ABSTRACT

WAITT, KYRA MEHAFFEY. Unveiling Watauga: A Comparative Analysis of Geophysical Survey at the Ancestral Cherokee Town of Watauga. (Under the direction of Drs. John Millhauser, Jane Eastman, and Brett Riggs)

Magnetic surveys of the Middle Mississippian period component at the Watauga site (31MA89) in southwestern North Carolina revealed well defined mound top structural patterns, but associated domestic buildings are difficult to discriminate from geomagnetic data alone. Ground penetrating radar survey of the site provided better definition of structure patterns allowing for comparative analysis with the gradiometer data. Results from the 2024 geophysical field school produced promising results. Simultaneous data collection with ground penetrating radars and gradiometers offers an opportunity for direct comparison. For this survey, I applied different analytical techniques to the two datasets to search for an identifiable magnetic signature representing Middle Mississippian residential structures at the site. GPR results confirmed the presence of Middle Mississippian residential structures, but the comparative analysis did not uncover a cohesive pattern in the magnetic data that could reliably identify residences in the magnetometry data in the absence of GPR data. These results highlight the benefits of multi-instrument geophysical surveys.

Unveiling Watauga: A Comparative Analysis of Geophysical Survey at the Ancestral Cherokee Town of Watauga

By
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DEDICATION

To my husband Brennan, whose selflessness and love for me knows no limits.

To Dr. Riggs and Dr. Eastman, who will be stuck with me forever if I have any say in it.

BIOGRAPHY

Kyra Waitt was born and raised in Haywood County, NC. She married her high school sweetheart at 19 and has two dogs who are the center of her universe. She attended Western Carolina University and earned her bachelor's, majoring in anthropology. After graduating, she worked for almost two years in WCU's archaeology lab for Dr. Brett Riggs. Here, she became involved with the Watauga project and discovered her interest in archaeogeophysics. After moving to Raleigh for her husband's career, she began pursuing a master's degree at North Carolina State University. Kyra is the first in her family to graduate from college. She is deeply grateful for the sacrifices made by her husband and family, both recently and in past generations, which have made earning a master's degree possible, knowing finishing high school wasn't always an option just two generations ago.

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Many people supported me throughout this thesis, and there are not enough pages to fully express my gratitude.

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I am especially grateful to Dr. Riggs and Dr. Eastman. What was meant to be just three months turned into four years of support. I'm not sure they knew what they were in for, but I am incredibly grateful they stuck with me. From including me in the Watauga project to helping me develop a research topic and guiding me through an unexpected pivot, they have been there every step of the way. Their generosity with their knowledge and guidance has been endless, and I am deeply appreciative of the many opportunities they have given me.

My advisor, Dr. John Millhauser, has served as the keystone for my journey at NCSU. The impact of his steadfast guidance, patience, encouragement, and thoughtful review cannot be overstated. I truly could not have completed this thesis without his support.

I would also like to thank Dr. Eileen Ernenwein and the students from the 2024 field school for making this research possible. Special thanks to Stephen Yerka for always being generous with his time and expertise and for serving on my committee as a representative of the EBCI THPO. I extend my gratitude to the Eastern Band of Cherokee Indians for trusting us with the study of such a significant site. Additionally, thank you to the North Carolina Archaeological Society for funding this project. My cohort, Greer, Lee, Michayla, Anna, and Charity, thank you for your companionship and camaraderie throughout this shared experience.

To my family, thank you for being my unwavering support system. My husband, Brennan, has made my academic career possible, as he does with all my dreams. Bren, my sister,

Emily, my best friend, Gabriella, and my mother-in-love, Jolene, never fail to encourage and uplift me when I need it most. My Mamaw has listened to me talk about school so much that she memorized everyone’s name and the key points of my thesis. My Papaw shared his love of history with me and always encouraged me to pursue higher education, which helped me see this path as a real possibility. Thank you to my parents for their encouragement along the way.

Finally, thank you to Watauga, a place I love so much. I’ve given you my blood, sweat, and tears, and in turn, you’ve given me everything.

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Part 1: Framing and Reflection

Watauga, an ancestral Cherokee town site, is located in the upper Little Tennessee River Valley of Macon County, North Carolina. Mainspring Conservation Trust, a land trust operating in the southern Blue Ridge, has preserved the site by acquiring two parcels of the site in 2021 and the third in 2023, with plans to ultimately return the reassembled tract to the Eastern Band of Cherokee Indians. Mainspring extended an open invitation for anthropological research by Western Carolina University.

Since 2021, WCU archaeologists Dr. Brett Riggs and Dr. Jane Eastman have led an archaeological project, in partnership with the Eastern Band of Cherokee Indians (ECBI) and their Tribal Historic Preservation Office (THPO), to unravel the complex history of this ancestral site (Eastman 2022; Ernenwein et al. 2024; Osiyo Voices of the Cherokee People 2023; Riggs and Eastman 2024, 2022a, 2022b; Riggs et al. 2022). Prior to this, cultural resource management groups and other WCU archaeological field schools have conducted fieldwork at the site: Deborah Joy (2007) and Tasha Benyshek (2009) completed limited shovel testing around mound A; Ben Steere's field school (2015) expanded Benyshek's grid and recovered diagnostic Qualla sherds (Steere 2015). The most recent collaboration brought in East Tennessee State University for a joint field school focused on geophysics.

Remote sensing can create bridges between archaeology and Indigenous communities. It allows sites to be documented, researched, and preserved while maintaining boundaries, such as limited informed excavation and avoidance of sensitive areas identified in the geophysical results. Respondents to a 2020 survey sent to THPOs across the country, titled *What do Tribes Really Want from Archaeologists*, were 65% in favor of non-tribal archaeologists performing geophysics compared to 38% in favor of traditional excavation (Sanger et al. 2020). With geophysics to inform what cultural features are present, Tribal leaders and THPOs can establish guidelines and boundaries for continued archaeological investigation. Presenting current research on Watauga throughout the year and at the annual Cherokee Archaeological Symposium has garnered support from the Cherokee community (Eastman and Riggs 2022; Riggs and Eastman 2024). The partnership of the EBCI THPO, and Dr. Riggs and Dr. Eastman has resulted in a project where the Indigenous community can witness archaeology conducted and taught to the next generation in a respectful, ethical way that follows Indigenous guidance.

The Cherokee community is actively involved in the archaeological investigations at Watauga and has been since the project started in 2021. Chi Shipman, an EBCI member enrolled at WCU, acted as a conduit to the community during the first field season, bringing tour after tour of tribal members to reconnect with Watauga. She immersed the field school students in Cherokee language at every opportunity, teaching new words on the way to the site each morning. Shipman also provided Cherokee perspective for recovered artifacts, geophysical results, and topics taught during field school. She remains a major connection for the project and will speak on the Cherokee perspective on the impact of this work with Madison Long (EBCI) later in 2025.

Attendees at the 2022 Cherokee Archaeological Symposium were moved as Riggs and Eastman presented the patterns and connections to astronomical events revealed through magnetic data I collected in 2021 and 2022. Cherokee Culture Keeper and essential pillar of the Watauga project, Dr. Thomas Belt, spoke about the importance of the research after this presentation. He stressed that these patterns are not simply archaeological relics of the past, but a direct connection to Cherokee Ancestors and their way of life. Since then, the interest from the community has continued to grow exponentially as site interpretations become more informed through geophysics.

Watauga was the catalyst for my interest in geophysics. My role in the project prior to attending NCSU for graduate school was to collect and process magnetometry data for Riggs and Eastman to interpret. Since 2021, I have collected all magnetometry data at the site with my partner, Kelly Hoover. Unveiling this site and returning that knowledge to the Cherokee community has become immensely important to me. I plan to present my findings to the EBCI Elders Board at a future date, and I hope they see in me an example of a recent graduate shaped by archaeologists who are deeply involved with and led by the Native community. My goal is that my work at Watauga will always generate information that the Cherokee people find valuable. Watauga is truly a once-in-a-career site, and it is an incredible gift to be involved and serve the community through geophysics.

Based on the evidence we have gathered up to this point, I think Watauga will make an impression on what is known about Mississippian sites in the Southern Appalachians. This region is home to several mound sites, but Watauga is the only one with two documented mounds. The site's location is atypical, and Dr. Riggs, Dr. Eastman, and Cherokee Culture Keeper Dr. Tom Belt have developed theories connecting aspects of the site to complex Mississippian cosmologies and Cherokee traditions. One of the most impactful interpretations to emerge from the geophysical data is the alignment of the mound-top buildings to the summer and winter solstices; events which were important to the Mississippians and remain significant within Cherokee culture.

Evidence supports the mound center was active during a poorly defined phase of the Late Savannah culture. This presents a unique opportunity to contribute new information to a subject area that is already saturated. People from the EBCI, United Keetoowah Band, and Cherokee Nation have visited and connected with Watauga. *Place* is a very important aspect of Indigenous cultures, and Watauga connects people back to their lands and heritage (Lefler and Belt 2022, Osiyo Voices of the Cherokee People 2023). This is a concept Dr. Belt discusses often, he summarizes it well in this quote from OsiyoTV's episode featuring Watauga,

> "All of these places had a purpose, and we connect with these. That tells us that when we do that, then that connects us with these places, and makes it part of what we are, and it *completes us as human beings*."
> (Osiyo Voices of the Cherokee People 2023).

The importance of *place* has been impressed upon Dr. Eastman and Dr. Riggs as they work closely with Dr. Belt to understand Watauga. In the same documentary, Dr. Eastman goes on to talk about how *place* is so deeply ingrained in Native culture that it's difficult to fully comprehend the insurmountable significance of this concept,

> "Thinking about *place*, where you are it's not just where you are on this surface, it's where you are within everything going on and around you within the cosmos and those cycles. You know where you are in such a rich way that I don't even think most of us can appreciate what that would feel like."
> (Osiyo Voices of the Cherokee People 2023).

The historic preservation specialist from the EBCI THPO, Stephen Yerka, has helped guide geophysical investigations since our first year at Watauga. Yerka taught me gradiometry and GPR in ways that followed the expectations of the THPO, down to which side is appropriate to approach the mounds in respect of Native customs. His example was my first exposure to geophysics. That, paired with the guidance of Riggs and Eastman, has established an Indigenous-first approach to everything I have learned and been involved in since. This is one example of many showing how collaborative relationships are key to ethical archaeological practice at Watauga.

In this document, I present the results of my master's project in two parts: a brief reflection followed by a manuscript formatted for the journal *Archaeological Prospection.* The preliminary results of this study were presented alongside an overview of results from the 2024 field season at the 80th annual SEAC meeting in Williamsburg, Virginia. While this project diverted from the original plans, I feel the results are meaningful and reinforce Dr. Eastman and Dr. Riggs' decision to secure a GPR for Western Carolina University.

Part 2: Manuscript

Abstract

Magnetic surveys of the Middle Mississippian period component at the Watauga site (31MA89) in southwestern North Carolina revealed well defined mound top structural patterns, but associated domestic buildings are difficult to discriminate from geomagnetic data alone. Ground penetrating radar survey of the site provided better definition of structure patterns allowing for comparative analysis with the gradiometer data. Results from the 2024 geophysical field school produced promising results. Simultaneous data collection with ground penetrating radars and gradiometers offers an opportunity for direct comparison. For this survey, I applied different analytical techniques to the two datasets to search for an identifiable magnetic signature representing Middle Mississippian residential structures at the site. GPR results confirmed the presence of Middle Mississippian residential structures, but the comparative analysis did not uncover a cohesive pattern in the magnetic data that could reliably identify residences in the magnetometry data in the absence of GPR data. These results highlight the benefits of multi-instrument geophysical surveys.

1. Introduction

Near-surface applied geophysics was developed for use in geological sciences, engineering, and the military, but it was adopted by archaeologists when it proved excellent for documenting the subsurface features of cultural sites. For the archaeologist, geophysics is beneficial for several reasons: the rendered image of the subsurface, the time and labor saved, and the ability to carry out informed investigations (Aspinall et al. 2008; Gaffney and Gater 2003; Ernenwein 2023). Technological advancements have simplified their field operation and enhanced the quality of results. The data produced by these non-invasive instruments can be comparable to the detailed plan drawings of traditional excavation but require little to no disturbance. Geophysical results provide a comprehensive view of the site beneath the subsoil, revealing overall site patterns, from community layout to overarching landscape archeology. These results help delineate features by offering insight into their types, integrity, and depth, all white remaining non-invasive. Additionally, geophysical surveys can help guide targeted excavations, minimizing disturbance and protecting sensitive areas.

Magnetometry is a passive method, meaning it only measures what is already present in the local magnetic field and does not produce an artificial field. The sensors in fluxgate magnetometers measure variations in the vertical component of the local magnetic field, which are influenced by materials with induced and remnant magnetism (Kvamme 2003; Somers 2002). Magnetic gradiometers are composed of two fluxgate magnetometers spaced at a fixed distance apart, typically one meter. The dual sensor configuration accounts for diurnal fluctuations of the earth's magnetic field without a base station, unlike single-sensor magnetometers. The local magnetic field gradient is found by taking the difference of readings from the two sensors and is measured in nanoteslas (Conyers 2018). The all-in-one design of the gradiometer, its effectiveness for detecting shallow anomalies in higher detail, and the ability to cover large tracts in one day set this instrument apart from other magnetometers. Overall, magnetometry is cost-effective, has simple processing, and pairs well with other geophysical techniques (Aspinall et al. 2008; Gaffney and Gater 2003).

Ground penetrating radar is an active method that emits electromagnetic waves into the ground via an antenna and then receives their reflections. Targets are detected based on the difference in dielectric permittivity between the feature and surrounding soil, which causes some radar energy to reflect back to the machine and influences its velocity. The time it takes for the radar wave to reach a target and return is called two-way travel time. Ground penetrating radar uses this, velocity, and reflection amplitude to produce images of the subsurface. Many factors, such as soil composition and moisture content, can impact the performance of ground penetrating radar, but this instrument does well for near-surface archaeological targets (Conyers 2003, 2017). GPR data can be displayed as horizontal slice images, 3D images, plan views, and radargrams that show reflections along each traverse line.

Geophysical prospecting became popular in recent decades for exploring prehistoric sites in North America. Human activities such as building structures and fires alter the natural qualities of the subsurface, making it possible to *see* these features through geophysics (Kvamme 2003). Because cultural processes increase or decrease soil magnetism, the nanotesla strength of plow scars can be used to identify areas of intense human interaction at disturbed sites (Bigman 2014; Horsley et al. 2014; Wright and Horsley 2019). The typical nanotesla range for prehistoric sites is 0.1 nT - 50 nT (Somers 2002; Yerka 2010). Geophysics has been used successfully at Mississippian villages and mound centers throughout the Southeast. Finding the best geophysical method for a site can be trial and error, and one of the many reasons why planning for multi-instrument surveying is beneficial.

Each geophysical method has a unique set of strengths and limitations that additional instruments can compensate for. GPR can be affected by soil types, moisture content, and sometimes cell phone signals. Magnetometry is less susceptible to these but is sensitive to major soil disturbance, like plowing, and ferrous metal debris. Operators must wear ferrous metal-free clothing, remove metal on their person, and avoid metal around them while the instrument is collecting. The GPR does not require such attention to personal detail and can be effective tens of meters deep into the subsurface depending on antenna frequency. Gradiometers tend to fall off at about 2 meters. Gradiometers are cheaper, efficient, and the data is easy to process and interpret for beginners. Although more complicated and expensive, ground penetrating radar supplies a level of detail that is invaluable. When used together, these instruments supply a comprehensive view of the subsurface that strengthens the confidence and accuracy of archaeological interpretation.

Over a century of archaeological focus has been dedicated to researching the Mississippian period in the Southeast. Major themes include architecture, landscape, sequence of development, households, politics, place, cosmology, community, and symbolism (Coe 1995; Dickens 1970; Keel 1976; Lewis et al. 1998; Milner 2021; Pauketat 2000; Riggs et al. 2021; Rodning 2010; Rodning & Thorpe 2021; Rogers and Smith 1995; Steere 2021 & 2017; Ward and Davis 1999). Geophysics has been used to investigate community patterning at Mississippian sites such as Etowah, Cox, Battle, Hollywood, and Stephan-Steinkamp (Haley 2014; King et al. 2021; Patch et al. 2017; Malouchos et al. 2021; McKinnon and Haley 2017; Walker 2009).

Archaeologists have used these methods to understand prehistoric architectural patterns. Etowah Mounds is located approximately 110 miles from Watauga and has been extensively researched. The site has published geophysical surveys depicting Middle Mississippian domestic structures similar to the Late Savannah cultural phase structures at Watauga (King 2021, Walker 2009). These anomaly signals have been classified into types (see Figure 1.2), contributing key information to the occupation timeline (King et al. 2021, Walker 2009). King also compares plan drawings of excavated structures to magnetic signatures, giving insight into the presentation of differing architectural styles of the Mississippian period (Figure 1.2).

Contemporaneous sites such as Ledford Island, Hickory Log, and Rucker's Bottom do not have published geophysical surveys but have been excavated and features documented in detailed plan drawings (Anderson and Schuldenrein 1983, Anderson et al. 1986, Ernenwein et al. 2024, Steere 2017). Similarities between Watauga and the Mouse Creek Phase at Ledford Island and houses excavated at Hickory Log have been drawn (see Figure 1.1) (Ernenwein et al. 2024).

The non-intrusive nature of geophysical instruments pairs well with the sensitivity level expected at mound complexes. The goal of the entire Watauga project is to gather and share knowledge with the Cherokee community through informed archaeology. However, even with a noninvasive method like geophysics, there are still ethical concerns to be aware of. Avoiding asymmetrical power dynamics, over-reliance on geophysics for narratives, and archival concerns are all matters that must be considered throughout a project's life (Davis and Sanger 2021).

Researchers have applied several geophysical methods to investigate the site of Watauga Town (31MA89). The main methods applied over large tracts of the site include dual-sensor fluxgate gradiometer and ground penetrating radar. These are two of the more well-known geophysical methods and are often paired for use in multi-instrument surveys (Aspinall et al. 2008, Clay 2001, Conyers 2017, Gaffney and Gater 2003, Ernenwein 2023). Both methods are noninvasive but measure different properties. The resulting data can fill gaps that may be left by single-instrument surveys.

The extent of the mound center at Watauga (31MA89) was established in my prior gradiometer surveys, however, the domestic areas have not been as well-defined and delineated as the more deeply buried, better preserved mound-top structures. Mississippian mound centers usually follow the pattern of mound(s) flanked by a plaza and public structures, then domestic structures radiating out from this central point (Lewis et al. 1998). Riggs and Eastman estimate the mound center was active during the 13th and 14th centuries. Ceramic artifact collections recovered from shovel test sampling and excavated test units support two main site components. The 17th-18th century site occupations can be characterized as Middle Qualla phase and Late Qualla phase components of the Lamar archaeological culture and are referable to well documented Cherokee occupations in the region. However, more than 50% of recovered ceramic wares resemble late Savannah culture pottery similar to wares common in Middle Mississippian period contexts in northern Georgia (Brett Riggs, personal communication 2025). These represent an undefined Savannah culture phase thought to be contemporaneous with the Late Wilbanks phase (AD 1250-1375) of the Etowah River Valley (King 2003). Excavations at the nearby Iotla site recovered similar wares from discrete contexts dated to the 14th century (Benyshek 2020).

Investigators speculate that Watauga's Middle Mississippian domestic component may be most comparable to contemporaneous Wilbanks phase domestic structures documented in northern Georgia. Wilbanks phase houses (see Figure 1) are typically single-post construction, square with rounded corners in shape, ranging from 30 to 40 m^2, and include four main support posts around a central hearth (Steere 2017). The hearth and post placements are deliberate to represent major cosmological ideas of the Southeastern Ceremonial Complex that drove the Mississippian period. Burials within houses and rebuilding episodes were common. Additionally, partitioning became popular in the Middle Mississippian period, and the number of wall posts used in construction peaked (Steere 2017). A few of these characteristics, such as single-post construction, make it challenging to capture Wilbanks structures with magnetometry (Figure 1.3). The wall-trenched structures of the Late Woodland/Early Mississippian period are an example of architecture seen well in magnetic data.

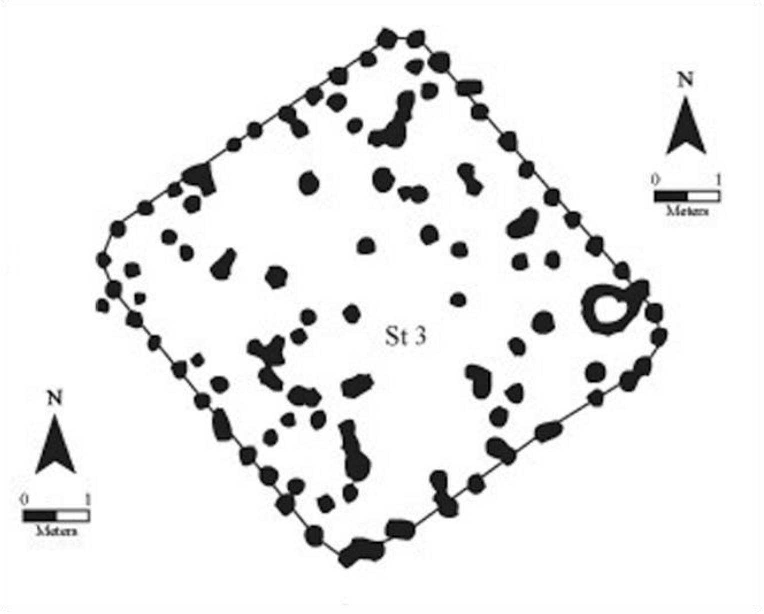

Figure 1.1. Excavated Wilbanks phase house plan at the Middle Mississippian period Hickory Log Site (9CK9), courtesy of Paul Webb (Ernenwein et al. 2024).

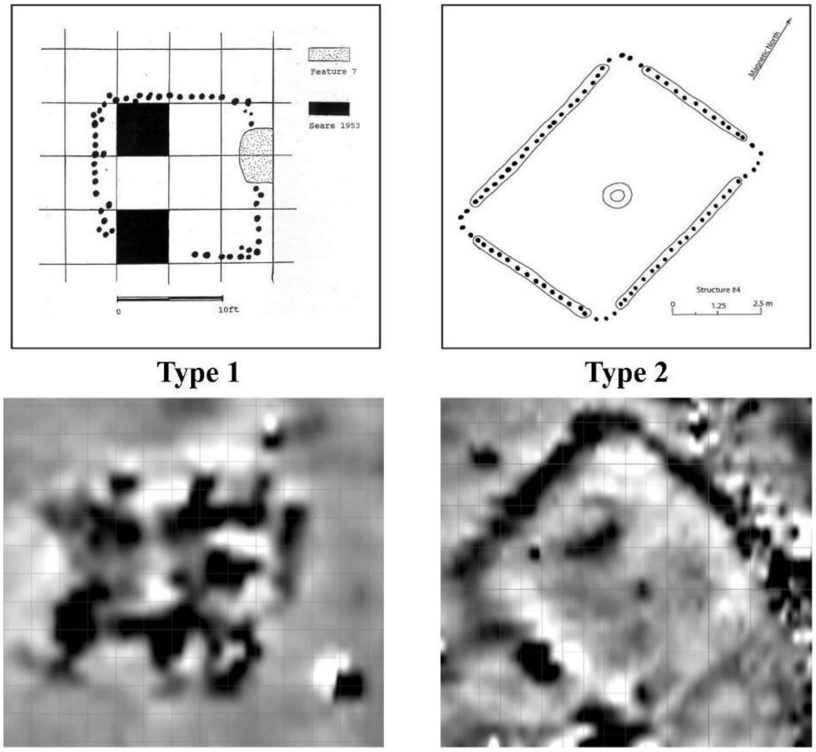

Figure 1.2. Reproduced from King (2021), Figure 3. Archaeo-geophysics at Etowah. Depicted is a *type 1* structure (similar to Wilbanks), as defined by Walker, in both an excavated plan view and in magnetometry. Type 2 represents a wall-trenched house at Etowah, which is more distinct in magnetometry (King 2021, Fig. 3).

In 2024, our exploration of Watauga continued the previous field seasons investigations with a simultaneous gradiometer and GPR survey across 3.5 hectares of the site. The priority for this survey was locating the domestic area, or confirming its absence, and the geophysical results are encouraging. My study contributes to this larger project; my goal is to identify and explain connections between residential signatures in these two datasets. With GPR data as a guide, I compare anomaly patterns within the magnetometry data to identify correlations with structures to enhance interpretation.

2. Archaeological Context

2.1 Site Description

Watauga is located in the Southern Appalachian Highlands region of North Carolina (Figure 2.1). Sitting on an ancient terrace surface above the Little Tennessee River, 300 meters from the nearest water source of Rocky Branch and over 500 meters from the river, are the remains of two platform mounds. From this vantage point, a complete 360° view of the surrounding horizon is visible. There is no woody vegetation, and it is heavily disturbed from decades of deep plowing. The sites plow zone is mainly 30 cm but continues deeper in some areas. This site has been used for agriculture for over a century but is now only mowed to harvest hay. Recovered artifacts recount a long history of human interaction from Archaic period (8000-1000 BC) lithics to a Revolutionary War era (AD 1775-1783) gun lock. However, the interaction was limited to people passing through until the mounds were constructed, likely due to the inconvenient proximity to water. Only one archaic period projectile point has been recovered, with no debitage to suggest any sort of habitation. Recovered ceramic wares support flashes of occupation during the 13th and 14th century and then diffuse reoccupation in the 17th century.

Watauga’s mound center would most likely have been active during the Middle Mississippian period (AD 1100-1350). In the South Appalachian Mississippian tradition, several phases overlap in this time period. Evidence recovered from Watauga, such as distinct ceramic styles, points toward the Late Savannah culture phase which was undefined prior to this survey and remains unnamed and uncharacterized (Brett Riggs and Jane Eastman, personal communication 2023).

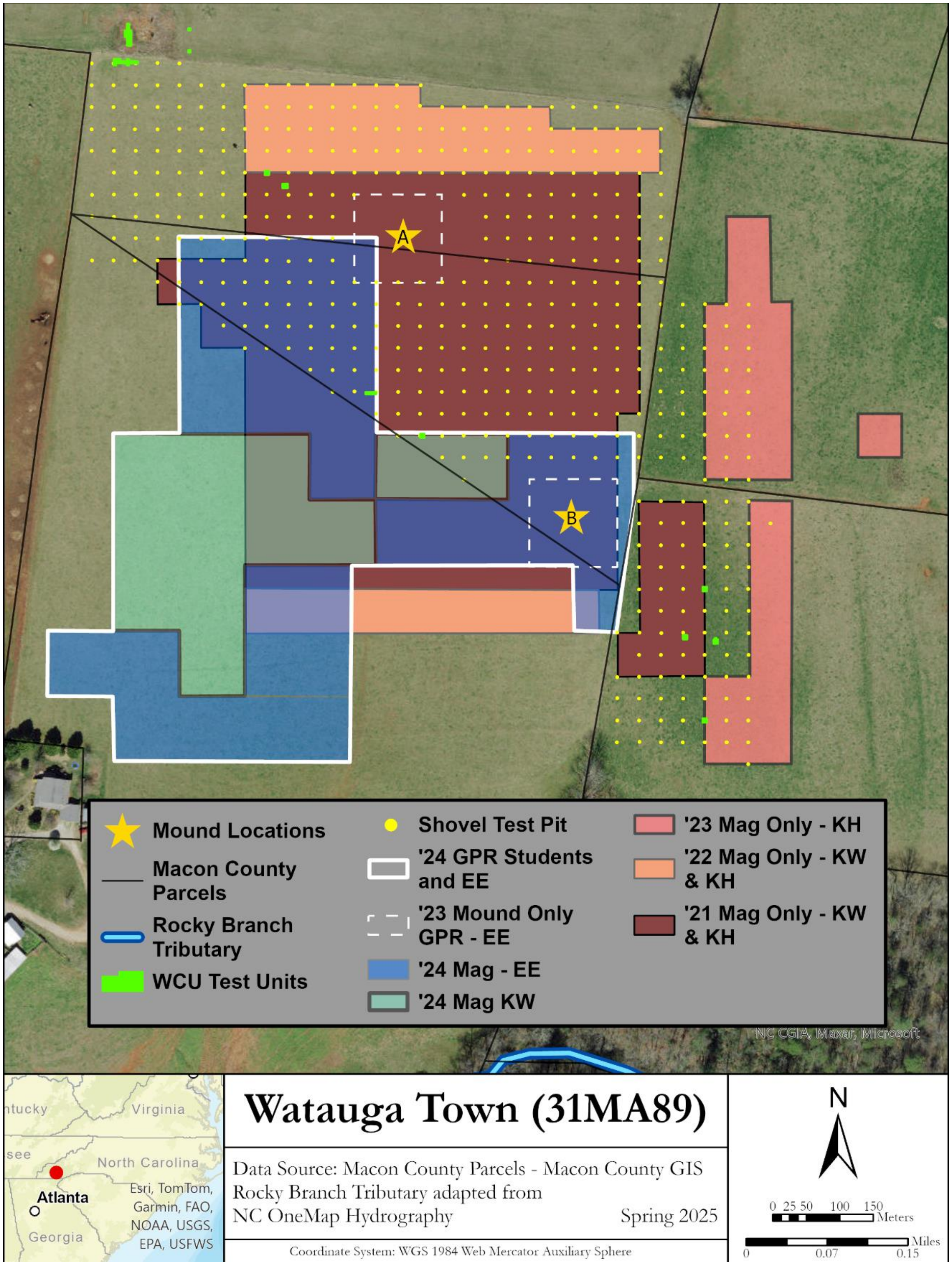

Figure 2.1. The location and overview of Watauga Town, with Macon County Parcels and Rocky Branch tributary. Geophysical survey has taken place at Watauga since 2021, included are surveyed areas by year, instrument, and operator: KW – Kyra Waitt (NCSU), KH – Kelly Hoover (UMaine), EE – Dr. Eileen Ernenwein (ETSU). Excavations since 2021 also marked.

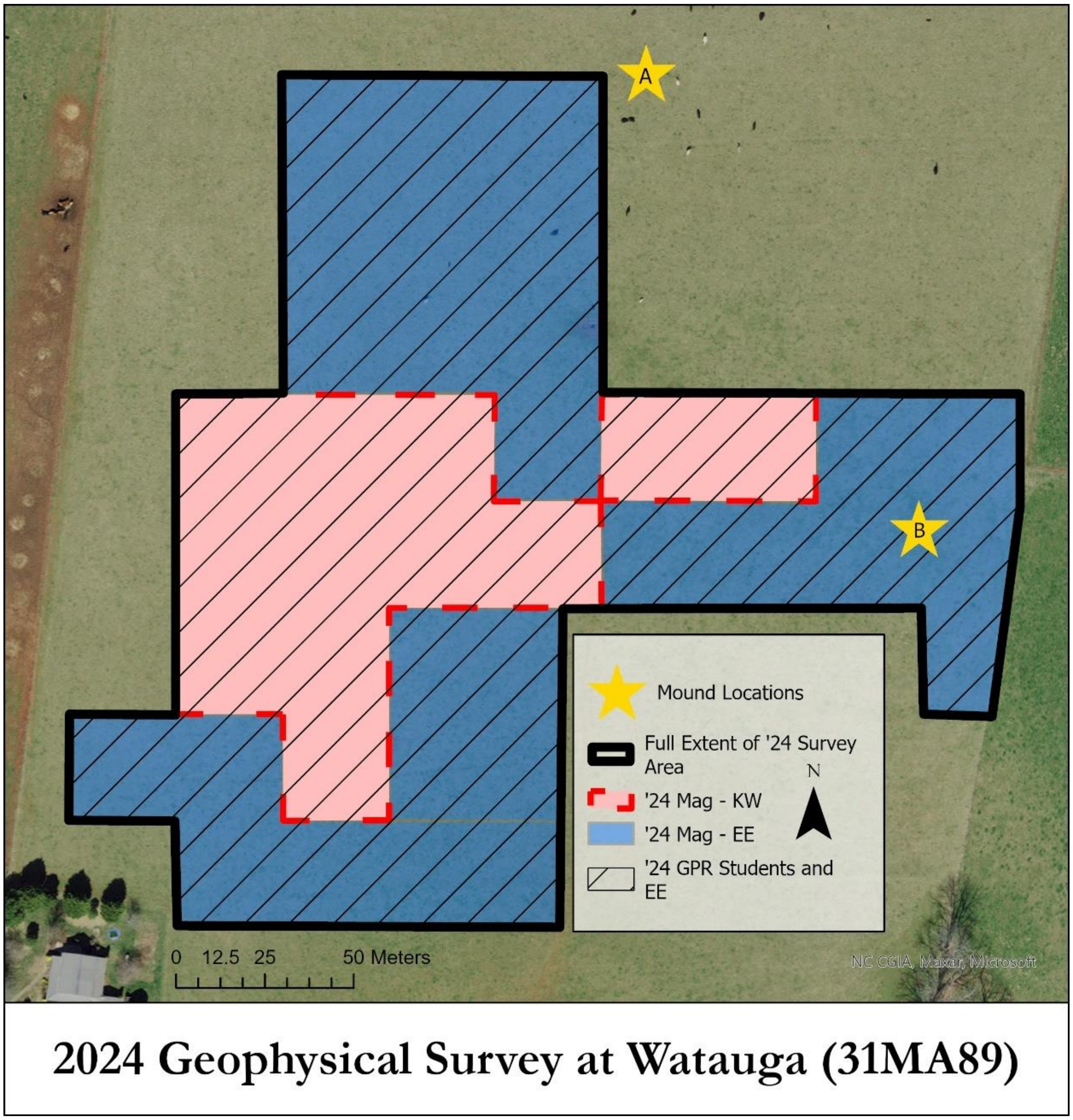

Figure 2.2. Map of 2024 geophysical survey at Watauga. Data presented in this paper is solely from the 2024 survey.

2.2 2024 Geophysics Survey Location | West of Mound B

The 2024 survey focused on the 2 to 3 hectares west of Mound B (see Figure 2.2). This area is completely level and was not collected during previous gradiometer surveying. A couple hundred meters south down the hill, Rocky Branch follows the valley bottom. Water is an important commodity, and building residential structures closer to a water source would reduce the effort required to retrieve it. In the existing magnetic data from other portions of the site, the concentration of pit-like anomalies increases toward the west from Mound B, as does the number of positive shovel tests and recovered artifacts.

3. Methods

3.1 Ground Penetrating Radar

The GPR survey was conducted by Dr. Eileen G. Ernenwein of East Tennessee State University. Dr. Ernenwein created a 30-meter grid for the entire site with alphanumeric labels to guide collection and organize processing. A total station and a roving GPS unit were used to lay out the grid with PVC flags. Dr. Ernenwein and students utilized two GSSI SIR-4000 systems with 400 MHz antennas. In total, 38 grids, or 3.5 hectares, of GPR data were collected in 50 cm transects following a north-starting orientation and a zig-zag traverse pattern.

3.2 Magnetometry

Dr. Ernenwein and I collected magnetometry data with Bartington Fluxgate Gradiometers (Grad 601-2), across the same 38 grids from the GPR survey. While students practiced using the gradiometer, the magnetic data used in this study was collected exclusively by Dr. Ernenwein or myself to ensure consistency. Gradiometers are highly sensitive, and variations in technique by less experienced users could affect data quality, so this was the best practice considering the aims of this specific study. We collected with the same 50 cm transects, zigzag, and north starting orientation as the GPR. The gradiometers were set to 8 samples per meter, and the range was set to 100nT to limit signal extremes from ferrous metal debris. The instruments were tuned daily to zero out the constant magnetic field so that fluctuations could be recorded accurately. These adjustments were completed while standing on an elevated surface at the same place each day.

PVC flags at the cardinal directions guided students through the setup process to limit directional variations and errors. This task was completed only after the instruments were allowed to adjust to site conditions for at least 15 minutes after assembly.

3.3 Processing

3.3.1 GPR Processing

To process individual GPR grids, I followed a templated procedure provided by Dr. Ernenwein. I imported raw grids to GPR-SLICE and applied the same processes for each one with no variation. Depth slices from 40 cm to 60 cm for each grid were brought into ArcGIS Pro (v3.3.2) for evaluation. I was supplied with full composites with more customized processing completed by Dr. Ernenwein for the same depths. She notes the processing steps for these images in our 2024 SEAC poster:

> GPR data were processed in GPR-Slice (v7) software. Each radargram was processed as follows: automatic time zero line-by-line, band pass filters set to pass 200-800 MHz, background removal, and velocity analysis. An average velocity was used to create absolute amplitude, 10-cm thick slices, which were then mosaicked, de-striped, and interpolated in ArchaeoFusion to produce survey-wide mosaics. Mound areas were also processed separately in GPR-Slice for topographic correction. GPR slices and magnetometry data were combined with the previous magnetometry survey and other data in ArcGIS Pro (v3.3). These were analyzed in conjunction with 3D versions of GPR data in GPR-slice to detect structures. GPR slices from 30-60cm were combined using a maximum function to produce a single, survey-wide slice for visualization purposes (Ernenwein et al. 2024).

3.3.2 Magnetometry Processing

To process the magnetometry data, I used the software TerraSurveyor64. I processed all grids individually and as a composite of the full survey area, starting from the raw data. The clip display was set to ±3 standard deviations and applied to composites when exporting. The main processes used were *destripe*, *destagger*, *search and replace*, and *interpolate*. *Destripe* corrects striping in the data by subtracting the median value along each traverse. *Destagger* corrects errors in operator pacing for zigzag traverses, shifting tracks to align anomalies. Operator stagger can improve and stabilize over time. For example, Dr. Ernenwein has extensive operating experience and a consistent destagger of 10 cm, while mine is 20 cm. *Interpolate* smooths the data to aid interpretation by changing the resolution of the image and reducing pixelation. Order is important for processing in TerraSurveyor, and interpolation is usually the last step. *Search and replace* replaces data from set ranges with dummy data. My experience using TerraSurveyor allowed me to tailor processing to meet the specific needs of each grid. When completed, I exported grids as Surfer ASCII files to import into ArcGIS Pro (v3.3.2). All grids for both datasets were georeferenced in ArcGIS.

3.4 Comparative Methods

3.4.1 Contour

While magnetic anomalies can be enhanced by increasing image contrast, the more subtle details of the signatures are not obvious without looking at the numerical data. An anomaly may not be one consistent nanotesla strength throughout, measuring high in one area and tapering off is often the case. This change is difficult to see when the color pallet lacks contrast between close readings. Contour lines are used to outline anomaly shapes at specific strength intervals, the same technique is used in topographic maps for elevation changes. Kvamme’s article for multi-instrument data integration made great use of contours; Yerka later recommended their use as well (Kvamme 2006; Stephen Yerka, personal communication 2024). Contours are widely used in archaeogeophysics, as it simplifies the data to aid interpretation (Clay 2001; Kvamme 2006; Yerka 2010; Verdonck 2019).

Within ArcGIS, I used the geoprocessing tool *contour* from the spatial analysis toolbox to visualize signal strength for magnetic anomalies. I chose a contour interval of 5 nT to observe the more subtle anomalies. Within the subsequent feature class, I applied colors only to the ranges I wished to focus on. I examined the contour layer over both the GPR and magnetometry data to search for recurring patterns that were consistently present within structures. The contours made it possible to see where anomalies were detected by both instruments.

3.4.2 Visual Manipulation

I visually manipulated both datasets by changing the color scheme, contrast, and transparency of the raster layers. These techniques were implemented to reduce noise from the plow scars and highlight prehistoric anomalies. I adjusted the clip value for the magnetometry data to change the contrast. This limits the absolute values displayed in the raster, homogenizing higher values so they do not drown out the signals of more subtle anomalies. Additionally, I used search and replace to experiment with replacing high values with dummy data and observing how the image was impacted. I applied ranges from 45 to 3000 nT and -3000 to -45 nT, down to 10 to 3000 nT and -3000 nT to -10nT.

I shifted through several color schemes for both datasets. The different distributions of colors highlighted or dampened certain readings in the data depending on how they were assigned. For the GPR, changing the color scheme muted background signals and made structures stand out. I compared the datasets by overlapping raster layers with various transparency percentages and complementary color schemes. This mimicked part of Kvamme’s study and was meant to enhance features present in multiple layers (Kvamme 2006).

3.4.3 Visual Evaluation

The visual evaluation involved manually examining each grid, section, and the full survey area composite to find patterns. In ArcGIS, I manually created point data from magnetic anomalies to record possible connections between structures identified in the GPR data and anomalies in the magnetometry data. I chose to focus on signatures that were roughly uniform in shape, larger than 40 cm, and measured above 15 nT. As I discuss later, anything less than this nanotesla range is obscured by plowing. I used the *select* tool to extract points falling within a two-meter buffer around GPR structure outlines to zero in on magnetic anomalies more likely to be associated with domestic structures. Then, I used a 2 meter buffer around the extracted points and used lines to connect all pairs more than 1 meter and no more than 4 meters apart. This pair distance seemed reasonable following the suspicion that these anomalies may represent support posts or hearths.

With this method, I identified several patterns I felt were promising. Pairs of positive anomalies were present within several structures, and they seemed to share a common azimuth. Mississippian residential structures commonly follow intentional orientations which vary by site (Steere 2017). It is reasonable, then, that the four main support posts placed around the central hearth could share a certain azimuth. Individual postholes can be difficult to see in magnetometry data, however, these posts would have been slightly larger and placed in the center of the buildings. So, their magnetic signals could be more prominent. I also considered hearths to explain these anomalies because domestic structures have at least one central hearth inside, and secondary hearths may be present inside or outside structures. In my search for patterns, I used *calculate geometry* to populate coordinates and azimuths for these pairs into the attribute table. I tracked characteristics with an Excel spreadsheet to record patterns and exported the attribute table data into a spreadsheet to search for outliers.

4. Results

4.1 GPR Interpretation

I relied on the expertise of Dr. Ernernwein in order to utilize the GPR data as comparative guide. Her identifications of possible structures are reliable and backed by years of experience (Brett Riggs, personal communication 2025). This allowed me to focus on specific areas to improve the probability of finding patterns and test them against magnetic anomalies in other structures. Ernenwein describes these structures as square with rounded corners and measuring approximately 5 m to 7 m on each side. This is consistent with Steere’s observations of Wilbanks phase houses (Steere 2017).

Structure signals were most concentrated on the northern side of Mound B (see Figure 4.3.1), where they are tightly compact, extending to the west like the anomalies in the magnetic data. Signals become more dispersed moving away from Mound B, randomly distributed but in rows southeast of the plaza. Houses follow Lewis’ community patterning model, surrounding and radiating outward from the mound-plaza complex (Lewis et al. 1998). It is likely there are more structures on the eastern side. Sometimes, Mississippian residences subscribe to a common orientation following environmental features, public buildings, or cardinal directions (Steere 2017). Watauga’s council houses are intentionally aligned with astronomical events (Riggs et al. 2021). Based on these observations, orientations may have been important in local traditions. Some of Watauga’s residential structures seem to follow a common axis, while others do not. Ernenwein also noted rebuilding episodes, which were a common occurrence in the

Mississippian period. Evidence of these episodes is derived from overlapping signatures in the same and subsequent depth slices. Structure signals are seen from the bottom of the plow zone at 30 cm to approximately 60 cm, well within the effective range of gradiometers (Conyers 2018).

4.2 Contour Comparison

Contour outlines gave detail to solid shapes, which helped identify feature types. I was able to limit contours to display specific nanoteslas that were more likely the result of prehistoric cultural features. I included contours from -20 to 20 nT in 5 nT increments and excluded stronger signals. Though anomalies at prehistoric sites may be as high as 50 nT, limiting to ±20 nT captured everything above that threshold without making the layer busy. The contours exposed the remaining anomaly patterns for structures, but they were not uniformly representative across the sample.

The contours showed distinct features where magnetic signals for multiple features amalgamated into a single anomaly, while depth slices showed where anomalies continued deeper into the subsurface (Figure 4.2).

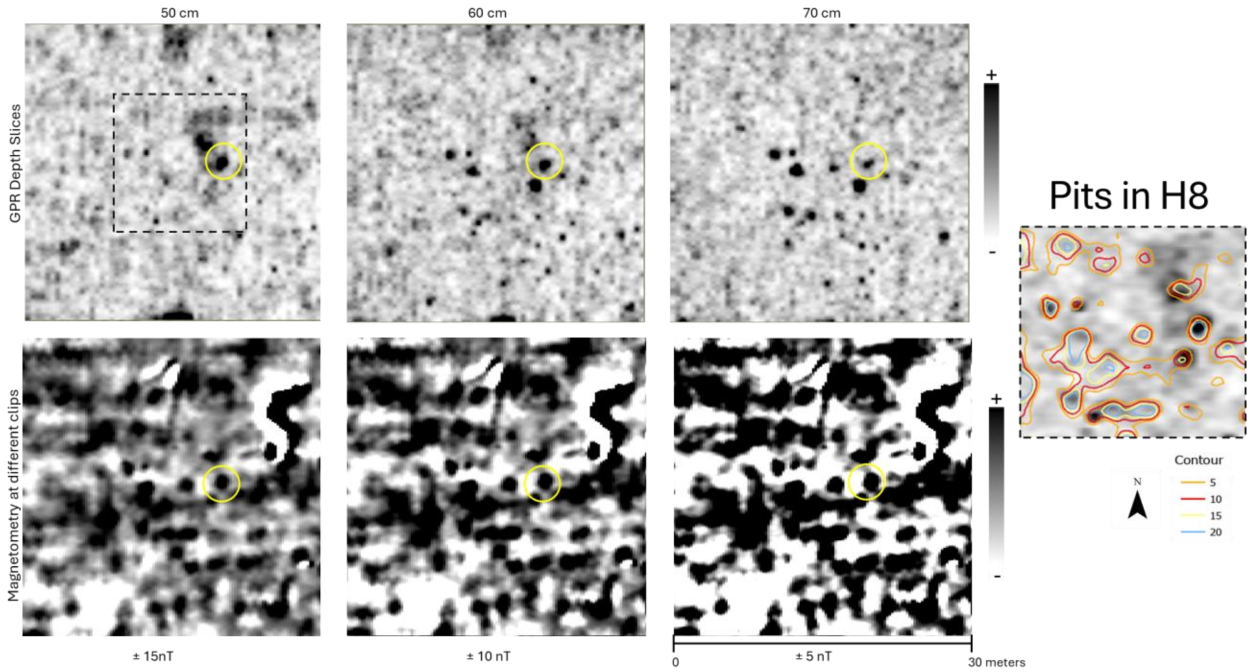

Figure 4.2. Examples of pits in Grid H8 are shown in both magnetometry (bottom row) and GPR (top row) grids. From left to right, the GPR data shows depths of 50, 60, and 70 cm. The anomaly in the yellow circle is likely a pit feature, the shaft of the pit shrinks as we descend, showing the tapering of the pit toward the end of the disturbed soil. The magnetometry data shows clip ranges from 15 to 5 nT from left to right. Prehistoric features are usually subtle and need to be viewed at a lower clip value for proper contrast.

Decreasing nanotesla clip levels show how anomalies become harder to identify as the clip range is lowered, but with the help of the GPR, they remain evident to the viewer. The image on the right shows relevant magnetometry data presented as contours over the GPR data; this helps focus the eye on target anomalies.

Geophysics requires ground-truthing before absolute confirmation of features, but this comparison method may be reliable for identifying pits. These features were present in both data sets, as positive roughly round anomalies in the magnetic data, and in GPR as tapering circular anomalies in descending depth slices. Pits are also seen in radargrams as reflected layers where signals hit material with dielectric permittivity differing from that of the surrounding subsoil. Pits are often found within and just outside Mississippian homes (Steere 2017). This demonstrates a positive connection between the datasets and supports future research on mapping possible cultural features by direct comparison of individual anomalies across multiple datasets.

4.3 Visual Manipulation Comparison

Visual manipulation was helpful for finding GPR structures for areas where I did not have Dr. Ernenwein's interpretations. Using color schemes like *inferno* in ArcGIS made structures stand out significantly in the GPR data (Figure 4.3.1). Changing the transparency of the GPR rasters allowed layers to merge, creating stronger contrast for feature signals. For a visual, think of puzzle pieces; transparency helps show the whole image by fitting pieces of anomalies together into one image. I attempted to use transparency to view magnetic and GPR anomalies together, but I had better results using contours. I found transparency to be of limited use for comparison across datasets. Additionally, color pallets were more beneficial when paired with clip adjustment for contrast control.

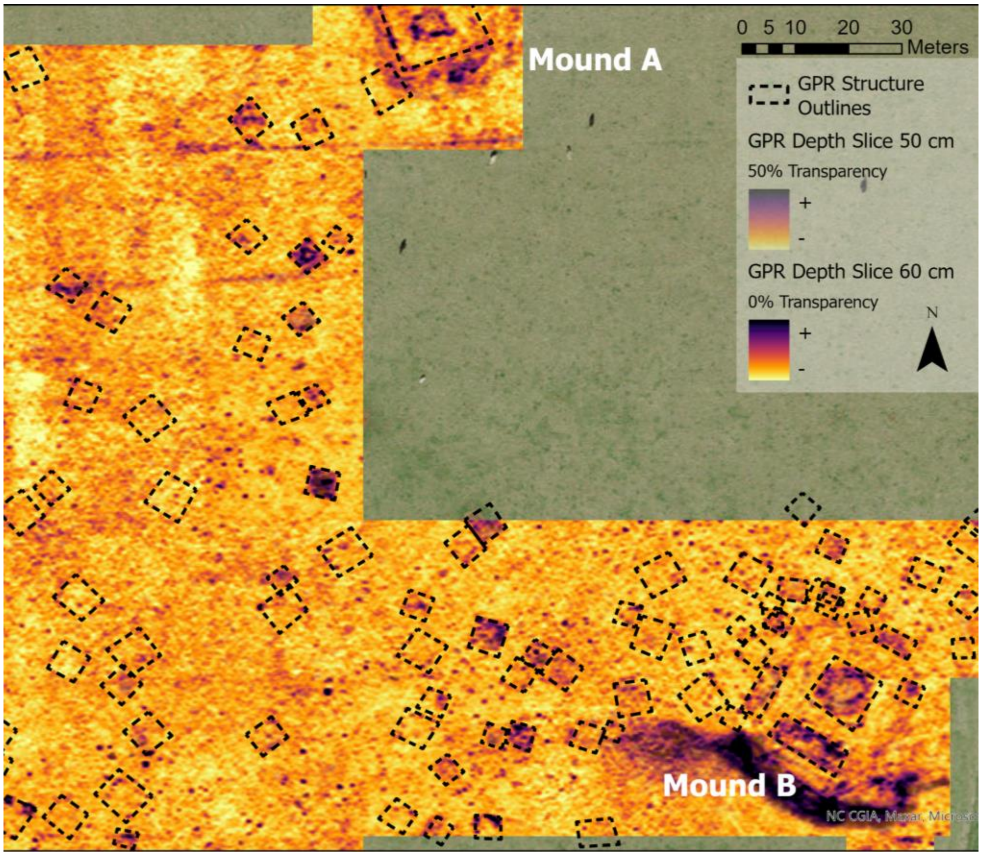

Figure 4.3.1. Visual manipulation: GPR data is shown in a color scheme that makes structure signals stand out but is not typically used for presentations. The 50 cm depth slice is set to 50% transparency so the strength of the lower (60 cm) layer can show through.

With *search and replace*, I tried replacing plow signals with dummy data to reduce their impact on the overall image. I replaced from 15 to 3000 nT and -3000 to -15 nT, which did help, but at this level, probable cultural features were also removed, making it counterproductive. I settled on a higher value for my main images to remove the more prominent signals without jeopardizing prehistoric features.

Clipping is an important part of processing magnetometry data and another method to reduce the impact of high readings. Prehistoric sites are often viewed at a low clip value to enhance the contrast of the site's subtle features. For example, gradiometer survey results for the Stephan-Steinkamp site were displayed clipped to ±6 nT, making the full anomaly signature of Middle Mississippian structures visible as solid or nearly solid positive square anomalies (Malouchos 2021). When this clip is applied to Watauga's data, it instead enhances the plow scar signatures, making it nearly impossible to separate cultural anomalies. The same occurred for Horsley at Garden Creek, two counties over from Watauga:

> These agricultural responses are responsible for the parallel and diagonal lines that dominate in the open fields and in places measure in excess of ±15 nT. Clipping the data to narrow display ranges renders the results almost meaningless in these areas; however, these intense plow scar anomalies demonstrate a strong magnetic contrast between topsoil and subsoil layers, thereby indicating areas of significant anthropogenic enhancement and consequently former occupation (Horsley et al. 2014).

Similar to those at Garden Creek, the plow scars at Watauga dominate even at ±15 nT (Figure 4.3.2). Additionally, areas identified as structures in GPR data do not stand out in the magnetometry data. This is likely because the floors are no longer intact, making the signatures ambiguous in any visual manipulation technique applied.

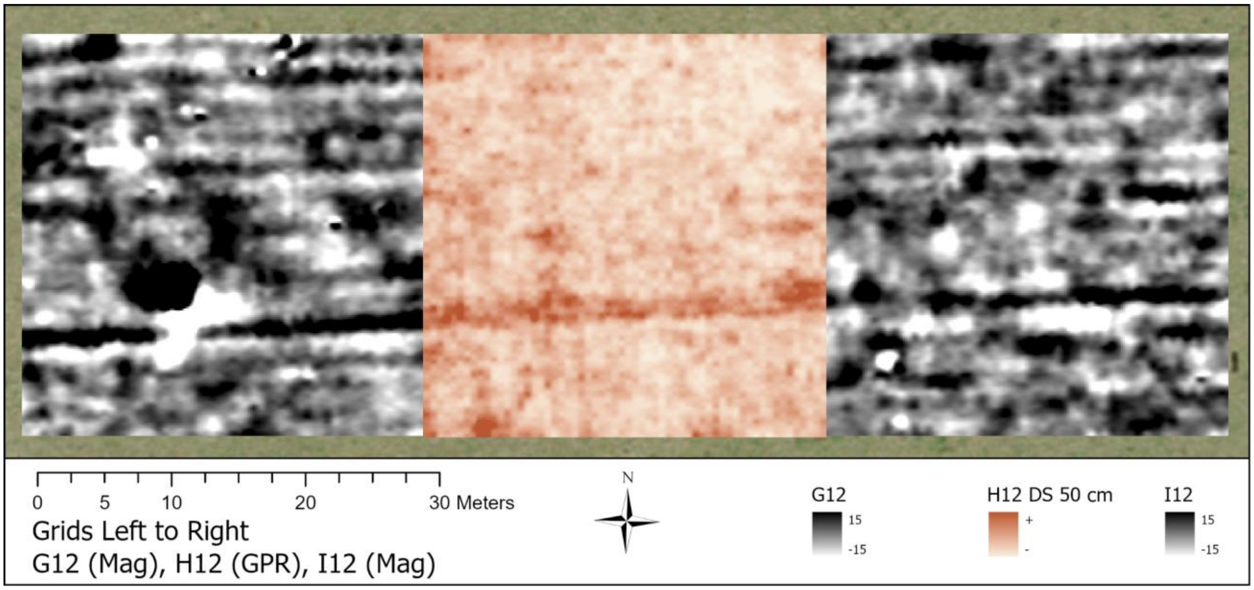

Figure 4.3.2. Example of a strong plow scar signal in Grids G12, H12, and I12 just west of Mound A. The signature for this linear anomaly is uninterrupted when viewed across both datasets; here, a 50 cm GPR depth slice is shown between two magnetometry grids.

There are anomalies that appear closer to the expected presentation in areas not identified as structures, which could lead to misinterpretation without GPR guidance (Figure 4.3.3). Nevertheless, clipping still enhances subtle features at Watauga, and identifying a range that works well for the data is essential for successful interpretation.

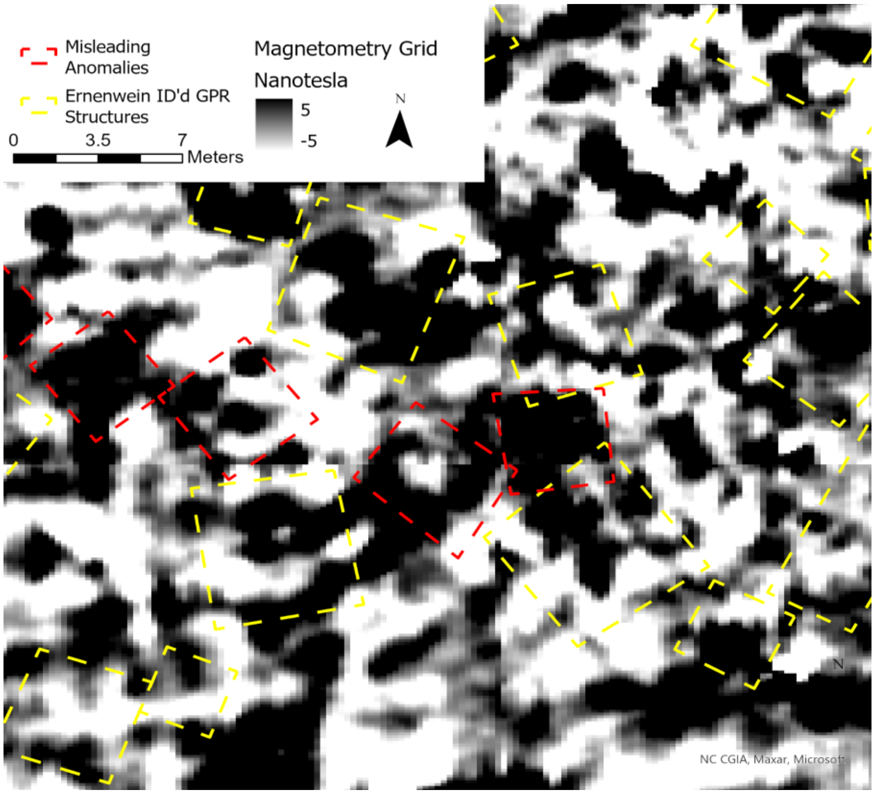

Figure 4.3.3. An example of Watauga's gradiometer data is displayed at a clip like the results from Stephan-Steinkamp, where house floors showed up as clear squares. This shows two things: the actual disturbed structure floors and examples of unreliable anomaly signals, which are areas that Dr. Ernenwein did not specify as structures but resemble the expected shape.

4.4 Visual Evaluation Comparison

The pattern I felt most confident in was pairs of magnetic anomalies that coincided with GPR structures. One structure near Mound A had a more complete signal and resembled the magnetic signature of *Type 1* structures identified at Etowah. These type 1 structures represent Brewster phase (AD 1475-1550) architecture: "single-set post walls [with] interior supports and gabled roofs" (King et. al 2021:6). King and Walker suggest that the *Type 1* structure patterns at Etowah were comparable to those of the Wilbanks phase architecture (Walker 2009). These magnetic anomalies lack well-defined walls, but signals from interior features create a roughly square shape. In Walker's *Type 1* example, circular anomalies with abrupt edges at approximately 10 nT are reminiscent of the pair pattern at Watauga (Walker 2009: Figure 3.5). Considering the level of disturbance at Watauga, I postulated that the pairs of anomalies that I identified may have been what survived plowing for the full signal of a *Type 1* signature. Since Wilbanks structures are not wall-trenched, we must rely on the interior architecture for structure identification. Structural support posts would be set deeper than the floor of the house, meaning this feature could have escaped plowing. Their magnetic fields would be stronger than that of the dispersed plow zone soil, causing them to stand out in the magnetometry data. The presence of post holes below 30 cm is supported by the GPR data.

To create point data from anomalies, I set parameters of at least 15 nT, larger than 40 cm, and approximately round. These choices follow the characteristics of the pair patterns that originally caught my eye. I recorded 825 magnetic anomalies as point data (Figure 4.4.1). 591 (72%) were within four meters of at least one other point. Of these 591, only 166 (28%) points were within two meters of an identified GPR structure. Out of the 825 points, I drew 540 pair lines for every possible connection, only 202 (37%) of these connected pairs fell within two meters of a structure. The fact that less than half of the pairs were located within structures suggests that they are not strongly correlated with structure signals. When exploring patterns, these 202 pair lines were my focus as they were more likely to be architectural features considering their proximity to structures.

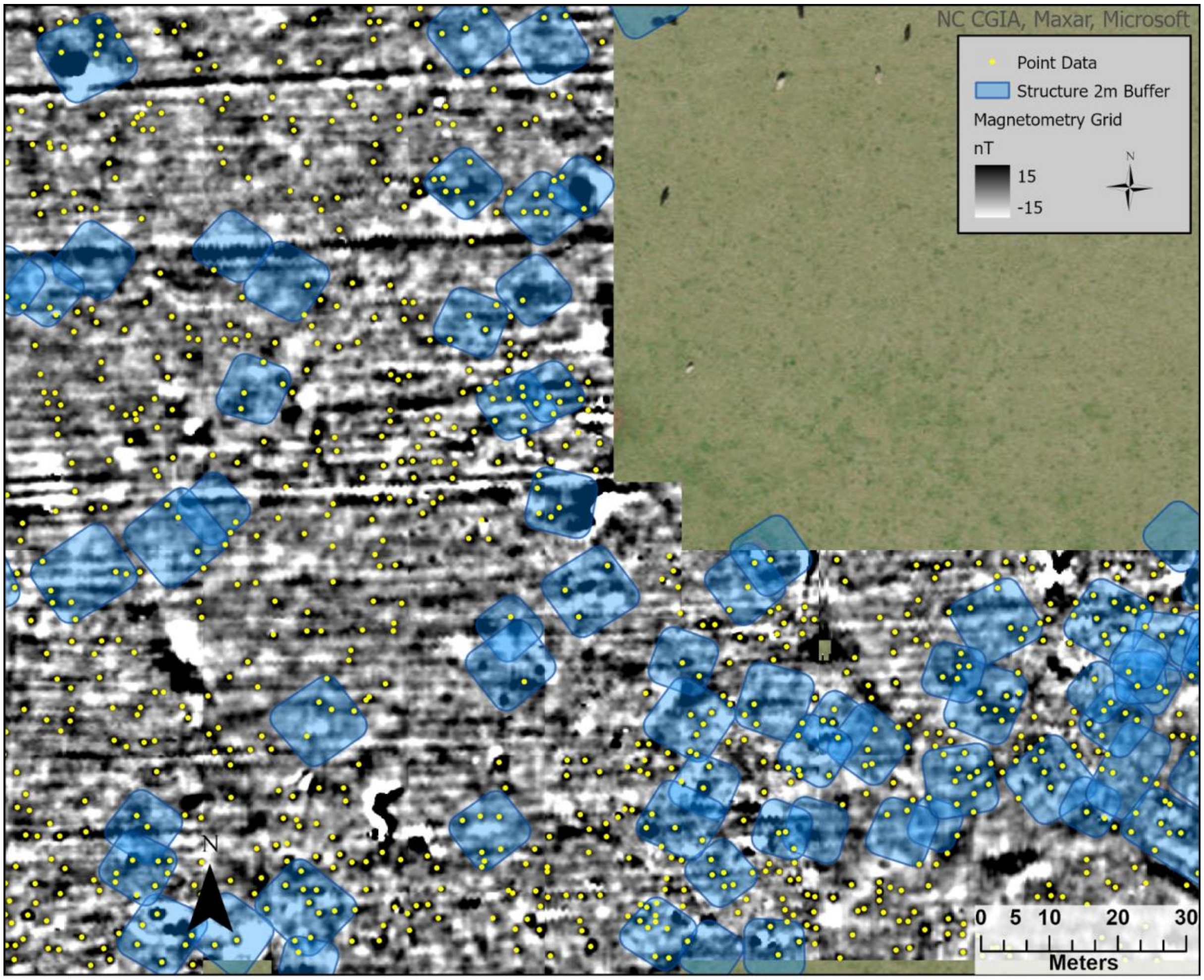

Figure 4.4.1. Example of feature class layers used for visual evaluation. Point data was derived from any anomaly that was at least 15 nT and uniform in shape. I chose this nanotesla range based on the strength of the original anomaly pairs to identify similar anomalies. The buffer restricted point data to focus on anomalies that may be relevant to identified structures.

Within the 202, I explored two factors to determine if there were any regular patterns: distance and azimuth. A handful of pairs shared a common azimuth of N24°W and a distance of approximately 2 meters apart. To observe if this combination of characteristics was significant, I selected all pair lines with a shape length of approximately 2 meters within 2 meters of a GPR structure (Figure 4.4.2). From this pool, I extracted pairs with azimuths within 5 degrees of N24°W. The resulting data included less than 20 pairs, only 10% of the sample.

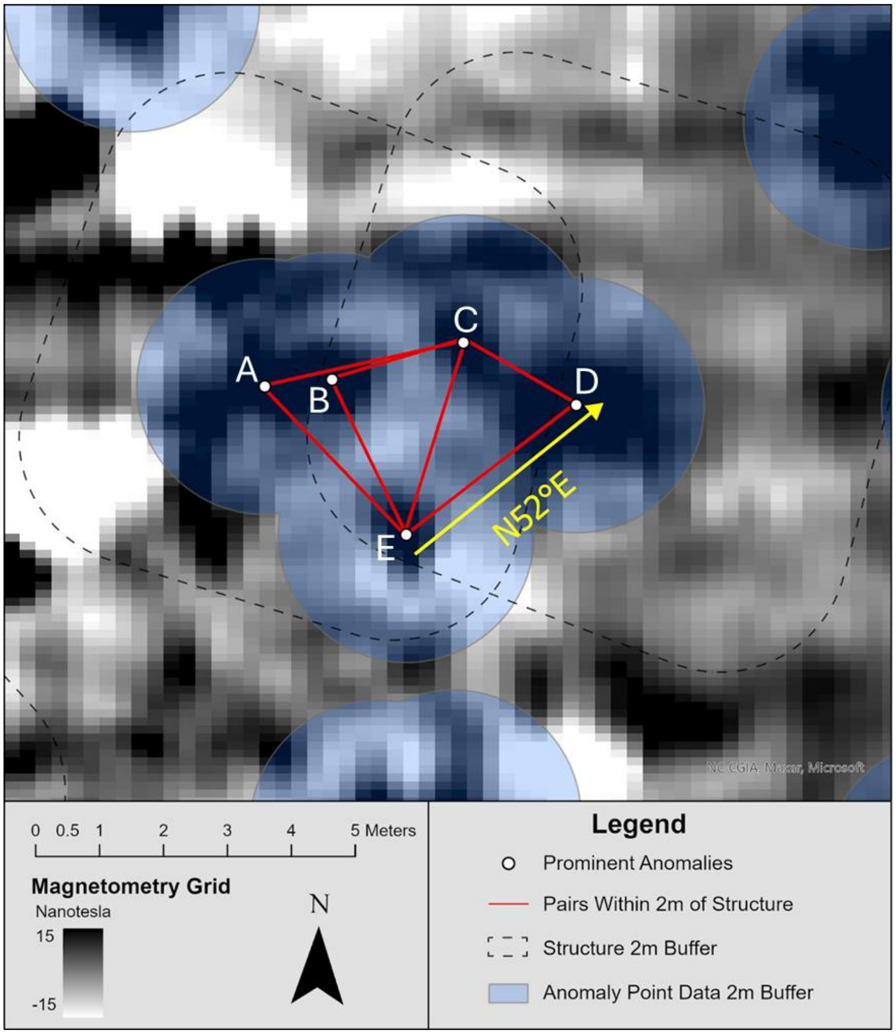

Figure 4.4.2. Example of the feature class layers created for visual evaluation. Line data was added for connections between point data if the points were greater than 1 meter but less than 4 meters apart. These measurements are suited to my focus on interior features, mainly the four central support posts and hearth (Steere 2017). Their central location simplifies attribution to individual structures for this study, but corner post measurements could extend up to 5-6 m, following the size of Wilbanks phase houses.
Creating these feature class layers allowed me to evaluate the azimuths and distance between selected anomalies for patterns. Combinations of anomalies in this image are AC, AE, BC, BE, CE, CD, and ED. Bearings and lengths were generated for each of these lines.

Since support posts and hearths are the main components of domestic structures and are placed intentionally, I continued searching for a relational pattern. As a next step, I opened up the sample to explore other possible distances and patterns that may not have been as obviously evident. I analyzed the distribution of distances, ranging from 1.5 to 4.8 meters, and expanded the azimuth range to include 0 to 180 degrees. Despite the wide variation in both properties, no significant trends were observed for distance data. Results on azimuth patterning require further investigation and are currently inconclusive.

5. Discussion

Applying multiple geophysical instruments has enhanced our ability to capture residential structures relating to the unnamed Late Savannah phase component at Watauga. We now have multiple views of the subsurface and information about its magnetic and dielectric properties to guide future steps. This information allows us to consider areas with the highest informative potential before excavation, which is important for honoring our commitment to remain minimally invasive throughout the project.

Obstacles such as identifying the Middle Mississippian architecture amongst strong plow scar signals are unavoidable, but I found contours immensely helpful for seeing past the background noise caused by these linear anomalies. Contours showed distinct shapes held within linear anomalies from plowing, which are probable cultural features that have been shifted by the plow (Figures 5a & 5b). Because the feature’s magnetic field is stronger below the plow zone, where it was less impacted than the diffuse material of the upper layer, contours offer a more accurate shape. This technique will undoubtedly remain useful as we cover the rest of the site.

My study did not produce a cohesive pattern for structure identification, but it did show techniques that could be applied to investigate individual anomalies using multiple datasets. My results support the merit of continuing collection with both instruments and highlight future research opportunities in analyzing structure features individually.

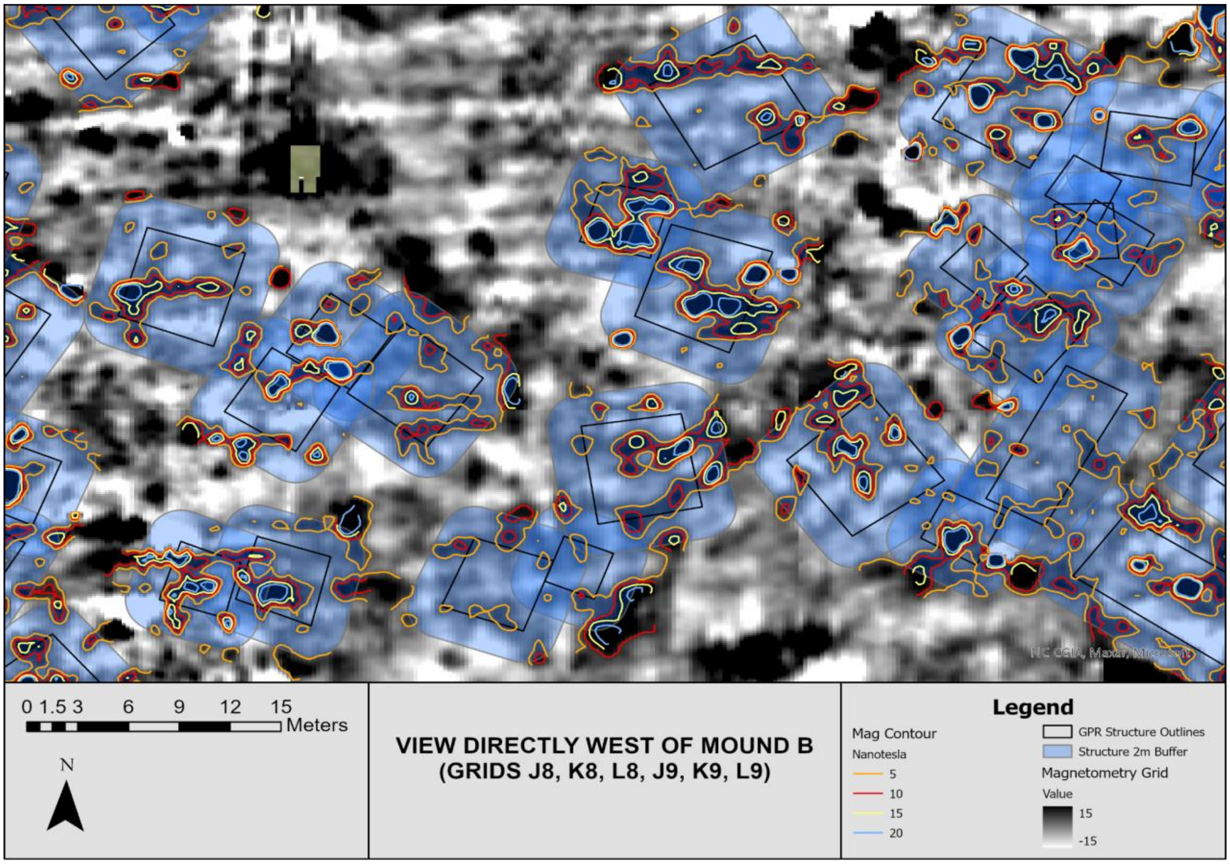

Figure 5a. Contours show the variability of anomalies found within two meters of structures. contours from plow scars show the impact on features as they drag, elongate, truncate, and obscure cultural anomalies.

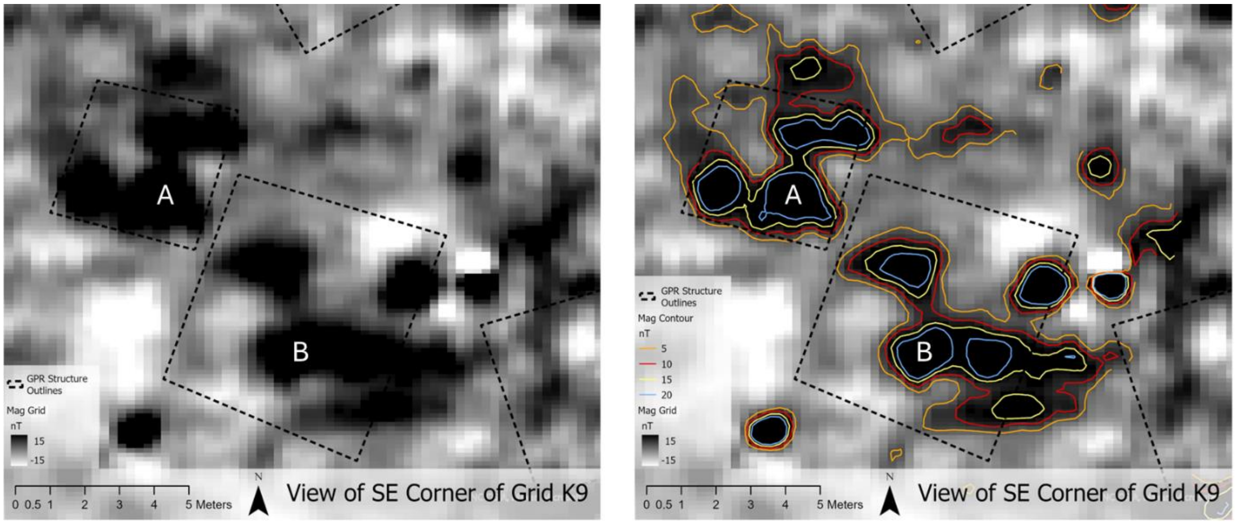

Figure 5b. Contours display the nanotesla strength of anomalies (right) that are not readily apparent (left). In this example, the conglomerate anomalies *A* and *B* are separated into several anomalies where the highest nanotesla areas are distinct. Signals in the image on the left may be merged due to the overlap of strong magnetic fields, or upper portions have been dragged by the plow, shifting the magnetic soil and elongating/truncating their shapes. Applying contours

enhances visualization through the noise, allowing for an accurate assessment of present anomalies.

5.1 Plow Scars

Watauga has seen decades of historic plowing, and this impacted site integrity. The GPR offers a better look at the intensity of the plow scars. GPR data shows plow scars running through structures. The more prominent ones, seen in the shaded relief map, are detectable when walking through Watauga’s fields (Figure 5.1.1).

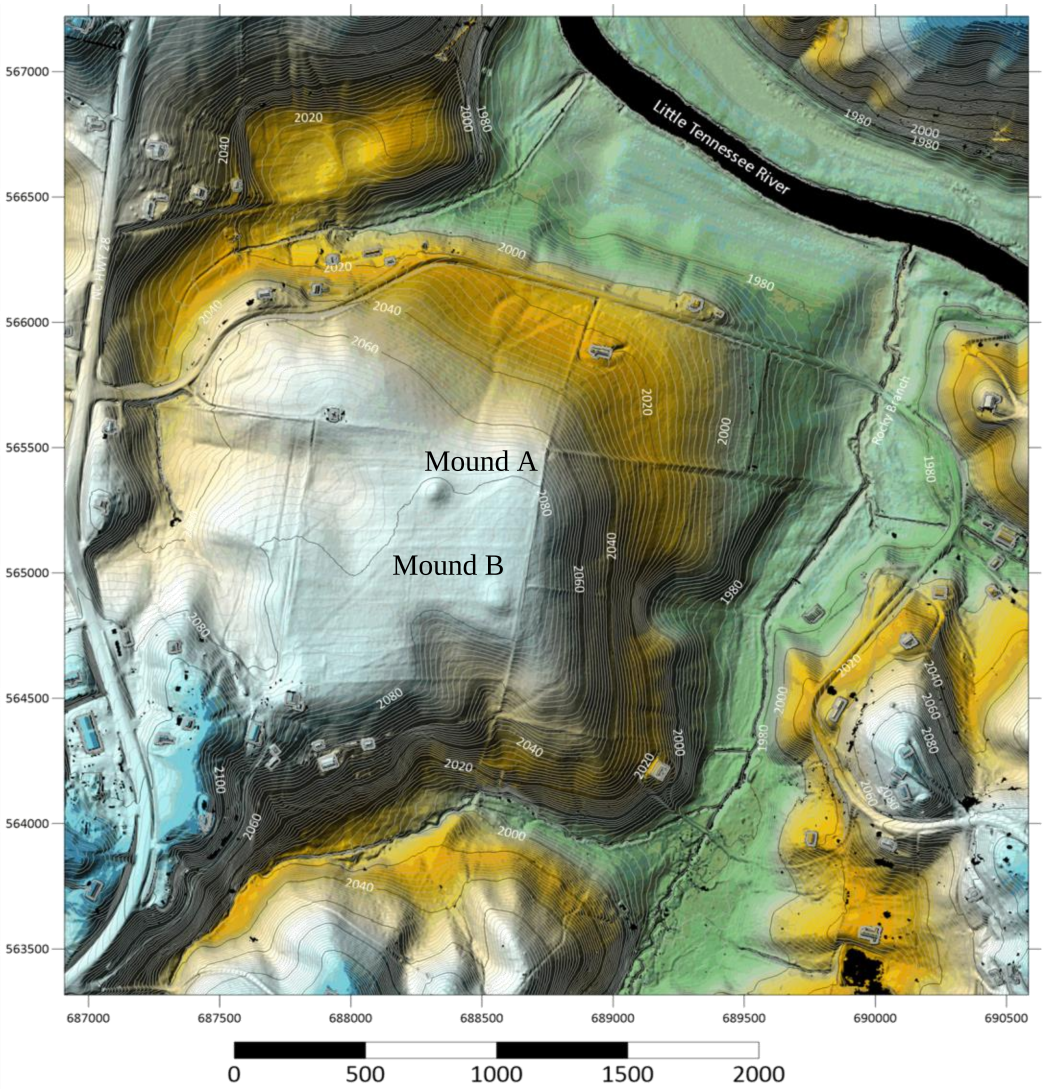

Figure 5.1.1. Shaded relief map of Watauga, plow scars are clearly visible across the site, as are the mounds (Ernenwein et al. 2024).

Additionally, their patterns are slightly irregular, making it difficult to remove with advanced processing techniques without also removing signatures of historic or ancient activity (Daivd Wilborn, personal communication 2024). The same problem exists when attempting to replace the stronger plow scar signals with dummy data. Even replacing all data outside of ±15 nT does not remove the entire plow signature, but it certainly removes cultural anomalies (Figure 5.1.2). Similarly, restricting the clip range below ±15nT only serves to blow out the plow scars, suppressing other anomalies.

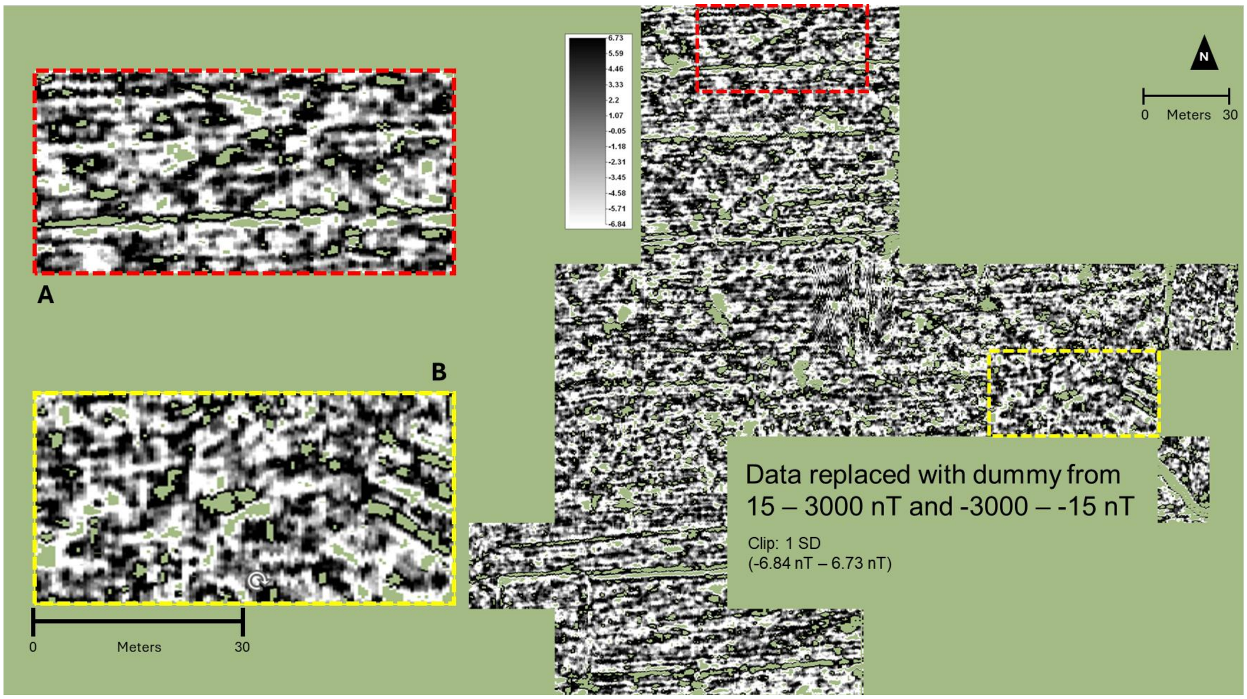

Figure 5.1.2. Full composite of Watauga (before interpolation) with data replaced with dummy data to attempt removal of plow scars. The clip was set to 1 standard deviation (~±7nT), a range typically seen in the literature. Image A shows the remaining plow scars and image B shows the removal of archaeological features from Mound B's public structures.

This comparative survey may have produced a suitable pattern if the plowing had not been so extensive. The gradiometer is highly sensitive, but the noise from the plowing increases the difficulty of postprocessing and interpretation. If structures had been better preserved, qualifying features for patterns might have included partial floors, walls, or hearth and support post placements. Additionally, plowing has blended the plow zone extensively, reducing the chance of using the nanotesla strength of their signals to identify areas of high interaction.

While GPR and magnetometry can be complementary under certain conditions, this was not the case at Watauga for the specific features this survey sought to uncover. In the GPR data, the appearance of structures fluctuates in the 10 cm difference between depth slices, which is evidence that recent plowing has truncated subsurface features. The soils in the remaining shallow features may hold water better than the surrounding soil, changing how radar waves interact with the material and allowing the GPR to record them where the gradiometer cannot (Stephen Yerka, personal communication 2024).

5.2 Contours: A Method to Revisit

Out of all the methods, contours seemed the most promising for interpretation. Creating contours simplified the data and made it manageable to work with. Unlike other methods, it was easier to look past the signatures of the plow scars and examine target anomalies. Though there was not a cohesive pattern across all structures, the contours did highlight the anomalies representing the remains of structures on an individual level. Any future research analyzing the individual houses to document their unique anomalies would benefit from applying contours. Additionally, combining contour data with a distribution map of the recovered artifacts would strengthen anomaly and cluster theories. When the full geophysical map is complete, contours will make pinpointing cultural features easier. Additionally, displaying results with contours would make presenting the geophysical data more intelligible for the public.

5.3 The Value of GPR & Magnetometry

I have discussed the advantages of both instruments used in this study. The gradiometer is more efficient and offers quick results with minimal processing; it is good for phase one exploration. However, now that this project has moved into more detailed investigations, GPR has provided more comprehensive results. GPR data offers radargrams, depth slices, and 3D modeling; this level of detail is beneficial for planning excavations. Once target anomalies have been ground-truthed, we can attach that result to similar signatures, expanding understanding of community patterning (Horsley et al. 2014; Brett Riggs and Stephen Yerka, personal communication 2021).

The lack of results for this study may seem to imply the outperformance of one instrument, insinuating the redundancy of the other, but the exact opposite is true. I must emphasize that the mound-top structures are very clear in both the magnetometry data and the GPR. My previous gradiometer survey produced the images from which all interpretations, particularly those of the public architecture, were derived prior to the 2024 field school. Geophysics is the only method for studying mounds, as these sacred earthen features are protected and never excavated. At Watauga, magnetometry is highly effective for capturing this information.

GPR and magnetometry are radically different in their methodology, with data from one unable to be replicated by the other. While they did not complement each other for my study, the value of insights gained through each method on an individual level cannot be overstated. This is where the significance of multi-instrument surveys lies. It is clear why archaeologists prefer multi-instrument surveys to explore prehistoric sites through geophysics (Clay 2001; Horsley et al. 2014; Kvamme 2006; Patch et al. 2017).

6. Conclusion

6.1 Confirmation of Residential Components

We conducted a multi-instrument survey across the area west of Watauga's southern mound and confirmed the presence of an extensive Middle Mississippian residential component. The presence of structures seeming to correlate with the unnamed Late Savannah phase will offer opportunities to expand current knowledge about this phase and lifeways at Watauga. Residential structures are present across the survey area, especially congregated near Mound B. The inevitable expansion of the GPR map will undoubtedly uncover additional structures to the northeast if the site continues to follow the typical architectural grammar of Mississippian sites.

6.2 Gradiometer Limitations at Watauga

As exhibited in the geophysical results, the plowing at Watauga is extensive. As a result, the disturbance of features resulted in ambiguous structure signals, so there was no cohesive pattern to be observed across all structures. The methods used here, such as contours and clip ranges, are common post-processing steps for geophysical data. Just as geophysical instruments are site specific in terms of what works best, analysis methods adapt based on site context.

Gradiometer surveys are favored for phase one investigations. Our original gradiometry results did narrow our focus to the area west of Mound B, where the domestic component was ultimately found. Additionally, the extensive gradiometer surveys I completed before the 2024 field school made sitewide spatial interpretation possible. This data was essential to the interpretations that made a strong impact on the Cherokee community, as the geophysical images and archaeological analysis brought the past to life. The undertaking of geophysical prospecting continues to produce exceedingly useful information about the remains of Watauga's paired mound center that would be otherwise inaccessible.

6.3 Impact on the Cherokee Community

The Watauga archaeological project has fostered a strong relationship between the archaeologists involved and the Cherokee community, building on the trust and connections Dr. Riggs and Dr. Eastman share with the community. The relationship between WCU's archaeology department and the EBCI is unique and a model for the level of partnership all universities should strive for. At its core, the Watauga project is about reconnecting Cherokee people with the site, and the work has and continues to do that. People gather at Watauga to observe the solstices, travel from Oklahoma to connect with this piece of their homeland, and high schoolers participate in field school during the summer. This is an archaeological project done *for and with* the people.

Dr. Tom Belt, Cherokee Culture Keeper and highly respected Elder, expresses what this research means to the Cherokee community,

> "Dr. Riggs and Dr. Eastman are archaeologists. The idea of archaeologists and Native peoples working together is a fairly new kind of thing. It hasn't been that long ago when archaeologists weren't considered someone we would even talk to. These folks are actively engaged in bringing those things back to life; not just finding them, putting them on display, and documenting them, but trying to figure out how those things worked, what they meant, and how important they were to the people who lived then. Thereby, this understanding that if it was important to our ancestors, to our grandmothers and grandfathers, then it's very likely that it's very important to us too, and that needs to be **kept**, so they're helping us to revive that."
>
> (Osiyo Voices of the Cherokee People 2023).

Dr. Belt has been a vital voice representing this project to the Cherokee, his interpretations ground findings in the Cherokee experience and reinforce the cultural significance of this work. It has been an honor to see my initial survey results and the early analyses of Riggs and Eastman embraced and positively received by the Cherokee people. The support and involvement of the Cherokee community emphasizes the significance of the rediscoveries at Watauga. What we unveiled in the summer of 2024 is poised to build on that foundation, and the future of the Watauga project is shaping an exciting path forward.

Part 3: References

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