NAS Part II Survey: Corduroy Road remnant near Brownstown, Michigan

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Project Summary:

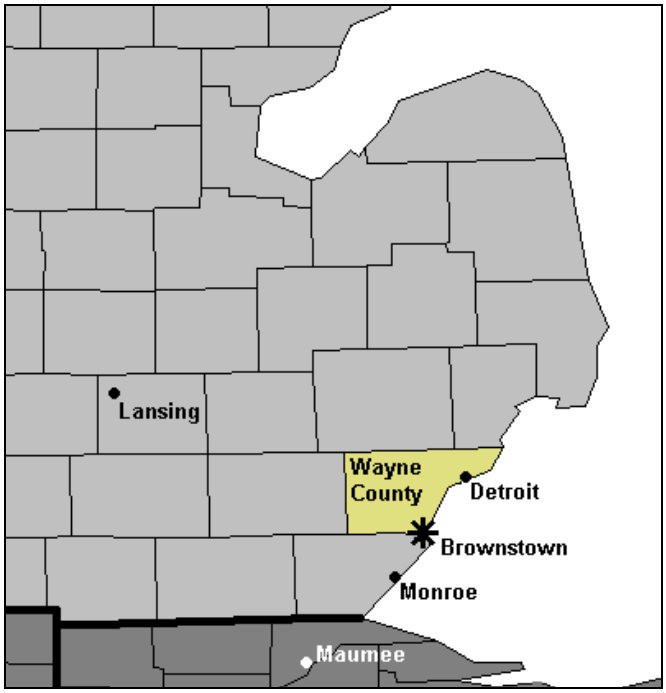
A survey was taken of a portion of a partially-submerged log road near the shore of Lake Erie near the historic site of Brownstown, Michigan, 26 miles (42 km) south of Detroit (maps 1 and 2). This historic feature measures 380 meters in length, and is comprised of over 600 logs laid parallel to each other and perpendicular to the direction of travel, in what is commonly

Map 1: Michigan and the Great Lakes region

known as a "corduroy road." The survey collected data on the position, dimensions and condition of 209 logs, extending over 90 meters, thus constituting a sample of a third of the existing feature.

Historical Background of Feature:

The author conducted an extensive survey of the available documentary record, including archival and primary sources, (Harrison, 2008). The historic structure is an exposed remnant of corduroy road forming a portion of Hull's Trace, a military road constructed by American troops and settlers in June-July 1812 as a means of supplying American-held Fort Detroit and the Michigan Territory. This was necessitated by British control of Lake Erie, which effectively blocked supply by water. The corduroy technique was a standard expedient for stabilizing the



Map 2: Location of Feature (Brownstown Township, Wayne County, Michigan)

roadbed on marshy terrain, as here at the mouth of the Huron River. The corduroy road segment formed the northern approach to a wooden bridge over the Huron River. Both the bridge and the road were hastily constructed by troops under the command of General William Hull, Michigan's military governor, on July 4, 1812, as he approached Fort Detroit, completing a 200-mile (320 km) "trace" to carry American troops and supplies from Ohio (map 3).

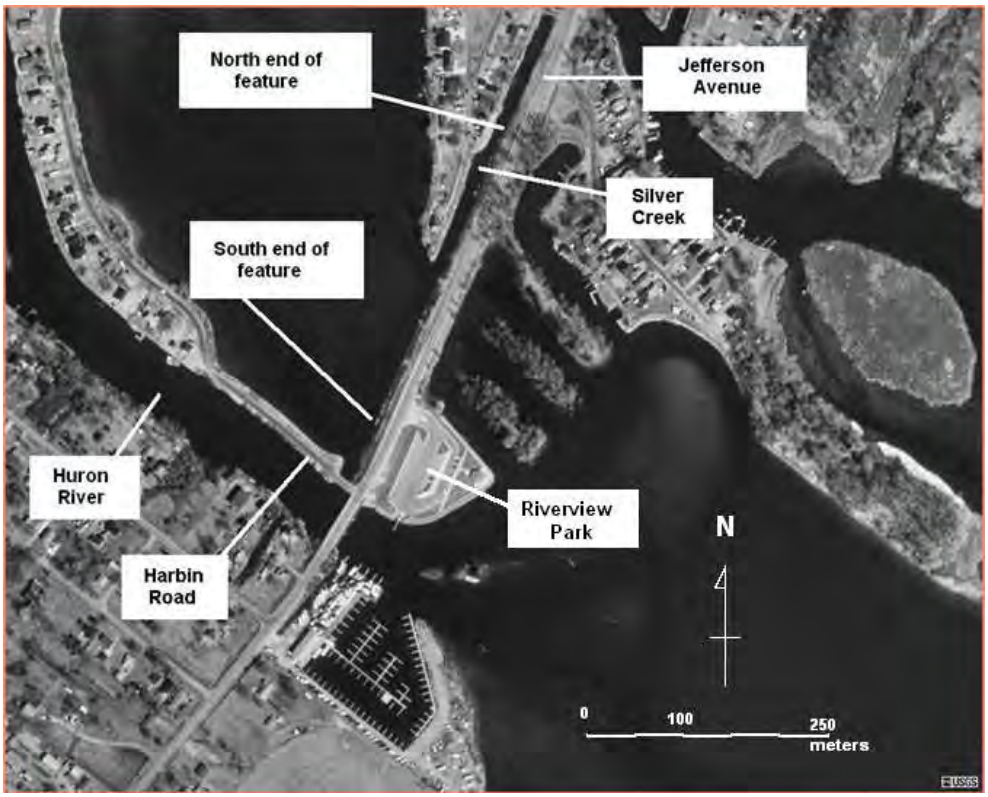
The proximity of the trace to Lake Erie made it vulnerable to combined assault by amphibious British forces stationed along the Canadian shore at nearby Fort Malden, and their Indian allies headquartering in the area of Brownstown, a Wyandot village. Hull's Trace was the scene of the first land engagement of the War of 1812, when the Battle of Brownstown was fought on August 5, 1812 near the site of the feature under study. The subsequent Battles of Monguagon (August 9, 1812) and River Raisin (January 22, 1813), were also fought on Hull's Trace, as the waters of Lake Erie and the densely wooded and marshy interior effectively restricted the movements of the combatants to the narrow coastal corridor occupied by the road.

Map 3: Hull's Trace. "Frenchtown" is the present city of Monroe, Michigan

The road was renamed "Great Military Road" and rudimentarily improved beginning in 1816. It was the first of a national system of military roads ordered by Congress and administered under Secretary of War John C. Calhoun. It was improved as a civilian thoroughfare and by the early 20th century had become the paved road known today as West Jefferson Avenue.

Description of Site:

The visible portion of the feature consists of the ends of unsquared logs, emerging horizontally from the embankment underlying Jefferson Avenue in Brownstown Township, just north of the Huron River (map 4). The points marked "North end of feature" and "South end of feature" are located at N42.04632 W83.21231 and at N42.04317 W83.21402, respectively.



Map 4: Aerial view of site.

The feature functioned as the northern approach to the original wooden bridge, now replaced by the modern (1930) concrete and steel Jefferson Avenue Bridge over the Huron River. The archaeological feature is at or near the present water level of Silver Creek, a tributary of the Huron. In some cases, the logs are exposed to the air over a length of 4 meters or more; in

others, only the extreme ends are visible, totally submerged and nearly buried in silt. The logs are arranged in a broken sequence over a distance of approximately 380 meters. A total of 589 logs were counted in a preliminary field survey on September 27, 2008. Some of the logs, particularly those better preserved by consistent submersion, show marks of felling by axes.

The overburden covering the buried ends of the logs consists of a dirt and gravel embankment built up to a thickness of approximately 1 meter, and topped with a modern secondary paved road. The embankment is heavily infested with *Phragmites australis*, an invasive grass that can grow to a height of 3 meters or more, thus affecting sight lines for survey purposes.

Significance of Feature:

The feature under study represents the only known remnant of the first military road and first federal road in the United States, known initially as Hull's Trace, then as the Great Military Road. The portion of the trace that includes the feature was constructed where an existing footpath traversed a marshy area at the mouth of the Huron River, impassable to a wheeled baggage train. The roadbed was stabilized using a common military engineering expedient—laying logs across the route and covering them with brush and earth. Recent research indicates that the road was built during a time of near-record lows in the level of Lake Erie (Wiles *et al*., 2009). Subsequent rising in water level has led to the submersion of the logs for most of their history, while a lack of alternate routes through the area dissuaded attempts to rebuild the feature, instead encouraging the formation of a protective embankment which partially encapsulated the feature. Together, these factors help account for the feature's survival and remarkable state of preservation.

Survey Rationale:

While long known to be historically significant, the feature has never been formally studied or surveyed. A limited archaeological survey was conducted on the opposite side of Jefferson Avenue in 2003, in compliance with requirements for extending a sewer through the area (Wade-Trim, 2004). No evidence of the feature was found in the proposed sewer right-of-way. Any pre-disturbance survey data collected at this time will furnish valuable information for managing and interpreting the site, by providing benchmark data to measure change.

Survey Plan:

A detailed three-year research plan (Appendix A) was developed using NAS guidelines. The present survey represents a significant sample of the "Site Plan Development" phase of the overall plan. Methodologies were developed to measure the position and dimensions of the exposed portions of logs both above and below waterline.

Preparation:

As the feature lies within the right-of-way of Jefferson Avenue, a roadway owned and maintained by the Wayne County Road Commission, authorities within the Commission were contacted for permission to conduct a non-destructive survey. Additionally, since the roadway is adjacent to the Riverview unit of Wayne County Parks, a representative of County Parks & Recreation was contacted, who acted as facilitator. A permit (Appendix B) was issued by the Department of Public Services granting permission to be on the site, and to tag logs for inventory purposes.

Survey Methodology:

A. Inventory

Every tenth visible log was marked using round aluminum tree survey tags stamped with a number. The tenth log was tagged "1," the twentieth log "2" and so on. Using this method 569 logs were counted, and 56 logs tagged, in the initial field session of July 17, 2009. At regular intervals, a laminated notice was attached to the tag, briefly describing the survey in progress (Appendix C). A field data entry sheet (Appendix D) was developed, permitting entry of subsequent data for individual logs: diameter, exposed length, elevation, orientation of axis (degrees magnetic), and position of outer end (northing and easting).

In subsequent field sessions, it quickly became apparent that a significant number of logs had been missed during tagging. Additional logs were inserted into the inventory without changing the numbers of the tagged logs, by adding letters to the numbers. Hence, two logs found between logs #80 and #90 (tags "8" and "9") would be given inventory numbers #89A and #89B. On at least two occasions, objects initially counted as two logs turned out to be a single log that was badly split. On at least one occasion, a log originally counted as part of the feature has disappeared, possibly because it was not an embedded part of the original feature, but rather a part of the overburden that floated away. In all these and similar cases, the inventory has been amended with annotations, and comments have been made in the field notes. A simple system of notations was developed to indicate logs that were split or shattered, buried in the substrate, unusually short, or emergent (at least partly above waterline at time of observation)

Fig. 1: Using calipers to measure the diameter of a log (Photo: M Holley)

Using this methodology, a total of 304 logs was counted between log # 1 and log #252. This portion of the feature was chosen for the survey as it represented a significant (approximately 50%) sample of the total feature, resulting in a manageable data set given the time and resource constraints of the project, and offered adequate sight lines to a point where an EDM could be stationed for recording positional data.

B. Diameter of Logs

A tree caliper was fabricated using a design from the forestry industry. Logs were measured in centimeters, at the point of greatest integrity nearest to the exposed end (Fig. 1). Badly split or shattered logs were measured, when possible, at a point where the trunk showed the greatest integrity. Most logs showed little variation in diameter along their exposed length;

this evidently reflects the designs of the road builders, who would be expected to select straight, uniform logs for the construction.

Fig. 2: Measuring the exposed length of a log (Photo: M Holley)

C. Exposed Length of Logs

A standard surveyor's tape, marked in centimeters, was used to measure the distance from the point where the log emerged from the overburden (an angled embankment) to its outer endpoint (Fig 2). Deeply buried logs were occasionally encountered, where the outer end was buried as well. In such cases, this was noted and the exposed length measured accordingly.

D. Elevation of Logs

The objective was to obtain a value for each log in terms of its elevation above sea level. With its proximity to Lake Erie, the water level at the site was subject to fluctuations. Fortunately, a gauging station in nearby Gibraltar (about two miles distant) maintains a Web-

based display of 3 days worth of real-time data. An initial value was determined by measuring the position of the upper surface of each log relative to water level (Fig. 3). Time of day was noted regularly, and both data were entered into a spreadsheet. Later, the lake level data were downloaded (Appendix F), and the value corresponding to the time of measurement was entered

Fig 3: Measuring the elevation of a submerged log (Photo: M Holley)

for each log. By adding the observed elevation of the log to the gauging station data, and adding it to LWD, an elevation for each log was calculated, with accuracy to a tenth of a foot (3 centimeters). This was done by embedding a conversion formula in the survey data spreadsheet, (Appendix E). The discovery of a bronze benchmark of known elevation attached to the Jefferson Avenue Bridge, will simplify this measurement in the future.

E. Axis of Logs

All but a few of the logs lie roughly parallel to each other, evidencing the deposition of the feature at the time of initial site formation. The orientation of the axis of the logs was measured using the compass on an NS dive slate (Fig 4). Orientation generally ranged between 117^{o} to 120^{o} (Magnetic), which corrected to 110^{o} to 113^{o} (True). Significant deviations usually occurred among logs that were emergent (normally above waterline).

Fig 4: Measuring orientation of a log using the NAS dive slate (Photo: M Holley)

F. Position of Logs

In order to complete a sample site plan, a fixed point of reference for each log was needed The outer endpoint of the log was chosen, as it lay farthest from any obscuring vegetation along the embankment, and was most easily identified, even with poor visibility.

Position was plotted using an EDM, operated by NAS senior instructor Dr. Mark Holley. A total of 209 endpoints were plotted in a single session on August 16, 2009. Communication between the spotter and the EDM operator was facilitated using 2-way radios with a hands-free headset on the spotter's unit (Fig 5).

Fig 5: Spotter with prism pole, radio and other measuring tools (Photo: M Holley)

Fieldwork:

Nine field sessions were conducted between July 17 and August 19, 2009. A total of 74 man-hours were spent in the field gathering data. After each session, data were compiled (Appendix E), and field notes were written up (Appendix G). Except for the assistance of Mark Holley with the EDM session on August 16, all data were collected by the author.

Plotting the survey:

It was felt that the purposes of the NAS 2 survey project were best served by demonstrating competence in basic technique; hence, the sample plots accompanying this report were initially done using manual drafting. For a full-scale survey of the feature, however, site management software such as 3H Consulting's *Site Recorder 4* is strongly recommended.

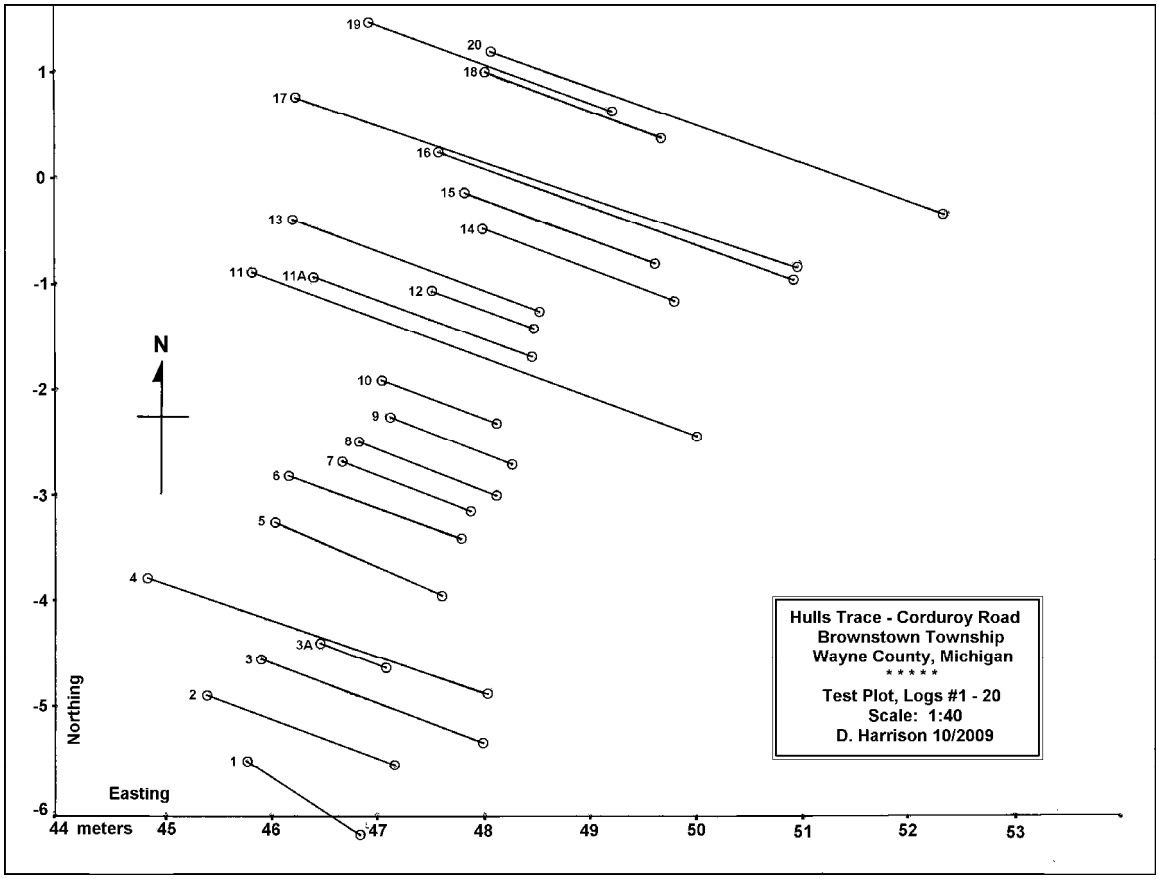


Fig 6: Test plot of Logs #1 through #20

Plot One: A sample of 22 logs was chosen to test the technique of determining the position of a log using the available data. First, the endpoint of each log was plotted on graph paper at a scale of 1:40, using the northings and eastings from the EDM session. Next, a line was drawn using a protractor along the observed orientation of the log's axis, corrected from magnetic north to true north according to the local magnetic declination. The length of the line

was scaled to the observed length of the log. The resulting plot was scanned and digitally enhanced using graphics software (Fig 6).

Plot Two: Orienting the test plot to the larger context was facilitated by the existence of a plan that included the entire site. In 2003-2004, the Wade Trim Corporation was contracted to conduct a Phase I/II archaeological survey of the opposite side of Jefferson Avenue, preparatory to the installation of a sanitary sewer extension. Through the assistance of Brian Woodruff, engineer for Wade-Trim, that site plan was made available, supplying the position of key features including the shoreline, Jefferson Avenue, Harbin Drive and associated bridges and structures in the vicinity (Appendix G). The position of the datum point used for the EDM session was trilaterated using the footings of the bridge over Harbin Drive, and transferred to the

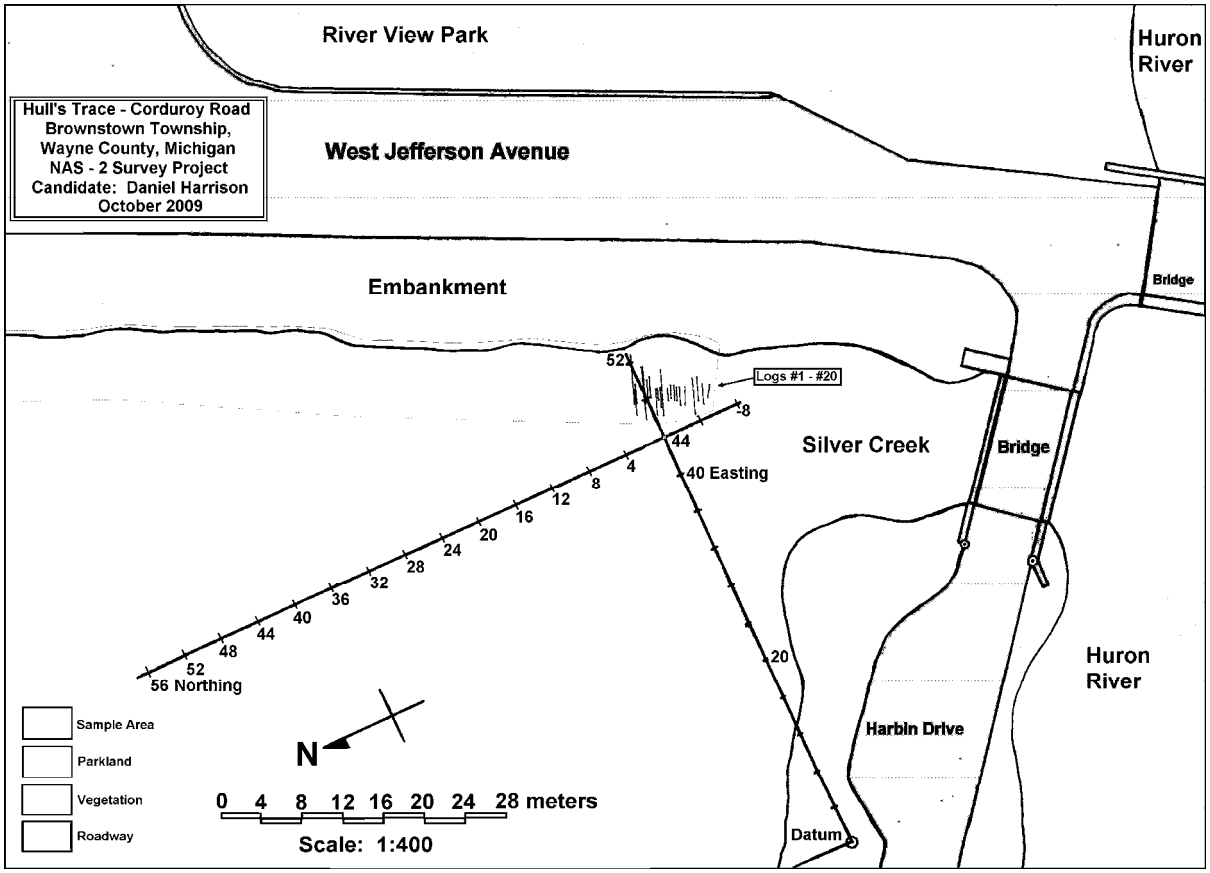


Fig 7: Site Plan with Sample Plot ("Logs #1 - #20") superimposed

Wade-Trim site plan. The resulting site plan was de-cluttered and reduced to a simple line drawing showing the shoreline, the roadways and bridges, and the vegetated embankment that forms the overburden. The resulting site plan was scanned to produce a scale of 1:400, or one-tenth the scale of the test plot. The test plot (Plot One above) was reduced to 1:400 and superimposed on the site plan (Fig 7). An attempt to create a larger test plot revealed an apparent discrepancy between the northing used in the EDM session, and true North. While the error produced in the test plot is minor due to its small size and proximity to the easting baseline, a larger sample would have been unusable. Future field sessions will determine the exact amount of the discrepancy, and the data corrected accordingly.

Conclusions:

The site represents a rare opportunity to study a civil engineering technique which is rarely preserved in the archaeological record. Its remarkable state of preservation is largely due to its having been submerged for much of its two hundred year history. Nevertheless, natural and human forces are both contributing to its breakdown. Based on both archival research and the field research here presented, the author is taking steps to have the site listed in the National Register of Historic Places (NRHP).

If successful, the NRHP listing will facilitate a National Historic Preservation Grant to fund the non-destructive survey and testing procedures outlined in the Research Plan (Appendix A). The City of Monroe and the War of 1912 Bicentennial Commemoration Commission have expressed strong interest in the feature, with its historic ties to the recently-designated River Raisin National Battlefield Park. The development of comprehensive management plan will ensure the conservation and interpretation of this historic structure for future generations.

References

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