The Archaeological Delineation of the Dickson-Rainey Burial Ground,
Sandy Beach Park, Lake Tobesofkee Recreation Area, Bibb County, Georgia

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Prepared for
Lake Tobesofkee Recreation Area
Macon, Bibb County, Georgia

Prepared by
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Introduction

The archaeological delineation of the Dickson-Rainey Burial Ground was performed on June 21, 2012 in response to a consultation request by Lake Tobesofkee Recreation Area (LTRA). LTRA had been contacted by the grandson of the last property owner, Mr. Russell Jones, who raised concerns about a cemetery he remembered as being near the old family residence, but that he could no longer locate on the ground. In the course of Mr. Jones’s research, he found a cemetery survey performed by the Church of Jesus Christ of Latter Day Saints on May 23, 1957 that fit the location. Mr. Jones provided this evidence to Bibb County, and this was corroboration enough for the county to approve this investigation.

Figure 1. Dickson-Rainey Burial Ground Depicted on Lizella, Georgia Quad Map
Effective Environment

Lake Tobesofkee is located in western Bibb County, near the Fall Line separating the Piedmont of northern Georgia from the Coastal Plain of southern Georgia. The Dickson-Rainey Burial Ground is shown in Figure 1 on the USGS Lizella, 7.5’ minute topographic quadrangle map. The elevation of the project area is approximately 410 feet above sea level. The nearest water source, Tobesofkee Creek, is located just south of the project area, though it is now dammed and covered by Lake Tobesofkee, a recreational park run by Bibb County. It is interesting to note here that the name Tobesofkee (sometimes Tobosochte in early travelers’ accounts) originated with the Creek Indians who lived in the area between AD 1680 and 1716, and according to one translation could mean “I have lost my sofkee,” which was a corn dish that was the Indian precursor to grits; alternatively, sofkee can also refer to a deep hole; and thirdly, since there is a very good chance that the name originated with those Creek who spoke the Hitchiti dialect and who were native to Georgia, and not the speakers of the Muscogee dialect who moved from Alabama in the late 1600s, it is safest to say that the meaning is still unknown at this time (Utley and Hemperly 1975:37-39; Krakow 1999:227; Martin and Mauldin 2004:225).

The project area is situated in the Southern Piedmont Major Land Resource Area. “This resource area consists of broad to narrow ridgetops and long, irregular hillsides dissected by numerous small winding drainageways. Slopes are commonly smooth and convex, and the soils are very gently sloping to strongly sloping. Deep valleys and steep hillsides are in areas between the larger creeks, near the Ocmulgee River. Nearly level floodplains are along the Ocmulgee River and many of its tributaries. In most places they are narrow, and during winter and early in spring they are frequently flooded” (Woods 1979:2).

The soils in the project area consist primarily of Vance sandy loam (VaB), which is found on 2 to 6 percent slopes, and this “well drained, very gently sloping soil is on ridgetops and hillsides on Piedmont uplands. Slopes are smooth and convex. Areas are 15 to 40 acres in size. Typically, the surface layer is light yellowish brown sandy loam about six inches thick. The subsoil is clay and extends to a depth of 49
inches. It is firm, sticky, and plastic throughout. The upper part of the subsoil is yellowish red and has brownish yellow, strong brown, red, and pale brown mottles. Below this, to a depth of five feet or more, is strong brown, red, and gray weathered rock material….This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface area has been limed. Permeability is slow, and available water capacity is medium….This soil has medium potential for farming (Woods 1979:20).

The average summer temperature in Bibb County is a mild 80° F and the average winter temperature is 49° F, although higher temperatures in the mid 90’s are common on and off throughout the summer months. Rainfall averages 44.85 inches per year, and nine years in ten there are 208 days when the temperature is above freezing (Woods 1979:1, 58-59). “Bibb County is highly urban, but it provides habitat for a variety of wildlife species. The woodland provides habitat for deer, squirrel, raccoon, many non-game animals, and songbirds. Quail, rabbits, and doves are most abundant near cropland areas” (Woods 1979:31).

**Methodology**
A title search for historic deeds pertaining to the property was performed in the Record Room of the Bibb County Superior Court. Additional research was performed at Washington Memorial Library’s History and Genealogy Room. Information was also gathered from Mr. Russell Jones, grandson of the last property owner, Mr. Doug Furney of Lake Tobesofkee Recreation Area, and Cadastral Land Surveyor (and local historian) Jim Preston. A thorough pedestrian surface inspection of all exposed ground was performed to locate evidence of east-west depressions, since these can be indicators of unmarked graves. Archaeological probing, employing a four-foot-long tile probe rod at 12-inch intervals over the entire cemetery and adjacent areas, was one of the two methods used during the course of this project. Probing is a method used by professional archaeologists on a widespread basis, and constitutes an accepted form of “ground-truthing.” Additionally, Ground Penetrating Radar (GPR) was also utilized, and the specific
type of equipment used was a MALÅ 500 MHz antenna. The GPR was towed across a 53 x 52 meter grid, which was established over the site by a team of Bibb County’s surveyors. Fifty-four profiles or “radargrams” were collected along transects spaced one meter apart, with each profile extending for 52 meters. The antenna was always pulled in the same direction and then towed back to the baseline before beginning the next profile. The GPR profile data were collected in the field using a laptop computer running MALÅ GroundVision™ software. The historical research and probing was performed by or under the supervision of Stephen Hammack, the GPR data-collecting and post-processing was performed by or under the supervision of Don Thieme, and this report was jointly authored by both Hammack and Thieme.

**Historical Research**

This project began with the copy of the cemetery records provided by Mr. Jones to Bibb County, and this document, entitled the “Rainey Family Cemetery Records,” stated that based on a field survey on May 23, 1957, eight marked graves and about 40 graves altogether were visually inspected (LDS 1957). It lists eight persons, although is it not known how their names and other information was gathered. Additional information found during the course of the current research about these people is included in the brackets.

1) Mary Rainey Du Berry [Dewberry], daughter of William and Dochia (Theodosia) Rainey and wife of Benny Du Berry [Dewberry]
2) Dochia [Theodosia “Dosia”] Agnes Rainey Jennings, daughter of William and Dochia (Theodosia) Rainey and wife of William Jennings
3) Elizabeth [Margaret] Right Nowell, [daughter of William and Theodosia Rainey] wife of William Nowell
4) Dochia [Theodosia or “Dosia”] Rainey, wife of William Rainey
5) [Illegible] Rainey, unmarried daughter of William and Dochia [Theodosia] Rainey
7) [Illegible] Rainey, wife of Thomas [A.] Rainey
One other known interment was Mr. Reuben A. Rainey, whose undated obituary from the Macon Telegraph (ca. 1900) was also provided by Mr. Jones. It states that Reuben Rainey, age 73, had died and would be buried in “Dickson’s Burial Ground,” indicating that the cemetery had been named after and first used as a cemetery by the Dicksons, who owned the land. It is also interesting to note here that Reuben is listed in the index to the Census of 1870 as being 27 years old and the head of the Rainey household. Other members of that household included Washington Rainey, 26, and his mother Theodosia, 65. Since no mention is made of father William Rainey, he must have already died. Another brother, Thomas A. Rainey, 22, is also listed as being the sole member of his own nearby household.

A title search was performed on Land Lot 211 of Bibb County’s 3rd Land District (originally Houston County’s 3rd Land District), where the burial ground is located, and what follows is a summary of that research. This lot was surveyed and offered up to the public in Georgia’s 4th Land Lottery of 1821. A detail of an 1866 map based on the original 1821 survey is included below as Figure 2. This system of land dispersal was unique to Georgia, and was one of seven such land lotteries in the state. The “fortunate drawer” of Land Lot 211 was McCullers Kirkland, who sold the entire 202.5-acre lot to Davis Smith of Laurens County for $100 in a deed recorded on February 19, 1824. Smith then sold the lot to John Jones of Houston County for $250 in a deed recorded on the same day. The first deed that could be found to unmistakably refer to the correct Dickson family (the name was sometimes spelled Dixon) was dated December 21, 1857, and was recorded on March 18, 1858 (BCSC DB 15:287). In this deed William N. Dixon transferred several properties to his wife Sarah Amanda Dixon, including several slaves, horses, mules, and Land Lot 211 and half of Land Lot 210. Fourteen years later, Sarah applied for and was granted a homestead exemption on this same land (BCSC HPEB 1866-1874:89). At this time her neighbors included Charles Strozier to the north, W. R. Moseley to the west, S. C. Chambliss to the south, and W. Rainey and J. J. Wit to the east. While no mention was made of a cemetery on the property at this time, a schedule of personal property, including livestock, fodder, bags of cotton, a wagon, and household furniture, was included and valued at $967.50. The document is shown below as Figure 3.
Figure 2. Map Based on Surveyor Paul McCormick’s 1821 Field Notes (SGD 1866)
Figure 3. Sarah A. Dickson Homestead Exemption, February 8, 1871 (BCSC HPEB 1866-1874:89)
The homestead exemption of the Dickson’s neighbor, Eugene Sylvester Chambliss, recorded January 2, 1891, also contains a reference to the “Dickson estate.” Chambliss owned the eastern fourth of Land Lot 209 and most of the northern half of Land Lot 210, while Sarah Dickson still owned the south half of Lot 210 and all of Lot 211 (BCSC HPEB 1875-1895:323-325). Chambliss’s other neighbors included Seth Gates to the west, Dan Matthews, Frank Dozier, and H. N. Wright to the north, and John Rainey to the east. Several of these names, and many of those mentioned in the following pages, are shown on the 1897 Fox Map of Bibb County, a detail from which is shown below as Figure 4.

Figure 4. Detail of the Herman S. Fox & Co. Map of Bibb County, Georgia, 1897
References to the Dicksons and Raineys in later deeds include the sale of the north half of Land Lot 239, which bordered Land Lot 210 to the east, by Hester “Hettie” Rainey to her sister Dosia Ann Agnes Jennings for $100 recorded January 3, 1899 (BCSC DB 85:671). On the same day the sale of Lots 247 and 241 were recorded as being sold by Hettie and Dosia Ann Agnes to their brother John Rainey for $500 (BCSC DB 85:672). Hettie’s Last Will and Testament, dated September 25, 1907, bequeathed the south half of Lot 239 to her brother John (BCSC WB E:374). And while less is known of the Dickson family during the twentieth century, a few deeds involving transfers of the south half of Lot 210 and all of Lot 211 were located. In a deed recorded on August 5, 1903, Mrs. Mary E. Young sold her one-quarter interest in the property to W. C. Dixon (probably her brother) for $200 (BCSC DB 112:492). P. H. Dickson (evidently another brother) also sold W. C. Dickson his one-quarter interest in the property for $600 in a deed recorded on December 1, 1903 (BCSC DB 111:736). And Joseph M. Dickson (probably another brother) sold William C. Dickson his one-quarter interest in the property for $575 in another deed recorded on December 1, 1903 (BCSC DB 112:531). Just to make certain that this was all done correctly, a final deed dated January 24, 1906 but not recorded until June 2, 1910 sold W. C. Dickson his three siblings’ (and any interest their mother had) interests in this property for one dollar (BCSC DB 110:538).

**Figure 5** shows a detail of a 1914 map of Bibb County landowners in this area around this time. And although it is not sure how or even if he is connected to this same property, the Estate Inventory and Appraisal of Mr. B. F. Dickson, dated December 9, 1936 was also located. It included personal property, farm property, and real estate valued at $7,718.50 (BCSC IB F:211). **Figure 6** shows the area in 1938.

The final part of this title search pertains to the court case involving the condemnation of the property for the creation of Lake Tobesofkee. One of the last actions before the court battles between Bibb County and landowner J. W. Edwards began was a cursory visit to the area by National Park Service Archeologist J. Earl Ingmanson. Ingmanson visited Mr. Edwards’ farm and recorded site 9Bi32, a Late Archaic site that had yielded a few stone tools, but he did not think the area worthy of further investigations despite
the fact that Mr. Edwards told him that one of his fields had been a good producer of projectile points in the past (Ingmanson 1964:4).

In May 1964 the court issued special instructions to the Special Mast regarding the condemnation and the condemnation was filed with the court (BCSC DB 137:128-136). In June the court recognized an agreement made between the parties, and awarded the property to Bibb County, despite the fact that the agreement had recognized that a delay in the title transfer had postponed construction (BCSC DB 137:149-155). In September 1964, the Special Master decided that Bibb County should pay Edwards $55,000 for his property, and the county and Edwards both appealed the ruling (BCSC DB 137:138-148). Edwards was paid the $55,000, but in June 1965 he was ordered by the court to repay $2,500, since $52,500 was the fair market value of the land. And finally, in October 1979, the Chairman of the Bibb County Board of Commissioners agreed that per the federal stipulations attached to the funding that had constructed Lake Tobesofkee and its various parks and beaches, the park would be used solely for outdoor recreation in perpetuity.
Figure 5. Detail of the Hudgins Co. Map of Bibb County, Georgia, 1914
Figure 6. Detail of a 1938 Aerial Photograph Showing the Probable Location of the Dickson-Rainey Burial Ground in Relation to Tobesofkee Creek
Archaeological Fieldwork Results

Archaeological Probing
While archaeological probing has been used successfully during the course of many projects to locate graves (Garrow and Holland 1993; Hammack 2012), and while the entire area suspected of being the location of the Dickson-Rainey Burial Ground was thoroughly probed, it soon became apparent that the ground was simply too compact to force the probe into the ground. This would appear to be explained by the continuous use of heavy machinery at the project site over the course of the last 45 years. Unfortunately then, the use of the probe rod to locate grave cavities beneath the ground surface was not successful and after a thorough attempt, it was discontinued in favor of remote sensing using the GPR.

Ground Penetrating Radar Results
Based upon historic maps and archival research, the search focused on a one-acre site expected to contain the graves. The Ground-Penetrating Radar investigations reported here identified geophysical anomalies which probably represent the graves in question. Based upon our GPR results, it became possible to better define the horizontal and vertical boundaries of the area where graves occur within the original site.

GPR investigations at the Dickson-Rainey Burial Ground were performed on June 21, 2012. A MALÅ 500 MHz antenna was towed across a grid of 53 x 52 meters (2756 m²), covering approximately 70 percent of the one acre site identified from historic maps and archival research. The baseline trended on a bearing 22.5 degrees east of magnetic north, which corrects to 17.5 degrees east of true N using the declination of 5 degrees west for June 21, 2012. The four corners of the grid shown on Figure 7 and Figure 8 were all surveyed in using a total station by professionals who work for the county government. The baseline for the GPR profiles extended between the corners labeled “SE” and “NE” and we ran each profile from that baseline heading toward the northwest.
Figure 7. Location of the Four Corners of the Dickson-Rainey Burial Ground at Sandy Beach Park Based on the Current Project's Findings
Figure 8. Sandy Beach Park Showing the GPR Grid at the Dickson-Rainey Burial Ground

Figure 9 shows archaeologist Stephen Hammack beginning a GPR profile from the baseline of the grid. Fifty-four profiles or “radargrams” were collected along transects spaced one meter apart, and each profile extended for 52 meters. The antenna was always pulled in the same direction and then towed back to the baseline before beginning the next profile, i.e. we did not “weave” the profiles within the grid. The GPR profile data were collected in the field using a laptop computer running MALÅ GroundVision™ software (MALÅ 2012). With the time window set at 31.6 ns and an average velocity of 10 cm/ns for the radar pulse to travel through the sandy loam soils, the GPR profiles record anomalies to a depth of at least three meters within the area investigated. While the one meter spacing between profiles has proved to be a mapped using GPR does indicate that intact graves/grave shafts are still present at the site.
Anomalies were flagged in the field and then mapped in by the professional survey team (see Figure 4). Any significant interruption or “truncation” of horizontal bands in the upper 10 ns of a profile was considered to be an anomaly, and most anomalies appeared in two or more GPR profiles. Based upon the pattern of the reflections, we made a very general distinction between “N” (natural) and “C” (cultural) anomalies, as shown on Figure 10. Because the goal was to identify graves within the historic cemetery, we only flagged a “C” anomaly where we observed sharp vertical truncations typical of a grave shaft. Table 1 provides the UTM coordinates (NAD 1983) of both the natural and cultural anomalies identified.
Figure 10. Map of Shallow Subsurface Anomalies Identified with GPR at the Dickson-Rainey Burial Ground
**Table 1: UTM Grid Coordinates (NAD83 Zone 17N) for “C” and “N” Anomalies at the Dickson-Rainey Cemetery, Bibb County, Georgia**

<table>
<thead>
<tr>
<th>Anomaly</th>
<th>UTM N (km)</th>
<th>UTM E (km)</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>3,635,604.166</td>
<td>238,849.694</td>
<td>4 Standing Trees, rooted together</td>
</tr>
<tr>
<td>N2</td>
<td>3,635,612.643</td>
<td>238,835.373</td>
<td>Trees removed after abandonment</td>
</tr>
<tr>
<td>N3</td>
<td>3,635,614.462</td>
<td>238,844.473</td>
<td>Probable tree or trees</td>
</tr>
<tr>
<td>N4</td>
<td>3,635,620.111</td>
<td>238,867.847</td>
<td>Scrapped with heavy equipment, filled</td>
</tr>
<tr>
<td>N5</td>
<td>3,635,641.647</td>
<td>238,840.793</td>
<td>Old road bed</td>
</tr>
<tr>
<td>N6</td>
<td>3,635,638.544</td>
<td>238,879.379</td>
<td>Tree or gully</td>
</tr>
<tr>
<td>N7A</td>
<td>3,635,643.781</td>
<td>238,860.306</td>
<td>Gully draining to Tobesofkee Creek</td>
</tr>
<tr>
<td>N7B</td>
<td>3,635,645.947</td>
<td>238,860.215</td>
<td>Gully draining to Tobesofkee Creek</td>
</tr>
<tr>
<td>N7C</td>
<td>3,635,648.028</td>
<td>238,860.412</td>
<td>Gully draining to Tobesofkee Creek</td>
</tr>
<tr>
<td>N8</td>
<td>3,635,653.195</td>
<td>238,857.293</td>
<td>Tree or gully</td>
</tr>
<tr>
<td>C1</td>
<td>3,635,622.692</td>
<td>238,846.997</td>
<td>Grave</td>
</tr>
<tr>
<td>C2A</td>
<td>3,635,619.260</td>
<td>238,851.332</td>
<td>Large Grave aligned N-S</td>
</tr>
<tr>
<td>C2B</td>
<td>3,635,620.427</td>
<td>238,854.395</td>
<td>Large Grave aligned N-S</td>
</tr>
<tr>
<td>C3</td>
<td>3,635,621.644</td>
<td>238,854.733</td>
<td>Grave shaft dug to &gt;1.8 m (18 ns)</td>
</tr>
<tr>
<td>C4</td>
<td>3,635,624.418</td>
<td>238,855.514</td>
<td>Grave</td>
</tr>
<tr>
<td>C5</td>
<td>3,635,627.468</td>
<td>238,854.940</td>
<td>Grave</td>
</tr>
<tr>
<td>C6</td>
<td>3,635,629.144</td>
<td>238,849.592</td>
<td>Grave</td>
</tr>
<tr>
<td>C7A</td>
<td>3,635,628.896</td>
<td>238,856.401</td>
<td>Large Grave aligned N-S</td>
</tr>
<tr>
<td>C7B</td>
<td>3,635,629.988</td>
<td>238,856.563</td>
<td>Large Grave aligned N-S</td>
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<tr>
<td>C8</td>
<td>3,635,630.865</td>
<td>238,850.355</td>
<td>Grave</td>
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<td>C9</td>
<td>3,635,632.033</td>
<td>238,856.522</td>
<td>Grave</td>
</tr>
<tr>
<td>C10</td>
<td>3,635,633.887</td>
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<td>Grave</td>
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<td>C11</td>
<td>3,635,635.269</td>
<td>238,856.282</td>
<td>Grave</td>
</tr>
<tr>
<td>C12</td>
<td>3,635,638.537</td>
<td>238,850.727</td>
<td>Grave</td>
</tr>
<tr>
<td>C13</td>
<td>3,635,634.567</td>
<td>238,861.108</td>
<td>Grave</td>
</tr>
<tr>
<td>C14</td>
<td>3,635,635.438</td>
<td>238,868.278</td>
<td>Grave</td>
</tr>
<tr>
<td></td>
<td>X-Cord</td>
<td>Y-Cord</td>
<td>Width</td>
</tr>
<tr>
<td>---</td>
<td>----------</td>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>C15</td>
<td>3,635,636.693</td>
<td>238,867.099</td>
<td>Grave</td>
</tr>
<tr>
<td>C16</td>
<td>3,635,634.690</td>
<td>238,871.306</td>
<td>Grave</td>
</tr>
<tr>
<td>C17</td>
<td>3,635,644.697</td>
<td>238,849.012</td>
<td>Grave</td>
</tr>
<tr>
<td>C18</td>
<td>3,635,643.348</td>
<td>238,856.317</td>
<td>Grave</td>
</tr>
<tr>
<td>C19</td>
<td>3,635,649.136</td>
<td>238,852.798</td>
<td>Grave</td>
</tr>
<tr>
<td>C20</td>
<td>3,635,649.707</td>
<td>238,857.221</td>
<td>Grave</td>
</tr>
</tbody>
</table>

A wider variety of features and processes are responsible for what we flagged as “N” anomalies.

As discussed below, some of the “N” anomalies were probably caused by human activities such as heavy equipment modifications to the site after the time when the cemetery was abandoned.

Approximately 20 possible grave shafts were identified at the “C” anomaly locations. A typical example of a “C” anomaly is illustrated by the anomaly which we designated “C3” along the GPR profile #23, shown in Figure 11. The radargram for this profile was processed with several filters using the program RadExplorer™ (DECO Geophysical 2005). First, “time zero” was set at 6.8 ns, approximating the first inflection or “wiggle” in each trace along the profile. The new time zero for the radargram should correspond to the original land surface, where the returning radar wave is scattered by the air (Conyers 2004:122). A “DC removal” filter was used to remove the DC signal background noise coming from the system’s battery and other electronic circuits. The signal amplitude was also boosted with depth to compensate for the loss of signal from deeper reflectors (“Amplitude Correction” filter). Finally, a “Bandpass” filter was used to enhance the signal-to-noise ratio and remove some duplication of reflectors at different frequencies.
Horizontal reflectors appearing in the radargrams at approximately 5 ns (50 cm) and 7 ns (70 cm) represent soil horizon boundaries common to nearly all of the profiles for the Dickson-Rainey Burial Ground. As illustrated by the “C3” anomaly in Figure 11, grave shafts originate from a former land
surface which is no more than 50 cm beneath the present surface. Sharp vertical truncations where the soil was cut through during excavation typically occur on only one side of the profile anomaly. The jumbled pattern of GPR reflections from the material which abuts the truncations on the other side represents “fill” material which was introduced into the grave shaft anomaly (Conyers 2004:160-161). Some “C” anomalies also contain “hyperbola” patterns in this space abutting the truncations, indicating voids or chambers where a coffin may be found (Conyers 2006:136-137). Metal or magnetized soil material was also indicated by a “ringing” pattern (Conyers 2004:77-79) within many of the “C” anomalies.

The largest anomalies on the site are the result of natural processes, particularly the growth of tree roots into the ground followed by natural decay as well as removal and burning of trees on the site. There is a tree line within fifty meters of the lower left (SE) corner of the GPR grid, and several trees were clustered toward the left (S) side of the grid. Roots of these trees and of trees which had previously grown on the Dickson-Rainey Burial Ground have created distinctive geophysical anomalies. Anomaly “N1” as shown on GPR profile Figure 12 (above on page 22) represents the roots from a cluster of four trees currently growing on this part of the Dickson-Rainey Burial Ground GPR grid. Anomaly “N2” shown at the northwest end of the profile exhibits a similar pattern of radar wave reflections, and anomalies N2, N3, N6, and N8 are all interpreted to record disturbance by trees which formerly grew on the site. Anomalies N5 and N7, encountered in Profile #50, are shown in Figure 13 (above on page 22).

A number of other “N” anomalies resulting from natural processes or other human activities on the property were also identified and mapped in this investigation. Relatively deep disturbance, probably by heavy equipment, is evident along the east edge of the site, bordering the bare soil which is visible in the Google Earth™ image on Figure 7 above. In GPR Profile #23, shown in Figure 11 above, anomaly N4 takes the form of reflections dipping to the east, opposite the direction in which the antenna was pulled.
The disturbance here extends to at least 1.5 m while similar disturbance along other profiles barely extends beneath the upper 50 cm of parallel soil horizon reflectors.

A three-dimensional analysis of all 54 radargrams collected at the Dickson-Rainey Burial Ground was performed using the time-slice program GPR-SLICE™ (Goodman et al. 1995; Goodman 2012). Time-slice programs create grid files with X, Y, and Z values for preparing contour maps of reflected wave amplitude differences (Conyers 2004:148-153; Goodman and Nishimura 1993). Each grid file represents a slice at a particular interval of time (ns) or depth (m) through the radargrams. Because three-dimensional anomalies may appear as very small amplitude variations and/or “banding” along some of the radargrams analyzed, little or no filtering is typically performed on the GPR data prior to time-slice analysis (Goodman et al. 1995:483). GPR-SLICE™ does have its own robust filtering routines, and these were used to set time zero and to boost the signal amplitude with depth for the radargrams from the Dickson-Rainey Burial Ground.

**Figure 14** displays the twelve contour maps prepared from GPR-SLICE™ grid files. A moving window of 2 ns was used, equivalent to 20 cm thickness for each slice at a velocity of 10 cm/ns for two way travel of the radar wave. A step of 1.1 ns was used between slices and the slices have been overlapped by 0.9 ns, following suggestions by Goodman (2012). With time zero set at 6.7 ns, the slices represents the time interval 6.7-8.7 ns, 7.8-8.8 ns, 8.9-10.9 ns, etc…. The overlap makes it easier to map anomalies which change shape and size between depth as well as to create three-dimensional views and animations from GPR results in GPR-SLICE™ (Goodman 2012).
Figure 14. Amplitude Time-Slices for the Dickson-Rainey Burial Ground Prepared Using GPR-Slice™
Figure 15. Field Map of Shallow Subsurface Anomalies Overlaid on 15.5-17.5 ns (88-108 cm) Time Slice
The one meter spacing between GPR profiles at the Dickson-Rainey Burial Ground limited the detail shown on the time slice amplitude maps (Figures 8 and 9). In particular, many of the “C” anomalies identified in the field cannot be identified with specific areas of either low or high amplitude in the return of the radar wave. Anomalies which only appeared in one radar gram typically will not appear on these maps unless they contained a metal artifact or other material which caused the antenna to “ring” (Conyers 2004:77-79). Nonetheless, several “C” anomalies (triangles) do coincide with areas of low amplitude, shown in blue on Figure 15 (above on page 26). These represent areas of lower density sediment or even void spaces. Most of them occur at or beneath the depth for Slice 9, approximately 87-107 cm (2.9-3.5 ft.) below surface.

All of the “N” anomalies identified in the field were large enough to be identifiable on one or more of the time slice amplitude maps. Anomaly “N4,” an area of heavy equipment damage southeast of the cemetery itself, originates in Slice 7 at 66-86 cm (2.1-2.8 ft.) below surface. It extends nearly to the base of several of the radargrams, approximately 130 cm (4.2 ft.) below surface. Anomaly “N7” is a large gully which coincides with areas of lower density sediment beginning at approximately 76 cm below surface in Slice 8. The gully is cut down to the base of at least ten radargrams in the upper right (northwest) corner of the radar grid. High amplitude radar returns which form a distinctive rectangular pattern in Slices 2-7 suggest some attempts to control the gully erosion or perhaps to erect a temporary structure atop after filling it in.

The northwestern edge of the Dickson-Rainey Burial Ground is an area which currently slopes toward a small dirt road where the radar profiles were completed at approximately 52 meters from the baseline. There is some evidence for an older, more substantial road in this area, as shown by the radargram for GPR profile #50 in Figure 13 (above on page 22). On the time slice amplitude maps shown in Figure 14 (above on page 25), the compaction of the soil in this area is visible as a high amplitude anomaly “N5” originating at approximately 22 cm below surface in Slice 3. Evidence for tree root disturbance also occurs toward the end of several radargrams in the general area identified as anomaly “N5.” Disturbance
of the ground by trees in the “N1” and “N2” anomalies produced irregular rings of high amplitude returns surrounding areas of lower amplitude. This pattern is evident in the upper left (SW) corner of Slice 7.

In addition to the general lack of detail due to the one-meter spacing of the Dickson-Rainey Burial Ground GPR grid, there is a “banding” artifact along several profiles running through the cluster of trees at anomaly “N1.” This is probably because the length of these profiles was either stretched or shrunk as the antenna was threaded through the tree trunks. There are processing techniques which can be used to remove or reduce the effects of such banding (Goodman and Welch 2005). However, the artifact in this case affects an area of the grid which is well to the south of what can now be determined to be the limits of the Dickson-Rainey Burial Ground.

The “C” anomalies identified using ground-penetrating radar (GPR) at the Dickson-Rainey Burial Ground may not all represent graves, but many do have a pattern or signature on the two-dimensional radar profiles which is very characteristic of grave shaft features (Conyers 2004, 2005; Goodman et al. 1995). The GPR profiles appear to have run in an oblique direction with respect to the alignment of the graves at the site. Most of the graves were crossed by two or more GPR profiles but at staggered distances from the origin of the profile lines.

**Conclusion and Recommendations**

As a result of our ground-penetrating radar investigations at the Dickson-Rainey Burial Ground, we can report with confidence that some probable grave features are found within the limits of the area investigated. The area where those features occur is only a portion of the one-acre site initially defined
on the basis of historic maps and archival research. Possible grave features are clustered in a rectangular area of approximately 24 m x 20 m (480 m$^2$). Anomalies begin approximately 15 m in from the left edge of the profile grid and continue to about 39 m moving to the right. In the direction of travel of the GPR profiles, the possible grave features were found in a cluster between a distance of 25 m and 45 m from the baseline, for a total of 20 probable graves. However it is still possible that more graves could exist.

Based on these findings, our recommendation is to set aside the area defined in this report as an historic cemetery in perpetuity. It is also recommended that a 50-foot buffer zone be extended from the edges of the cemetery in order to protect it and in case there are more graves than those encountered by this project. A chain-link fence could also be erected around the cemetery, if so desired. Finally, a marker of commemorating the families involved should also be placed at the Dickson-Rainey Burial Ground.

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