper	1	1933	2022	Plastic Packaging History 2018
O2	Synthetic	black earbud cover	1			
O2	Synthetic	purple	1			
O2	Synthetic	round white bead	1			
O2	Wood	plank	1			
O2	Metal	black	1			
O2	Metal	aluminum foil	1	1947	2022	Miller et al 2013
O2	Synthetic	black hairtie	1	1958	2022	PONY-O 2021
O2	Synthetic	u-shaped red rubber	1			
O2	Fibers	red string	1			
O2	Synthetic	blue chewing gum	1			

O2	Bone	part of deer mandible with teeth	1			
O3	Shell	mussel fragments	3			
O3	Synthetic	red wrapper	1	1933	2022	Plastic Packaging History 2018
O3	Synthetic	white straw	1			
O3	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
O3	Bone	deer?	1			
O3	Glass	thin lightbulb	1	1879	2022	Miller et al 2013:15
O3	Synthetic	light blue chewing gum	1	1848	2022	Pandolfi 2018
O3	Wood	plank fragments	3			
O3	Metal	pile of wire	3			
O4	Shell	mussel fragments	1			
O4	Wood	small plank	1			
O4	Glass	lightbulb	1	1879	2022	Miller et al 2013:15
O5	Glass	lightbulb	1	1879	2022	Miller et al 2013:15
O5	Metal	wire nail in wood plank	1	1885	2022	Miller et al 2013:14
O5	Shell	mussel fragments	1			
P1	Metal	Quarter	1	1991	1991	
P1	Wood	plank fragments	4			
P1	Synthetic	white wrapper	1	1933	2022	Plastic Packaging History 2018
P1	Synthetic	black wrapper	1	1933	2022	Plastic Packaging History 2018
P1	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
P1	Synthetic	white shoelace	1			
P1	Paper	green and white	1			
P2	Synthetic	hairtie	1	1958	2022	PONY-O 2021
P2	Fibers	white string	1			

P2	Synthetic	yellow stick	1			
P2	Synthetic	brown candy wrapper	1	1933	2022	Plastic Packaging History 2018
P2	Synthetic	red wrapper	1	1933	2022	Plastic Packaging History 2018
P2	Metal	wire nail	1	1850	2022	Miller et al 2013:14
P2	Metal	wire	2			
P2	Shell	mussel	1			
P3	Synthetic	green chewing gum	1	1848	2022	Pandolfi 2018
P3	Charcoal		1			
P3	Building Material	concrete	1			
P3	Stone	brown gift shop rock	1			
P3	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
P3	Synthetic	blue wrapper	1	1933	2022	Plastic Packaging History 2018
P3	Synthetic	black tape	1			
P3	Fibers	white string	1			
P3	Synthetic	hairtie	1	1958	2022	PONY-O 2021
P4	Wood	plank fragment	1			
P4	Synthetic	blue and black wrapper	1	1933	2022	Plastic Packaging History 2018
P4	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
P4	Synthetic	green and white wrapper	1	1933	2022	Plastic Packaging History 2018
P4	Seed	Sunflower seed	1			
P4	Shell	mussel fragment	1			
P4	Charcoal		1			
P4	Glass	colorless shard	1			
P4	Metal	wire nail	1	1850	2022	Miller et al 2013:14

P4	Bone	possible long bone shaft fragment	1			
P5	Bone	small (bird?)	1			
P5	Metal	blue aluminum foil wrapper		1947	2022	Miller et al 2013:17
P5	Shell	mussel	1			
P5	Charcoal	fragments	1			
Q1	Fibers	fabric, small, red/pink, shiny	1			
Q1	Synthetic	colorless sheet	1	1933	2022	Plastic Packaging History 2018
Q1	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
Q1	Synthetic	water bottle	1			
Q1	Synthetic	pink hairtie	1	1958	2022	PONY-O 2021
Q1	Metal	rusty fragments	3			
Q2	Building Material	lime mortar	1			
Q2	Synthetic	tag	1			
Q2	Synthetic	colorless piece	1			
Q2	Synthetic	small tube	1			
Q2	Synthetic	colorless tape	1			
Q2	Synthetic	black wrapper	1	1933	2022	Plastic Packaging History 2018
Q2	Shell	mussel fragments	2			
Q3	Synthetic	shoelace	1			
Q3	Paper	white wrapper	1	1933	2022	Plastic Packaging History 2018
Q3	Glass	aqua shard	1			
Q3	Stone	brown rock from gift shop	1			
Q3	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
Q4	Metal	wire	1			

Q4	Wood		4			
Q4	Glass	light green (possibly aqua)	1			
Q4	Glass	colorless, light bulb	2	1879	2022	Miller et al 2013:15
Q4	Glass	aqua neck and rim of bottle	1	1916	2022	Lockhart and Porter 2010:47
Q4	Shell	mussel fragments	2			
Q4	Paper	gold paper string	1			
R1	Metal	fragments, crusty	4			
R1	Synthetic	blue star sticker	1			
R1	Synthetic	blue wrapper	1	1933	2022	Plastic Packaging History 2018
R1	Synthetic	mesh	1			
R2	Synthetic	shoelace	1			
R2	Synthetic	yellow chewing gum	1	1848	2022	Pandolfi 2018
R2	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
R2	Synthetic	wrapper with green	1	1933	2022	Plastic Packaging History 2018
R2	Synthetic	wrapper with black and white writing	1	1933	2022	Plastic Packaging History 2018
R2	Metal	aluminum foil	1	1947	2022	Miller et al 2013:17
R3	Glass	aqua sherds	3	1916	2022	Lockhart and Porter 2010:47
R3	Glass	yellow green shard	1			
R3	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018
R3	Synthetic	yellow flagging tape	1			
R3	Metal	pin	1			
R3	Metal	aluminum foil	1	1947	2022	Miller et al 2013:17

R3	Metal	wire nails	3	1850	2022	Miller et al 2013:14
R3	Wood	fragments	2			
R3	Paper	white	1			
R4	Charcoal		1			
R4	Metal	aluminum foil	1	1947	2022	Miller et al 2013:17
R4	Metal	wire	2			
R4	Synthetic	candy wrapper green and white	1	1933	2022	Plastic Packaging History 2018
R4	Glass	round lightbulb, unused, thumb-nail sized	1	1879	2022	Miller et al 2013:15
R4	Wood	fragment	1			
R4	Metal	lightbulb base	1	1879	2022	Miller et al 2013:15
R4	Glass	colorless, thick	1			
R4	Glass	lightbulb	1	1879	2022	Miller et al 2013:15
R4	Synthetic	broken flash cube	1	1965	1979	Harriss 2021
R4	Shell	mussel fragment	1			
R4	Metal	penny	1	1982	1982	
R4	Fibers	red string	1			
R4	Paper	paper string	1			
S2	Synthetic	purple	1			
S2	Synthetic	yellow wrapper	1	1933	2022	Plastic Packaging History 2018
S2	Synthetic	blue wrapper	1	1933	2022	Plastic Packaging History 2018
S2	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
S2	Synthetic	silver tinsel	1			
S2	Synthetic	green circle	1			
S2	Synthetic	colorless wrappers	2	1933	2022	Plastic Packaging History 2018
S2	Wood	green, 9mm long	1			

S2	Wood	golf tee	1			
S2	Wood	worked wood	1			
S2	Ceramic	hotel porcelain	2			
S2	Metal	clip, possibly from a knife	1			
S2	Metal	rusted, possibly iron/steel	2			
S2	Metal	orange aluminum foil candy wrapper	1	1947	2022	Miller et al 2013:17
S2	Metal	black twist tie	1	1939	2022	twist-ems® n.d.
S2	Synthetic	half of a pink eraser	1			
S2	Synthetic	very worn hairtie	1	1958	2022	PONY-O 2021
S2	Metal	flattened lightbulb base	1	1879	2022	Miller et al 2013:15
S2	Fibers	finger nail	1			
S3	Synthetic	cigarette butt	1			
S3	Synthetic	cinnamon candy wrapper	1	1933	2022	Plastic Packaging History 2018
S3	Synthetic	Jolly Rancher	1	1949	2022	Hershey Land n.d.
S3	Synthetic	gold strip	1			
S3	Synthetic	red strip, box of ciggs	1			
S3	Synthetic	colorless straw wrapper	1	1933	2022	Plastic Packaging History 2018
S3	Metal	wire, hook shaped	1			
S3	Synthetic	Band-Aid, used	1	1924	2022	J&J 2018
S3	Synthetic	red acrylic nail	1	1970	2022	encyclopedia.com 2023
S4	Metal	lightbulb filament	1	1879	2022	Miller et al 2013:15

S4	Lithic	chert flake	1			
S4	Synthetic	dental floss	1	1882	2022	Oral-B n.d.
S4	Metal	string wire	1			
S4	Metal	gum wrapper	1	1947	2022	Miller et al 2013:17
S4	Metal	foil gum wrapper, torn up	1	1947	2022	Miller et al 2013:17
S4	Metal	long nail, bent, 3" long	1			
S4	Metal	lightbulb base	1	1879	2022	Miller et al 2013:15
S4	Wood	worked wood, 4" long	1			
S4	Synthetic	T-Shirt tag	1			
S4	Fibers	string	1			
S4	Glass	broken, bottle	1			
T2	Synthetic	Sweet tart	1	1963	2022	leaf.tv n.d.
T2	Glass	brown and purple	1			
T2	Metal	wire nail	1	1850	2022	Miller et al 2013:14
T2	Synthetic	wrapper	1	1933	2022	Plastic Packaging History 2018
T2	Paper	white	1			
T3	Metal	curly wire	1			
T3	Metal	straight pin, ball on end, probably scarf/tie pin	1			
T3	Metal	aluminum foil with pink	1	1947	2022	Miller et al 2013:17
T3	Synthetic	candy wrapper, yellow	1	1933	2022	Plastic Packaging History 2018
T3	Fibers	red string	1			
T3	Synthetic	black zip tie	1			
T3	Paper	white	1			

T3	Wood	plank with texture	1			
T3	Glass	colorless light bulb	1	1879	2022	Miller et al 2013:15
T3	Glass	shard, red and white "S"	1			
T3	Synthetic	yellow chewing gum	1			
T4	Metal	metal fragment, V shaped, possibly related to 1940s lighting along northern cave wall	1			
T4	Metal	bolt, 2 cm, round, greenish	1			
T4	Glass	colorless with white stripes	1			
T4	Fibers	shoe leather fragments	2			
T4	Fibers	fragments, possibly from watchband	2			
T4	Wood	fragments	2			
T4	Wood	hole in ground with wood fragment	1			
T4	Building Material	concrete	1			
T4	Synthetic	Cloth Vera Bradley tag	1	1982	2022	Vera Bradley n.d.
U2	Metal	sliver	1			

U2	Metal	wire nail	1	1850	2022	Miller et al 2013:14
U2	Metal	Phillips screw head	1			
U2	Synthetic	rubber band	1			
U3	Metal	wire	3			
U3	Metal	wire nails	2	1850	2022	Miller et al 2013:14
U3	Metal	twist tie	1	1939	2022	twist-ems® n.d.
U3	Wood	fragments	2			
U3	Glass	colorless, irridescent shard	1			
U3	Glass	colorless, lightbulb	1	1879	2022	Miller et al 2013:15
U3	Glass	colorless sherds	6			
U3	Glass	colorless sherds with red and white, one with "S", one with "ES Sunrise Inc"	3	Post 1935		
U3	Charcoal		1			
U3	Synthetic	green tube	1			
U3	Synthetic	white	1			
U3	Synthetic	colorless wrappers	2	1933	2022	Plastic Packaging History 2018
U3	Synthetic	straw wrapper	1	1933	2022	Plastic Packaging History 2018
U3	Synthetic	black rubber wire coating	1			
U3	Synthetic	black zip tie	1			
U3	Fibers	black string	1			
U3	Fibers	yellow string	1			
U3	Ceramic	white glaze, does scratch	1			

U3	Paper	white	1			
U4	Synthetic	blue circle	1			
U4	Synthetic	green flash cube?	1	1965	1979	Harriss 2021
U4	Synthetic	rubber band	1			
U4	Synthetic	black	1			
U4	Synthetic	round, white plastic bead	1			
U4	Synthetic	strip of foam, rubber, green	1			
U4	Metal	wire nail	1	1850	2022	Miller et al 2013:14
U4	Glass	colorless light bulb	1	1879	2022	Miller et al 2013:15
U4	Glass	unused lightbulb	1	1879	2022	Miller et al 2013:15
U4	Glass		1			
U4	Glass	colorless with white stripes	1			
U4	Glass	colorless with red stripes	1			
U4	Wood	fragments	3			
U4	Synthetic	blue chewing gum	1	1848	2022	Pandolfi 2018
U4	Fibers	white string	1			
U4	Paper	yellow and white	4			
U4	Synthetic	battery, used	1			
U4	Synthetic	small red hairtie	1	1958	2022	PONY-O 2021
U4	Seed	sunflower seed	1			
V2	Synthetic	yellow	1			
V2	Metal	watch pin	1			
V2	Wood	smashed	5			

V3	Synthetic	colorless bag fragment	1			
V3	Synthetic	colorless rubber strap	1			
V3	Synthetic	textile clothing tag	1			
V3	Synthetic	colorless straw wrapper	1	1933	2022	Plastic Packaging History 2018
V3	Synthetic	colorless mint wrapper with blue letter	1	1933	2022	Plastic Packaging History 2018
V3	Synthetic	red tag	1			
V3	Synthetic	toothpick or straw wrapper	1	1933	2022	Plastic Packaging History 2018
V3	Wood	smashed, lots of pieces	2			
V3	Synthetic	hairties	1	1958	2022	PONY-O 2021
V3	Metal	yellow twist tie	1	1939	2022	twist-ems® n.d.
V3	Stone	1/4 of a hematite ring	1			
V3	Glass	broken bottle top	1			
V4	Paper	McDonalds Monopoly	1	1987	2022	Kennedy 2022
V4	Synthetic	gold cig "To open box of cigs"	1			
V4	Synthetic	long, stringy	1			
V4	Synthetic	colorless candy wrapper	1	1933	2022	Plastic Packaging History 2018
V4	Metal	aluminum foil gum wrapper	1	1947	2022	Miller et al 2013:17
V4	Metal	rusty nail, 2"	1			

V4	Glass	bottle base "Glasgow, KY"	1			
W2	Fibers	black string	1			
W2	Fibers	blue, fuzzy string	1			
W2	Synthetic	black plastic silver	1			
W2	Synthetic	yellow and white wrapper	1	1933	2022	Plastic Packaging History 2018
W2	Synthetic	red and white wrapper	1	1933	2022	Plastic Packaging History 2018
W2	Synthetic	shoelace	1			
W2	Paper	white	1			
W2	Synthetic	orange hairtie	1	1958	2022	PONY-O 2021
W2	Metal	pull tab	1	Post 1962		
W3	Wood	fragments	2			
W3	Fibers	brown string	1			
W3	Synthetic	colorless wrapper	1	1933	2022	Plastic Packaging History 2018
W3	Synthetic	black ring	1			
W3	Fibers	green fuzzy thread	1			
W3	Fibers	red fuzzy thread	1			
W3	Metal	wire	2			
W4	Wood	fragments	2			
W4	Fibers	blue tiny fabric	1			
W4	Metal	wire nail	1	1885	2022	Miller et al 2013:14
W4	Metal	aluminum foil	1	1947	2022	Miller et al 2013:17
W4	Metal	green aluminum foil	1	1947	2022	Miller et al 2013:17
W4	Metal	wire	1			

W4	Metal	ring from clothing?	1			
W4	Paper	white	1			
W4	Synthetic	colorless wrappers	3	1933	2022	Plastic Packaging History 2018
W4	Synthetic	gray tube	1			
W4	Synthetic	blue wrapper	1	1933	2022	Plastic Packaging History 2018
W4	Building Material	concrete	1			
W4	Fibers	yellow string	1			
W4	Glass	brown/amber, thick, beer bottle "81	1			

Appendix C: Excavation Data

Excavation Unit (EU) 1

Classification Line 3 (material class)	Classification Line 4 (specific class of material)	Description	Level	Item Count	Functional Category	TPQ	TAQ	Source
Animal	Bone	long	1	5	Faunal			
Animal	Bone	possible rib	1	1	Faunal			
Animal	Bone	mandible	1	1	Faunal			
Animal	Shell	snail	1	5	Faunal			
Animal	Shell	mussel	1	1	Faunal			
Composite	Synthetic	lime-sand mortar	1	3	Architectural			
Unidentified	Unknown	really hard to tell if bone or wood	1	2	Unknown			
Composite	Ceramic	Stoneware body shard. Exterior is dark green salt glaze, interior is Albany slip	1	1	Container/Vessel	1805	1920	Miller et al 2013:10
Animal	Shell	mussel	1	3	Faunal			
Animal	Shell	snail	1	2	Faunal			
Composite	Synthetic	Pink chewing gum	1	1	Chewing Gum	1848	2022	Pandolfi 2018
Composite	Synthetic	Pink acrylic nail	1	1	Fashion	1970	2022	encyclopedia.com 2023

Mineral	Metal	might be wire	1	1	Hardware			
Mineral	Metal	might be part of a nail	1	1	Hardware			
Mineral	Glass	Aqua neck and lip shard. Lip is rounded. Probably a coke bottle based on color and size.	1	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	Aqua body shard, scalloped, "OZ", probably coke bottle	1	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	colorless body shard, very flat and has a rounded edge, possibly from a square or rectangular vessel	1	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	olive green body shard, possibly from a wine bottle	1	1	Container/Vessel			
Mineral	Glass	colorless body shard with small embossed dots	1	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	colorless body shard, embossed scallop design and red and white painted letters (not inact	1	1	Container/Vessel	1960	1979	Jacobson 2016

		enough to read), probably a soda bottle						
Composite	Synthetic	duct tape	1	1	Hardware	1943	2022	Steven 2018
Composite	Synthetic	colorless plastic wrappers	1	2	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	large flexible plastic sheet	1	1	Plastic Artifact	1933	2022	Plastic Packaging History 2018
Composite	Fibers	string	1	1	Fashion	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	tied pleather piece	1	1	Fashion			
Vegetal	Wood	wood	1	1	Botanical			
Vegetal	Other Plant Materials	grass	1	1	Botanical			
Mineral	Seed	seed	1	1	Botanical			
Unidentified	Unknown	Pink interior white exterior substance	1	5	Unknown			
Composite	Synthetic	flash cube side pieces	1	8	Photography	1965	1979	Harriss 2021
Composite	Synthetic	flash cube bases	1	5	Photography	1965	1979	Harriss 2021
Composite	Synthetic	flash cube top	1	1	Photography	1965	1979	Harriss 2021
Mineral	Glass	light bulb glass pieces	1	9	Lamp/lighting	1879	2022	MIller et al 2013:15
Mineral	Glass	Aqua body shard, scalloped, "OZ", probably coke bottle	1	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	colorless body sherds	1	2	Container/Vessel	1864	2022	Miller et al 2013:8

Mineral	Glass	light bulb glass piece	1	1	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	blue flash cube side	1	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	Plastic wrapper encrusted in calcite	1	1	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Building Material	Semicircular concrete	1	1	Architectural			
Animal	Shell	Snail	1	1	Faunal			
Mineral	Stone	light brown, parts thin enough to be transparent, chert	1	1	Lithic			
Mineral	Glass	citron body shard	1	1	Container/Vessel			
Mineral	Glass	olive amber body shard with patina	1	1	Container/Vessel			
Mineral	Glass	aqua body shard	1	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	colorless body shard	1	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	Colorless body shard with embossed dots	1	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Metal	light bulb fragments	1	2	Lamp/lighting	1879	2022	MIller et al 2013:15
Mineral	Glass	pieces of light bulb glass	1	23	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	small blue piece of a flash cube base	1	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	pieces of flash cube sides	1	7	Photography	1965	1979	Harriss 2021

Mineral	Ceramic	Ceramic button with blue, red, and navy on front. On reverse, very rusted so can't tell what type of shank	1	1	Fashion			
Mineral	Metal	Dime, 2013	1	1	Coin	2013	2013	
Animal	Shell	snail	1	5	Faunal			
Animal	Shell	mussel	1	13	Faunal			
Animal	Shell	beetle carapace	1	1	Faunal			
Vegetal	Wood	tiny pieces of wood	1	2	Botanical			
Vegetal	Charcoal	pieces of charcoal	1	2	Botanical			
Vegetal	Seed	long seed	1	1	Botanical			
Vegetal	Nut	nut	1	1	Botanical			
Composite	Building Material	Cement/concrete	1	7	Architectural			
Mineral	Metal	possibly pieces of wire	1	6	Hardware			
Composite	Fibers	knotted string	1	1	Fashion			
Composite	Fibers	calcite-encrusted string	1	1	Fashion			
Composite	Fibers	calcite encrusted blue lint	1	1	Fashion			
Composite	Fibers	blue lint	1	1	Fashion			
Mineral	Metal	Aluminum foil	1	10	Wrapper	1947	2022	Miller et al 2013:17
Composite	Synthetic	colorless wrapper	1	11	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	string probably dental floss	1	1	Plastic Artifact			

Composite	Synthetic	straw piece	1	1	Plastic Artifact			
Unidentified	Unknown	Pinkish white substance	1	15	Unknown			
Mineral	Glass	Tiny red shard	1	1	Container/Vessel			
Mineral	Stone	Unidentified white glossy rock	1	1	Unknown			
Mineral	Stone	unidentified rock with black top (possibly painted concrete)	1	1	Architectural			
Mineral	Stone	unidentified red shiny mineral	1	1	Unknown			
Mineral	Stone	Chert	1	1	Lithic			
Mineral	Stone	limestone (burned), could be prehistoric or historic	1	1	Lithic			
Mineral	Glass	pieces of light bulb glass	1	2	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	flash cube side pieces	1	2	Photography	1965	1979	Harriss 2021
Composite	Synthetic	white chewing gum	1	1	Chewing Gum	1848	2022	Pandolfi 2018
Composite	Synthetic	colorless plastic wrappers	1	2	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Building Material	Lime-sand mortar	1	4	Architectural			
Composite	Building Material	Cement/concrete	1	6	Architectural			
Mineral	Stone	Colorful rock	1	1	Unknown			
Mineral	Glass	aqua body shard	1	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47

Mineral	Glass	aqua bottle neck encrusted in calcite	1	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Composite	Synthetic	flash cube sides	1	2	Photography	1965	1979	Harriss 2021
Composite	Building Material	Cement/concrete	1	2	Architectural			
Composite	Building Material	Cement/concrete, flat part is painted red	1	1	Architectural			
Composite	Synthetic	Pink chewing gum	1	9	Chewing Gum	1848	2022	Pandolfi 2018
Mineral	Stone	Colorful rock	1	1	Unknown			
Mineral	Glass	light bulb glass	1	3	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	flash cube side pieces	1	2	Photography	1965	1979	Harriss 2021
Composite	Fibers	Blue thread	1	1	Fashion			
Mineral	Metal	Unidentified iron fragments	1	3	Hardware			
Vegetal	Wood	wood	1	5	Botanical			
Vegetal	Charcoal	charcoal	1	3	Botanical			
Vegetal	Nut	nut	1	1	Botanical			
Mineral	Stone	fossil shell impression	1	1	Faunal			
Composite	Building Material	Brick	1	2	Architectural			
Composite	Building Material	Cement/concrete	1	15	Architectural			
Composite	Building Material	Lime-sand mortar	1	24	Architectural			
Animal	Bone	long bone	2	1	Faunal			
Animal	Bone	irregular possible mandibles or skull fragments	2	2	Faunal			

Animal	Bone	socket joint	2	1	Faunal			
Animal	Shell	snail	2	3	Faunal			
Animal	Shell	mussel	2	1	Faunal			
Composite	Building Material	Lime-sand mortar	2	1	Architectural			
Unidentified	Unknown	unidentified whiteish/tan substance with shiny surface, almost looks like chewing gum but I don't think that's what it is	2	1	Unknown			
Composite	Metal	Brass button with inlay.	2	1	Fashion			
Mineral	Glass	small natural body shard	2	1	Container/Vessel			
Mineral	Glass	aqua shard with embossed numbers, hard to make out but maybe "[] IS []//[] 105 []	2	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	light bulb glass pieces	2	3	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	flash cube side piece	2	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	plastic cigarillo end?	2	1	Plastic Artifact			
Composite	Synthetic	white chewing gum	2	1	Chewing Gum	1848	2022	Pandolfi 2018
Vegetal	Wood	wood	2	1	Botanical			

Vegetal	Charcoal	charcoal	2	1	Botanical			
Animal	Bone	long bones	2	6	Faunal			
Animal	Bone	mandible	2	1	Faunal			
Composite	Building Material	Cement/concrete	2	5	Architectural			
Composite	Building Material	White Lime-sand mortar	2	5	Architectural			
Composite	Building Material	Orange Lime-sand mortar	2	1	Architectural			
Composite	Fibers	blue thread	2	1	Fashion			
Composite	Synthetic	black hard plastic	2	1	Plastic Artifact			
Mineral	Metal	Aluminum foil	2	5	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Glass	7-up green body shard	2	1	Container/Vessel	1940	2022	Lockhart 2010:433
Mineral	Glass	Colorless base fragment with embossed letters. Very hard to read on bottom. Base also has a semi-circular scar. On the side is the embossed "7 FL. OZS. 1033"	2	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Metal	light bulb wire bundle	2	1	Lamp/lighting	1879	2022	MIller et al 2013:15
Mineral	Glass	light bulb glass fragments	2	8	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	flash cube side pieces	2	3	Photography	1965	1979	Harriss 2021
Composite	Synthetic	flash cube base	2	1	Photography	1965	1979	Harriss 2021

Composite	Synthetic	flash cube interior parts	2	4	Photography	1965	1979	Harriss 2021
Composite	Synthetic	intact GE magicube flash cube	2	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	pink chewing gum	2	2	Chewing Gum	1848	2022	Pandolfi 2018
Mineral	Metal	iron wire, barbed?	2	4	Hardware			
Animal	Bone	long bone	2	1	Faunal			
Animal	Bone	flat bone	2	1	Faunal			
Composite	Building Material	Cement/concrete	2	3	Architectural			
Vegetal	Wood	wood	2	4	Botanical			
Composite	Synthetic	colorless plastic wrappers	2	4	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	gold plastic strip	2	1	Plastic Artifact			
Composite	Synthetic	blue plastic wrapper	2	1	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	gray plastic string	2	1	Plastic Artifact			
Composite	Synthetic	white plastic string (dental floss?)	2	1	Plastic Artifact			
Mineral	Metal	gray aluminum foil	2	2	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	green aluminum foil	2	1	Wrapper	1947	2022	Miller et al 2013:17
Composite	Fibers	Blue thread	2	1	Fashion			
Mineral	Ceramic	small whiteware body shard with white glaze	2	1	Container/Vessel	1820	2022	
Mineral	Glass	Natural body shard	2	1	Container/Vessel			

Animal	Shell	Snail	2	1	Faunal			
Vegetal	Wood	Wood	2	4	Botanical			
Composite	Synthetic	colorless plastic wrapper	2	1	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	red plastic straw	2	1	Plastic Artifact			
Mineral	Metal	silver aluminum foil	2	6	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	gold aluminum foil	2	4	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	yellow aluminum foil	2	1	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	aluminum coil	2	1	Hardware			
Composite	Building Material	Lime-sand mortar	2	2	Architectural			
Mineral	Glass	aqua body sherds	2	2	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	colorless body sherds	2	1	Container/Vessel			
Mineral	Glass	light amber body shard with "[] OT []"	2	1	Container/Vessel			
Composite	Synthetic	colorless flash cube sides	2	2	Photography	1965	1979	Harriss 2021
Composite	Synthetic	blue flash cube side	2	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	flash cube base	2	1	Photography	1965	1979	Harriss 2021
Mineral	Glass	pieces of light bulb glass	2	7	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	flash cube interior piece	2	1	Photography	1965	1979	Harriss 2021
Mineral	Metal	light bulb base	2	1	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	pink chewing gum	2	3	Chewing Gum	1848	2022	Pandolfi 2018

Composite	Synthetic	white chewing gum	2	1	Chewing Gum	1848	2022	Pandolfi 2018
Composite	Fibers	blue piece of lint	2	1	Fashion			
Composite	Fibers	red piece of lint	2	1	Fashion			
Animal	Bone	long bone	2	1	Faunal			
Animal	Shell	Snail	2	2	Faunal			
Composite	Synthetic	colorless plastic wrappers	2	3	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	colorless plastic string	2	1	Plastic Artifact			
Composite	Synthetic	black plastic wrappers	2	2	Plastic Artifact			
Composite	Synthetic	round bandaid	2	1	Plastic Artifact			
Mineral	Stone	Calcite?	2	11	Unknown			
Mineral	Stone	Fossil Shell	2	4	Faunal			
Composite	Building Material	Lime-sand mortar	2	51	Architectural			
Composite	Building Material	Cement/concrete	2	19	Architectural			
Composite	Building Material	Cement/concrete, painted green on the flat side	2	1	Architectural			
Mineral	Stone	colorful rock	2	3	Unknown			
Mineral	Stone	unidentified rocks	2	2	Unknown			
Vegetal	Wood	wood	2	51	Botanical			
Vegetal	Nut	nut	2	1	Botanical			
Mineral	Charcoal	charcoal	2	13	Botanical			
Mineral	Wood	charred wood?	2	4	Botanical			
Animal	Bone	long bones	3	10	Faunal			
Animal	Shell	Snail	3	1	Faunal			

Vegetal	Wood	Wood, worked with squared off edge	3	2	Botanical			
Composite	Building Material	Lime-sand mortar	3	1	Architectural			
Animal	Bone	Small long bones, some of which appear to be burned	3	124	Faunal			
Animal	Bone	5 mandible pieces	3	5	Faunal			
Unidentified	Unknown	odd cylindrical piece	3	1	Unknown			
Animal	Shell	snail	3	11	Faunal			
Vegetal	Nut	nut	3	1	Botanical			
Vegetal	Charcoal	charcoal/burned wood, completely black	3	2	Botanical			
Vegetal	Charcoal	charcoal/burned wood, partly black but mostly brown	3	2	Botanical			
Vegetal	Charcoal	charcoal/burned wood, white	3	1	Botanical			
Composite	Building Material	Lime-sand mortar	3	1	Architectural			
Mineral	Stone	Shiny brown mineral, possibly calcite	3	1	Unknown			
Animal	Bone	long bones	3	17	Faunal			
Animal	Shell	Snail	3	10	Faunal			
Composite	Synthetic	colorless flash cube sides	3	2	Photography	1965	1979	Harriss 2021

Composite	Synthetic	film reel fragment	3	1	Photography			
Composite	Synthetic	pink chewing gum	3	1	Chewing Gum	1848	2022	Pandolfi 2018
Composite	Synthetic	green chewing gum	3	1	Chewing Gum	1848	2022	Pandolfi 2018
Mineral	Metal	wire nail, 3cm	3	1	Hardware	1850	2022	Miller et al 2013:14
Mineral	Metal	wire nail, 8 cm (bent, 9 cm if unbent)	3	1	Hardware	1850	2022	Miller et al 2013:14
Vegetal	Wood	Sawn wood	3	1	Architectural			
Vegetal	Wood	charred wood	3	1	Botanical			
Composite	Synthetic	colorless plastic strips	3	2	Plastic Artifact			
Composite	Synthetic	gold plastic strip	3	1	Plastic Artifact			
Composite	Synthetic	bandaid	3	1	Plastic Artifact			
Mineral	Metal	aluminum foil	3	1	Wrapper	1947	2022	Miller et al 2013:17
Composite	Fibers	lint	3	1	Fashion			
Mineral	Metal	Metal coil	3	1	Hardware			
Mineral	Stone	Horn coral fossil	3	1	Faunal			
Composite	Building Material	Cement/concrete	3	1	Architectural			
Mineral	Glass	aqua bottle rounded finish, probably coke bottle	3	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	3 Colorless body sherds	3	3	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	pieces of light bulb glass	3	5	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	plastic flash cube sides pieces	3	4	Photography	1965	1979	Harriss 2021
Mineral	Metal	light bulb bases	3	2	Lamp/lighting	1879	2022	MIller et al 2013:15

Composite	Building Material	Lime-sand mortar	3	12	Architectural			
Composite	Building Material	Cement/concrete	3	14	Architectural			
Composite	Synthetic	pink chewing gum	3	1	Chewing Gum	1848	2022	Pandolfi 2018
Mineral	Metal	Unidentified iron fragments	3	1	Hardware			
Composite	Fibers	brown threads	3	3	Fashion			
Composite	Fibers	red thread	3	1	Fashion			
Composite	Fibers	black thread	3	1	Fashion			
Composite	Fibers	teal thread	3	1	Fashion			
Composite	Fibers	yellow lint	3	1	Fashion			
Composite	Synthetic	plastic string	3	1	Plastic Artifact			
Composite	Synthetic	colorless plastic wrapper	3	1	Wrapper	1933	2022	Plastic Packaging History 2018
Mineral	Metal	green aluminum foil	3	4	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	silver aluminum foil	3	1	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	metal can fragments	3	2	Container/Vessel			
Vegetal	Charcoal	charcoal	3	8	Botanical			
Vegetal	Wood	wood	3	12	Botanical			
Composite	Synthetic	Questionable, could be natural but suspiciously brick-like	3	4	Architectural			
Mineral	Stone	calcite	3	9	Unknown			
Unidentified	Unknown	unknown tan substance, quite light	3	2	Unknown			

Mineral	Glass	Colorless base shard with embossed "[] NET []"	3	1	Container/Vessel	1864	2022	Miller et al 2013:8
Composite	Synthetic	flash cube side pieces	3	5	Photography	1965	1979	Harriss 2021
Composite	Glass	intact light bulbs	3	2	Lamp/lighting	1879	2022	MIller et al 2013:15
Mineral	Glass	piece of light bulb glass	3	1	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	flash cube base	3	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	flash cube interior	3	1	Photography	1965	1979	Harriss 2021
Composite	Fibers	purple thread	3	1	Fashion			
Composite	Fibers	very thin brown treads	3	3	Fashion			
Composite	Fibers	orange lint	3	1	Fashion			
Mineral	Metal	piece of possibly wire	3	1	Hardware			
Mineral	Metal	piece corroded to rock	3	1	Hardware			
Animal	Bone	long bone	3	1	Faunal			
Animal	Shell	Mussel	3	1	Faunal			
Composite	Synthetic	plastic Pizza Hut mint wrapper	3	1	Wrapper	1958	2022	History of the Hut n.d.
Composite	Synthetic	colorless plastic wrappers	3	3	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	green plastic string	3	1	Plastic Artifact			
Composite	Synthetic	red plastic string	3	1	Plastic Artifact			
Mineral	Metal	silver aluminum foil	3	6	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	gold aluminum foil	3	1	Wrapper	1947	2022	Miller et al 2013:17

Mineral	Metal	Werther's Original gold aluminum foil wrapper	3	1	Wrapper	1947	2022	Miller et al 2013:17
Composite	Synthetic	hard blue plastic tip	3	1	Plastic Artifact			
Composite	Synthetic	pink chewing gum	3	1	Chewing Gum	1848	2022	Pandolfi 2018
Unidentified	Unknown	pink substance	3	2	Unknown			
Vegetal	Wood	wood	3	7	Botanical			
Vegetal	Charcoal	charcoal	3	2	Botanical			
Vegetal	Nut	nut	3	1	Botanical			
Mineral	Stone	Unidentified mineral, white, possibly gypsum crust	3	1	Unknown			
Mineral	Stone	Unidentified mineral, green	3	1	Unknown			
Composite	Building Material	Cement/concrete, painted red	3	1	Architectural			
Composite	Building Material	Cement/concrete	3	5	Architectural			
Mineral	Stone	Chert	3	1	Lithic			
Mineral	Stone	FCR Limestone	3	1	Unknown			
Mineral	Glass	colorless body sherds	3	2	Container/Vessel	1864	2022	Miller et al 2013:8
Composite	Synthetic	flash cube side pieces	3	5	Photography	1965	1979	Harriss 2021
Mineral	Glass	light blub glass pieces	3	7	Lamp/lighting	1879	2022	MIller et al 2013:15
Composite	Synthetic	flash cube interior	3	1	Photography	1965	1979	Harriss 2021
Mineral	Metal	Wire nails	3	1	Hardware	1850	2022	Miller et al 2013:14

Mineral	Metal	Unidentified iron fragments	3	51	Hardware			
Animal	Bone	small long bone shaft	3	1	Faunal			
Animal	Bone	medium burnt bone fragments	3	2	Faunal			
Composite	Synthetic	colorless plastic wrappers	3	4	Wrapper			
Composite	Synthetic	yellow plastic wrappers	3	3	Wrapper			
Composite	Synthetic	plastic string	3	2	Plastic Artifact			
Mineral	Metal	gold piece of aluminum foil	3	1	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	silver pieces of aluminum foil	3	2	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Wood	wood	3	42	Botanical			
Vegetal	Charcoal	charcoal	3	20	Botanical			
Unidentified	Unknown	pink substance	3	1	Unknown			
Mineral	Stone	Calcite?	3	7	Unknown			
Composite	Building Material	Cement/concrete	3	15	Architectural			
Composite	Building Material	Lime-sand mortar, orange	3	2	Architectural			
Composite	Building Material	Lime-sand mortar, white	3	1	Architectural			
Mineral	Stone	Rock	3	1	Unknown			
Mineral	Stone	Mineral	3	1	Unknown			
Composite	Building Material	Cement/concrete	3	1	Architectural			
Mineral	Metal	Metal step guard with screw	3	1	Architectural			

Mineral	Metal	probably part of step guard or screw	3	2	Architectural		

Excavation Unit (EU) 2

Classification Line 3 (material class)	Classification Line 4 (specific class of material)	Description	Level	Item Count	Functional Category	TAQ	TPQ	Source
Composite	Glass	aqua body shard	1	1	Container/vessel	1916	2022	Lockhart and Porter 2010:47
Composite	Glass	colorless body shard with embossed lines	1	1	Container/vessel	1864	2022	Miller et al 2013:8
Composite	Glass	light bulb glass	1	11	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	light bulb base	1	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	flash cube base	1	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	flash cube side	1	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	flash cube interior	1	1	Photography	1965	1979	Harriss 2021
Mineral	Metal	wire nails	1	1	Hardware	1850	2022	Miller et al 2013:14
Mineral	Metal	Unidentified iron fragments	1	3	Unknown			
Animal	Shell	mussel	1	1	Faunal			
Composite	Synthetic	black plastic sheet	1	1	Plastic Artifact			
Mineral	Metal	silver aluminum foil	1	1	Wrapper	1947	2022	Miller et al 2013:17
Vegetal	Wood	wood	1	3	Botanical			
Vegetal	Charcoal	charcoal	1	3	Botanical			
Vegetal	Nut	nut	1	2	Botanical			
Composite	Synthetic	Black hard plastic piece	1	1	Plastic Artifact	1907	2022	Miller et al 2013:16

Mineral	Stone	Calcite?	1	1	Unknown			
Animal	Bone	long bones	1	3	Faunal			
Mineral	Ceramic	Small whiteware body shard with white glaze and crazing	1	1	Container/vessel			
Composite	Glass	aqua body sherds	1	2	Container/vessel	1916	2022	Lockhart and Porter 2010:47
Composite	Glass	colorless body shard	1	1	Container/vessel	1864	2022	Miller et al 2013:8
Composite	Glass	Colorless body shard with embossed lines and letter. Very small piece, but the letter might be "L"	1	1	Container/vessel	1864	2022	Miller et al 2013:8
Composite	Glass	pieces of light bulb glass	1	14	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	light bulb	1	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	light bulb base	1	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	flash cube sides	1	2	Photography	1965	1979	Harriss 2021
Composite	Fibers	yellow thread	1	1	Fashion			
Mineral	Metal	Wire nails	1	2	Hardware	1850	2022	Miller et al 2013:14
Mineral	Metal	Unidentified iron fragments	1	20	Hardware			
Animal	Shell	snail	1	6	Faunal			
Animal	Shell	mussel	1	2	Faunal			
Composite	Building Material	Cement/concrete	1	10	Architectural			
Mineral	Stone	minerals	1	8	Unknown			
Mineral	Stone	Calcite?	1	4	Unknown			

Vegetal	Seed	carbonized seed (wrapped in aluminum foil, seed and aluminum foil weighted at 0.3)	1	1	Botanical			
Vegetal	Charcoal	charcoal	1	11	Botanical			
Vegetal	Nut	nuts	1	5	Botanical			
Vegetal	Wood	wood	1	2	Botanical			
Mineral	Metal	silver aluminum foil	1	5	Wrapper	1947	2022	Miller et al 2013:17
Composite	Synthetic	white plastic cylinder	1	1	Plastic Artifact	1907	2022	Miller et al 2013:16
Animal	Bone	long bone	2	5	Faunal			
Animal	Shell	snail	2	5	Faunal			
Animal	Shell	mussel	2	2	Faunal			
Composite	Building Material	Lime-sand mortar, black staining, possibly burned	2	1	Architectural			
Mineral	Glass	Small shard with yellowish patina	2	1	Container/vessel			
Composite	Metal	light bulb bases	2	2	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Glass	light bulb glass fragments	2	9	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Metal	Wire nails	2	1	Hardware	1850	2022	Miller et al 2013:14
Composite	Synthetic	Film reel 120 kodak	2	1	Photography			
Composite	Synthetic	Plastic toothpick or straw wrapper	2	1	Wrapper	1933	2022	Plastic Packaging History 2018
Mineral	Metal	Yellow aluminum foil wrapper	2	1	Wrapper	1947	2022	Miller et al 2013:17
Composite	Building Material	lime-sand mortar, Orange	2	2	Architectural			

Vegetal	Wood	curved piece of wood	2	1	Botanical			
Vegetal	Wood	small square brown piece of wood with a hair-like substance stuck to it	2	1	Botanical			
Mineral	Stone	Unknown minerals, one looks like quartz	2	3	Unknown			
Composite	Metal	light bulb bases	2	2	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Glass	light bulb glass fragments	2	2	Lamp/lighting	1879	2022	Miller et al 2013:15
Animal	Shell	Snail	2	1	Faunal			
Vegetal	Wood	sawn wood	2	1	Architectural			
Vegetal	Charcoal	charcoal	2	1	Botanical			
Composite	Building Material	Cement/concrete	2	1	Architectural			
Composite	Synthetic	colorless plastic cylinder	2	1	Plastic Artifact	1907	2022	Miller et al 2013:16
Composite	Synthetic	small black fragment that can't tell if plastic or glass	2	1	Unknown			
Mineral	Glass	aqua body shard	2	1	Container/vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	colorless body shard	2	1	Container/vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	Colorless shard with embossed line and patina	2	1	Container/vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	pieces of light bulb glass	2	19	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	flash cube side	2	1	Photography	1965	1979	Harriss 2021

Composite	Synthetic	Metal chapstick with plastic screw base "TURN // MADE IN U.S.A."	2	1	Fashion	1912	2022	Carpenter 2013
Mineral	Metal	screw, whitish-gray corrosion	2	1	Hardware			
Mineral	Metal	Unidentified iron fragments	2	1	Hardware			
Animal	Shell	Mussel	2	1	Faunal			
Vegetal	Charcoal	Charcoal	2	1	Botanical			
Composite	Synthetic	colorless plastic wrapper	2	1	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	white plastic knot	2	1	Plastic Artifact	1907	2022	Miller et al 2013:16
Mineral	Stone	FCR: Sandstone is broken somewhat rectangularly and has some discoloration.	2	1	Lithic			
Mineral	Stone	FCR: Limestone has a rectangular break and reddish discoloration.	2	1	Lithic			
Mineral	Glass	aqua body sherds	2	2	Container/vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	colorless body sherds	2	2	Container/vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	olive body shard	2	1	Container/vessel			
Mineral	Glass	olive bottle neck probably from a wine bottle	2	1	Container/vessel			
Mineral	Glass	pieces of light bulb glass	2	20	Lamp/lighting	1879	2022	Miller et al 2013:15

Composite	Synthetic	flash cube side	2	1	Photography	1965	1979	Harriss 2021
Composite	Synthetic	light bulb	2	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Metal	light bulb base	2	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	cylinder	2	1	Unknown			
Mineral	Metal	1968 Penny	2	1	Coin	1968	1968	
Composite	Wood	Match	2	1	Lamp/lighting			
Composite	Synthetic	half of a white plastic bead	2	1	Fashion			
Composite	Synthetic	white chewing gum	2	3	Chewing Gum	1848	2022	Pandolfi 2018
Mineral	Metal	Wire nails	2	1	Hardware	1850	2022	Miller et al 2013:14
Mineral	Metal	nails, very corroded so can't tell if wire or cut	2	3	Hardware			
Mineral	Metal	Unidentified iron fragments	2	6	Hardware			
Animal	Shell	Mussel	2	3	Faunal			
Mineral	Metal	copper, possibly a wire but quite thick, bent	2	1	Hardware			
Vegetal	Wood	Wood sample wrapped in aluminum foil (50.4 g)	2	1	Botanical			
Vegetal	Charcoal	4 pieces of charcoal (2.8 g)	2	4	Botanical			
Animal	Bone	part of long bone shaft?	2	1	Faunal			
Composite	Building Material	pieces of gray hard concrete (8.8 g)	2	6	Architectural			
Composite	Building Material	pieces of orange more brittle concrete (109.2 g)	2	63	Architectural			
Mineral	Stone	Minerals	2	13	Unknown			

Mineral	Metal	silver aluminum foil	2	3	Wrapper	1947	2022	Miller et al 2013:17
Composite	Synthetic	colorless plastic	2	1	Plastic Artifact	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	rubber	2	1	Plastic Artifact	1870	2022	Miller et al 2013:16
Composite	Synthetic	thread	2	1	Fashion			
Mineral	Glass	colorless body shard	3	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Metal	Rebar, 17 cm long	3	1	Hardware			
Mineral	Metal	Pepsi can, rusted and corroded, pieces are flaking off	3	1	Container/Vessel	1959	1971	Ryanmj n.d.
Vegetal	Wood	Charred wood	3	4	Botanical			
Mineral	Stone	Mineral, possibly calcite	3	1	Unknown			
Composite	Building Material	Cement/concrete	3	4	Architectural			
Composite	Building Material	whiteish gray lime-sand mortar	3	1	Architectural			
Composite	Building Material	orange with white, blue, and brown mixed in lime-sand mortar	3	1	Architectural			
Composite	Synthetic	Intact light bulb. 3 cm long, filled with silver wire, has a pointed tip	3	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Animal	Shell	Mussel	3	1	Faunal			
Animal	Bone	Long bones. These bones were found within the mussel shell	3	3	Faunal			
Animal	Bone	long bone, 4 appear to be charred. These bones	3	4	Faunal			

		were found within the mussel shell						
Composite	Soil	Matrix from within mussel, might be good for flotation	3	1	Unknown			
Animal	Bone	small long bones	3	3	Faunal			
Animal	Bone	medium size rib	3	1	Faunal			
Animal	Shell	snail	3	15	Faunal			
Animal	Shell	mussel	3	2	Faunal			
Mineral	Glass	7-up green glass bottle rim/finish	3	1	Container/Vessel	1940	2022	Lockhart 2010:433
Mineral	Glass	colorless shard with embossed lines	3	1	Container/Vessel	1864	2022	Miller et al 2013:8
Composite	Synthetic	flash cube side piece	3	1	Photography	1965	1979	Harriss 2021
Mineral	Glass	piece of light bulb glass	3	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Metal	light bulb base	3	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Building Material	Cement/concrete	3	1	Architectural			
Vegetal	Wood	wood	3	5	Botanical			
Vegetal	Charcoal	charcoal	3	1	Botanical			
Mineral	Metal	long skinny piece of white metal	3	1	Hardware			
Mineral	Metal	short curved greenish piece of metal	3	1	Hardware			
Mineral	Ceramic	Unknown ware type body shard with white lead glaze. The glaze has an almost salt glaze like texture.	3	1	Container/Vessel			

Mineral	Glass	aqua body shard	3	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	colorless body shard	3	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	light bulb glass	3	6	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	green chewing gum	3	2	Chewing Gum	1848	2022	Pandolfi 2018
Animal	Shell	mussel	3	2	Faunal			
Animal	Shell	snail	3	3	Faunal			
Mineral	Metal	flaking from metal can	3	1	Container/Vessel			
Mineral	Metal	metal (possibly copper) band	3	1	Hardware			
Mineral	Metal	Unidentified iron fragments	3	6	Hardware			
Vegetal	Wood	wood	3	21	Botanical			
Vegetal	Charcoal	charcoal	3	1	Botanical			
Vegetal	Nut	nut	3	3	Botanical			
Mineral	Stone	sandstone	3	1	Unknown			
Composite	Building Material	Cement/concrete	3	4	Architectural			
Mineral	Stone	Calcite?	3	5	Unknown			
Mineral	Stone	Minerals	3	5	Unknown			
Composite	Building Material	orange lime-sand mortar	3	1	Architectural			
Mineral	Metal	silver aluminum foil	3	4	Wrapper	1947	2022	Miller et al 2013:17
Animal	Bone	small long bones	4	4	Faunal			
Animal	Bone	large long bone fragment which is blackened on the inside (possibly burned)	4	1	Faunal			

Animal	Shell	Snail	4	4	Faunal			
Mineral	Glass	Colorless body shard with yellowish tint	4	1	Container/Vessel			
Mineral	Glass	Colorless shard with embossed dots, possibly soda bottle	4	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Metal	Iron nails, too rusted to tell if wire or cut. 9 cm long and 7.5 cm long	4	2	Hardware			
Animal	Shell	mussel	4	1	Faunal			
Mineral	Glass	aqua body shard	4	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	light bulb glass	4	3	Lamp/lighting	1879	2022	Miller et al 2013:15
Vegetal	Wood	Wood	4	1	Botanical			
Composite	Synthetic	pink chewing gum	4	1	Chewing Gum	1848	2022	Pandolfi 2018
Composite	Synthetic	Black plastic wrap	4	1	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	green plastic wrap	4	1	Wrapper	1933	2022	Plastic Packaging History 2018
Composite	Fibers	red lint	4	1	Fashion			
Composite	Synthetic	styrofoam	4	1	Plastic Artifact	1944	2022	Miller et al 2013:16
Animal	Bone	long bones	5	14	Faunal			
Animal	Bone	long bone, one blackened (possibly burned)	5	1	Faunal			
Animal	Shell	Snail	5	1	Faunal			

Animal	Shell	Snail	5	2	Faunal			
Composite	Building Material	Cement/concrete	5	1	Architectural			
Animal	Bone	long bones	5	6	Faunal			
Mineral	Glass	colorless body shard	5	1	Container/Vessel	1864	2022	Miller et al 2013:8
Mineral	Glass	light bulb glass	5	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Animal	Bone	long bone	5	1	Faunal			
Animal	Bone	mandible	5	1	Faunal			
Animal	Shell	Snail	5	2	Faunal			
Vegetal	Wood	wood	5	5	Botanical			
Vegetal	Bark	bark	5	2	Botanical			
Vegetal	Wood	unknown botanical	5	1	Botanical			
Composite	Building Material	Cement/concrete	5	2	Architectural			
Mineral	Stone	Calcite?	5	1	Unknown			
Composite	Building Material	Lime-sand mortar	5	2	Architectural			
Mineral	Glass	pieces of light bulb glass	5	2	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	piece of a flash cube sticker	5	1	Photography	1965	1979	Harriss 2021
Animal	Shell	snail	5	1	Faunal			
Composite	Building Material	Cement/concrete	5	4	Architectural			
Vegetal	Wood	wood	5	4	Botanical			
Vegetal	Charcoal	charcoal	5	1	Botanical			
Composite	Building Material	lime-sand mortar	5	2	Architectural			
Mineral	Stone	Calcite?	5	1	Unknown			
Mineral	Glass	light bulb glass	5	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Metal	Unidentified iron fragments	5	1	Hardware			

Composite	Building Material	Lime-sand mortar, orange	5	1	Architectural			
Composite	Building Material	Lime-sand mortar, white	5	1	Architectural			
Composite	Fibers	brown thread	5	1	Fashion			
Animal	Bone	mandible	5	1	Faunal			
Animal	Shell	shell	5	1	Faunal			
Vegetal	Charcoal	charcoal	5	11	Botanical			
Vegetal	Wood	wood	5	1	Botanical			
Mineral	Metal	Unidentified iron fragments	5	3	Hardware			
Composite	Building Material	Cement/concrete, orange	5	38	Architectural			
Composite	Building Material	cement/concrete, other	5	6	Architectural			
Composite	Building Material	Lime-sand mortar	5	7	Architectural			
Mineral	Metal	corroded nails, can't tell if wire or cut	5	3	Hardware			
Vegetal	Wood	wood	5	1	Botanical			
Mineral	Stone	Limestone	5	1	Unknown			
Mineral	Stone	Calcite?	5	1	Unknown			
Animal	Bone	long bone shafts	Clean Up	4	Faunal			
Animal	Bone	blackened (possibly burned) long bone shaft	Clean Up	1	Faunal			
Mineral	Glass	light bulb glass	Clean Up	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Animal	Shell	Snail	Clean Up	1	Faunal			
Composite	Synthetic	colorless plastic wrappers	Clean Up	2	Wrapper	1933	2022	Plastic Packaging History 2018

Composite	Synthetic	colorless plastic rolled	Clean Up	1	Plastic Artifact	1933	2022	Plastic Packaging History 2018
Vegetal	Wood	wood	Clean Up	12	Botanical			
Composite	Building Material	Lime/sand mortar	Clean Up	2	Architectural			
Composite	Building Material	Cement/concrete	Clean Up	4	Architectural			
Mineral	Stone	Minerals	Clean Up	7	Unknown			
Mineral	Glass	light bulb glass	Clean Up	6	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	tiny colorless plastic	Clean Up	5	Plastic Artifact	1933	2022	Plastic Packaging History 2018
Mineral	Metal	Unidentified iron fragments	Clean Up	1	Hardware			
Animal	Bone	long bone	Clean Up	1	Faunal			
Animal	Bone	rib that looks charred	Clean Up	1	Faunal			
Animal	Shell	Snail	Clean Up	3	Faunal			
Composite	Building Material	Lime-sand mortar	Clean Up	6	Architectural			
Composite	Building Material	Cement/concrete	Clean Up	1	Architectural			
Vegetal	Wood	wood	Clean Up	3	Botanical			
Vegetal	Charcoal	charcoal	Clean Up	1	Botanical			

Mineral	Glass	colorless body shard	Clean Up	1	Container/Vessel	1864	2022	Miller et al 2013:8
Composite	Synthetic	red plastic strip	Clean Up	1	Plastic Artifact	1933	2022	Plastic Packaging History 2018
Composite	Synthetic	tiny pieces of colorless plastic	Clean Up	5	Plastic Artifact	1933	2022	Plastic Packaging History 2018
Composite	Fibers	black thread	Clean Up	1	Fashion			
Composite	Fibers	brown thread	Clean Up	1	Fashion			
Composite	Synthetic	white plastic thread (dental floss?)	Clean Up	1	Plastic Artifact	1933	2022	Plastic Packaging History 2018
Composite	Metal	silver thread bundle from inside lightbulb, has 7 pieces of light bulb glass still attached	Clean Up	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Metal	silver thread bundle from inside lightbulb	Clean Up	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Glass	48 pieces of light bulb glass	Clean Up	48	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Metal	light bulb base	Clean Up	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	flash cube side	Clean Up	1	Photography	1965	1979	Harriss 2021
Vegetal	Wood	Wood	Clean Up	7	Botanical			
Animal	Bone	long bone	Clean Up	3	Faunal			

Animal	Shell	mussel	Clean Up	2	Faunal			
Animal	Shell	snail	Clean Up	5	Faunal			
Composite	Building Material	lime-sand mortar	Clean Up	2	Architectural			
Mineral	Glass	light bulb tip	Clean Up	1	Lamp/lighting	1879	2022	Miller et al 2013:15
Mineral	Metal	Wire nails	Clean Up	1	Hardware	1850	2022	Miller et al 2013:14
Composite	Building Material	Cement/concrete	Clean Up	3	Architectural			
Animal	Shell	snail	Clean Up	2	Faunal			
Mineral	Stone	Minerals	Clean Up	15	Unknown			
Composite	Synthetic	colorless plastic wrapper	Clean Up	1	Wrapper	1933	2022	Plastic Packaging History 2018
Mineral	Metal	silver aluminum foil	Clean Up	1	Wrapper	1947	2022	Miller et al 2013:17
Mineral	Metal	wire nail 9.5 cm long	Clean Up	1	Hardware	1850	2022	Miller et al 2013:14
Mineral	Glass	aqua body shard	Clean Up	1	Container/Vessel	1916	2022	Lockhart and Porter 2010:47
Mineral	Glass	light bulb glass	Clean Up	5	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Building Material	Lime-sand mortar	Clean Up	1	Architectural			
Mineral	Metal	Unidentified iron fragments	Clean Up	4	Hardware			

Vegetal	Charcoal	Charcoal	Clean Up	1	Botanical			
Mineral	Stone	Minerals	Clean Up	2	Unknown			
Composite	Synthetic	pink substance	Clean Up	1	Unknown			
Composite	Synthetic	hard black plastic	Clean Up	1	Plastic Artifact	1907	2022	Miller et al 2013:16
Mineral	Stone	chert, secondary decortication flake	Clean Up	1	Lithic			
Mineral	Stone	chert, broken flake	Clean Up	1	Lithic			
Mineral	Glass	light bulb glass	Clean Up	2	Lamp/lighting	1879	2022	Miller et al 2013:15
Composite	Synthetic	black electrical cable	Clean Up	1	Hardware			
Composite	Building Material	Lime-sand mortar	Clean Up	2	Architectural			
Composite	Building Material	Cement/concrete	Clean Up	1	Architectural			
Animal	Shell	snail	Clean Up	2	Faunal			
Vegetal	Wood	wood	Clean Up	84	Botanical			
Vegetal	Charcoal	charcoal	Clean Up	1	Botanical			
Mineral	Metal	Unidentified iron fragments	Clean Up	2	Hardware			
Mineral	Stone	Minerals	Clean Up	5	Unknown			

Appendix D: Timeline of Modifications at Historic Entrance

1812	Saltpetre mining at Historic Entrance
1835	There is a door labeled on the Edmund Lee Map at the Narrows. This is the earliest mention of any sort of gate or door.
1842 (December 21)	Oliver Hazard Perry Anderson mentions an entrance door in a letter.
1845	Rambles "Rather rude steps of stone," earliest reference to steps. Door set in rough stone wall Bishop Map. Door is labeled.
1847 (May/June)	Diary of Thomas Kite. He describes a "rude flight of steps" going to the entrance. He also says there were the remains of an ice house in a pit to their left. He then describes an "aperture where formerly was placed a door." Apparently when the door was in place, opening it caused wind so severe it put out lamps. Just past the gate, there was a stone wall 4 feet high on either side made by the saltpetre miners.
1851	Pictorial Guide to the Mammoth Cave, Kentucky. Rev. Horace Martin. First illustration of Historic Entrance from inside.
1874	Hovey 1882. "The prevailing coolness and uniformity of temperature led the late Dr. Croghan to excavate a deep hollow here to serve as an ice-house. The passage-way suddenly grows very narrow, at a point about 300 feet within, and here there is an iron gate made of rude bars crossing each other. This was built by Capt. W. S. Miller, in 1874, as a safeguard

	against secret surveys, spoliation, and the escape of fugitives from justice." Pg 19
1892	Photo of stone steps going to entrance
1897	Hovey. Limestone steps pg. 15 Stoop in Houchin's Narrows, piled rocks on either side. Pg. 18
1898	Entrance to the cave oil painting by J. André Castaigne. Shows stone steps.
Circa 1905	Concrete steps and metal handrail installed
1908	steps and handrail in H. C. Ganter postcard Kaemper Map. The Iron Gate is labeled.
1910	Photo of "The Iron Gate to Mammoth Cave" H. C. Ganter
1934	CCC did work at entrance. From the photos, it appears that they installed concrete steps and a handrail, probably of metal, to the entrance.
1961 (February 21)	Working drawing. Plans for a barrier grille to replace the existing gate. The remains of the 1961 gate can be seen just inside the present gate in holes drilled into the ceiling.
1962 (August 23)	Journal of Spelean History Vol. 16, No. 1, pg. 8. New concrete steps and rock wall
1966 (June)	Preliminary drawing. Plan to remove existing iron grill and corrugated aluminum sheet.
1966 (September)	Working drawing. Double doors opening into cave. Put metal panels on gate to control cold air in winter. Not great for the bats.
1967 (December)	Journal of Spelean History Vol. 16, No. 1 pg. 8. New gate completed.
1968	Plans to add another row of stairs next to the existing one.

1989	Open grid gate. (Rick Olson)
1996	1996- Proceedings of the Fifth-Annual Mammoth Cave National Park Science Conference. John F. Fry Eighteen Cave Gates and Airlocks: Conclusion of a Three-Year Project to Restore Cave Entrance Dynamics at Mammoth Cave National Park. Bat gate designed by American Cave Conservation Association and approved by U.S. Fish and Wildlife Service. Gate was replaced in 1996 to "restore airflow, atmospheric conditions, and habitat." Supposed to mimic natural airflow. Plexiglass meant to simulate natural cross-section. Using paleontological research to restore conditions to pre-historic modifications. Double doors perpendicular to gate segments, to allow for airflow, bat entry/egress, and for safety. Existing gate removed AFTER new gate is put in. Rick Olson added plexiglass panels to the bottom and sides of the gate. Purpose was to block cold air and test how much of an impact it would have on airflow in the cave. (6/15/2021, personal communication)

Appendix E: Project Quick Reference

United States Department of the Interior Permit for Archeological Investigations	MACA 2022-01
Permit Administrator	Katrina Eichner, PhD
PI	Katrina Eichner, PhD
Field Director	Kailey Alessi
OSA Site Number	15 ED 1
CRIS Number	MACA 215.1
CRIS Name	Mammoth Cave Historic Entrance
National Register of Historic Places Number	91000503
Mammoth Cave National Park Curation Accession Number	MACA-00991
Study Number	MACA-00236
Permit Number	MACA-2022-SCI-0012
Study Title	A Pit Investigation: Historical Archeology at the Historic Entrance of Mammoth Cave, Kentucky