Northeast Historical Archaeology

Volume 13 Article 6

1984

Log Roads to Light Rails: The Evolution of Main Street and Transportation in Buffalo, New York

Michael A. Cinquino

Marvin G. Keller

Carmine A. Tronolone

Charles E. Vandrei Jr.

Log Roads to Light Rails: The Evolution of Main Street and Transportation in Buffalo, New York

Cover Page Footnote
This article is a condensed and edited version of a report submitted to the Niagara Frontier Transportation Authority (NFTA) in June 1981 (Ecology and Environment, Inc. 1981). Research on the Buffalo Log Road was conducted with public funds provided through PL 93-291. The NFTA and the engineering firm of Cordy, Carpenter, Dietz and Zack deserve special thanks for their cooperation and logistical support. Ecology and Environment, Inc. in particular Mr. Gerald Strobel, provided the corporate support required for the production of this paper; Patrica Kammer, who prepared the graphics for this paper; and Nancy Schiller, who edited the original report which was the basis of this paper. The authors also acknowledge the valuable comments provided by the anonymous reviewers. Of course, authors alone take full responsibility for the content of this paper.

LOG ROADS TO LIGHT RAILS: THE EVOLUTION OF MAIN STREET AND TRANSPORTATION IN BUFFALO, NEW YORK

Michael A. Cinquino,
Marvin G. Keller,
Carmine A. Tronolone,
Charles E. Vandrei, Jr.

INTRODUCTION

In June 1980, during initial construction of Buffalo's Light Rail Rapid Transit System, parallel logs were discovered 1.5 meters below the present street surface in downtown Buffalo, New York. Preliminary investigations suggested that they were part of a log or plank road used sometime during the first part of the 19th century, and as such represented a significant historic resource (Vandrei and Nagel 1980). Subsequently, the site was declared eligible for inclusion in the National Register.

In November 1980, when destruction of the log road was imminent, data recovery investigations were performed by the authors. Information was gathered on the age, construction, and function of the log road by examining both the physical remains and the historic record. In addition, available information afforded an opportunity to study not only the log road but also the general development of a particular roadway, Main Street, over the span of nearly 200 years.

MAIN STREET: THE DOCUMENTARY RECORD

The first road located along the approximate route of what is now Main Street was the "Great Central Trail." This trail crossed New York State from the Hudson River to Lake Erie; it was a major aboriginal trail and remained in use during the colonial period. Initially, the trail was used to bring supplies to the Holland Land Company's field crews who were surveying lots in preparation for the first wave of Euro-American settlement in western New York.

In 1801, Joseph Ellicott, agent of the Holland Land Company, commissioned the marking of a new trail on drier land along the same line as the "Great Central Trail." This became known as "Buffalo Road" (Main Street). Soon afterward, this trail was widened to 40′ by cutting all trees 12″ or less in diameter to ground level. Although larger trees were also cut down, they were cut to ground level only if they were within 8′ of the centerline. Therefore, only a part of this 40′ section was actually used as a road, since the remaining part was often obstructed by tree stumps and undergrowth. No attempt was made to grade the road surface. Completed in 1803, Buffalo Road was an ungraded, stump-covered, wagon route extending from what is now Batavia, New York, to the Village of New Amsterdam (now Buffalo) (Bingham 1937; Evans 1924:232; Cummings 1907:6-11, Horton, et al. 1947:22-23; Koszuta 1969:43-44, Chazanoff 1970).

Although recognizing the importance of opening a roadway to encourage settlement of western New York State, the Holland Land Company invested only a minimal amount of money and effort in road construction, and considerably less in road maintenance. By 1810, Main Street and Buffalo Road were in disrepair due to inadequate maintenance (Koszuta 1969:43-44).

The construction of log causeways or corduroy roads was one inexpensive method used to keep poorly-drained, swampy, or muddy road segments passable. Sidway (1906:315) offers this account of the condition of Main Street during the War of 1812:

> The road then was in the usual condition of most if not all roads, through a new and timbered country, there being very little done except to cut the timber out sufficiently for the passage of teams and the making of causeways over the low and very wet grounds. The road from the Three-mile Creek was at first called Four Miles, and was throughout the entire distance from the creek to the "Cold Springs" covered with a log causeway. The road, from what was afterwards Walden's Hill to Chip-

> pewa Street and to North Church (Dr. Johnson's lot) was covered with a log causeway. Between Chippewa Street and where the North Church now stands was a log bridge over a ravine and low grounds, which extended nearly if not the entire distance.

From this eye witness account it can be concluded that log causeways and corduroy pavement were used extensively in early Buffalo.

In the early 1800s, and throughout most of that century, money for road construction was scarce. The corduroy technique of road repair was cheaper than building bridges or constructing a more permanent road surface. Lumber was inexpensive and an abundant local resource. Corduroy roads were made of any available trees including oak, cedar, and hemlock (Beers 1880:7; Koszuta 1969:40,45-46).

Causeway improvements undertaken on the Buffalo-Batavia Road c.1807 are discussed by Joseph Ellicott in the *Holland Land Company's Papers:*

> A usual mode of constructing Causeways is to lay two Rows of timber parallel to each other, commonly called String Piece from nine to twelve feet asunder, the whole Extent to be causewayed. This Method saves the Trouble and Expense of leveling the ground on which the Logs would otherwise lie, and is much the most expenditious Method of making Causeways; but in consequence of the underside of the logs being kept from the Earth by the String-Pieces which support them, the Moisture of the Ground keeping them always swamp, and being exposed to the Air, in a few Years the Logs become rotten, and require further Expenses in repairing . . .
>
> The Manner I had the Causeways constructed on this Road was as follows. First the several Parts of the Road intended to be causewayed were made level by digging down the Hillocks and filling up the Cavities, and where Stumps came in the Way they were dug up and removed, or cut close to the Ground. This being done and bedded in the Earth close to each other, and required to be so nearly of a size as to make a tolerable even Surface. They were then covered with Earth from 4 to 8 inches in Depth. Causeways constructed on this Plan must necessarily be more permanent than those constructed in the usual Way; because the Logs being surrounded with Earth will prevent the Air from having Access to them, and consequently will indure a great Number of Years(Bingham 1937:337-338).

Passage on a corduroy road bed was satisfactory, although after a short time many logs would sink into the soft soil, and constant use would break apart the remaining logs, making passage difficult (Beers 1880:7; Durrenberger 1931:29; Koszuta 1969: 39-40, 45-46).

An attempt was made in 1826 to improve travel conditions on Main Street by paving it with gravel (Reeves 1957). Gravel paving was more expensive and entailed more labor than previous forms of road construction. Gravel or pebble size usually ranged from 3/4″ to about 2″. Soil was used to properly unite and bind the gravel surface since water worn pebbles were too clean and would not adequately bind the pavement (Gillespie 1871:189, 193-194).

In the second quarter of the 19th century, the macadam technique, an improvement on gravel roads, became popular in eastern North America. This road building technique was developed in 1815 in England by John L. McAdam (Encyclopedia Brittancia 1974b:426, Levy 1980). Two types of macadam pavement were used: waterbound crushed rock and bituminous (tar and crushed stone) macadam pavement (Byrne 1892:200-201). The Buffalo and Williamsville Macadam Road company was chartered to build a macadam road from Buffalo to Williamsville. This road was completed between 1839 and 1840 (Johnson 1876:412; Burr 1840). Waterbound crushed rock macadam pavement was constructed by repeatedly rolling layers of wet crushed stone into a compacted base. Bituminous macadam pavement was applied in a similar manner, except that coal tar or asphalt were used as a binder for stone of slightly inferior quality.

Another paving technique used in the 1840s and 1850s was the plank road. In some cases, plank roads were constructed over old road beds, such as macadam or corduroy roads. Most often, plank roads

were constructed as branches connecting other systems of transportation (e.g., canals or railroads) and, as a result, were not in direct competition with these systems (Owen 1850:25; Durrenberger 1931: 144-146).

Construction of plank roads began with the preparation of the road surface. After grading, two stringers (base planks) were laid parallel to the road bed. Wooden planks were then laid over the stringers (Owen 1850:30, 66-67). The most durable and profitable wood pavements were made of planks with as few irregularities as possible (Geddes 1850:10; Owen 1850:10, 67). Planks were usually laid down in tracks 8′ wide; two tracks were often constructed together (Owen 1850:28-29). Normally, plank road surfaces lasted only about five years, although, in some cases, the road could be used for eight years before repairs were necessary (Geddes 1850:12).

Along with the development of better road surfaces came improvements in public transportation systems. By 1829, Main Street was designated a stage coach road. Shortly thereafter, the public transportation system began a major expansion. In 1835, a horse-drawn omnibus was in operation, its service extending north from the waterfront for a distance of about two miles. This system was discontinued in 1837 due to financial problems. By 1843, an intra-city stagecoach line was in operation. Between 1847 and 1860, another omnibus was in operation, increasing the service from the waterfront to three miles (Dibble 1980:H-8).

The first iron streetcar lines, those of the Niagara Streetcar Company, were in operation in 1860. In that same year, Buffalo Street Railroad began horsecar service on Main Street. By 1884, the system included a total of approximately 40 miles of iron track and 120 cars drawn by 730 horses, and employed approximately 350 men (Smith 1884b: 529-530; Dibble 1980a:H-8).

In 1888, Buffalo's first electric streetcar system, powered by a system of storage batteries, began operation. The first bus, also powered by storage batteries, began service in 1899. However, operating costs were too high to make this type of system profitable. Consequently, storage battery-powered streetcars and buses remained in operation for a only short time (Dibble 1980a:H-8).

In 1890, the electric trolley streetcar began operations. By 1894, the last horse-drawn streetcars were replaced by the electric trolley, and the public transportation system in Buffalo was completely driven by electric power. One of the premiere systems of its time, by 1892 there were 140 miles of electric trolley track in Buffalo. This system had increased to approximately 202 miles of track by 1922 (Dibble 1980a:H-8).

These forms of public transportation required additional improvements to the road surfaces. Cobblestone, block stone, and brick pavements were utilized in Buffalo during the last quarter of the 19th century. Cobblestone pavements usually were embedded in a rather unstable sand base. As a result, cobblestone pavements were difficult to travel over and to maintain (Byrne 1917: 125). Block stone pavement is made of stone blocks of regular shape which remain in place better than cobblestone. Block stone pavement was laid on Main Street in conjunction with the trolley car railroad and the electric trolley tracks of the 1890s (Byrne 1917:151-152).

Concrete was used in some areas of the country as a smooth paved surface, but it was asphalt that became the most popular pavement in Buffalo. Asphalt was first used as a road pavement in 1838 in Paris; it was not used in the United States until about 1869 (Byrne 1892: 114). By 1890, nearly 83 miles of Buffalo's streets were paved with asphalt (Byrne 1892:114). However, significant portions of Main Street remained block stone until the electric trolley service ended in the mid-20th century.

The gasoline driven bus, introduced in 1923, eventually became the main form of public transportation in Buffalo. By 1951, all trolley service had ended, and most tracks and block stone pavement were completely covered with asphalt to offer a

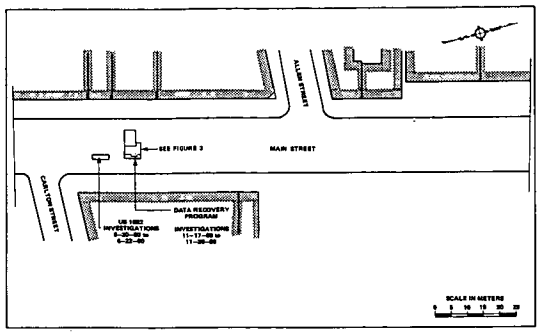

Figure 1. Placement of Excavation Units at the Buffalo Log Road Site (UB 1682).

smooth surface for bus and automobile traffic.

The construction of a 6.4 mile Light Rail Rapid Transit Line that runs for a distance of 1.2 miles at ground surface and travels below ground for a distance of 5.2 miles began a new chapter of public transportation in Buffalo. The system became operational in May 1985.

MAIN STREET: THE ARCHAEOLOGICAL REMAINS

Data recovery operations began as an "L"-shaped excavation unit which covered an area of about 38 m^2 and was located approximately in the middle of Main Street (Figure 1). Size and placement of the excavation were governed by the following objectives: to uncover as complete a section of the log road as possible; to open an area adjacent to the log road surface in order to identify any additional features; and to place the excavation unit in such a way as to allow free flow of two lanes of traffic at all times.

A backhoe was used to break through existing pavement and to excavate fill deposits down to 1.35 meters below the present ground surface, or about 15 cm. above the level of the log road. After completion of backhoe excavation, the side walls and floor of the unit were straightened using shovels. A one meter square grid pattern was then established within the excavation. All measurements were recorded in relation to this grid pattern. The grid was tied into a nearby USGS benchmark.

Since the location of the road had been established by preliminary investigations, the one meter square units that lay directly over the expected area of the log road were chosen for hand excavation. Ten units were hand excavated to the surface of the logs. Seven additional units were excavated in an attempt to locate any other features. Excavation using trowels and brushes allowed for recovery of small artifacts and, at the same time, permitted careful and efficient exposure of the log surface. All squares were then plan drawn and photographed, and the locations of the recovered artifacts were mapped in situ. Artifacts recovered from the excavation units were recorded within one of three general provenience categories: Level A: fill deposits 15 to 20 cm. above the log surface; Level B: directly on or in between the logs; or Level C: below the logs.

Two one meter squares (units IN 3E and ON 3E) were excavated to a sufficient depth below the logs to determine if any additional surfaces existed, or if any base preparation had taken place prior to log placement (Figures 2 and 3). The logs located within these squares were cut in half and removed, samples were retained for identification of the wood. Profiles and cross sections were drawn of the overall excavation, as well as of individual excavation units. Soil augering was conducted throughout the excavation unit to verify the depth of deposits and to check for additional surfaces.

Log Road Description

All logs uncovered were in good condition. Fill material deposited over the top of the logs, and the silty clay deposit in which they were embedded, served to keep them moist and well preserved. A chain saw was used to obtain a cross section of the road. The largest logs, which ranged from 29 to 40 cm. in diameter, were below an organic layer of rotted wood and earth measuring 2 to 5 cm. in thickness (Figures 2 and 3). The cross section of the logs indicated this organic layer was not only present on the upper road surface, but also extended between the logs

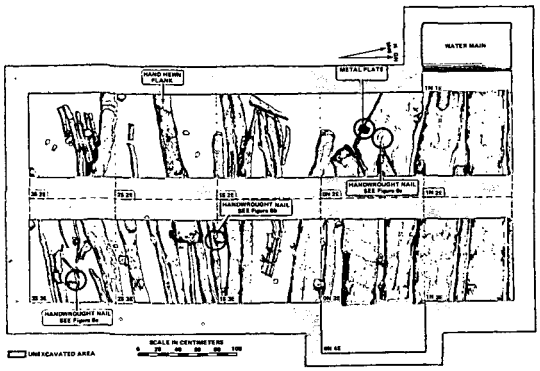

Figure 2. Plan Drawing of the Log Road.

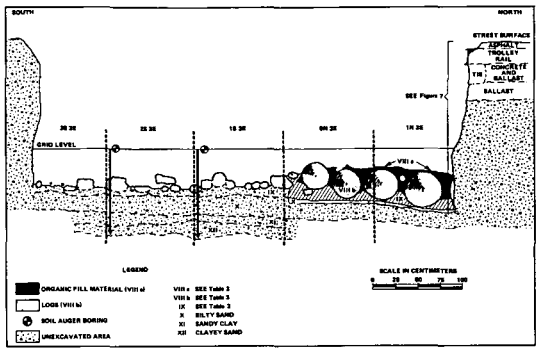

Figure 3. General Cross Section of Excavation Unit.

(Figure 3). The organic material did not, however, extend beneath the logs. This layer is apparently the earth mantel placed over the logs described by Ellicott (Bingham 1937:337-338).

Removal of the organic layer indicated that in one instance the space between the logs had been filled with a smaller branch or log (Unit 1N 3E, Figure 2). Apparently, an attempt had been made to fill in the space between the larger logs prior to the addition of the organic material to the road surface.

Excavation of the organic layer supports the interpretation that this was part of the original road surface. A single groove 25 cm. in width and 70 cm. in length was found cut into this layer. This groove may represent a wagon rut caused by continued use of the road. Unfortunately, this rut was limited to a small area, and additional ruts were not discovered; previous utility trench excavations had disturbed both sides of the log road.

Most of the logs showed no evidence of having been intentionally hewn to make a smoother road surface. A single exception was a hewn plank uncovered in excavation unit 2S 2E (Figure 2). Since this plank was the only one of its kind recovered, it is believed that its use as part of the log road was secondary. All logs were placed perpendicular to the flow of traffic, and were roughly parallel to each other. There was no evidence that the logs were tied together; they were simply held in place by their own weight.

The logs varied in size and diameter. Those excavated in preliminary investigations were fairly consistent in size, ranging in diameter from 15 to 30 cm. (Vandrei and Nagel 1980:9). However, the diameter of the logs and branches excavated during data recovery ranged from 2 to 40 cm. The diameter of the logs generally decreased from north to south across the overall excavation unit. This size differential may best be explained if the portion of the road excavated was at the southern end of a larger causeway. The larger logs were likely those placed in the wettest area. In fact, these logs were embedded in a gray silt and clay deposit. The smaller pieces were probably laid over a drier area. Soil borings showed that the gray silt and clay deposit was shallower at the southern end of the excavation than at the northern end. Smaller pieces of wood were also embedded deeply in the clay deposit and several branches were covered with the clay, suggesting that they were forced into the ground as a result of heavy pressure from use. A few branches, as illustrated in units 3S 2E and 3S 3E, were overlain by larger branches, suggesting that attempts were made to build up the surface of the smaller branches (Figure 2).

The original width of the log road could not be determined from the excavations, since both sides of the road had been disturbed by previous construction. The western side had been cut by a waterline that was installed approximately parallel to the present centerline of Main Street, and the

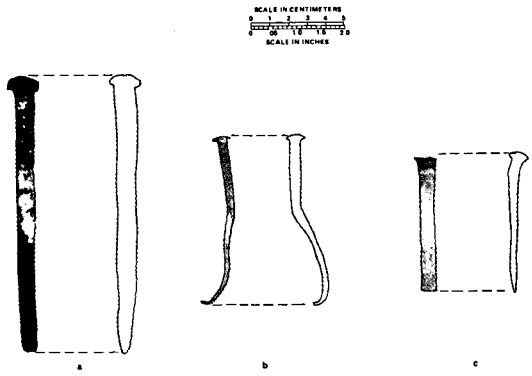

Figure 4. Handwrought Nails Found in Association with Log Road

eastern side had been cut by another modern trench (Figure 3). As a result, only 2.1 meters of the log feature remained undisturbed. Test units placed west of the modern trench failed to locate any additional evidence of the road. No excavation was possible east of this line.

The length of the road or causeway also could not be precisely determined by the excavations. However, as a result of monitoring of construction and previous investigations in the area, it is known that the logs extend north-south along Main Street approximately 60 meters. Monitoring both north and south of the data recovery excavation unit turned up additional evidence of possible road surfaces in the form of a dark organic stain or isolated logs. However, no evidence of a continuous road surface was encountered.

ARTIFACT DESCRIPTION AND ANALYSIS

Data recovery excavations on the log road recovered a total of 49 artifacts. These were recovered from three areas: the backhoe spoil resulting from fill removal above the road, the area above the road surface excavated by hand (Level A), and the area in direct association with the log pavement (Level B). No artifacts were recovered from beneath the logs (Level C). Artifactual material recovered included metal, leather, ceramic, and glass. Nonartifactual materials recovered included wood, shell, stone, and soil.

Metal

Metal artifacts comprise the largest category of indentifiable materials, and provide the most reliable chronological information since they were the artifact type most frequently found in association with the log pavement. Nine metal artifacts were recovered; all but two appear to be iron. Six of these items are nails or spikes, two of which were recovered from the backhoe spoil during early excavation. These two spikes are modern steel railroad spikes, probably associated with the electric railway which operated along the center of Main Street. Of the remaining four nails, three were found in direct association with the log pavement. The one nail not associated with the road appears to be a farrier's shoeing nail, possibly handwrought. All of the remaining nails are handwrought iron types of various sizes and configurations (Figure 4). One is a large wrought spike. With the onset of cut nail production, the manufacture of such wrought nails began to decline in the early 19th century; thus the nails may be dated generally to this period of time (Noel-Hume 1969:252-254).

The remaining metal artifacts consist of a drilled or punched metal plate, a fragment of a horseshoe, and an unidentifiable iron fragment. The horseshoe fragment, recovered in backhoe spoil directly above the log layer, is about one-half of an iron shoe with one nail. The horseshoe is of a type in use c.1800 (Noel-Hume 1969:237-239; Figure 74 #6).

Brass

A single brass artifact was recovered. This artifact, a civilian coat button, was dated from about 1790 to the early 1800s and suggests the log road was constructed and/or used around this time period (Vandrei and Nagel 1981:15).

Leather

Most of the leather was found in the hand excavated layer (level A) above the log pavement. Occasional fragments also were found

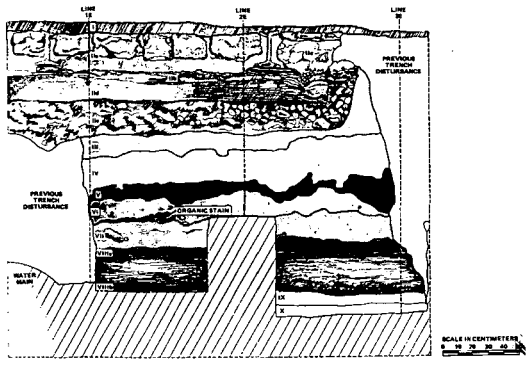

Figure 5. Profile of North Wall of the Excavation. See Table I for stratigraphic descriptions

in the backhoe spoil before hand excavation. Of the leather fragments which are identifiable, seven are probable strap fragments and three may be shoe parts. The remaining unidentifiable pieces range in size from 1 cm^2 to 80cm^2. The thicknesses of the pieces also vary considerably. All leather pieces had one smooth finished side and one rough flesh side. The fragmented nature, wide distribution, and lack of association with the road suggest that the leather was deposited with later fill placed on top of the road surface.

Ceramic

Five ceramic fragments were recovered. Two are brick fragments. Two are untyped pieces of unglazed, smooth, white paste earthenware which could not be further identified. The earthenware fragments may be a form of refined stucco and, therefore, not vessel sherds. None of these items was found in direct association with the log pavement.

The fifth ceramic sherd, a small piece of wheel-made, refined redware glazed on both interior and exterior surfaces, was found in direct association with the log road. Because of the small size of this sherd, further identification was not possible.

Glass

During excavation, two glass artifacts were recovered: a clear window glass fragment found in level A above the road and a small fragment of smoky clear bottle glass found in direct association with the logs. The small size of each of these items makes further identification and chronological placement impossible.

STRATIGRAPHY

Figure 5 illustrates the profile of the north wall of the excavation from the present surface of Main Street to beneath the log road. Descriptions of the eleven strata identified in Figure 5 are included in Table 1.

The profile reveals the successive layers of both earlier road surfaces and fill deposits. Analysis of sediments taken from these layers show well-sorted, beachlike sands above the logs, and glacial till below. The mineral content of these sediments is typical of sand-sized sediments in western New York. It is believed that the log road was constructed on naturally deposited glacial sediment and later overlain with successive layers of sand obtained locally, perhaps from Lake Erie beach deposits (Cazeau 1981:3).

The stratigraphy illustrates a general historical sequence of road construction on Main Street over the last 180 years. At least nine distinct strata were recognized in the north wall profile. These strata, identified by Roman numerals in Figure 5, represent separate chronologically distinct deposits. Separate components recorded within two of the strata (Strata II and VIII) are identified by lower case letters.

Stratum I. Stratum I consists of asphalt pavement, which is the present surface of Main Street. This pavement was placed as late as the 1950s. The stratigraphic profile shows that the asphalt, which is 5 to 10 cm. thick, was laid directly over the block stone and rails of the previous road surface.

Stratum II. This stratum represents the road surface and remnants of the trolley car system which operated on Main Street from about 1890 to 1950. Five separate components of this stratum are identified in the profile. These components illustrate how the road surface of Stratum II was constructed.

A 20-cm. layer of stone ballast (Stratum

TABLE I
STRATIGRAPHIC DESCRIPTION

Strata	Description of Material	Interpretation
I	Asphalt pavement	Present road surface
IIa	Stone and mortar	Block stone pavement
IIb	Quarry crush	Sand and gravel deposit placed below block stone
IIc	Concrete	Concrete pavement, associated with trolley system
IId	Railroad tie and rails	Trolley tracks
IIe	Quarry crush	Stone ballast to support trolley tracks
III	SAND: gray/tan, bulk/fine sand; pebbles, rotted wood, and glass.	FILL: fairly well-sorted beach sand
IV	SAND: yellow/tan, uniform, well-sorted; pebbles.	FILL: fairly well-sorted beach sand
V	SAND: dark gray/brown, dries to pale gray/brown; organic fragments common; pebbles.	FILL: fairly well-sorted beach sand
VI	SAND: medium gray/brown, dries to pale gray/brown; organics and some grit present; predominantly fine sand.	FILL: fairly well-sorted beach sand
VII	CLAY SAND: unlike other sands, this may have a glacio-lacustrine origin; pale brown when dry; contains some shell fragments and pebbles, but is predominantly reworked clay and very fine sand/silt; sieving yielded a sand distribution, but further examination indicates that this contains a large proportion of aggregated lumps (sand/silt bonded by clay); overall behavior is that of a coarse pebbly sand, but composition is dominated by the aggregate clasts, not the primary components; hence, a poorly-sorted clay sand reworked by latter events seems to be indicated	FILL: not well-sorted sand of glacial origin
VIIIa	ORGANICS: Predominantly rotted wood debris.	FILL: earth mantel applied above and between logs
VIIIb	Log	Log road pavement
IX, X	SILTY SAND: pale brown; coarse sizes absent; exhibits little evidence of disturbance in its behavior of composition.	NATURAL DEPOSIT: not well sorted sand of glacial origin

Source: Cazeau 1981.

IIe) was first laid over the ground surface. As seen in the profile, a portion of the ground may have been excavated in order to provide a level bed for the route. The eastern end of Stratum III extends above the ballast on the east side of the trench wall, suggesting that a portion of this deposit was removed when the rails were laid.

Wooden ties (IId) were set into the stone ballast, and the rails were placed on top of these ties. Between the rails, mortared block stone (IIa) was laid over a small bed of crushed stone (IIb). Early photographs of Main Street taken during the late 19th century show block stones as part of the trolley system pavement (Dibble 1980a: H-8).

Concrete (Stratum IIc) also was identified as part of the trolley system pavement. Concrete was widely used in the latter part of

the 19th century. Only the eastern edge of the profile contains concrete. Cobbles were recorded only between the rails. The use of concrete is restricted to the area outside of the trolley tracks, and is contemporaneous with the block stone pavement.

Strata III through VII. These five strata represent successive layers of sand fill which were deposited over the log road. Each stratum is between 10 and 20 cm thick and represents a distinct fill deposit. The deposits were placed over a 70 year period from when the log road was first in use (1807-1820) to when the trolley system began operation (1890). It could not be determined from either the profile or from documentary evidence exactly when the fill materials were deposited, or whether these deposits were laid consecutively over a period of weeks or years. The only diagonostic artifact recovered from the fill deposits was a horseshoe fragment, dating to the early part of the 19th century. Since the horseshoe was uncovered during the initial backhoe excavation, exact placement of the artifact could not be determined.

Stratum VIII. Stratum VIII represents the original log road surface. It is divided into two components: a 5- to 12-cm. thick organic deposit of wood fragments and bark (Stratum VIIIa) and the logs themselves (Stratum VIIIb).

Stratum IX. The deepest level excavated, Stratum IX is the original ground surface. It is a deposit of unsorted, silty sand, and lies at a depth of 1.8 m. below the present street surface.

Only three distinct road surfaces were identified. Although other pavements, such as gravel, macadam, and plank, have been recorded elsewhere on Main Street, none of these surfaces appear in the excavation. However, during monitoring of construction along other areas of Main Street, portions of what may be a macadam pavement were recorded at a depth of 80 cm. in one of the fill layers above the log road. No macadam pavement was found during data recovery. It is possible that any previously existing macadam and plank roads were removed during the leveling of the roadway for the trolley system. Since a portion of Stratum III has been disturbed, it is likely that any road surface associated with this level also were removed.

Disturbances from utility trench excavations are illustrated in Figure 5. The most recent trench is shown on the east side of the wall profile. This trench, which was excavated during the summer of 1980, cuts through all of the stratigraphic levels. A portion of the log road was removed during excavation of this trench. The trench on the west side is much older and is the result of excavation of a waterline which runs down the center of Main Street. An examination of the profile reveals that this waterline was placed in the ground prior to the construction of the trolley line and the block stone road surface in the late 19th century. The trench cuts through Strata V through IX, but is overlaid by the undisturbed ballast (Stratum IV) of the trolley system.

SUMMARY

The field investigation along with the historical research enabled questions to be answered regarding the age, function, and construction of the log road. Although the number of artifacts recovered was low, the dates for those that were recovered correlate well with the documentary evidence. A handwrought iron horseshoe was recovered from the fill layers overlying the log road. Although no specific provenience is available for this artifact, the manufacture and use of this type of horseshoe dates to c.1800 (Noel-Hume 1969:237-239; Figure 74 #6). Three handwrought nails, most likely dating from no later than the early 19th century, also were recovered from the excavation units directly over the log road surface. Also, a brass coat button dated from the late 18th century was recovered (Vandrei and Nagel 1981:15).

Available documentary evidence supports the dates obtained for the button and the wrought iron artifacts. It is unlikely that the logs were in place prior to 1798. Before that

date, Main Street was an Indian trail (Koszuta 1969:27-30). In 1798, the trail was widened to accommodate wagon traffic. Log causeways were employed shortly after the turn of the 19th century (Bingham 1937:336). Documentary evidence places construction between 1800 and 1810.

Evidence supports the final date for use of the log road as 1839 or 1840, when a macadam road was constructed on Main Street (Burr 1840; Johnson 1876:412). Although no evidence of the macadam road was uncovered during data recovery excavations, monitoring of construction activities located what may be a macadam surface at a depth of approximately 80 to 100 cm. The log and probable macadam surfaces were separated by 5 to 20 cm. of earth fill. The early date of 1798 and the later date of 1840 correlate well with the probable use-span of the button and wrought iron artifacts.

The purpose of the logs was to fill in a low wet area to prevent vehicles becoming mired in mud. Excavation uncovered logs either embedded in, or resting on top of, fine grain deposits of silty clay sand and sandy clay, which suggest a wet area. Although additional logs were periodically noted during subway excavations, there was no evidence of a continuous log surface. In every case, the logs were found embedded in a similar silty layer and overlain by various layers of fill. The archaeological evidence, as interpreted, correlates with the documentary evidence. In most cases, the logs were used as causeways and were not part of the continuous pavement. Construction methods for the log road were not complicated. Since trees were plentiful, they were used as the most expedient material to cover poorly drained areas. Log causeways were often used while leveling hillock areas and filling in low areas of the road. Soil was then placed between and on top of the logs to level the surface of the logs and to provide a more permanent road (Bingham 1937:337-338).

Excavations at UB 1682 demonstrated that logs were placed directly over the wet area, perpendicular to the traffic flow, and were fitted together as closely as possible. In one case where an odd "V"-shaped tree trunk was used, another log was closely fit next to it (Unit ON 2E; Figure 2). Smaller branches were placed between larger logs to make as smooth a surface as possible before an organic layer was added. Excavation showed that a 2 to 5cm. thick deposit of organic material was then placed over the log surface. The nearest available trees were used to construct the causeways. Preliminary identification of log samples indicates that cedars and other hardwoods indigenous to poorly-drained areas were used. A complete stratigraphic sequence of road building was not uncovered during the field investigations. The historic research indicates that gravel, macadam, and plank surfaces were used also on parts of Main Street. Although portions of what may have been a macadam surface have been observed while monitoring construction activities in other areas of Main Street, no evidence of a plank or gravel surface was noted. However, despite the nature of urban development, historic resources can still be found in an undisturbed setting. The stratigraphic profile serves to graphically illustrate extensive fill sequences that can occur in many urban areas. Historic fill not only serves to conceal historic resources but to protect and preserve them.

ACKNOWLEDGMENTS

This article is a condensed and edited version of a report submitted to the Niagara Frontier Transportation Authority (NFTA) in June 1981 (Ecology and Environment, Inc. 1981). Research on the Buffalo Log Road was conducted with public funds provided through PL 93-291. The NFTA and the engineering firm of Cordry, Carpenter, Dietz and Zack deserve special thanks for their cooperation and logistical support. Ecology and Environment, Inc., in particular Mr. Gerald Strobel, provided the corporate support required for the production of this paper; Patrica Kammer, who prepared the graphics for this paper; and Nancy Schiller, who edited the original report which was the

basis of this paper. The authors also acknowledge the valuable comments provided by anonymous reviewers. Of course, authors alone take full responsibility for the content of this paper.

BIBLIOGRAPHY

Anonymous
1951 *The Buffalo Evening News,* March 16, p. 47.

Beers, Frederick W.
1880 *Illustrated Historic Atlas of Erie County, New York.* F.W. Beers and Company. New York.

Bingham, Robert Warwick, Editor
1937 *Reports of Joseph Ellicott as Chief of Survey (1791-1800) and as Agent (1800-1821) of the Holland Company's Purchase in Western New York. Holland Land Company's Papers.* Volume 1. The Buffalo Historical Society. Buffalo.

Bingham, Robert Warwick, Editor
1941 *Reports of Joseph Ellicott as Chief of Survey (1797-1821) of the Holland Land Company's Purchase in Western New York. Holland Land Company's Papers.* Volume II. The Buffalo Historical Society. Buffalo.

Bloodgood, S. Dewitt
1838 *Treatise on Roads, Their History, Character, and Utility.* Oliver Stetle. Albany.

Bureau of Engineering
1897 *Index to Records of Streets, Public Grounds, Waterways, Railroads, Gas Companies, Water Works, etc. of the City of Buffalo from 1814 to 1896.* The Wenborne-Sumner Company, Printers. Buffalo.

Burr, David H., (Ed.)
1840 Map of Erie County. *Burr's Atlas of New York State.* David H. Burr and Company. New York.

Byrne, Austin T.
1892 *A Treatise on Highway Construction.* John Wiley and Sons. New York.

Byrne, Austin T.
1917 *Modern Road Construction.* American Technical Society. Chicago.

Cazeau, Charles J.
1981 Buffalo Log Road Site (UB 1682): *A Geological Analysis.* CPF Associates. Buffalo.

Chazanoff, William
1970 *Joseph Ellicott and the Holland Land Company: The Opening of Western New York.* Syracuse University Press. Syracuse, New York.

Cummings, Uriah
1907 Indian Trails of Western New York. *Akron Herald.* Akron, New York.

Dibble, Ralph
1980 Story of Mass Transit is Filled with Irony. *The Buffalo News:* Sunday, June 1, 1980, p. H-8.

Dibble, Ralph
1980b Buffalo Led in Rail Transit—Nearly a Century Ago. *The Buffalo News,* Sunday, June 1, 1980, p. H-8.

Durrenberger, Joseph Austin
1931 *Turnpikes: A Study of the Toll Road Movement in the Middle Atlantic States and Maryland.* Southern Stationery and Printing Company. Baldosta, Georgia.

Ecology and Environment, Inc.
1981 *Archaeological Investigations of the Buffalo Log Road Site (UB 1682 Buffalo, New York: Data Recovery Program.* Report submitted to the Niagara Frontier Transportation Authority. Buffalo, New York.

Encyclopedia Britannia
1974a Roads and Highways. Volume 15, pp. 892-906. Encyclopedia Britannica, Inc. Chicago.
1974b John Loudon McAdam. Volume 6, p. 426. Encyclopedia Britannica, Inc. Chicago.

Evans, Paul D.
1924 *The Holland Land Company.* Buffalo Historical Society. Buffalo.

Geddes, George
1850 *Observations upon Plank Roads Together with the General Plank Road Law of the State of New York.* L.W. Hall, Syracuse; and A.S. Barnes and Company. New York.

Gillespie, William M.
1871 *A Manual of the Principles and Practice of Road-Making.* A.S. Barnes and Company. New York and Chicago.

Hammersley, Margaret
1969 Niagara Frontier Roads that Grew from Indian Trails. *The Buffalo Evening News,* September 20, 1969.

Horton, John T., Edward T. Williams, and Harry S. Douglas
1947 *History of Northwestern New York, Erie, Niagara, Wyoming, Genesee, and Orleans Counties.* Volume I. J. Horton, editor. Lewis Historical Publishing Company, Inc. New York.

Johnson, Crisfield
1876 *Centennial History of Erie County, New York.* Printing House of Matthews and Warren. Buffalo.

Kingsford, W., F.G., Skinner, and O.E. Clarke
1851 *History, Structure and Statistics of Plank Roads in the United States and Canada with Remarks on Roads in General and a Letter on*

Plank Roads. Hart, Carey, and Hart; Philadelphia.

Koszuta, Joanne Barbara
1969 An Interpretation of the Sequent Patterns of Trails, Roads, and Highways on the Niagara Frontier to 1950. Masters of Arts Thesis, State University of New York at Buffalo.

Levy, Michael
1980 "City Fathers Saw its Roads as the Path to Future Growth." *The Buffalo Evening News*, Sunday, June 1, 1980, p. H-9.

Noel-Hume, Ivor
1969 *A Guide to Artifacts of Colonial America*. Knopf; New York.

Owen, Robert Dale
1850 *A Brief Practical Treatise on the Construction and Management of Plank Roads*. Kent and Norman, Publishers; New Albany.

Reeves, Jean
1957 Main St.—Road of Dreams; Progress. *The Buffalo News*, March 23, 1957.

Sidway, Parnell
1906 Recollection of the Burning of Buffalo. In *Publications of the Buffalo Historic Society*. F.H. Severance, editor. Volume IX, pp. 311-336.

Smith, Henry Perry
1884a *History of Buffalo and Erie County*. Volume I. D. Mason and Company, Publishers. Syracuse.

Smith, Henry Perry
1884b *History of Buffalo and Erie County, New York*. Volume II. D. Mason and Company, Publishers. Syracuse.

Vandrei, Charles E., and Brian Lee Nagel
1980 *Archaeological and Documentary Research on UB 1682 Buffalo Plank Road*. Reports of the Archaeological Survey. Volume 12, Number 15. Department of Anthropology, State University of New York at Buffalo.

White, Truman C., (Ed.)
1898 *Our Country and its People: A Descriptive Work on Erie County, New York*. Volume I. The Boston History Company, Publishers. Boston.

Authors:

Michael A. Cinquino
Carmine A. Tronolone
Ecology and Environment, Inc.
P.O. Box D
Buffalo, New York 14225

Marvin G. Keller
Bureau of Reclamation
P.O. Box 2553
Billings, Montana 59103

Charles E. Vandrei, Jr.
New York State Department of Environmental Conservation
150 Wolf Road
Albany, New York