Phase I Archaeological Investigations of the Glenwood Parcel For the Southwest Light Rail Transit Project, Minneapolis, Minnesota

(#13P026 Amendment #2)

Prepared for
Metropolitan Council

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Chapter 1: Introduction

Project Overview

In August 2013, the Metropolitan Council contracted 10,000 Lakes Archaeology, Inc. to evaluate seven archaeological sites for the Southwest Light Rail Transit Project (project). The final report for these evaluations was submitted in February 2014. The contract was amended in July 2014 to include Phase I investigations at two parcels (Area A and Area B) in Eden Prairie, and Phase Ia research with the potential for Phase I and subsequent Phase II investigation at the Holden-Royalston parcel in Minneapolis. The contract was subsequently modified again in December 2014 to conduct Phase Ia with the potential for Phase I and Phase II investigations at the Glenwood-Royalston parcel.

This work is being conducted in anticipation and preparation for project-related construction and maintenance activities which have been determined by the Federal Transit Administration (FTA) as an undertaking as defined by the National Historic Preservation Act (NHPA). Thus, the project is subject to the provisions of Section 106 of the NHPA which requires federal agencies to consider development impacts on historic properties as part of the planning process. The Cultural Resources Unit (CRU) of the Minnesota Department of Transportation (MnDOT) acts on behalf of FTA for the Section 106 review process for the Project.

The research and archaeological investigations documented in this report represent the latest step of archaeological and historic property identification over several years of work guided by *Southwest Transitway: A Research Design for Cultural Resources* (Roise et al. 2010) (Appendix A). This report presents the results of the Phase Ia background research, and Phase I investigations for the Glenwood-Royalston parcel in Minneapolis.

10,000 Lakes Archaeology Inc. conducted Phase Ia background research, and Phase I investigations for the Glenwood-Royalston parcel in Minneapolis. The 10,000 Lakes Archaeology, Inc. team was comprised of three separate companies. Amanda Gronhovd, President of 10,000 Lakes Archaeology, Inc., served as Project Manager and Principal Investigator. Ryan Grohnke, archaeologist at Westwood Professional Services assisted with the background research and archaeological fieldwork. Geoffery Jones of Archaeo-Physics, LLC, conducted the geophysical investigations and served as the project Geographic Information System (GIS) specialist.

The Environmental Setting and Historic Context were previously presented in presented the Royalston Phase I and Phase II report, and the Holden Phase Ia, Phase I, and Phase II reports (Gronhovd et al, 2014, and Gronhovd and Maki 2015), and thus are not included in this document.

Chapter 2: Research Methods

By Amanda Gronhovd and Geoffery Jones

Background Research

Literature and Archival Research

Background research for this project took place during early 2015, and included examination of the Minnesota Archaeological Site Files and Minnesota Architectural History Site Files at the State Historic Preservation Office, historic maps (plat, city, insurance, etc.), local histories, and city directories. These sources were housed in a variety of locations, including the Minnesota Historical Society, Hennepin County Library, and State and Local agencies.

Field Methods

Field methods employed during this project included a ground penetrating radar survey and formal excavation.

Geophysical Field Methods

Introduction

The ground penetrating radar (GPR) survey covered 1,400 square meters, and was conducted at the Glenwood parcel on July 3rd and 10th, 2015 (Figure 1). Geoffrey Jones of Archaeo-Physics, LLC, conducted the survey under the direction of Amanda Gronhovd of 10,000 lakes Archaeology, Inc. David Maki and Oliver Jones of Archaeo-Physics assisted with data collection. The purpose of the survey was to map and assess possible subsurface archaeological resources in the asphalt and gravel parking lot.

Figure 1. Location of GPR survey area showing the altered alignments of Glenwood and Royalston Avenues.

GPR is a standard tool for subsurface mapping in archaeology. It can detect a wide range of archaeological features and patterning, even through pavement, and can create high-resolution maps of relatively great depths.

The GPR functions by sending high frequency electromagnetic waves into the ground from a transmitter antenna. The varying dielectric permittivity of the ground reflects some of these waves back to the surface, which are detected by a receiver antenna. The amplitude and two-way travel time of these reflections are recorded on a computer, and used to create a two-dimensional map. The graphic plot of a line of data can be thought of as a vertical profile of the subsurface, showing reflections caused by subsurface structures and objects (Figure 2).

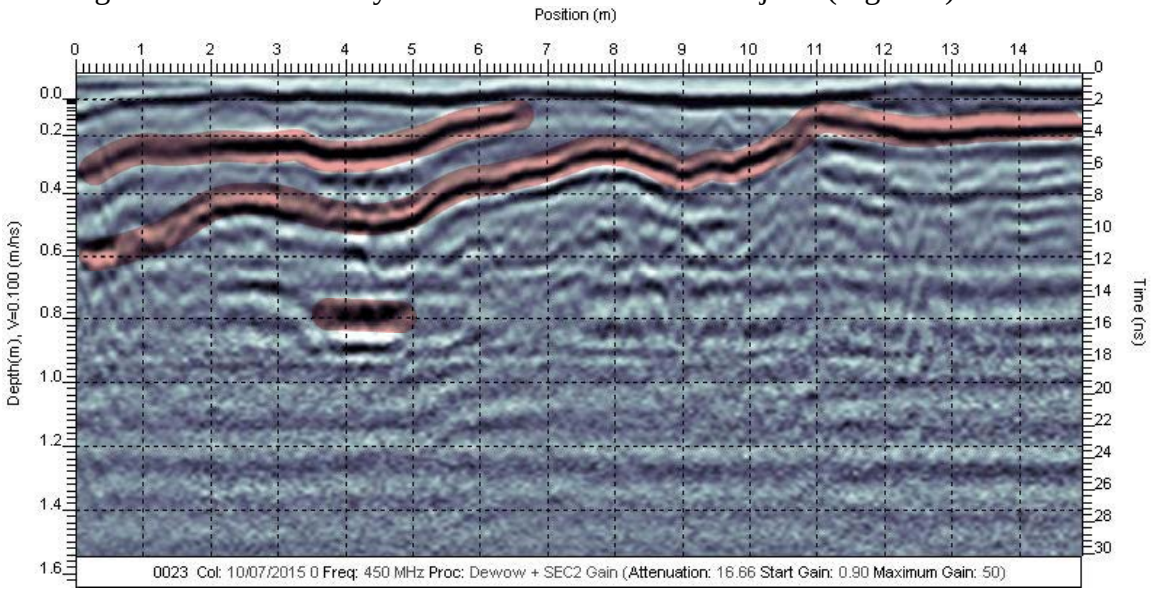

Figure 2. An example of a GPR depth section showing reflections *(highlighted in red)*.

GPR data are most often plotted as single transects, which appear as vertical profiles. A technique known as “time slicing” makes it possible to construct planview maps of an area which has been surveyed with multiple adjacent transects. Planview maps are constructed using the average amplitude of radar reflections within a selected time window (or estimated depth window). This not only makes interpretation of the data in the horizontal plane much more intuitive, but also allows one to isolate specific depths (or more properly, the two-way travel times of reflected waves) for examination. A more complete and technical discussion of the method can be found in Conyers and Goodman (1997), and Annan and Cosway (1992).

The effectiveness of GPR is controlled by the local soil conditions. GPR is most effective in locating buried objects or features in homogenous soils with a high electrical resistance. GPR is least effective in a heterogeneous environment with high electrical conductivity. A heterogeneous environment contributes to signal scattering and can result in insufficient depth of penetration and a “noisy” reflection (poor signal to noise ratio). A conductive environment, often the result of clay, silt, and other fine-grained sediments, can seriously reduce the depth the GPR can penetrate.

The GPR survey methods employed for this survey involves pulling the transmitter and receiver antennas over the ground at the same time. This is called fixed offset reflection mode. Spatial control along the transect is controlled by a trailing wheel odometer. The odometer triggers the system at regular intervals, causing the transmitter to emit pulses at regular intervals, which are picked up by the receiver.

GPR Survey Methods

The general procedure followed to perform the GPR survey is to divide the survey area into a series of square or rectangular "grids". Each grid is surveyed by taking readings at regular intervals along regularly spaced transects. Successive transects are surveyed until the grid is completed. The value and position of each data point is recorded in digital format.

The survey grid at Glenwood was established using measuring tapes. The corners of the grid were marked with steel spikes driven flush with the surface, paint, or wooden stakes in unpaved areas. The northern edge of the parking lot was not surveyed due to standing water.

The GPR survey was performed using a Sensors & Software pulseEKKO 1000 ground penetrating radar, operating at a center frequency of 450 MHz. Data were collected using a transect spacing of 0.5 m. Along each transect, data were collected continuously while position was tracked by a trailing odometer wheel, resulting in at least 20 traces per linear meter (80 traces per square meter). Each GPR trace consists of data points within a 60-nanosecond time window, encompassing a depth (estimated 3 meters) somewhat greater than the effective range of the instrument at this site.

Processing of GPR data were performed with Sensors and Software EKKO View Deluxe® and EKKOmapper® software:

- DEWOW signal saturation correction was used to remove unwanted inductive low frequency components.
- Interpolation to correct horizontal positions of traces and normalize the number of traces per meter.
- For depth slices, data were converted from wavelets with both positive and negative components to a monopulse wavelet with all positives (average enveloped amplitude).
- Depth slice maps were created representing planviews at 10cm vertical intervals (a nominal wave velocity of 0.1 m/ns was used to estimate depths).
- Further processing including interpolation and smoothing of time-slice data was performed in Fortner Transform® and Geoscan Research Geoplot® software.

After processing and analysis, magnetic and GPR data were exported from Geoplot to Golden Software Surfer® mapping software for display as image maps. Depth sections were displayed with EKKO View® software.

Archaeological Field Methods

Prior to conducting subsurface archaeological investigations, the asphalt was removed from the ground surface using a backhoe. Once the ground surface was exposed, test units were excavated to examine anomalies identified by the geophysical survey. The soil was removed from the trenches in five to ten cm levels, as appropriate. All soil from trenches was screened through ¼-inch hardware cloth to determine if artifacts were present.

Chapter 3: Glenwood-Royalston Historic Research

The Glenwood parcel is located in Minneapolis, east of Interstate 94 and north of Interstate 394 (Figure 3). Historically, the area was a business district adjacent to a residential neighborhood. Glenwood Avenue ran east-west, and was lined with buildings that housed small businesses on the ground floor and boarders on the upper floors (Figure 4).

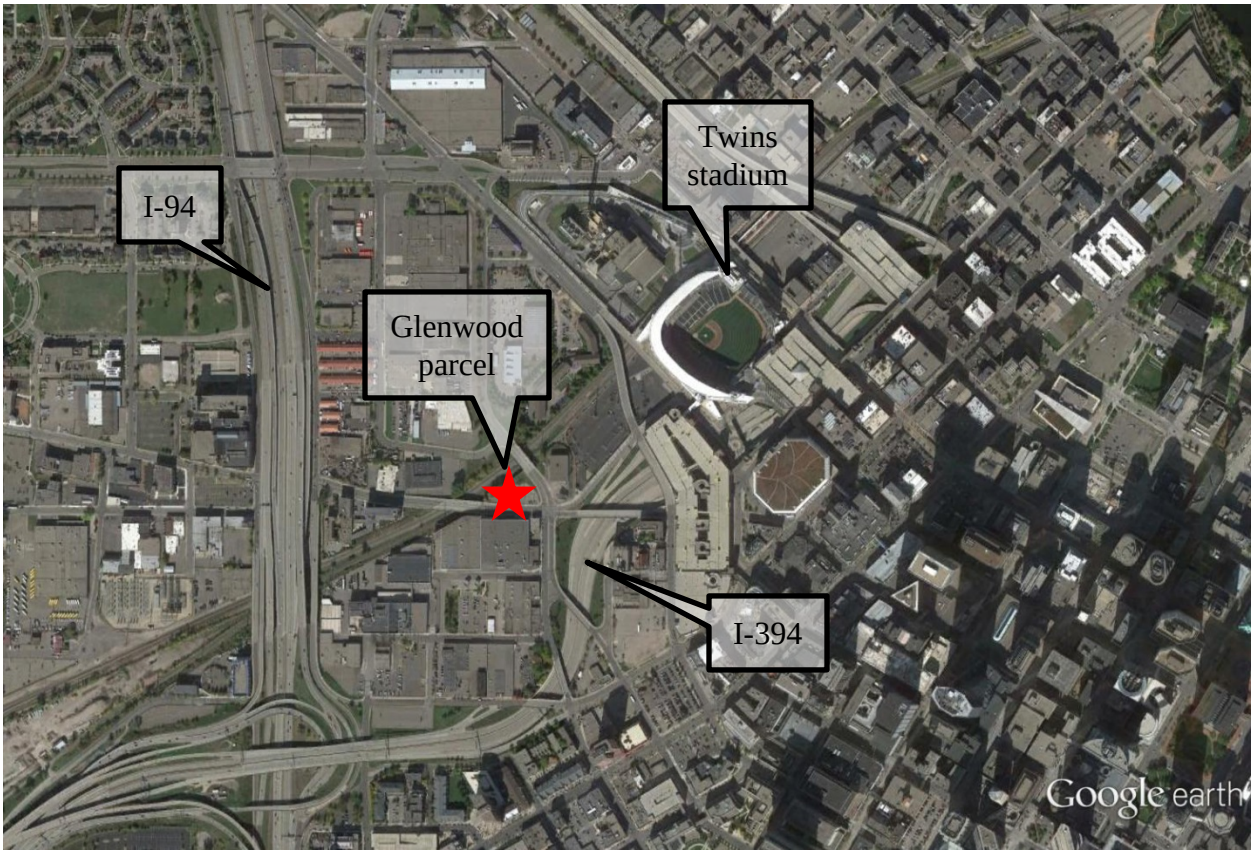

Figure 3. Location of the Glenwood parcel.

Figure 4. Modern aerial photograph with the 1889 Sanborn map showing historic layout of Glenwood (Western) Avenue.

Archival and Documentary Research

Background research for the Glenwood parcel took place during the summer of 2015. This research indicated that the parcel contained structures by the 1870s. The earliest of these structures were primarily listed as residences in the Minneapolis City Directories (1874, 1875, and 1876). By the 1880s, however, the lots contained grocers, cobblers, drug stores, and meat markets. Most of these business locations also had working-class boarders such as laborers, telephone operators, and railroad employees (Minneapolis City Directories 1883, 1888, 1894, 1896).

In the mid-1880s, the parcel's addresses changed from 1200-1232 Western Avenue to 100-124 Western Avenue. Despite the address change, the parcel continues to host a variety of shops and boarders, and in 1909, the Pearson Candy Company began operations at 108 Western Avenue (Minneapolis City Directories 1918, 1922; Pearson Candy Company 2015). In 1950, the Pearson's moved their candy company to St. Paul, and the majority of the structures on the site were removed between 1974 and 1978 (Figure 5) (MHAPO 1974, 1978; Pearson Candy Company 2015). Between 1983 and 1993, the last structure was removed (Figure 6). The parcel has been used as a parking lot since 1993.

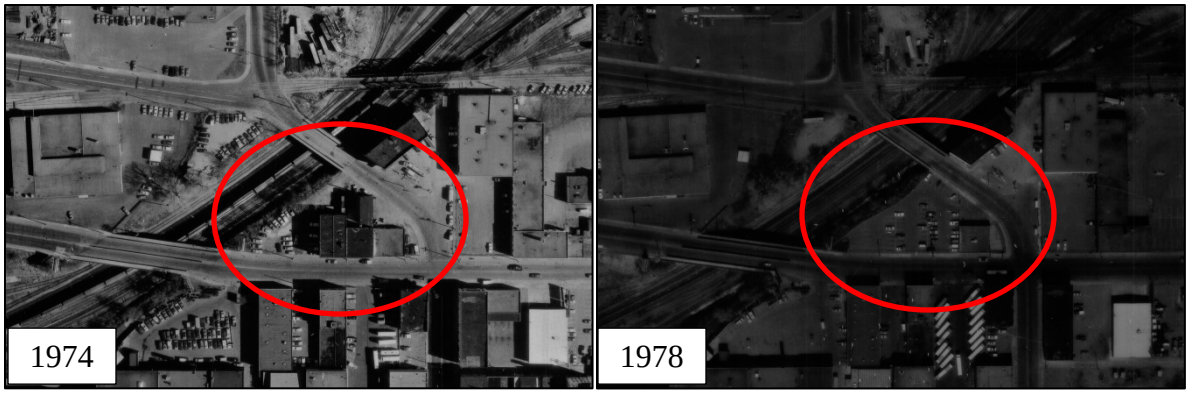

Figure 5. Aerial photos showing parcel in 1974 and 1978 (MHAPO 2015).

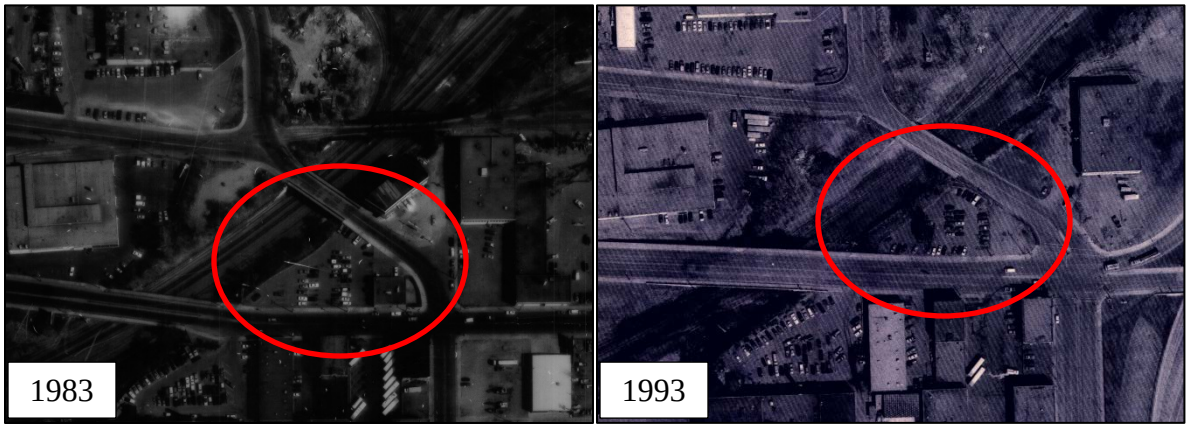

Figure 6. Aerial photos showing parcel in 1983 and 1993 (MHAPO 2015).

Georeferencing the historic maps and aerial photos onto modern maps and aerial photos indicate that the configuration of Highland and Western/Glenwood Avenues have shifted somewhat in the vicinity of the parcel (see Figure 4). The maps and aerials did not, however, indicate that a significant elevational change had occurred at the site due to dumping on the original ground surface, as has been the case in other archaeological investigations in the neighborhood, such as along Royalston Avenue (Gronhovd et al 2014) and Holden Avenue (Gronhovd and Maki 2015).

Chapter 4: Results and Interpretations

Ground Penetrating Radar

Survey results are presented as representative depth slices showing the average amplitude (strength) of reflected signals. Slices representing depths between 30 and 120 centimeters are shown in Figures 7-9. Shallower and deeper slices are not shown because they appear to show only patterning in the asphalt and gravel of the parking lot's surface, while the reflected signal below 120cm is very weak and does not show coherent patterning. These depth slices were examined for patterning of interest, and patterning consistent with anticipated historic features. The data plots are followed by a map of preliminary interpretations. These interpretations are not exhaustive, but show examples of the main classes of features suspected to be of interest.

In general, patterning of high-amplitude signals (darker shading) is most likely to be of interest, representing transitions between subsurface materials. These may be discrete objects, structures, or natural or anthropogenic strata. Zones of uniformly low-amplitude signal may be of interest as well. These may represent high-conductivity materials (such as fill containing slag or a high clay content) that attenuate the GPR signal.

Based on the results of the GPR survey, four specific areas were recommended for testing (Figure 7). These included two somewhat amorphous anomalies located in the southwestern and northern portions of the survey area, a substantial linear anomaly in the southcentral portion of the grid, and a very clearly expressed edge of a suspected feature in the southeastern portion of the survey area. (Due to the configuration of the parking lot entrance, the southcentral unit was shifted seven meters east, to allow cars to access the parking lot during the investigations.)

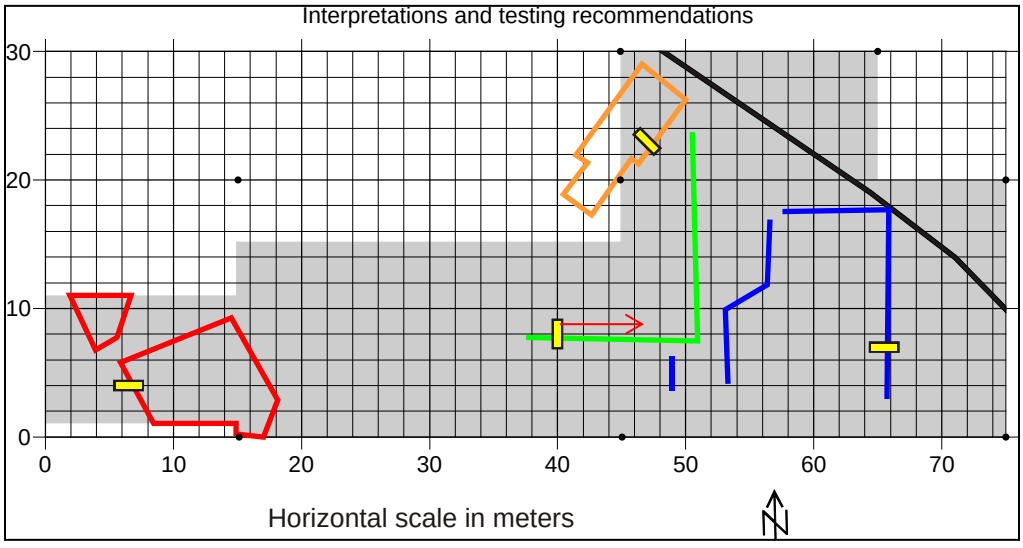

Figure 7. Interpretations of anomalies and testing recommendations (yellow rectangles).

In general, the eastern portion of the survey area shows extensive linear/rectilinear patterning, appearing throughout a range of depths from the near-surface to more than one meter (Figures 8, 9 and 10). This patterning is likely to be of architectural origin. Some irregularity in the linear

character of this patterning may be due to damage or partial collapse of architectural elements, or to informal construction (see blue outlining in Figure 6).

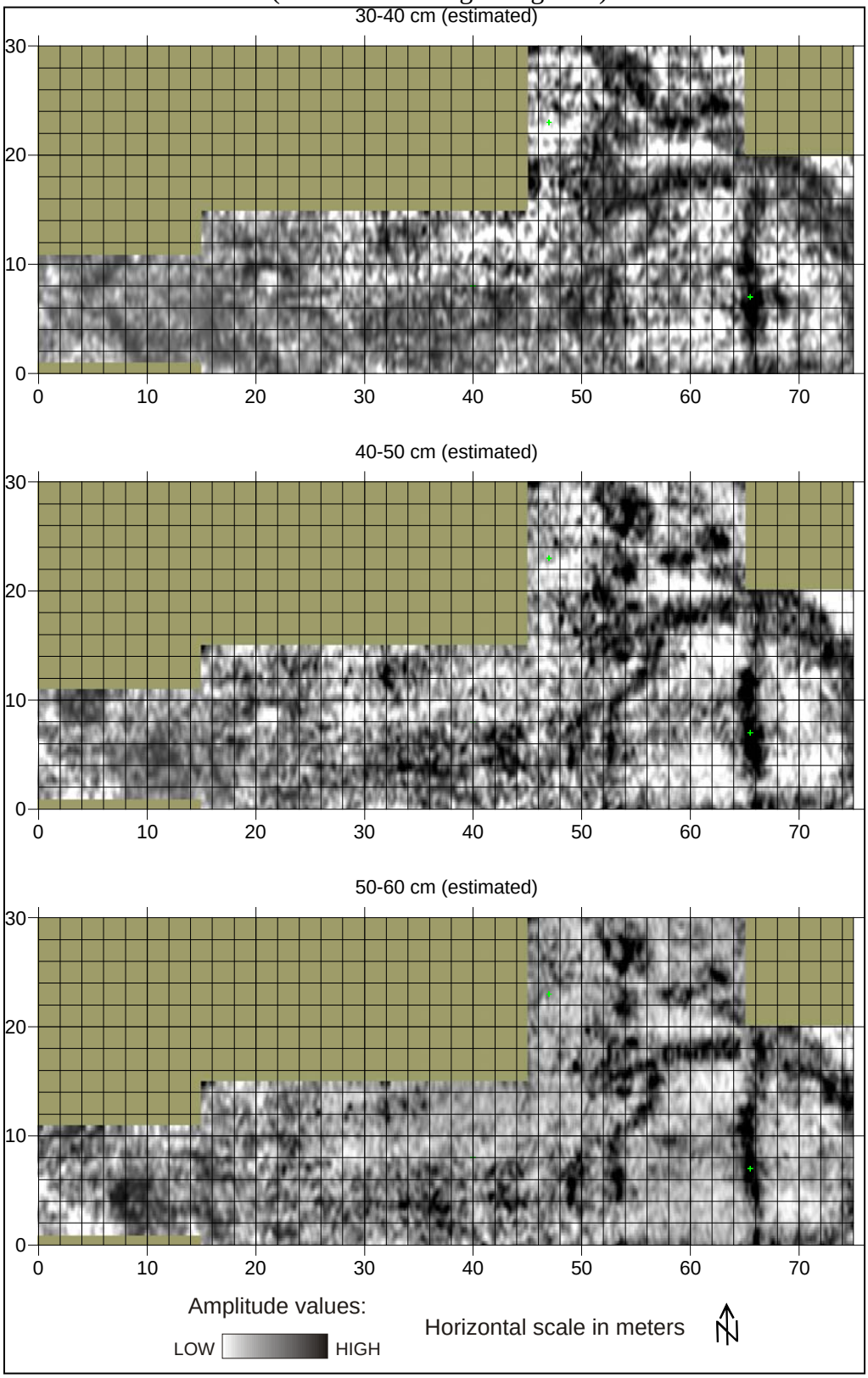

Figure 8. GPR depth slices, 30-60cm depth.

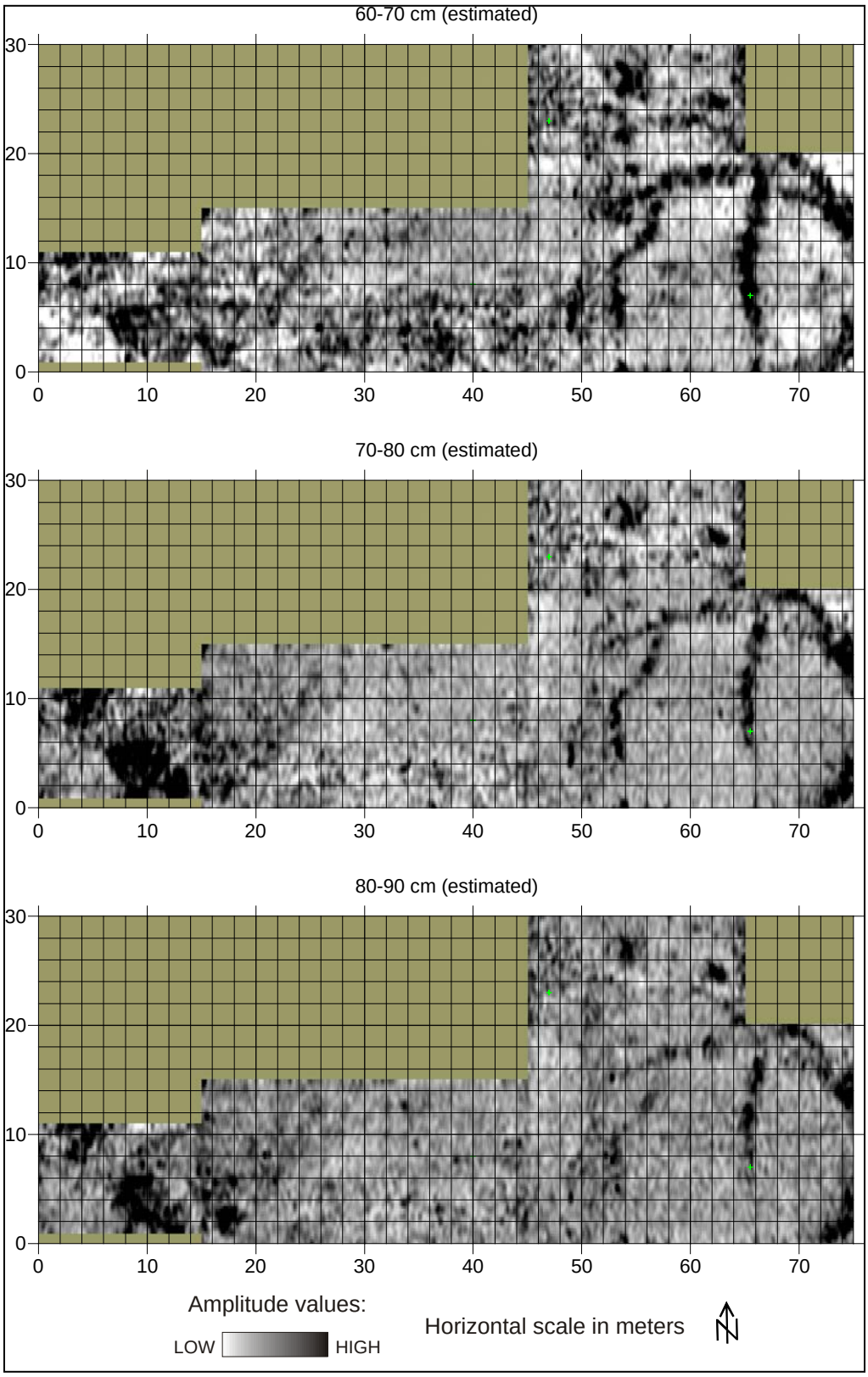

Figure 9. GPR depth slices, 60-90cm depth.

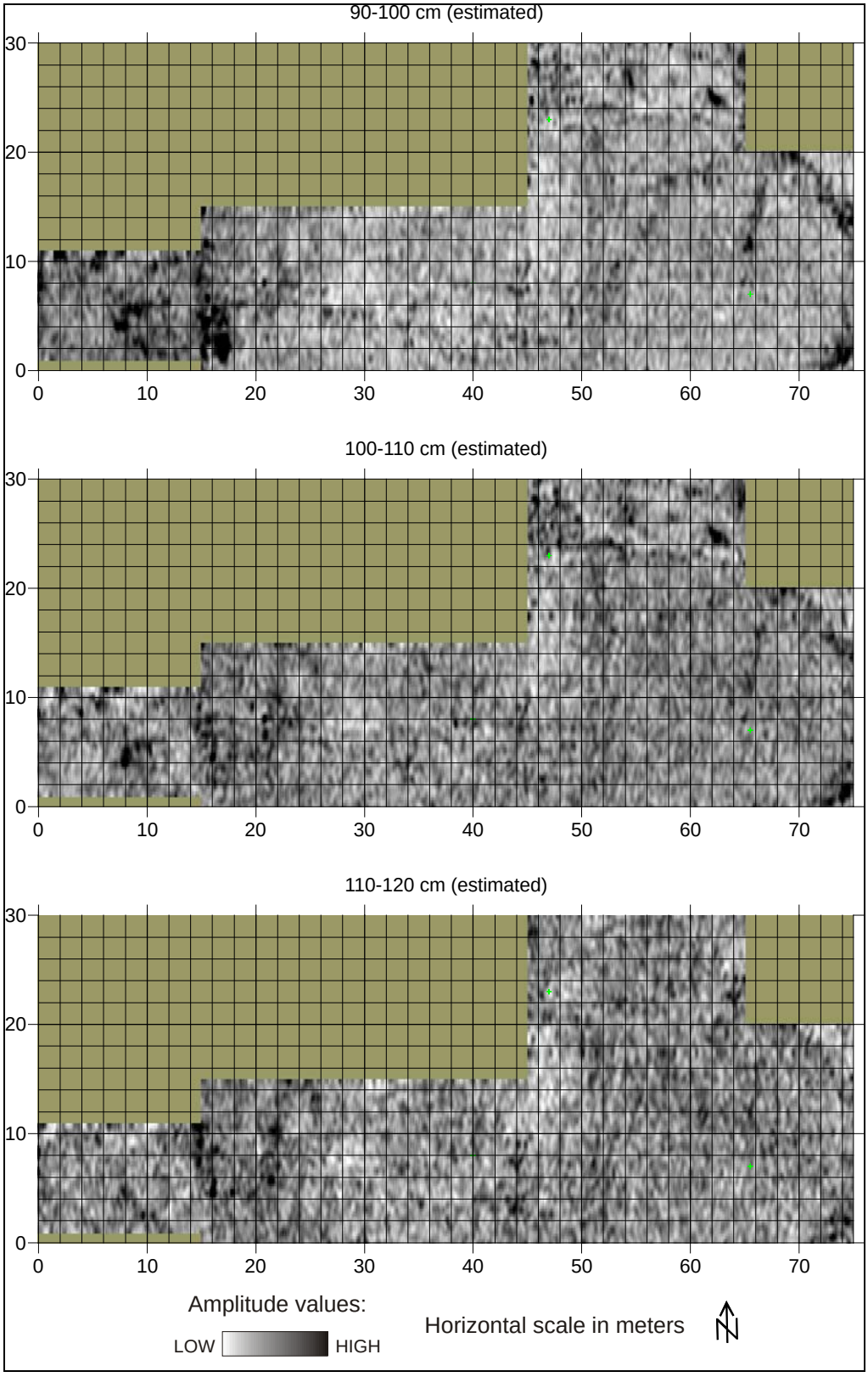

Figure 10. GPR depth slices, 90-120cm depth.

Very strong reflections, which appear to be potentially cultural, are located in the western portion of the survey area (see Figures 8, 9 and 10). They are visible from 50-100 cm depth, but are most clearly expressed from 60-80cmbs. The source of these anomalies is apparently complex, and not obviously architectural (see the red outlining in Figure 7).

Other patterning appears throughout the survey area that is weak or ambiguous (see Figures 8, 9 and 10). While these patterns may not be readily interpretable, they could express features of archaeological importance. The results of testing or excavation may inform the interpretation of currently ambiguous patterning. The first of these ambiguous anomalies indicates a possible wall or foundation, which is very faintly expressed at 80-100 cmbs (see green outlining in Figure 7). This anomaly might also be related to the edge of a zone of high amplitude appearing at 30-50 cm below surface.

The second ambiguous area indicates the approximate location of a structure recorded on the 1889 Sanborn map (see orange outlining in Figure 7). This coincides with a very faint area of higher-amplitude response appearing at approximately 100 cm below surface. This anomaly is weak and poorly defined, and not obviously of architectural origin. Nevertheless, this early building is potentially a very interesting target.

It should be noted that some relatively strong and coherent pattern occurs on the northeast corner of the survey area, but this appears to be in the former location of Royalston Avenue and adjacent sidewalk, and may not be of historical interest (see black outlining in Figure 7).

Archaeological Investigations

The purpose of the investigation was to determine whether intact archaeological deposits relating to the businesses and residents who had occupied the site were present under the parking lot, which covered the parcel. To accomplish this task, archaeologists monitored the excavation of mechanical test pits, and excavated formal units.

Amanda Gronhovd, Ryan Grohnke, Grayson Larimer, and Timothy Tumberg conducted the investigations in September and October 2015. John Buelow of Buelow Excavating operated the backhoe for the mechanical excavations. Four mechanical units were excavated within the parcel using a backhoe. These units were located in areas where the geophysical survey identified anomalies, indicating potentially significant archaeological features (see Figure 7). Four formal test units were also excavated. One was located within Mechanical Unit 1 (westernmost) and three were excavated in Mechanical Unit 4 (easternmost) (Figures 11 and 12).

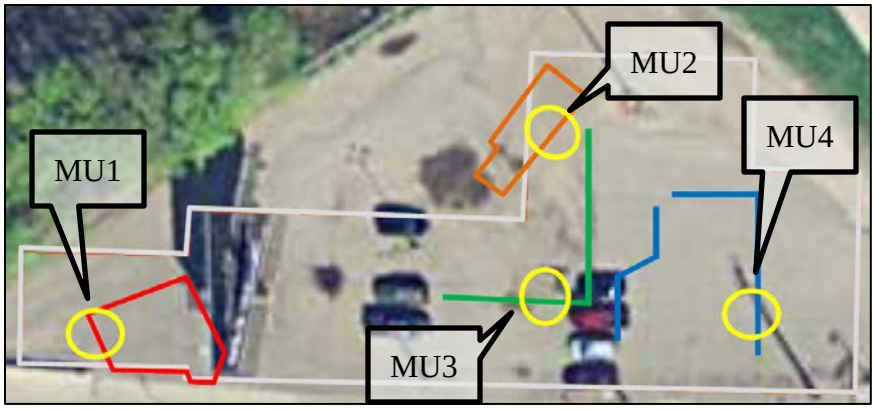

Figure 11. Locations of excavation (yellow) and anomalies being investigated.

Figure 12. Locations of Mechanical Units (yellow) and Test Units (red).

Mechanical Unit 1

The westernmost mechanical unit was placed over an anomaly identified between 60 and 80 cm below ground surface (cmbs). The asphalt in this location was degraded, and so was removed using the flat bucket on the backhoe. The soil was removed in approximately six-inch levels. The

deposits appeared to consist predominantly of fill (including a “No Parking” sign from the City of St. Paul). The mechanical unit was excavated to an approximate depth of 55cmbs.

To investigate the nature of the deposits within Mechanical Unit 1 (MU1), and in an attempt to determine the source of the anomaly, a 50cm by 150 cm formal excavation unit was placed in the bottom of MU1. Excavation of Test Unit 1 (TU1) extended to 85 cm below the bottom of the mechanical unit (approximately 140 cmbs). All deposits were from modern dumping and filling episodes, and no potentially significant historic archaeological remains were identified. Based on the excavation, it appears as though the anomaly identified during the geophysical survey merely consisted of different dumping and filling episodes (Figure 13).

Figure 13. Photograph of Unit 1.

Mechanical Unit 2

The northernmost mechanical unit (MU2) was placed over a faint anomaly identified approximately 100 cmbs. According to the 1889 Sanborn Fire Insurance Maps, a house was in this location. The area was chosen for examination, despite the faint nature of the anomaly, due to the potential age of the feature.

The asphalt in this location was degraded. Thus, a flat backhoe bucket was used to remove the soil in approximately six-inch levels. The deposits consisted entirely of fill, including bricks, concrete, electrical conduit, asphalt, and gravel. At a depth of approximately ten feet, a very hard “surface” was encountered. This surface might have been concrete or bedrock, however due to the extreme depth of the unit, the material could not be safely investigated. All deposits appeared to be dumping and filling episodes, and no potentially significant archaeological remains were identified (Figure 14).


Figure 14. Photograph of Mechanical Unit 2.

Mechanical Unit 3

The southcentral mechanical unit (MU3) was placed over a faintly expressed anomaly, potential indicating a foundation or wall between 80 and 100 cmbs. Pearson's Candy Company started their business at this location in 1909, and the 1912/1952 Sanborn Fire Insurance Map indicates that the "Candy Factory" and "Warehouse" were located in this area. The faint anomaly appears to align nicely with the division between the Warehouse, which had an "earth floor," and the Candy Factory (Figure 15).

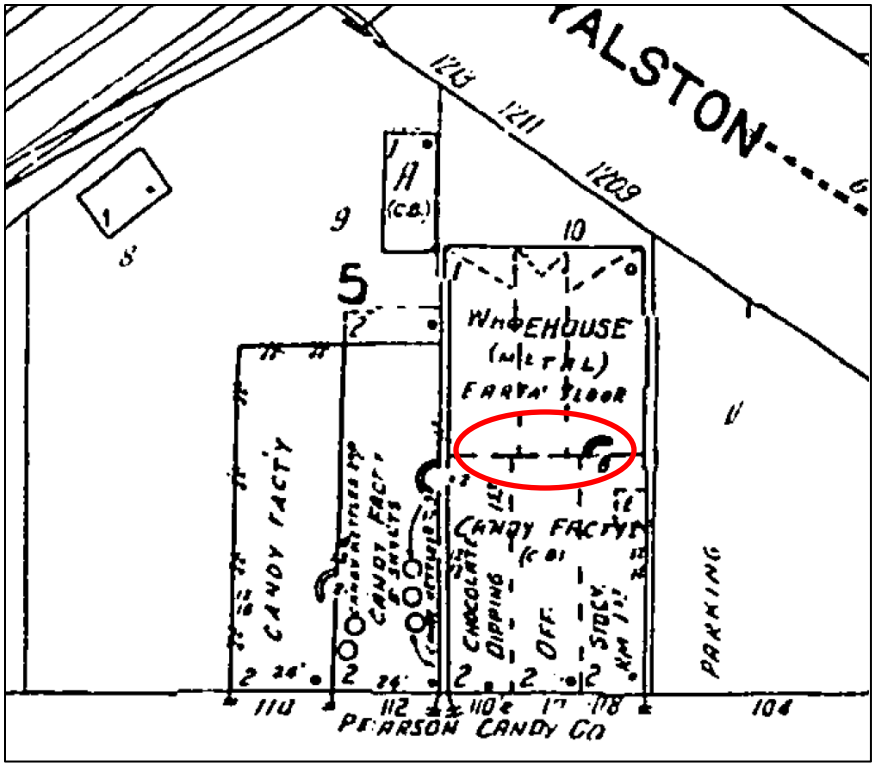

Figure 15. 1912/1952 Sanborn Fire Insurance Map.

The asphalt in this location was intact, so an hydraulic breaker was used to remove the asphalt. The soil was then removed in approximately six-inch levels using the flat bucket on the backhoe. The deposits consisted of modern fill, including bricks, concrete, asphalt, and gravel. Excavation ceased at a depth of approximately ten feet, for safety reasons. The source of the anomaly was not identified. All deposits appeared to be dumping and filling episodes, and no potentially significant archaeological remains were identified (Figure 16).


Figure 16. Photograph of Mechanical Unit 2.

Mechanical Unit 4

The easternmost mechanical unit was placed over a strong anomaly identified between 30 and 90 cmbs. The asphalt in this location was intact, so an hydraulic breaker was used to remove the asphalt. Then, the soil was removed in approximately six-inch levels using a flat bucket on the backhoe. Gravel and approximately 25 cm of fill were located under the asphalt. At approximately 41 cmbs, a wall was encountered. Mechanical excavation ceased, and three 1m x 1m excavation units were hand-excavated in the vicinity of the feature.

Test Units 2 and 3 formed an east-west trench, and TU4 was placed adjacent to the south side of TU3, within the mechanical unit (see Figure 12). The soils within these units generally consisted of fill and rubble over light brown sand, but no obvious historic level or original ground surface was identified. The anomaly identified during the geophysical survey, was caused by a north-south stone and concrete wall. The east side of the wall was constructed primarily with concrete pavers, while the west side of the wall was constructed with limestone slabs (Figures 17 and 18).

Figure 17. Photograph of the wall in TUs 2 and 3 (facing south).

Figure 18. Photograph of wall in TUs 3 and 4 (facing west).

The soil was primarily removed from the TUs in 5-cm levels. Excavation of TU2 ceased at approximately 40 cm below the mechanical unit floor (81cmbs), because the entire unit floor was covered by either the rock wall (eastern half) or concrete (western half). The deposits removed from TU2 appeared to consist of rubble and fill, and did not appear to represent intact historic strata.

As opposed to TU2, TU3 was excavated to 120 cm below the bottom of the mechanical unit (approximately 170 cmbs). These soils consisted of fill and rubble to approximately 82 cmbs, and light tan sand to 170 cmbs. Soil was removed in 5 cm level 110 cmbs, and then in 10 cm levels. The base of the wall was not located, however only one or two artifacts per level were

recovered from the sand, including nails, glass fragments, metal fragments, and asphalt shingle fragments. The deposits above the sand appeared to be fill and no obvious indication of an historic ground surface was located. It also appeared as though rodents and bioturbation carried the artifacts from the fill and rubble levels into the underlying sand, as opposed to being located within intact archeological deposits.

Artifacts

The artifacts recovered from the Glenwood parcel appear to have been entirely from fill, as opposed to intact historic deposits.

National Register of Historic Places Eligibility and Criteria

Survey of the Glenwood parcel located one historic wall feature. Based on the investigations of the wall and its context, no clearly intact historic artifact deposits were located. In order to determine whether the feature rendered the site *potentially eligible* for the NRHP, the information collected during the excavations was examined using the NRHP criteria A, B, C, and D.

These criteria address specific aspects of history, and are used to determine if a resource is eligible or potentially eligible for the NRHP. Eligibility under Criterion A, requires that a site be strongly tied to an event or a pattern of events that are significant to history. Under Criterion B, a site must be associated with a person who has had a significant impact on history. Criterion C states that a site needs to embody a distinctive form of construction, represent the work of a master, or possess high artistic value (Hardesty and Little 2000:35). The criterion most commonly applied to archaeological sites, however, is D, which asserts that a site is significant if it has or *is likely* to yield information important to history or prehistory.

National Register Criteria Considered

All four NRHP Criteria were initially considered at the start of this project, but as investigations proceeded, A, B, and C were removed from consideration. Criterion A was not used because archaeological sites eligible under Criterion A must be in good condition and have "excellent preservation of features, artifacts and spatial relationships" *and* convey a site's association to a significant historic event or pattern (National Park Service 1997:46). Because this site did not meet these criteria, it was not evaluated under Criterion A.

Integrity thresholds under Criterion B are the same as for A, and must be connected to an historically significant person. Because it did not meet the integrity thresholds and was not tied to an important person, Criterion B was not used to evaluate the site. Criterion C was also excluded from consideration because no features, structures or evidence were found that might indicate that the site embodied a distinctive form of construction or work of a master.

Ultimately, the site was examined under Criterion D. To be considered eligible to the NRHP under Criterion D, a site needs to be able to potentially answer questions important to our past, and retain integrity of location, association, and material (National Park Service 1997).

Mechanical excavations within the Glenwood parcel investigated four locations, and formal excavations occurred in two of these four locations. The formal excavations included one .5m x 1.5m test unit, and three 1m x 1m test units. None of these excavations identified clearly intact

and potentially significant archaeological deposits, although an historic feature was identified. Due to this lack of archaeological information, it seems unlikely that the site could yield information important to our past.

NRHP Recommendation

The Glenwood parcel is recommended **Not Potentially Eligible for the NRHP**, due to a lack of archaeological integrity and a concomitant inability to potentially answer significant questions relating to the past.

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Sanborn Fire Insurance Map Co.

1912-1952 *Minneapolis, Hennepin County.* Vol 6A. Sanborn Map Company, New York. Microfilm on file at Minnesota Historical Society Library.

Appendix A: Southwest Transitway: A Research Design for Cultural Resources

Southwest Transitway:
A Research Design for Cultural Resources
12 February 2010, updated 16 March 2010, 2 April 2010

Prepared by
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INTRODUCTION

The Hennepin County Regional Rail Authority is proposing to construct the Southwest Light Rail Transit (SWLRT) facility, linking the Intermodal Station in downtown Minneapolis with the central business area in suburban Eden Prairie. The line is located within the cities of Minneapolis, St. Louis Park, Hopkins, Minnetonka, and Eden Prairie.

The Federal Transit Administration (FTA) has determined that the proposed project is an undertaking as defined by the National Historic Preservation Act (NHPA) and is subject to the provisions of Section 106 of the NHPA. Section 106 requires that federal agencies take historic properties into account as part of project planning. The Cultural Resources Unit (CRU) of the Minnesota Department of Transportation (MnDOT) is acting on behalf of FTA for many aspects of the Section 106 review process for SWLRT. The FTA has also determined that the SWLRT is subject to the National Environmental Policy Act (NEPA) and a Draft Environmental Impact Statement (DEIS) is being prepared by Hennepin County under the direction of the FTA.

Through the NEPA scoping process, four build alternatives were identified. To streamline subsequent analysis, these alternatives were divided into five segments. The following table, which was included in the draft "Southwest LRT Technical Memorandum No. 9: Environmental Evaluation" (September 9, 2009), outlines the segments that are associated with each of the alternatives:

Alternative	*Segments*
LRT 1A	1, 4, A
LRT 3A	3, 4, A
LRT 3C-1 (Nicollet Mall)	3, 4, C-1 (Nicollet Mall)
LRT 3C-2 (11^{th}/12^{th} Street)	3,4, C-2 (11^{th}-12^{th} Streets), C-2A (Blaisdell Avenue), C-2B (1^{st} Avenue)

Segment 1 extends northeast from a station in Eden Prairie at TH 5 along a former rail corridor owned by the Hennepin County Railroad Authority (HCRRA) to a station at Shady Oak Road, on the border between Minnetonka and Hopkins.

Segment 3 creates a new corridor, running east from a station at Mitchell Road in Eden Prairie and turning northerly to terminate at the Shady Oak Station.

Segment 4 follows an existing rail corridor east-northeasterly from the Shady Oak Station through Hopkins and Saint Louis Park to the West Lake Station in Minneapolis, near that city's western border.

Segment A continues northeast from the West Lake Station, mostly using an existing rail corridor, to the Intermodal Station on the western edge of downtown Minneapolis.

Segment C also begins at the West Lake Station, traveling east along a former rail corridor (now the Midtown Greenway), north along one of several alternative courses under and on city streets, to and through downtown Minneapolis, and ultimately ending at the Intermodal Station or South Fourth Street. (For the purpose of this cultural resources assessment, all of the "C" variations will be considered as a single group.)

It should be noted that the above segments overlap at three points: the Shady Oak Station, the West Lake Station, and the Royalston/Intermodal Stations. When the results of the cultural resource surveys are sorted by segment, there will be redundancy in the findings at these three points. This redundancy is inevitable if the effects of each segment are to be analyzed. When a single alternative is selected, it will be necessary to eliminate duplicated properties to obtain an accurate representation of the effects of that alternative.

PROPOSED METHODOLOGY FOR ARCHAEOLOGICAL RESOURCES SURVEY

Christina Harrison, Archaeological Research Services
Mike Justin and Mike Madsen, HDR Engineering

This work plan outlines a program to identify archaeological properties which meet the criteria of the National Register of Historic Places in the project's area of potential effect (APE), to be used in assessing potential effects to those properties. Three primary tasks comprise the work plan. First, in order to provide a uniform assessment of available data across the five project segments discussed in the DEIS, the project team will prepare a report (by project segment within a broad APE) to include: results of the literature search, an archaeological probability assessment, and a field survey strategy (Task 1). It is expected that a limited amount of field investigation/sampling may occur as part of this task depending upon the weather. Second, an archaeological inventory/evaluation of the selected alternative will be completed, using a refined APE based on proposed construction (Task 2). Finally, a report of the field investigations of the selected alternative and an assessment of effects will be prepared (Task 3).

Task 1 will involve archaeologists from both HDR and ARS. Support will be provided, as needed, by Hess Roise research staff as well as by geomorphologists and other paleoenvironmental experts provided by HDR. Division of responsibilities will partly depend on what survey needs are identified by the background research, but primary responsibility for precontact and contact period archaeology will rest with Christina Harrison (ARS) and Michael Justin (HDR), and for historic archaeology with Michael Madson (HDR). The personnel for Tasks 2 and 3 are pending.

The survey will be conducted in accordance with all federal, state, and local requirements, including the Minnesota Field Archaeology Act and the Minnesota Private Cemeteries Act.

Area of Potential Effect (APE)

The APE for archaeological resources is generally defined as the anticipated limits of construction activities. At this stage in the project development, factors influencing those limits have not yet been fully identified. The APE, starting with a broad area at first, will be refined as the engineering design advances.

For Task 1, the APE for the literature search and probability assessment will be based, as appropriate, on the project limits as defined in the project engineering drawings used to prepare the DEIS. This will include the full width of existing railroad right-of-way corridors as well as the area within 100 feet on either side of the current engineering alignments. The APE near station areas also includes any undeveloped and/or vacant property within 500 feet that could potentially be utilized for construction/development activities. Depending on the station location, these may include open, green spaces (particularly in suburban areas) and paved parking lots (particularly in urban areas).

If the literature search/probability assessment identifies potentially significant historic features or high probability areas immediately adjacent to the above-referenced APE parameters, and if the significance of potential sites in these areas is expected to relate to National Register criteria A, B, and/or C, the APE for the field strategy for the Phase I-II survey may be adjusted to include these locations.

During Task 2, the APE will be reviewed in light of more detailed engineering plans. Throughout the design phase of the project, the adequacy of the APE will be periodically evaluated and expanded or retracted as necessary as project elements are added or modified. The survey report specified in Task 3 will provide a clear delineation of the surveyed APE, including all additions, so that the adequacy of survey efforts can be readily determined when project changes are proposed.

It should be noted that, generally, the APE for archaeological resources is a smaller area located within the APE for history/architecture resources.

Task 1. Report of Archival Review/Site Probability/Field Strategy

This task will uniformly represent the readily available information across the five project segments discussed in the DEIS. In general the report will be a desktop analysis of existing archaeological research data supplemented by a discussion of probability for previously unidentified archaeological properties. Field inspections may be utilized to confirm existing conditions, particularly to inform the discussion on field survey strategies.

The desktop analysis will utilize documents on file at the State Historic Preservation Office (SHPO) and the Office of the State Archaeologist (OSA). Historic maps and aerial photographs, local histories, and other archival information on file at the Minnesota Historical Society, the Borchert Map Library (at the University of Minnesota), and local libraries and historical societies may also be reviewed.

The task will review:

- archaeological survey reports on file at SHPO, OSA and other repositories in order to establish what segments of the project routes have already been inventoried according to current standards;
- known archaeological sites and/or (if applicable) recommendations/confirmations of NRHP eligibility;
- relevant USGS topographic maps and soil surveys as well as any Mn/Model information and other environmental and paleoenvironmental data pertinent to the assessment of pre-contact archaeological site probability, including land use histories;
- Historic maps and aerial photographs to identify localities with historic-period archaeological site potential.

A preliminary field review will be conducted. The survey team will document visible indications of topographic and hydrological features as well as past and current land use with concomitant loss of soil integrity. The information from field observations will be combined with the data gathered during the archival review to propose archaeological site probability along the five segments.

Pre-contact and historic-period contexts will be briefly reviewed, with a focus to inform the discussion of site types and assessment of probability. The probability assessment will be organized by the five project segments (1, 3, 4, A, and C). For each of the five segments the report will include:

- a general description of the APE;
- a discussion of previous surveys and previously identified sites;
- a discussion of historic site types and the associated conditions that may indicate a historic property;
- a discussion of archaeological probability (for pre-contact/contact period and historic-period), and;
- a survey strategy and methods, including specific places targeted for field investigation.

The survey strategy for precontact and contact period evidence will be guided by Native American and early Euro-American settlement and land use patterns identified by previous archaeological investigations in the vicinity including, for example, the 1992-1994 city-wide cultural resource survey of Eden Prairie, the corridor surveys conducted for Trunk Highway 212 and Trunk Highway 12, and a number of smaller scale compliance surveys conducted within the Nine Mile, Minnehaha and Purgatory Creek watersheds.

The results of Task 1 will be summarized in the DEIS.

Task 2. Inventory/Evaluation (Phase I-II) Survey

For the Inventory/Evaluation survey, the APE will be refined to reflect the updated engineering design. That refined APE will be surveyed in a manner consistent with the recommendations presented in the Task 1 report. Field methods outlined in the Minnesota SHPO and MnDOT CRU guidelines will be generally followed; any exception, as well as more detail specific to the existing conditions along each segment, will have been documented in the Task 1 report.

In the case of precontact/contact period Native American evidence, the field sampling will involve standard methods for identification and the preliminary assessment of horizontal and vertical site dimensions, integrity, and National Register potential. In addition, the survey may utilize targeted geomorphological testing and analysis in areas likely to feature deeply buried archaeological evidence.

Artifacts will be collected and analyzed in a manner consistent with contemporary standards. Artifacts from private property will be collected with written permission of the landowner. Historic period artifacts will only be collected if they appear to represent a potentially significant archaeological property.

Archaeological sites determined to have National Register potential will then require more comprehensive Phase II formal testing. As the Phase I review more than likely will have identified a wide range of site types associated with highly varied environmental settings and precontact to historic period contexts, the scope, research questions, field and analytic needs will be more appropriately defined at that stage of the investigation.

Task 3. Analysis and Reporting

A technical report of the Phase I and Phase II investigations, including the methodology, field work results, and recommendations, will be prepared in accordance with the guidelines of MnDOT's CRU, the Secretary of the Interior's Standards for Identification and Evaluation, and other applicable state and federal guidelines. This includes submittal of Geographic Information Systems (GIS) data per the CRU guidelines. All sites documented during the survey will be recorded on new or updated Minnesota Archaeological Site Forms.

Collected artifacts will be processed and analyzed in compliance with the survey guidelines of the SHPO and the Mn/DOT CRU. Artifacts will be curated at an approved facility as stipulated in the consultant's archaeology license.

PROPOSED METHODOLOGY FOR HISTORY/ARCHITECURE RESOURCES SURVEY

Charlene Roise, Hess, Roise and Company

Area of Potential Effect (APE)

Generally, the APE for history/architecture resources extends 300 feet on either side of the centerline of the alignment of each corridor. Around each station, the APE includes property within a quarter-mile radius. This area addresses anticipated project-related infrastructure work and reasonably foreseeable development.

The APE is illustrated in maps of the five project segments. Exceptions to the parameters outlined above include the following:

- The APE for the Intermodal Station (in segments A and C) includes all property within the boundaries adopted for the "Downtown Minneapolis Transit Hub" Environmental Screening Report (October 28, 2009 review draft) prepared for Hennepin County by Kimley-Horn and Associates. The area shown in the report is extended northeast of Washington Avenue to and across the Mississippi River to include the first tier of properties on Nicollet Island, to provide adequate APE coverage for the three-block potential station area and related developments such as rail storage yards. This area addresses infrastructure work associated with the SWLRT project as well as cumulative effects related to the development of the Intermodal station. (See below for discussion about splitting responsibility for survey of this area between the SWLRT project and the Intermodal Station project.)

- The APE for the 4th Street, 8th Street, 12th Street, Harmon Place, Hawthorne Avenue, Lyndale, and Uptown Stations (in segment C) includes the adjacent blocks in all directions from the station. This area is proposed for the stations in the more densely-built urban area, in comparison to the larger quarter-mile radius for other stations in outlying areas.

- The APE for the proposed tunnel area under Blaisdell, Nicollet, or First Avenues, including the 28th Street and Franklin Stations (in segment C), extends from one-half block west of Blaisdell Avenue to one-half block east of First Avenue. If this alternative is selected, the APE may need to be expanded in light of the design and construction methods for the tunnel.

- Along some portions of the corridor, the 300 foot APE may be extended to take into account visual effects. For example, if the 300 foot area comprises open space, and a row of buildings is located beyond, these buildings may be included in the APE.

- In some station areas, there are known areas of project related work and/or anticipated development outside of the quarter-mile radius, and these areas are included in the APE. This includes areas in downtown Hopkins.

The APE may also be adjusted if a field surveyor recommends that the project may affect a property or properties not included in the established APE boundaries.

As project planning proceeds, additional factors will be assessed to determine if there are other effects (direct, visual, auditory, atmospheric, and/or changes in use) which could require an expansion of the above APE. These factors include:

- Noise analysis, including areas where the use of bells and whistles is anticipated.
- Vibration analysis, including vibration related to project construction and operations.
- The specific locations of project elements, including operations/maintenance facilities, park-and-ride facilities, traction power substations, signal bungalows, and other infrastructure.

Survey Approach

Survey Zones

The project cuts through a number of distinct communities, each with a unique history. As a result, these communities, which share similar physical and historical characteristics, can serve as a framework for conducting the survey. The survey will be organized around the following zones (related project segments and stations are listed in parenthesis):

- Eden Prairie (Segments 1 and 3; Highway 5, Highway 62, Mitchell Road, Southwest Station, Eden Prairie Town Center, Golden Triangle, City West Stations)
- Minnetonka (Segments 1 and 3; Rowland, Opus, Shady Oak Stations)
- Hopkins (Segment 4; Shady Oak, Hopkins, Blake Stations)
- Saint Louis Park (Segment 4; Louisiana, Wooddale, Beltline Stations)
- Minneapolis west residential, including parts of Bryn Mawr, Lowry Hill, East Isles, Kenwood, Cedar-Isles-Dean, and West Calhoun neighborhoods (Segments A and C; West Lake, 21st Street, Penn Stations)
- Minneapolis south residential/commercial, including parts of the Stevens Square/Loring Heights, Whittier, Lowry Hill East, East Isles, and Cedar-Isles-Dean neighborhoods and the Midtown Greenway (Segment C; Uptown, Lyndale, 28th Street, Franklin Stations)
- Minneapolis downtown north of I-94 (Segment C; 12th Street, 8th Street, 4th Street, Harmon Place, Hawthorne Avenue Stations)
- Minneapolis industrial (Segments A and C; Van White, Royalston Stations)
- Minneapolis warehouse (Segments A and C; Intermodal Station)

In addition, there are four railroad corridors that traverse these community boundaries. These corridors will be considered as four individual zones. The corridors (by historic names) are:

- Minneapolis and Saint Louis Railway (Chicago and North Western Railway). Part of the main line is in the APE (Segments 1, 4, A and C). A segment of this line between downtown Minneapolis and Merriam Junction has recently been evaluated by the Surface Transportation Board as not eligible to the National Register; however, the SHPO did not concur with this finding. The line will be further evaluated, focusing on the section within the APE.
- Chicago, Milwaukee and Saint Paul Railway (Milwaukee Road), Benton Cutoff. Part of the CM&SP Benton Cutoff is in the APE (Segments 4, A, and C). Except for the Chicago, Milwaukee and Saint Paul Railroad Grade Separation Historic District, which is listed in the National Register, the Benton Cutoff has previously been determined as not eligible to the National Register by the Federal Highway Administration, with concurrence by the SHPO.
- Saint Paul and Pacific Railway (Great Northern Railway). Part of the main line is in the APE (Segment A). This line will be evaluated.
- Minneapolis, Northfield and Southern Railway. Part of the Auto Club-Luce Line Extension of the MN&S is in the APE (Segment 4). This line has been previously evaluated by Mn/DOT CRU, and the Auto Club-Luce Line Extension has been recommended as not eligible to the National Register. This determination has not been submitted to SHPO for concurrence. The Mn/DOT CRU evaluation will be summarized and incorporated into this survey by reference.

All of the above lines, including those which have been evaluated as not eligible, will be inventoried and evaluated to identify any railroad related features in the APE that are potentially significant in their own right. The statewide railroad context developed by Mn/DOT CRU will serve as a basis for evaluation of railroad resources.

The survey of the above thirteen zones will be completed by three consultants. Hess Roise will complete the surveys for the five zones in Minneapolis, Mead & Hunt will complete the surveys for St. Louis Park, Hopkins, Minnetonka, and Eden Prairie, and Summit Envirosolutions will complete the surveys for the four railroad zones. Each consultant will prepare a report for the Phase I-II survey of the zones completed. An overall summary, integrating the survey results from all thirteen zones, will be prepared for the analysis of effects, within the framework of the five project segments.

The survey will include properties built in 1965 and earlier. Although National Register guidelines use a 50-year cut-off for eligibility (except for properties of exceptional importance), adopting a 45-year cut-off for this survey provides 5 years for project planning before the survey becomes outdated.

NOTE ON RESPONSBILITY FOR SURVEYS IN THE INTERMODAL STATION AREA: There is an overlap of the APEs for the SWLRT project and the Intermodal Station project (currently in the planning stage). The SWLRT survey effort will complete survey work for only

a portion of the SWLRT APE in the vicinity of the Intermodal Station, including where SWLRT construction is anticipated. The remainder of this area will be surveyed as part of the planning for the Intermodal Station project. The survey results from the Intermodal Station survey will be included in the consideration of cumulative effects as part of the SWLRT Section 106 review. (See map for the division of survey responsibilities in this portion of the SWLRT APE.)

Phase I Survey (Reconnaissance Survey)

The primary goal of Phase I is to identify properties that appear to have the potential to qualify for the National Register and merit further analysis. This will eliminate from further consideration any properties that have little or no potential to meet National Register criteria. The Phase I survey will also verify that properties already listed or officially determined eligible for listing in the National Register still retain integrity.

Literature Search

The literature search will focus on areas within the APE, with broader contextual information procured as needed. The literature search will begin by collecting existing reports and research for each zone. Maps, atlases, and other information that can provide specific information about property within the APE for archaeology will be a high priority. Additional research will be conducted for specific areas, and occasionally on specific properties, as appropriate. The literature search will produce:

- A working set of research files, including maps and related materials, for each zone. A copy of these files will be provided to the archaeological team.
- For each zone, a brief context (perhaps with subcontexts) will be developed that is approximately two to five pages in length and comprises a brief narrative, an annotated list of relevant property types, and a preliminary period of significance. (This assumes that extensive narrative contexts will not be developed during this phase.) A similar context will also be prepared for each railway, focusing specifically on segments in the APE. These contexts will also be provided to the archaeological team.

Fieldwork

A project-specific inventory form will be developed. Prior to the onset of fieldwork, a draft inventory form will be submitted to the client for review and approval.

The Hennepin County property database provides building construction dates for tax parcels. These dates will be assumed to be generally reliable for properties erected in the last half of the twentieth century, and will therefore be used to eliminate properties built after 1965 from the survey. During fieldwork, however, surveyors will be observant of properties eliminated from the inventory to identify:

- Inaccuracies: Properties not included in the survey that appear to date from 1965 and earlier (in other words, instances where the county date appears to be incorrect);
- Incomplete data: Properties not included in the survey that contain multiple buildings or other features, where the county date may refer to a newer feature—but older features are also present;
- Exceptional properties: Properties dating from 1966 or later that might be of exceptional importance.

Fieldwork will be conducted by zones. The methodology for each zone is as follows:

- Using information from the Hennepin County database, surveyors will be provided with a spreadsheet listing all properties in the zone built in 1965 or earlier. In addition to the address and year built, the spreadsheet will include the property's use and the name of the owner and taxpayer. The survey will include properties listed or officially determined eligible for listing in the National Register (including those in historic districts) to verify that they retain integrity. Map books will be prepared for reference in the field.
- Surveyors will conduct site visits for each property, recording observations from public rights-of-way with field notes and digital photographs. At a minimum, surveyors will record information on noteworthy features and the property's integrity. Using the data categories for functions and uses outlined in the National Register bulletin *How to Complete the National Register Registration Form*, and with reference to the context information for each zone, the surveyor will suggest data categories that seem the most appropriate for evaluating the property's National Register potential. The surveyor will also provide a preliminary recommendation—and a justification for that recommendation—stating that 1) the property does not appear to be eligible for the National Register, or 2) the property should be evaluated in Phase II.
- All field surveyors will meet the Secretary of the Interior's Professional Qualifications Standards.

Deliverables for Phase I survey

- For each zone:
    - Synopsis for each zone, including the context and property type information.
    - Table of surveyed properties including recommendations for intensive level survey, with justification.
    - Inventory form (2 copies) for each property in the APE built in 1965 or earlier. In addition to the data collected in the field, the inventory forms will incorporate information on the property's location (UTM reference, township/range/section) from the county database. At least one color digital photograph of the property will be included on each form. (NOTE: For properties which go to a Phase II evaluation, the same survey form should incorporate the evaluation information.)
    - Map of zone with properties recommended for intensive-level survey identified.

Phase II Survey (Intensive)

The goal of Phase II is to evaluate properties, as recommended in Phase I, to determine which meet the criteria of the National Register of Historic Places. As with Phase I, the work will be organized by zones.

Literature Search

The literature search will focus on individual properties and districts that have potential to meet National Register criteria. To provide a framework for evaluating some properties, it may be necessary to expand the context synopses developed in Phase I to address specific physical areas, eras, and/or property types.

Fieldwork

Additional field work may be needed to evaluate the physical characteristics of individual properties and districts. It might be necessary to obtain permission to enter some properties for this evaluation—if, for example, there is the potential for a significant interior space, or if a parcel is large and contains a number of buildings and these buildings cannot be adequately evaluated from the public right-of-way, aerial photographs, or other means.

Deliverables for Phase II survey

- For each zone:
    - Table of Phase II properties, including recommendations on eligibility.
    - More detailed inventory form, including the narrative evaluation of eligibility, for each property included in this phase.
    - Map of zone, showing properties that appear to qualify for the National Register identified, along with listed and previously determined eligible properties.
- A Phase I-II survey report (for all zones completed by the same consultant) conforming to Mn/DOT CRU Architecture/History Report requirements and other applicable federal and state guidelines.

At the conclusion of all Phase II history/architecture survey work, a consolidated summary/table incorporating the work from all thirteen zones will be prepared for the analysis of effect. This summary will be organized by the five project segments.

Appendix B: Phase Ia Research and Phase I Survey for the Glenwood-Royalston Location

Phase Ia Research and Phase I Survey for the Glenwood-Royalston Location in Minneapolis, Minnesota for the Southwest Light Rail Transit Project

Introduction

Amanda Gronhovd of *10,000 Lakes Archaeology, Inc.* meets the Secretary of the Interior's Standards for archaeological investigations, and will manage and serve as Principal Investigator for this project. David Maki of *Archaeo-Physics* will conduct all geo-physical, mapping, and GIS-related activities. Ryan Grohnke of *Westwood Professional Services* will assist with fieldwork and reporting.

Glenwood-Royalston Location

The proposed project area is located south of the junction of Holden and Royalston Avenues, West from 12th Street North, and north from Glenwood Avenue. The Phase Ia research will examine archival and documentary information to help determine the likelihood of archaeological materials being present within the project area. Costs for a Phase I survey and Phase II evaluation have also been included in this cost estimate, although this work is not authorized at this time. *10,000 Lake Archaeology* will attend up to four project meetings as part of this project.

Project Management

10,000 Lakes Archaeology will provide information to the Council to facilitate their endeavor to obtain right-of-entry access, as requested. Weekly updates will be submitted to the Council using the e-Builder system.

Phase Ia

Literature and Archival Research

10,000 Lake Archaeology will conduct literature and archival research in an attempt to determine the land use history of the Glenwood-Royalston location. This research will primarily be conducted at the Minnesota Historical Society (MHS), the University of Minnesota's Borchert Map Library, the Hennepin History Museum, and the Hennepin County Library, as appropriate. Archaeologists will examine sources such as topographic maps, historic maps, and aerial photographs during the research.

Report

10,000 Lakes Archaeology will write a report that includes a description of the project area, results of the background research, and recommendations regarding the potential for unrecorded archaeological deposits at the location.

Phase I and II Investigations at the Glenwood-Royalston Location

If requested by the Council, a Phase I survey and Phase II evaluation of the Glenwood-Royalston location will take place. The Phase I survey will determine whether cultural resources are present within the proposed project areas, and whether these resources are potentially eligible for the National Register of Historic Places (NRHP). A Phase II evaluation will determine whether identified sites are eligible for listing on the NRHP.

Phase I Survey

If deemed appropriate and authorized by the Council, a Phase I survey of the Glenwood-Royalston area will be conducted. The Glenwood-Royalston project area has less than 25% of the ground surface visible due primarily to asphalt paving. To help determine the potential for archaeological deposits, a geophysical survey will be conducted in a portion of the Glenwood-Royalston Location.

The geophysical survey would focus on a parking lot located north of Lee's Liquor Lounge at the intersection of N 12th Street and Glenwood Avenue in North Minneapolis. This survey would examine the approximately 1,800 square meter parking lot using ground penetrating radar (GPR) survey methods. The GPR sends high frequency electromagnetic waves into the ground from a transmitter antenna. Some of these waves are reflected back to the surface as they encounter changes in the soil matrix through which they are traveling. These changes are detected by a receiver antenna, and recorded to create a two-dimensional picture of the subsurface site area.

The GPR data would be collected by taking readings every .5 meters, along transects spaced .5 meters apart. Upon completion of the survey, the data collected would be downloaded to a computer, processed appropriately, and used to create images depicting subsurface features of interest.

The GPR survey would be conducted using a Sensors & Software pulseEKKO radar system. A center frequency of 450 MHz would be used, and would result in an overall data sample density of 40 GPR traces per square meter.

Because much of the project area is paved, systematic shovel testing is most likely not possible. Thus, specific areas determined as having a high potential for archaeological deposits based on the GPR survey and background research will be mechanically stripped of asphalt and fill in an attempt to locate historic deposits. Once the fill has been stripped, the nature and significance of historic deposits will be assessed.

Shovel testing will occur if possible and appropriate. These excavations will measure 30 to 40 centimeters in diameter and be placed in areas having the potential to contain historic deposits. As the soil is removed, it will be screened through ¼-inch mesh hardware cloth to determine if cultural materials are present.

Phase II Evaluation

A Phase II evaluation will take place if deemed appropriate and authorized by the Council. This evaluation will involve the excavation of up to four formal 1x1 meter test units in an attempt to determine the nature and extent of the site. These units will be placed in locations thought to hold the highest potential to yield archaeological information. Units will be excavated in five to 10 centimeter levels or by natural/cultural stratigraphy. Soil will be screened though 1/4 –inch mesh hardware cloth. If the site is covered by a significant amount of fill, a backhoe will be employed to remove the fill overlying the historic deposits.

Archaeologists will keep detailed notes on standardized forms. These records will include information such as soil descriptions, sketch maps, artifacts types, and the depths from which the artifacts were recovered.

Mapping and Artifact Processing
All features and excavation locations will be mapped using GPS and GIS, and sites will be documented on a Minnesota Archaeological Site Form. Artifacts located during fieldwork will be collected and returned to the lab for analysis, as appropriate and at the discretion of the Principal Investigator. During analysis, the artifacts will be washed and cataloged. Curation costs at MHS are included in this cost estimate and assume one small historic archaeological site. All field and lab work will conform to the guidelines set forth by the Minnesota SHPO and MHS Curation Department.

Report
The report will include a description of the project area, results of the background research and archaeological fieldwork, and recommendations. The draft report will be submitted by uploading the report to the e-Builder system, and submitting two CDs. The final report will be submitted by uploading the report to the e-Builder system, and submitting two CDs and 10 hard copies to the Council.

Upon completion of the project, all GIS data will be submitted to MnDOT CRU following the MnModel requirements.

Assumptions
- Weather does not pose a significant obstacle for fieldwork or travel (e.g. sleet, snow, rain, frozen ground, excessive cold, flooding);
- No human remains are encountered;
- No more than one small archeological site is located.