RIVERSIDE CEMETERY HISTORIC RESTORATION CONDITIONS REPORT

HISTORIC PRESERVATION PLANNING

UNION PRESBYTERIAN CHURCH

Village of Endicott, Broome County, New York

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I. Introduction

1. Background of the project and goals

This Project is funded, in part, from a planning and survey grant from the New York State Office of Parks Recreation and Historic Preservation. The purpose of the grant is to survey the cemetery and identify the preservation and restoration needs of the cemetery. In particular, to outline the steps needed to best preserve the cemetery. One focus of the Project is on the gravestones of military veterans; however, those needs cannot be separated from the needs of the rest of the cemetery's gravestones. All of the gravestones are subject to the same weathering conditions, as well as pollution and acts of vandalism.

Therefore, this study was devised to evaluate the conditions of all pre-1900 gravestones in the cemetery. The cutoff date was chosen because by that date the use of slate, fieldstone, and marble for gravestones had largely been abandoned in favor of granite. Granite is a much harder stone, and therefore more impervious to some of the weathering conditions that affect other materials. Since gravestones of slate, fieldstone and marble are more likely to have more immediate preservation issues, this seemed to be an expedient way to separate the preservation issues that need to be addressed.

The cemetery is represented on early maps of the county (1851 and 1876). There are also internal maps showing the layout of sections and plots. It is possible to align the various historic maps with modern mapping. The results are usually less than perfect due a number of factors. One is that the early maps were not projected, and thus will not line up as a USGS map would. Also, the section and lot maps of the early graves are not to scale and thus will not properly align. Maps 1 and 2 show the early lay and map 2 shows the superposition of the graves. While not perfect, the maps do roughly align. The attempts to georeference these maps can help in understanding the early mapping and layout of the cemetery, and possible locations of the early church buildings.

2. Methodology and scope of the Project

The purpose of this study is to conduct an inventory of all pre-1900 tombstones in the Riverside Cemetery, Endicott, New York. This study has presented some unique challenges. First, the original cemetery plots are located at the north and west ends of the cemetery. These sections are shown on Map 1. As can be seen, these plots are irregular in shape and size. This map is also a sketch and is not drawn to scale. That is, the sketch map does not align with the gravestones nor the probable boundaries of the grave plot sections. Therefore, a different strategy had to be devised in order to accurately record the stones. The solution was to inventory each stone and plot each location using a Trimble Geo7x handheld GPS with centimeter capability. Many of these stones date from the late 18th to the early 19th century many are severely worn and difficult or impossible to read. Many were legible to the extent that the deceased's name could be discerned, or in many cases the death date could be read, and the deceased's name could be learned from the cemetery records. If the deceased could be identified from the inscription, the original

Section/Lot/Plot could be identified. This original section of the cemetery comprises about 250 gravestones, but there are probably more burials represented, due to missing stones and family monuments. From appearances, some stones are broken or are simply missing. Since the purpose of the study is to ascertain the condition of the gravestones, missing stones and likely location are noted on the mapping.

The rest of the cemetery located east and south of the original plots was found to be somewhat more regular in design. Rather than take a GPS reading for every stone, one stone in each section and lot was recorded and the rest of the locations were interpolated from that reading. The result is not 100% accurate but is adequate to locate each grave. In subsequent field visits, corrections were made to the mapping.

To locate each pre-1900 grave, all recorded burials that pre-date 1900 were separated from the 6000 recorded burials. There are 1349 recorded burials that pre-date 1900. Each name was entered on an inventory sheet along with the date of death and the Section, Lot, and Grave number where the deceased was interred. Once the section and lot numbers were identified, the individual graves could be identified, and in those instances where a stone does not exist, we can be fairly certain that we have an approximate location.

Some things to note. After the Civil War, beginning in the late 1860s, a trend developed of having a single large family monument with the names of all the deceased family members in that section and lot. If there are also individual stones, they are usually small footstones with "Mother" or "Father" or, for the children, the first name of the deceased. The more popular styles for these monuments were the obelisk, pedestal tomb—vaulted roof, pedestal tomb—urn, and the large die on base. The obelisk and pedestal tomb style have four sides and can accommodate a number of names. The die on base style when used as a family monument is much larger than when it is used as an individual or husband/wife marker. Also, when used as a family monument, they are often placed in a north-south orientation, rather than the east-west orientation more common for individual graves.

All the information collected was entered into a relational database. In addition to recording the marker condition, researchers recorded the type of monument, the inscription, gravestone material, size, design features, and any other features that were noted in the field.

Finally, digital photographs were taken of each stone to document their condition for future reference. Photos are referenced to the Section/Lot/Grave# of the stone for easy retrieval.

It should also be noted that the grave locations recorded by the Trimble Geo7x were transferred to an ArcGIS shapefile. Grave locations are noted by their Section/Lot/Grave# so that they could be quickly linked to the other databases used for this Project, thus facilitating the collation of all information. The databases were prepared using Paradox and dBaseIV. The databases have been exported to other formats (i.e. Excel, Access, etc.) for the convenience of the client. All inventory sheets have been preserved and

turned over to the client for curation. All inventory sheets have been scanned into pdf files by cemetery section, by lot and grave, generally proceeding west to east in the cemetery, with copies returned to the client.

3. Cemetery History and background

The cemetery history is recounted in greater detail elsewhere, but for the context of this Project, that history will be briefly summarized here. Riverside Cemetery was established in 1791. At the time, the cemetery was established the burial ground was associated with the Dutch Reformed Church, which met in a log building located on the cemetery grounds.

The first burial was that of Mary J. Fitch who died June 13, 1792. The cemetery has been in continuous use since that time and now contains some 6,000 graves. Among those buried in the cemetery are nine Revolutionary War soldiers, three War of 1812 veterans, 113 Civil War veterans, 16 veterans of the Spanish American War, 73 World War I veterans, 243 World War II veterans, 57 Korean War veterans, and 23 Vietnam War veterans. Further research may likely identify more veterans, in particular veterans of the War with Mexico, which do not seem to be represented.

Of particular note is that the Riverside Cemetery is the final resting place of brothers John and Joshua Mersereau. Joshua Mersereau was born on Staten Island in September 1728 and educated at Kings College (now Columbia University) and practiced law in New York City. He operated a public house called "The Blazing Star" and owned a stage coach line between New York City and Philadelphia. After New York fell to the British during the Revolutionary War, the Mersereaus turned their horses over to George Washington as he retreated through New Jersey. Washington asked Joshua and his son John LaGrange Mersereau to stay in Staten Island and act as spies. The group eventually embraced other actors and became known as the Mersereau Spy Ring. Mersereau's tavern and stage coach line provided the means to convey messages back and forth between the Mersereaus and Washington.

Besides Joshua and John LaGrange Mersereau, others involved included John Parker, an apprentice to John LaGrange and who acted as a courier. Parker was captured by the British and died while a prisoner. After that, John LaGrange assumed the roles of agent and courier. John Mersereau was the elder brother of Joshua. John oversaw a network of six agents within the ring. His only known agent was Paul Latourette, while the identities of "Amicus Republicae" and "A Stranger" are unknown. Suspected identities of other agents include John Cork (who also served the Culper Ring) under the alias "J.C.," John Meeker or one of the Mersereaus under the alias "J.M.," and Asher Randolph under the alias "A.R." The elder brother, John Mersereau, was proclaimed a "Rebel" and a reward of five hundred guineas was offered by the British for his capture "dead or alive." John LaGrange came under suspicion and rejoined the American forces in Rutland, Massachusetts. His younger brother Joshua continued to go to Staten Island and pick up copies of the Register from Paul Mersereau.

One of their earlier intelligence successes was in December 1776 as the British prepared to pursue the retreating Continental Army across the Delaware River. The Mersereaus discovered their boats for the crossing and destroyed them, allowing the army to escape.

Joshua Mersereau moved to Tioga County, New York (which at the time included all of what is now Broome County) after the war and became a surrogate judge. After the war, John LaGrange became a county clerk for Richmond County (Staten Island) and was later appointed a surrogate judge for Tioga County (1791). John Mersereau escaped the British and moved to Broome County after the war.

The Mersereau Ring was very much a family affair with brothers, John and Joshua, and sons John LaGrange and Joshua Jr. Also to note, the Latourettes and Mersereaus were related by marriage, and were also related to the LaGranges. All of these families figure prominently in the history of Riverside Cemetery, and further research may yield other connections to the Mersereau Ring.

The Riverside Cemetery occupies approximately nine acres of land and was laid out in 1791. In 1795 James and Hannah Wilson sold 70 acres of land for five shillings to Joshua Mersereau III, Cornelius Decker, elders and John Mersereau and Peter Bevier, deacons of the church of Union in the Town of Union, County of Tioga, state of New York. (James Wilson was a signer of the Declaration of Independence, a member of the Constitutional Convention in 1787, and one of the first four associate justices of the Supreme Court appointed by George Washington.) In 1819 the cemetery became the property of the First Presbyterian Church of the Town of Union (now known as Union Presbyterian Church, Endicott, New York.

The cemetery contains a full range of funerary art of the 18th, 19th, 20th and 21st centuries. Older stones were made of limestone or slate and sometimes fieldstone. Many of these stones were carved by Jonas W. Stewart of Clairmont, New Hampshire, sometimes known as the "coffin man." Stewarts work had a distinctive carved coffin and willow trademark. Later stones were carved from marble and granite, and were in a variety of forms such as obelisks and pedestal tombs.

The Riverside Cemetery was placed on the National Register of Historic Places on August 11, 2004. The cemetery was established in connection with the Dutch Reformed Church, as was previously described. The cemetery is part of a parcel conveyed to the Dutch Reformed Church in 1795. This parcel was then conveyed to the Presbyterian congregation in 1819. Among the Dutch Reformed congregants were John and Joshua Mersereau, the LaTourettes, and the LaGranges, who were all of French Huguenot descent. It is known that the Mersereaus were members of the Old Dutch Church in New York City. The Dutch Reformed, Huguenots, and Presbyterians were all part of the Reformed tradition in Protestantism. That is to say they were all Calvinist in theological orientation. Joshua Mersereau's first two wives are buried in the burial ground of the Reformed Church on Staten Island. The Dutch had a tradition not generally seen among other ethnicities. "Gravestones of Dutch women noted the woman's family of birth

by using her natal name and then her husband's name…" (Baugher and Veit 2014:102). This tradition has been carried on at the Riverside Cemetery, and extends well beyond the early settlers associated with the Dutch tradition. A side benefit of this practice allows us to easily trace many of the early family connections in the community.

The cemetery occupies a 9-acre parcel, bounded by Vestal Avenue on the east, River Terrace on the south, Mersereau Avenue on the west, and houses and businesses on the north. Over the years many of the stones have been broken, damaged from biologicals, weather, or pollution, are leaning, or are in an otherwise fragile condition.

4. Maintenance issues related to stone composition

The material from which the gravestone is constructed impacts the stone's preservation. Some stones are more susceptible to certain impacts than others. Marble gravestones are by far the most common 19th century gravestone material. The stone is relatively soft which lends itself to severe weathering, to the extent that the face of the stone is so degraded that it is unreadable. Slate tombstones manifest weathering in another form. Usually, the inscription is well preserved, slate, however is a compact metamorphoric rock and because it was originally deposited in layers has a tendency to split or delaminate. Once the face has spalled off, it is impossible to recover the inscription. Granite gravestones are largely immune to those conditions that afflict marble and slate stones, but they are susceptible to staining and the growth of biologicals. Throughout the cemetery, there are granite stones completely covered with lichens. Eventually, the lichens will weaken the structure of the stone. This section, then, will have a general discussion of the most common conditions for each stone type and focus on recommended treatments for these conditions. This discussion will focus on marble, granite, and slate gravestones, as these comprise nearly all of the observed gravestones.

a. Slate/sandstone

"Slate is a compact metamorphic rock geologically formed from fine-grained sedimentary rocks of poor quality. When it is used as a headstone, zones of residual internal stress can result in the partial detachment of vertical planes. These are seen as gaps at the top of the marker, which are directly exposed to the weather. Over time, moisture can enter these spaces, and repeated freeze-thaw cycles can make the delamination more extreme, ending in total loss" (Slavid 2014; accessed on 2-27-2020, site is no longer available, https://www.ncptt.nps.gov/blog/the-challenges-of-treating-delaminated-slate).

Slate is also susceptible to extreme high and low temperatures. Slate has a low coefficient of thermal conductivity. In the summer, a heated monument may expand, but just below the surface it will stay cooler. This can result in cracks from the front to back of the stone (Trinkley 2013; AGS Quarterly, Vol. 37, no. 3, Fall 2013). Slate can also take up salt in solution that can crystallize and cause spalling. Slate is also susceptible to landscape maintenance and is readily damaged by mowers, trimmers and trees.

"Sandstones are composed of quartz, feldspars, silicates, hornblende, and clay minerals that are cemented with either siliceous or carbonite/calcite cement. It is largely these cementing materials that affect the longevity of one type of sandstone over another" (Trinkley 2013; AGS Quarterly, Vol. 37, no. 3, Fall 2013). Decay specific to sandstone include: exfoliation, blistering, cracking, and detachment. Causes of these problems include air pollution, alveolus erosion, contour scaling, delamination, and efflorescence.

Air pollution can cause pollution crusts which are often hard and brittle, leaving the underlying stone soft, friable, and disaggregating. Treatments include different cleaning efforts. While chemical cleaners are more effective than water washing, they have residual problems of their own, and must be approached cautiously.

Alveolar erosion is characterized by the formation of smooth, hemispherical depressions in the stone that join together to form a honeycomb-like appearance. This may be caused by pockets of salt that weather into pockets (alveolus). There seems to be no consensus on treatment. Salts may also cause blistering. Rounded blisters may form at the top of the stone. Usually, these blisters are left alone to preserve the historic fabric, but may eventually need to be removed.

Contour scaling is a decay pattern similar to blistering and delamination, but it follows the surface contours of the stone. It is generally believed that this is the result when gypsum from varied sources forms on the outer layer and may change the mechanical behavior of the stone. Treatment involves desalination and removal of friable stone.

Delamination consists of the stone separating along its bedding planes. The cause is associated with the weakening of the bedding planes. Treatments include the use of injection grout to prevent additional water penetration or the use of acrylic resins to achieve the same end.

Efflorescence is visible soluble salt crystallization on the surface of the stone. Salts can come from a wide variety of sources. Treatment includes identifying the source of the salt (and removing the source) and then removing the salts using poultices or other desalination techniques.

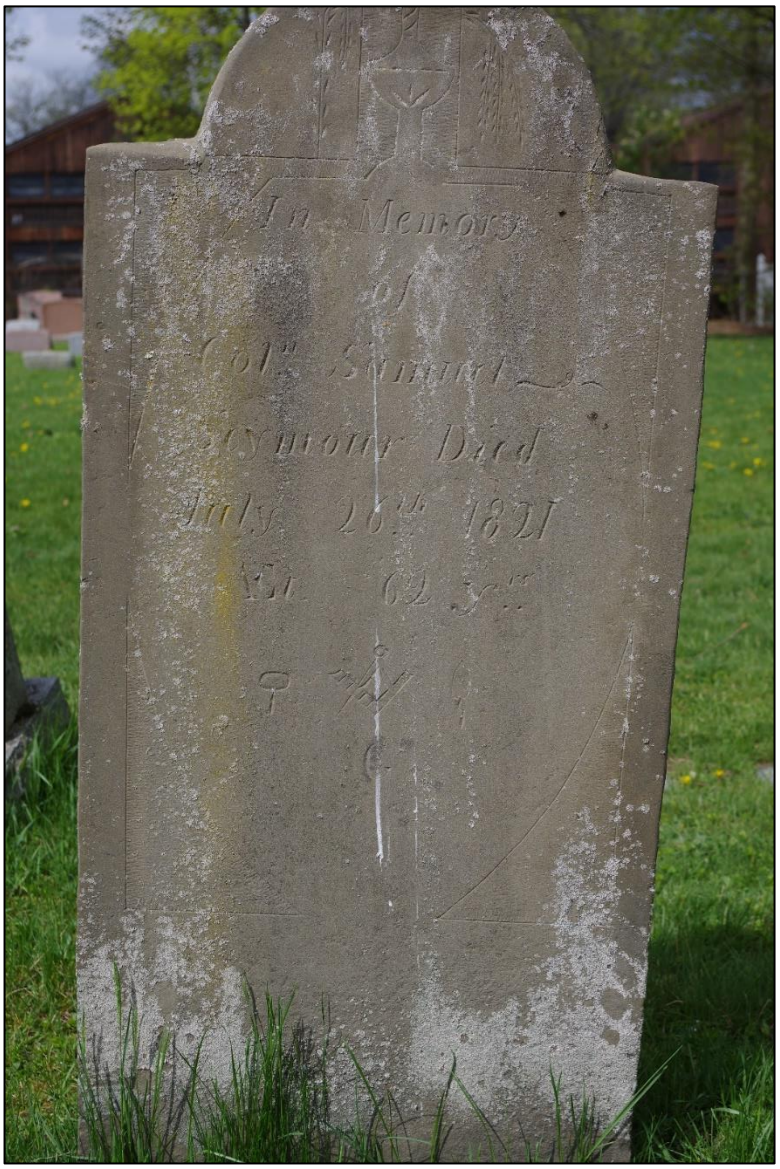

Photo 1. Slate tombstone of Col. Samuel Seymour, died in 1821. The stone exhibits some staining and a profusion of lichens, although the inscription is still readable.

Photo 2. Tombstone of Mary Fitch showing partial delamination with part of the face spalled off.

Photo 3. Close-up of Mary Fitch tombstone showing delamination

Photo 4. Severely delaminated tombstone with the inscription lost. From context, the stone is that of Susannah (DuBois) Seymour.

b. Marble

The term marble is applied to certain crystalline rocks composed primarily of calcite or dolomite metamorphosed limestone. In general, any marble-like or limestone-like rock that will take a polish is called "marble." Marble is soft and is easily worked. On the Mohs scale marble rates between three and four. For comparison, granite will rate between seven and eight.

Problems associated with marble include: development of a gypsum crust, "sugaring," weathering, erosion, cracking, slats and biologicals. A gypsum crust develops when water containing carbon dioxide evaporates from the porous marble. Small amounts of carbonate are transferred to the surface as bicarbonate. On the surface an oxidizing atmosphere is created by soot and sulfur dioxide from air pollution that transforms the carbonate to gypsum. The gypsum crust can be removed using fine water mists, but the underlying rock may be compromised.

Sugaring is a condition in which the stone crumbles and there are loose granules. Typically this is caused by the binder material in the marble being dissolved by acidic water intrusion. Wiping the surface of the stone will produce abundant grit. Sugaring can result in complete dissolution of the stone. Sugaring

can be addressed through consolidation. That is, a product is applied to form a stable layer that increases resistance to an acid attack and promotes consolidation (Trinkley 2013).

Weathering is another common marble problem. This includes the natural effects of wind, rain, and thermal changes that affect the polished surfaces of the marble. Erosion is another typical marble problem and is considered a type of weathering. In general, it is the wearing away of the surface, edges, and corner or carved details of the stone that gives the stone a granular texture. The effects of erosion can be very similar or identical to sugaring.

Cracking is another common marble issue. Narrow fissures may develop that can range from less than 1/16 inch to ½ inch in width. Cracking may result from mortar that is too hard, corrosion of internal ferrous pins and settlement. Cracking can also result from natural veining in the marble.

Warping can also be seen in marble. In the graveyard it can usually be seen in poorly supported ledgers and can be aggravated by thermal hysteresis and water vapor.

When salts crystallize within the pores of stone, stresses may be created that can fragment the marble. In extreme cases, salts can cause the stone to break down.

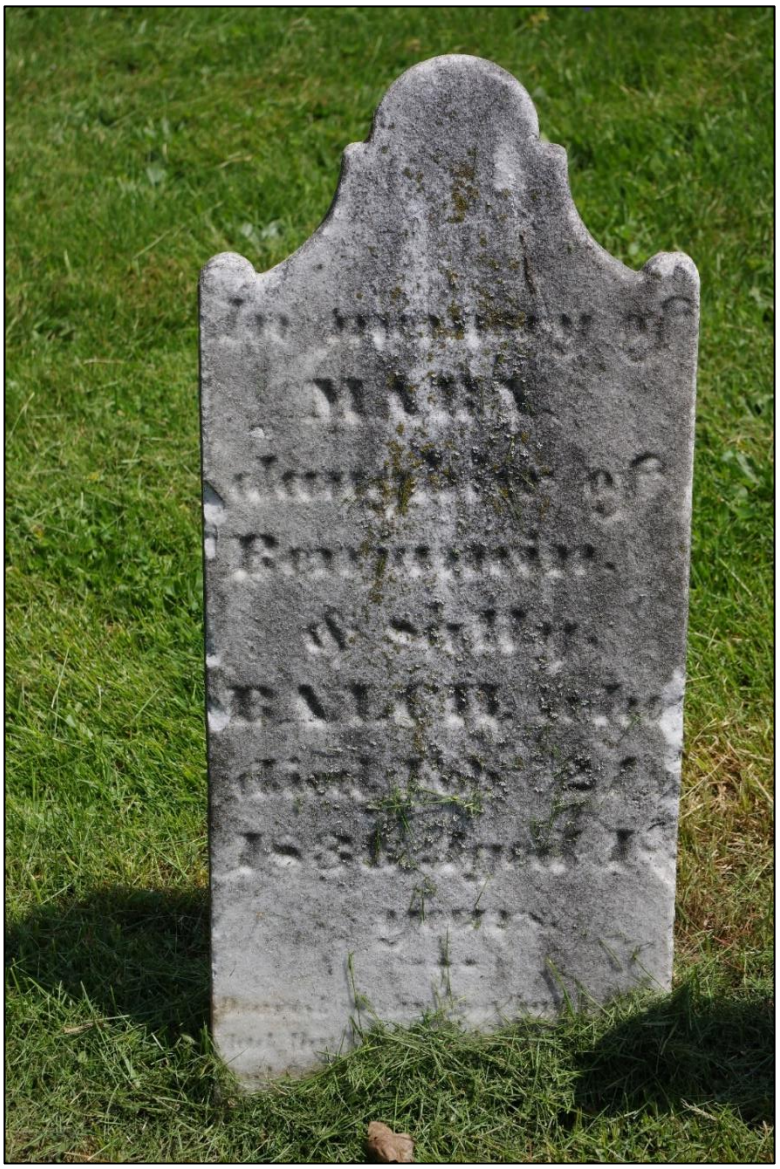

Photo 5. Marble tombstone of Mary Balch showing degradation of the surface (though still legible) and damage to the edges from line trimmers. Chips from higher up on the stone are likely mower or line trimmer damage.

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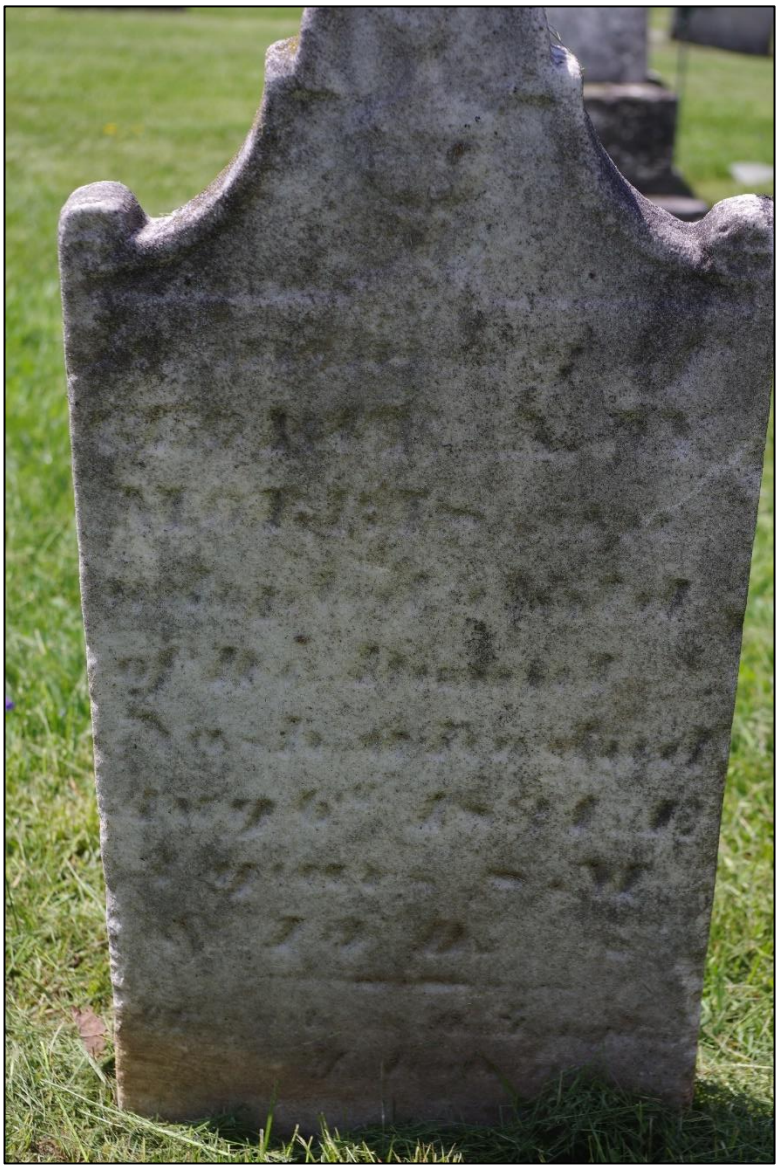


Photo 6. Marble tombstone of George Morris showing erosion of the surface and severe staining making the stone barely legible. Also shows damage from line trimmers.

c. Granite

Granite is an igneous rock formed when magma makes its way into the earth's crust. Granite is an intrusive rock, in that it is allowed to cool below the earth's surface and then is later exposed through the weathering of less durable rocks above it. Because the magma is allowed to cool slowly, the rocks are characterized by coarse grains. Granite can be composed of a variety of materials. Typically, there may be about 25% quartz. Plagioclase and orthoclase feldspar may constitute as much as 50% of the whole. Other minerals may include mica and hornblende.

Generally, granite can deteriorate through mechanical, chemical, or biological means. Sometimes two or more of these will combine to deteriorate the stone. Mechanical processes can include weaknesses that formed while the magma cooled, excessive force in carving the stone, finishing methods, salt crystallization and stresses due to thermal expansion.

Granite deterioration due to chemical processes is usually a case of hydrolysis. This can occur in pure water with the water separating into positively charged hydrogen ions and negatively charged hydroxyl ions. The positively charged ions in the crystalline rock can be replaced by the hydrogen ions and then minerals and then disintegrate.

Bacteria, fungi, and lichens are all associated with the bio deterioration of stone. The deterioration processes are largely chemical reactions very similar to other chemical processes. Deterioration due to lichen growth has been widely documented, but the processes are poorly understood.

Photo 7. Granite tombstone of Sarah Ann Grange, showing staining, moss, and lichen growth.

5. Maintenance issues related to gravestone type

Regardless of specific gravestone style, maintenance issues are related to two features: stones that are of a single piece that are partially buried; and stones composed of two or more pieces, with one part

acting as the base, and the piece, or pieces, resting on the base. The distinction is important in understanding the different maintenance issues.

a. Single section gravestones

Gravestones that are comprised of a single section include: the tablet headstone, government issued military stones, footstones, raised top and plaque markers. The tablet headstones and government headstones were intended to be buried deep enough to maintain the stone in a vertical position. The rule of thumb was that the buried portion of the stone should equal in length to one third the length of the above ground portion of the stone—the so-called one third rule. When stones of this type begin to lean, restoring the stone to verticality is a not a straightforward task. The stone must be excavated and removed, a new hole must be excavated and the bottom of the hole prepared with stone and sand, and then the stone can be repositioned and the hole backfilled so that the stone will retain its vertical stance. The part that puts the stone at most risk of breakage is when it is removed from the ground. The stone must be properly supported in order to prevent undue stress on the stone. Particularly with softer stone, like marble, weathering and moisture can weaken the stone and increase the likelihood of breakage. These problems are not as great a threat for footstones, though buried, are normally much smaller than a typical gravestone and therefore less subject to breakage. The raised top and plaque markers, though composed of a single piece, are generally not buried to a great depth, and thus correcting any leaning issues would involve those techniques more often used for leveling the base of a multi-component gravestone.

Photo 8. Tombstone, probably of Henry Garnochan, Jr., leaning forward with staining and lichens. Cleaning and straightening may make the stone more readable.

b. Composite gravestones

Composite gravestones typically have a base with one or more sections on top. Typical of this type of gravestone are the die-in-socket, die-on-base, die base and cap, pulpit marker, obelisk, and the pedestal tomb with either a vaulted roof or an urn. All of these stones can be either for an individual, but some of these are common as family monuments. The obelisk, and pedestal tombs and die base and cap forms are all commonly used for family monuments. When used as a family monument, the die-on-base form is typically 2-3 times larger than that of an individual or husband and wife die-on-base gravestone.

Issues with these types of stones include the entire monument leaning, the top of the monument has either fallen off the base or has moved, but is still on the base. Sometimes the top section has been affixed to the base, but often it has simply been set on the base and kept in place by gravity. Straightening a leaning composite gravestone can present challenges. If an obelisk is tipped, for instance, elevating the lower side may unseat the obelisk causing it to fall. Stones that have fallen from their base can be a challenge, since the stones are quite heavy and likely cannot be easily moved. Stone averages around 170 pounds per cubic foot.

Photo 9. Marble obelisk for the Padget family monument, shows some surface erosion and weathering and also has a slight lean. Other obelisks are leaning in the background.

c. Broken Stones

All stones can be subject to breakage. Those that seem most susceptible are the tablet stones, die-in-socket, and die-on-base. One factor is the thickness of the stone slab and the material of the stone. Tablet tombstones tend to be less thick than the die-on-base or die-in-socket stones. One hundred three of the broken stones were made of marble and six were made of slate. Many of the broken stones were the result of vandalism.

Broken stones, generally, have been left in place in the cemetery. Some stones have been placed in the maintenance building. The stones, for the most part are propped against an existing stone or tree, or left flat on the ground. The inscription may be visible, or turned to the ground. This leaves the stones vulnerable in a couple of ways. First, stones lying on the ground are prone to damage from lawn mowers. There are numerous stones that have nicks from the mower blades. Moving the stones to the maintenance shed introduces the risk of separating the stone from the grave. When moving stones to a protected location, a temporary marker should be placed at the grave so that the stone can eventually be returned to its proper place.

Photo 1. Broken pieces of the marble from Abram Goodnough tombstone.

II. Results of the Survey

1. Stone types and materials noted

As previously noted, the gravestone materials at the cemetery break down into three main materials: slate, marble, and granite. There are examples of other materials such as fieldstone, but these three types comprise the vast majority of materials used. As previously noted, some maintenance/preservation issues are related to the gravestone material and there are another set of preservation issues related to the gravestone type. There are also some preservation issues that are ubiquitous across all materials and stone types.

The effects of weathering are most noticeable on marble gravestones and hardly discernable on granite markers. Biological growths (mostly lichens) can be observed on stones of all types. In this instance, the location of a marker in a shaded area may be more determinant of biological growth than the material or type of stone. By the same token, staining of the gravestones appears on all stones regardless of material. Stones that are starting to delaminate are nearly all slate. The sole exception is one marble stone showing signs of delaminating.

In recommending preservation treatments and/or repair of individual gravestones, care will be taken to take account of stone material, gravestone type, as well as best practices for gravestone preservation.

2. Stones inventoried.

There are basically three broad types of stone inscriptions noted on the markers in the cemetery: individual inscription (sometimes dual, i.e. husband and wife), family monuments where multiple family members are represented on one stone, often along with footstones. Individual markers will rarely have an accompanying footstone. Family monuments will often have footstones to mark the burial of individuals, but just as often, there will be no footstone. On occasion, an individual marker will also be associated with a family monument. This latter seems to occur when a family monument is erected long after that individual had died and later family members are memorialized. There are also instances where an individual has more than one gravestone. In these cases, the stones are located in separate sections of the cemetery. It is generally not clear where the individual is actually buried.

The inventory showed 676 individual stones, 247 family monuments and 195 footstones. There are 472 recorded burials without an individual stone, but associated with a family monument. While any gravestone type can be associated with an individual or family, family monuments will tend to be larger to accommodate the extra names.

3. Overall assessment of condition

The following table summarizes the conditions of the pre-1900 gravestones that were inventoried. Note that the inventory form has a vandalized category. This category was not utilized for two reasons. First, it was never apparent if a stone's condition was a result of deliberate vandalism, even though there

was a well-documented instance of vandalism in the 1950s. Secondly, vandalism is a deliberate act, but it can take many forms that may include: breakage, defacement, or toppling. For the purposes of this inventory, the source of the condition is less important than the current condition, and the steps needed for preservation/conservation. Therefore, the vandalized category was not used.

Table 1: Conditions of the pre-1900 gravestones

Condition	Number of stones
Weathered	601
Unattached	24
Biologicals	612
Cracked	12
Loose	5
Stained	739
Broken	118
Leaning	122
Portions missing	26
Vandalized	0
Repaired	45
Other	42
Line trimmer damage	203

The first thing to note is that the vast majority of stones show signs of weathering, biological growth, and staining. These conditions are less noticeable on granite stones (n=22) and more noticeable on marble stones (n=534). The effects of weathering, for the most part, cannot be reversed, but it may be possible to stabilize the stone and minimize further erosion of the surface. Staining and biological growths can be addressed by cleaning and the application of agents to remove the lichens and moss. Some of the marble stone, in particular, may not be able to withstand the rigors of cleaning, even though only the gentlest of methods are to be used. These stones will need to be evaluated for cleaning on a case by case basis.

Other conditions noted have some fairly straightforward solutions. Unattached stones are usually those that consist of two or more parts and have become separated (i.e. die in socket or die on base styles). Repair may involve resetting the die onto the base. Recommended methods of attaching the die need to be researched with the assistance of a gravestone restoration specialist. Stones that are leaning tend to be tablet style gravestones. In these cases the solution is to dig out the stone and reset the stone. This is something

that should be undertaken by a specialist with the proper training/experience and with the proper equipment. In these cases, the stone must be properly supported to prevent breakage. Stones that consist of a base and a die, obelisk, or some other column may also tip. In these cases, the base can be leveled, but the technique may vary from stone to stone, and large obelisks and vaulted tombs should only be handled by specialists.

One noted condition is the result of damage from nylon line trimmers. The damage is usually seen on the edges of the stone. Most of the damaged stones are marble, although some slate stones also have similar damage. There is no way to repair the missing pieces, although in severe cases an epoxy filler may be appropriate in preventing further erosion of the surface. The best course of action to address this problem would be to have the maintenance crew stop using line trimmers around marble and slate stones.

Under the Other category one of the conditions noted is delamination. This condition largely pertains to slate stones. In this condition the layers of the stone have started to separate. If this is not addressed, the entire face of the stone could be lost. These stones are the older stones in the cemetery (pre-1850) and is something that needs to be addressed as soon as possible. The usual solution is an application of an epoxy in the cracks to bond the stone and to seal the delaminating layers from the weather. Choice of the epoxy and its application should be left to someone experienced and trained in this area.

There have been 118 stones that have been broken. Repairing these stones is a complex undertaking that will require the use of a specialist in this area. Factors to be considered in selecting stones for repair will be the number of broken pieces, their size and the condition of the inscription. Too many pieces and too small pieces may make the repair more difficult. Completeness should also be a factor. Too many missing pieces may make repair impossible.

4. Condition of war veteran's graves

Cemetery records indicate that there are nine Revolutionary War veterans, three War of 1812 veterans, and 114 Civil War veterans buried in the cemetery. One Revolutionary War veteran, Briand Stoddard has no marker and no known burial location. Of the 114 Civil War veterans, 55 died in the 19th century. There are, then, 66 Revolutionary War, War of 1812, and Civil War veterans that died prior to 1900 and are buried in Riverside Cemetery. Thirty-nine of these burials have individual markers, or a joint stone with their spouse. The most common conditions noted were weathering, biological growth, and staining. In fact, the same as the other markers in the cemetery. The degree of weathering is judged by the stone's legibility. There was only one stone that was largely illegible—that of C. Hughson. Elias Drake's stone was broken at ground level and was missing. Identification was made by the context of the surrounding stones. Those veterans without an individual marker are usually memorialized on a family monument. There were approximately 20 veterans who are listed on a family monument. There are some veterans without an individual stone or mentioned on a family monument. The stone may be missing, or there may not have been a marker. There are five of these from the Civil War (Elisha Ralyea, David C.

Millen, Samuel Wood, L. Hibbard Whittlesey, and Levi Howard). There is one Civil War veteran that is entombed in one of the family vaults (Alvinza Burdick) and is not included in this study. In total, there are 49 individual tombstones or family monuments for veterans of the three wars and that died in the 19th century.

The location of most graves without a marker can usually be determined by context. One Civil War veteran, L. Hibbard Whittlesey died on December 27, 1869 and was buried in plot G/72/5. However no gravestone was discovered for him. Buried near him were Susan Munn and Amy (Dawson) McLaughlin (G/72/6 and G/72/4). None of the three have any known relatives buried in the cemetery. A Susan Munn owned a plot somewhere just north of the northeast corner of the tool house, but the map is not to scale and can only be partially georeferenced to a modern aerial map. So a general location can be determined, but nothing exact.

Table 2: Conditions of war veteran's gravestones

Condition	Number of stones
Weathered	30
Unattached	2
Biologicals	27
Cracked	2
Loose	0
Stained	33
Broken	3
Leaning	3
Portions missing	2
Vandalized	0
Repaired	3
Other	5
Line trimmer damage	13

The results for the veterans' gravestones do not vary from the conditions noted for the remainder of the cemetery. Most stones show signs of weathering, biologicals and staining. Three stones are broken, three are leaning, and three have been repaired. The other category included those that have eroded and some that have been cleaned. For the most part stones that have been repaired is not a positive thing. Repaired usually means that the stone has been put back together with Portland cement mortar or with some sort of iron pins—repairs that are not recommended. Often the repair has failed.

5. Post-1900 Gravestones

As noted earlier, gravestones that post-date 1900 were not a part of the detailed study. However, there are a number of observations and conclusions that can be made. First, the overwhelming majority of post-1900 stones are made of granite. Granite, as earlier noted, is a more durable material than either marble or slate, and thus not as susceptible some of the types of deterioration and breakage noted for those stones. Granite does stain just as much as other stones and grows lichens and moss just as other stone types. While cleaning older stones may have a higher priority, it is recommended that granite stones be cleaned and have lichens and moss removed.

Granite stones are also prone to lean. This may be due to greater weight, but it may also be due to the stone styles that one sees with granite stones. Usually, the stone rests on the ground, with no part buried. If the ground is not sufficiently prepared the ground may settle unevenly under the weight of the stone. With composite stones, the top portion may shift from the base, or fall to the ground. In most instances, one reason is that the top simply rests on the base with no means to hold the two together. Straightening or replacing the top portions of these stones will be a much larger task, probably not feasible in the near future, but these conditions should be noted and corrective steps taken where and when possible.

III. Recommendations

It should be self-evident, but it needs to be reiterated that not all preservation issues can be addressed at once. In fact, due to anticipated funding it is likely that preservation and restoration activities will need to be managed over several years. Following are suggestions on prioritizing and addressing the maintenance and preservation issues that have been documented by this study. In this we have tried to outline a pragmatic approach utilizing best practices as outlined in the preceding sections. The purpose is to provide the cemetery managers a means to set priorities. In this attempt, there are not really any right or wrong answers, but will depend on how the cemetery committee wishes to set their priorities and maximize their resources.

1. Ranking of the seriousness of problems

In this section, we will outline some of the ways to prioritize preservation efforts. The ultimate decisions need to be made by the cemetery committee. This is meant only as a loose guide in the decision-making process, which can and should be revisited as priorities and funding shift.

a. Prioritizing types of conditions for treatment

The main issues that should be addressed early on are the cleaning and removal of biologicals. The reason is that these two conditions are the most pervasive in the cemetery. Another reason is that many stones that are illegible or only partly legible may be readable after cleaning. Cleaning and removing biologics is not mutually exclusive with other restoration activity. In fact any stones selected for more extensive restoration/preservation would also need to be cleaned prior to any other treatment. While weathering is also a pervasive issue, restoring eroded stones after a certain point is not often possible. It would be a good idea to explore ways to prevent future damage to stones that are still readable. The options may be limited, but would be worth it if more stones can be preserved.

The grant was written to prioritize the gravestones of veterans buried before 1900 and also early settlers, and it is assumed that this is still a priority. The condition of the veterans' graves has been addressed earlier in this report. As with the other stones in the cemetery, cleaning and removing biologicals should be an important first step. Broken and repaired stones should also be examined to see if repairs would be feasible. The more pieces that a stone is broken into, the more difficult and expensive the repair will be.

Another criterion for assessing treatment is readability. There may be little sense to attempt an expensive and complicated restoration if the stone cannot be read. Before making that final determination, however, a cleaning of all stones may be useful. As previously noted, it is possible that the legibility of many stones may be improved with a thorough cleaning. The two most common conditions are staining and biological growth, both of which affect the readability of the stones. The cleaning and removing biologicals discussed earlier will also assist in this assessment.

2. Treatments recommended to address maintenance issues

a. General

All treatments involve some risk to the treated object. While the overall goal is to preserve the gravestone, one must be cognizant of the inherent risks. Therefore, any recommended treatment must account for the current condition of the stone and structured so as to obviate any potential damage to the stone.

b. Cleaning

There are few stones that do not have signs of extensive staining. Some is severe, making the stone barely or completely unreadable. In other stones, the staining is noticeable, but not severe or barely noticeable.

First, any cleaning should be done in the least abrasive manner possible. Generally, pressure washers, sand blasting, rotary brushes (i.e. used on electric drills) and abrasive pads should never be used in cleaning a gravestone. It is normally recommended to never use water with a psi over 90.

The Cemetery Conservators for United Standards recommend the following precautions (from, "Cleaning Basics," by Susan Dunham, Cemetery Conservators for United Standards, http://cemeteryconservatorsunitedstandards.org/standards/cleaning/):

1. Ensure the stone is stable, secure, level and that all sections are securely attached to each other. Also make sure that the stone is not in danger of falling.
2. If the weather is hot and the stone surface is hot to the bare hand, do not put cool water on it as it may cause stress cracks.
3. Do not clean if there is a chance of frozen temperatures.
4. Do not attempt to clean a broken headstone.
5. Make sure you have enough water to thoroughly clean and then rinse the stone several times. Leave no residue from the cleaning agent on the stone as it could cause permanent streaking.
6. NEVER use household cleaners, bleach, metal tools, scouring pads, wire brushes, power tools, pressure washers, or nyalox brushes.

Inspection:

1. Check for delamination. If it is delaminating leave it to a professional stone conservator.
2. Check for stress cracks. Thoroughly wet the stone. As it dries stress cracks will show up as wet streaks in the stone. If cracks are wide and severe, leave it for a professional.
3. Check for loose sections. If it needs to be secured, leveled, or reset, leave it for a professional.
4. Check to see if biological growth has cracked the stone. If so, the growth must be carefully removed and repaired before cleaning.

Basic Cleaning Procedure:

1. Soak the stone with water. Gently remove loose materials from the surface. Lichens and moss can be removed with a plastic scraper or wooden spatula.
2. Clean the wet stone with a wet brush by making a random circular motion. Rinse the brush frequently.
3. Keep both the stone and brush wet at all times. This procedure will normally remove dirt and grime. If not there recommended cleaning agents that one can use.

The general rule for cleaning stones is to use the gentlest means possible. This means first, no pressure washing. Second, no brushes attached to a drill, especially abrasive pads. Use brushes with plastic bristles only. If the results are unsatisfactory, there are approved cleaners that can be used. However, any cleaner utilized must be completely removed from the stone. It is the simple cleaning of stones that volunteers can be trained to perform. This is probably the most needed treatment in the cemetery and volunteer hours can be used to match a potential matching grant.

c. Repair

Repairing delaminated stones

Slate tombstones are among the earliest stones in the cemetery and thus special attention should be made to preserving these stones. A common condition with slate stones is delamination where there are openings along the bedding planes which expose the marker to moisture intrusion. Traditionally stones with this condition are capped with a strip of lead or copper. This technique is seldom utilized today, instead openings are filled with grout or patching material compatible with the stone. As with other techniques, these types of repair need to be undertaken by someone skilled in selecting the appropriate materials to match the stone and skilled in making the needed repair.

Removing lichens

There are competing views on removing lichens from tombstones. It is argued that the lichens protect the stone from the effects of weathering and radiation. If cleaning is deemed essential, it is recommended that only the minimal amount of lichen be removed, usually by physically rubbing the lichens from the surface.

The alternate view is that lichens degrade the stone both chemically and mechanically. The metabolic processes produce a range of acids that can damage the stone. The recommended treatment for removal is Cathedral Stone's D/2 Architectural antimicrobial or Prosoco's Bio Wash.

d. Resetting stones

There are three basic types of grave markers: ground supported, slotted base, and stacked base. Ground supported stones include slate and marble headstones where the stone is partially buried below the inscription. Minor leaning can sometimes be repaired by removing a few inches of dirt around the stone and then straightened. More sever leaning may require the stone to be completely dug out, the hole enlarged, sand and/or gravel placed in the bottom of the hole, and then carefully backfilled and tamped once the stone is replaced.

The slotted base type of monument consists of either a mortise and tenon style construction or a slot that the headstone fits into. In this case, the upright element, or die, is removed (if not already separated) and the base is removed to properly prepare the hole before resetting. The hole can be prepared with sand and gravel for drainage, the soil hand tamped and leveled and plumbed. The upright element should be cleaned before resetting. A lime mortar can be used to fill any gaps and prevent moisture intrusion. Mortar consisting of Portland cement, or any material that is harder than the stone, should never be used.

The third type of grave marker that often needs resetting is the stacked base type. In this type, at least one element is placed on a base, or a series of bases, of varying size. This type includes a number of styles: die on base, pulpit marker, die, base, cap, obelisk and pedestal tomb styles. In these styles, the elements are often pinned in place. In some cases, the pins have deteriorated and need to be replaced,

usually by removing the corroded elements and replacing them with stainless steel pins set in epoxy. Once the pins have been replaced, special lifting equipment will likely be required to set the marker in place due to the weight of the elements. Even a small obelisk, for instance, can be too heavy for two or three people to safely manage and reset safely. Please remember that stone, on average, weighs approximately 170 pounds per cubic foot, and the weight adds up fast.

e. Marble

The types of deterioration common to marble tombstones has been detailed earlier. It would be tempting to try and put a protective coating around a marble stone to forestall its deterioration. In most cases, this is ill-advised. Stone is a porous material. Placing a barrier on the stone will cause moisture to be trapped. The moisture can then freeze and cause the face of the stone to break off. There may be treatments that will let moisture pass through the barrier, but this would be something for an expert to determine. In most instances, such a procedure is not advisable.

The best preservation may lie in the photo documentation that is being compiled as a part of this Project.

f. Preventative

One problem with cemetery preservation is that once a stone is treated or repaired it is returned to the environment that produced the condition. There is really nothing that can be done to alleviate that. There are some conditions that could utilize preventative measures. Treating delamination stones will act as a preventative measure to halt deterioration. The use of line trimmers around the stones—particularly marble and slate stones needs to be addressed. Most line trimmer damage is not too extensive at this time, but unless the problem is addressed it could become extensive. The solution here would either to not use line trimmers at all or to find another method that would not damage the stone. Hand trimming or using a lighter gauge line are the only solutions that have been suggested.

In many ways straightening stones can be viewed as a preventative measure. For single piece stones (i.e. tablet stones) that are partially buried, the leaning can put a strain on the stone and eventually lead to breakage. For composite stones, leaning can lead to the top piece falling causing damage to the stone, to nearby stones, or to anyone who happens to be nearby. Obelisks and vaulted tombstones are particularly at risk for this. Resetting severely leaning stones, then, may also need to be a priority.

3. Finding Qualified Personnel

Finding qualified people or companies to perform some of the very specialized tasks that have been enumerated here may be difficult. There are, however, a few places to contact in looking for qualified individuals and companies. One professional group is the Cemetery Conservators for United Standards. Much of the information presented here related to preservation techniques has been gleaned from articles

that have been published on their website. Some of these have been downloaded to pdf files and are available for review, and should help in deciding priorities and for hiring qualified conservators. Other sources include: The National Park Service's Center for Preservation Technology and Training (NCPT), the Preservation Trades Network (PTN) and the Association for Gravestone Studies (AGS). These organizations can prove to be a useful source in finding qualified personnel to address the cemetery's preservation and restoration issues, and for information on preservation issues related to gravestones.

Appendices

Appendix A
Bibliography

Bibliography

Baugher, Sherene and Richard F. Veit

2014 *The Archaeology of American Cemeteries and Gravemarkers.* Gainesville, FL: University of Florida Press.

Cemetery Conservators for United Standards

2017 "Cleaning Basics." Published at: https://cemeteryconservatorsunitedstandards.org/

Dexter, Mary L.

2020 *On the Trail of the Coffin Man: Researching 19th Century Gravestone Carvers of Central New York State.* Cortland, NY: Mary L. Dexter.

Everts, Ensign & Ensign

1876 *Combination Atlas Map of Broome County, New York.* Philadelphia: Everts, Ensign & Everts.

Goffinet, Pamela

2013 *Mapping & Documenting Cemeteries*, second edition. Published by Pamela Goffinet.

Gifford, Franklin, E. Wenig, & Robert Pearsall Smith

1855 *Map of Broome County, New York.* Philadelphia: A.O. Gallup & Co.

Hassen, Hal and Dawn Cobb

2017 *Cemeteries of Illinois: A field guide to markers, monuments, and motifs.* Urbana: The University of Illinois Press.

Leader, George M., Kimberlee Sue Moran, Jared Beatrice, Anna Dhody, and Richard Veit

2022 "Eighteenth- and Nineteenth-Century Funerary Hardware and Material Culture from the Historic Cemetery (ca. 1702-1859) of the First Baptist Church of Philadelphia." *Historic Archaeology*, Vol. 56, Number 1, March 2022.

Northwest Publishing Co.

1908 *Platbook of Broome County, New York.* DesMoines, Iowa: Northwest Publishing Co.

McKee, Harley J.

1973 *Introduction to Early American Masonry: Stone, Brick, Mortar, and Plaster.* National Trust for Historic Preservation.

Richards, Brandon

2014 "Heir Leydt Begraven: A Primer on Dutch Colonial Gravestones," *Northeast Historical Archaeology:* Vol. 43, Article 2.

Saving Graves

2020 "Cleaning a Gravestone," accessed 2/27/2020, link is no longer available. http://www.savinggraves.net/

"Cleaning a Gravestone—non ionic Detergents," accessed 2/27/2020, link is no longer available. http://www.savinggraves.net/care-and-cleaning-of-gravestones/.

"Removing Lichens," accessed 2/27/2020, link is no longer available. http://www.savinggraves.net/care-and-cleaning-of-gravestones/.

"The use of Sealants on a Gravestone," accessed 2/27/2020, link is no longer available. http://www.savinggraves.net/care-and-cleaning-of-gravestones/.

Slavid, Irving

2014 "The challenges of treating delaminated slate." https://www.nps.gov/subjects/ncptt/the-challenges-of-treating-delaminating-slate-headstones-new-treatments-with-new-materials.htm

Snider, Tui
2017 *Understanding Cemetery Symbols: A Field Guide for Historic Graveyards.* Castle Azle Press.
Steigel, Mary F., Frances Gale, Jason Church, & Debbie Dietrich-Smith
2016 *Preservation Brief 48: Preserving Grave Markers in Historic Cemeteries.* Technical Preservation Services, Washington D. C.: The National Park Service.
Strangstad, Lynette
2013 *A Graveyard Preservation Primer*. Lanham, NY: Altamira Press.
Trinkley, Michael
2009 "The role of lichen in stone deterioration." AGS Quarterly, vol. 33, no. 2, Spring 2009.
2010 "Rotary brushes for cleaning stone?" AGS Quarterly, vol 34, no. 2, A.
2010 "Are "Simple Epoxy Repairs" Really that Simple." AGS Quarterly, vol 34, no. 1, Winter 2010.
2011 "Suitability of Pins and Epoxy." AGS Quarterly, vol 35, no. 2, Spring 2011.
2013 "Why Sandstone Monuments have so many Problems." AGS Quarterly, vol 37, no. 1, Spring 2013.
2013 "Marble and its Deterioration." AGS Quarterly, vol 37, no. 2, Summer 2013.
2013 "Slate Monument Problems." AGS Quarterly, vol 37, no. 3, Fall 2013.

Appendix B

Inventory Forms

Cemetery Field Survey Form
Family/Group Monument

Cemetery: Riverside Cemetery
Family Name(s) on Marker:

Section#
Lot #:
Graves: Photo#:

Type of Monument:
☐ 1. Tablet headstone ☐ 2. government issue ☐ 3. raised top ☐ 4. bedstead/cradle ☐ 5. ledger
☐ 6. die in socket ☐ 7. lawn-type ☐ 8. pulpet ☐ 9. table tomb ☐ 10. obelisk
☐ 11. die on base ☐ 12.plaque ☐ 13. die, base, cap ☐ 14. box tomb ☐ 15. other:

Inscriptions:
North South East West

Inscription technique: ☐ 1. carved ☐ 2. painted ☐ 3. other:

Material:
☐ 1. marble ☐ 2. limestone ☐ 3. cast iron ☐ 4. other material:
☐ 5. granite ☐ 6. fieldstone ☐ 7. zinc
☐ 8. sandstone ☐ 9. other stone: ☐ 10. wood
☐ 11. slate ☐ 12. concrete

Gravestone Size: Height: Width: Thickness:

Gravestone Design Features:
☐ 1. Bible ☐ 2. willow and urn ☐ 3. lamb ☐ 4. Masonic ☐ 5. finger pointing
☐ 6. clasping hands ☐ 7. cross ☐ 8. dove ☐ 9. other fraternal order: ☐ 13. other design:
☐ 10. flowers ☐ 11. cross and crown ☐ 12. inverted torch ☐ 14. Military _____

Condition of Marker:
☐ 1. weathered ☐ 2. unattached ☐ 3. biologicals ☐ 12. other:
☐ 4. cracked ☐ 5. loose ☐ 6. stained ☐ 13. weed wacker
☐ 7. broken ☐ 8. leaninng ☐ 9. portions missing:
☐ 10. vandalized ☐ 11. repaired

Stonecutter's name: City: Location of Mark:

Footstone: Material: Design/initials: Condition:

Coping: Material: Design: Condition:

Fencing: Material: Design: Condition:

Grave Orientation: Marker inscription faces what direction:

Grave goods:

Surveyor: Date:

Cemetery Field Survey Form
Individual Marker/Monument

Cemetery: Riverside Cemetery Row #: Grave#: Section#
Lot #:
Name(s) on Marker: Grave#: Photo#:

Type of Monument:
- ☐ 1. Tablet headstone
- ☐ 2. government issue
- ☐ 3. raised top
- ☐ 4. bedstead/cradle
- ☐ 5. ledger
- ☐ 6. die in socket
- ☐ 7. lawn-type
- ☐ 8. pulpet
- ☐ 9. table tomb
- ☐ 10. obelisk
- ☐ 11. die on base
- ☐ 12.plaque
- ☐ 13. die, base, cap
- ☐ 14. box tomb
- ☐ 15. other:

Inscription:

Inscription technique: ☐ 1. carved ☐ 2. painted ☐ 3. other:

Material:
- ☐ 1. marble
- ☐ 2. limestone
- ☐ 3. cast iron
- ☐ 4. other material:
- ☐ 5. granite
- ☐ 6. fieldstone
- ☐ 7. zinc
- ☐ 8. sandstone
- ☐ 9. other stone:
- ☐ 10. wood
- ☐ 11. slate
- ☐ 12. concrete

Gravestone Size: Height: Width: Thickness:

Gravestone Design Features:
- ☐ 1. Bible
- ☐ 2. willow and urn
- ☐ 3. lamb
- ☐ 4. Masonic
- ☐ 5. finger pointing
- ☐ 6. clasping hands
- ☐ 7. cross
- ☐ 8. dove
- ☐ 9. other fraternal order:
- ☐ 13. other design:
- ☐ 10. flowers
- ☐ 11. cross and crown
- ☐ 12. inverted torch
- ☐ 14. Military _____

Condition of Marker:
- ☐ 1. weathered
- ☐ 2. unattached
- ☐ 3. biologicals
- ☐ 12. other:
- ☐ 4. cracked
- ☐ 5. loose
- ☐ 6. stained
- ☐ 13. weed wacker
- ☐ 7. broken
- ☐ 8. leaninng
- ☐ 9. portions missing:
- ☐ 10. vandalized
- ☐ 11. repaired

Stonecutter's name: City: Location of Mark:

Footstone: Material: Design/initials: Condition:

Coping: Material: Design: Condition:

Fencing: Material: Design: Condition:

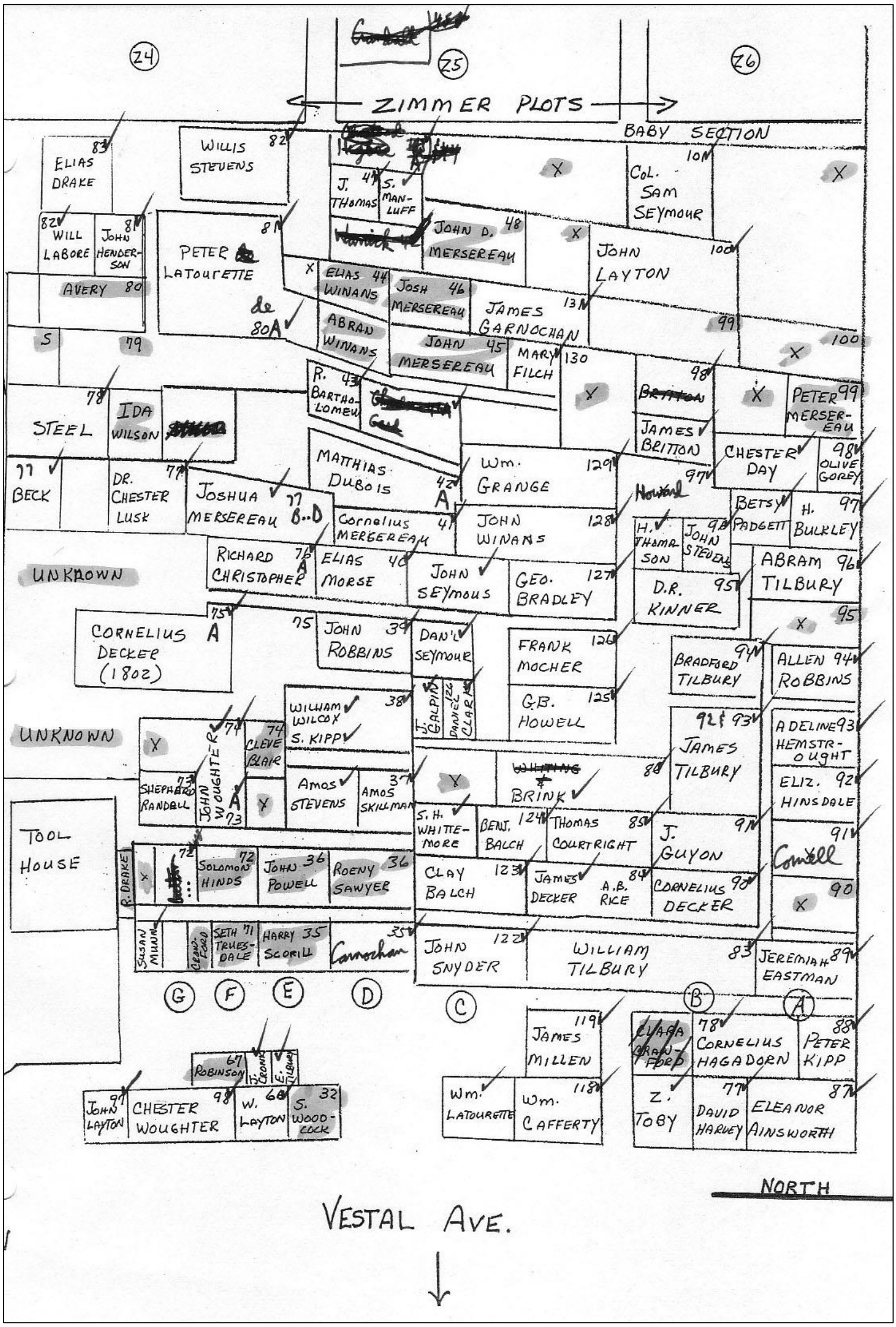
Grave Orientation: Marker inscription faces what direction:

Grave goods:

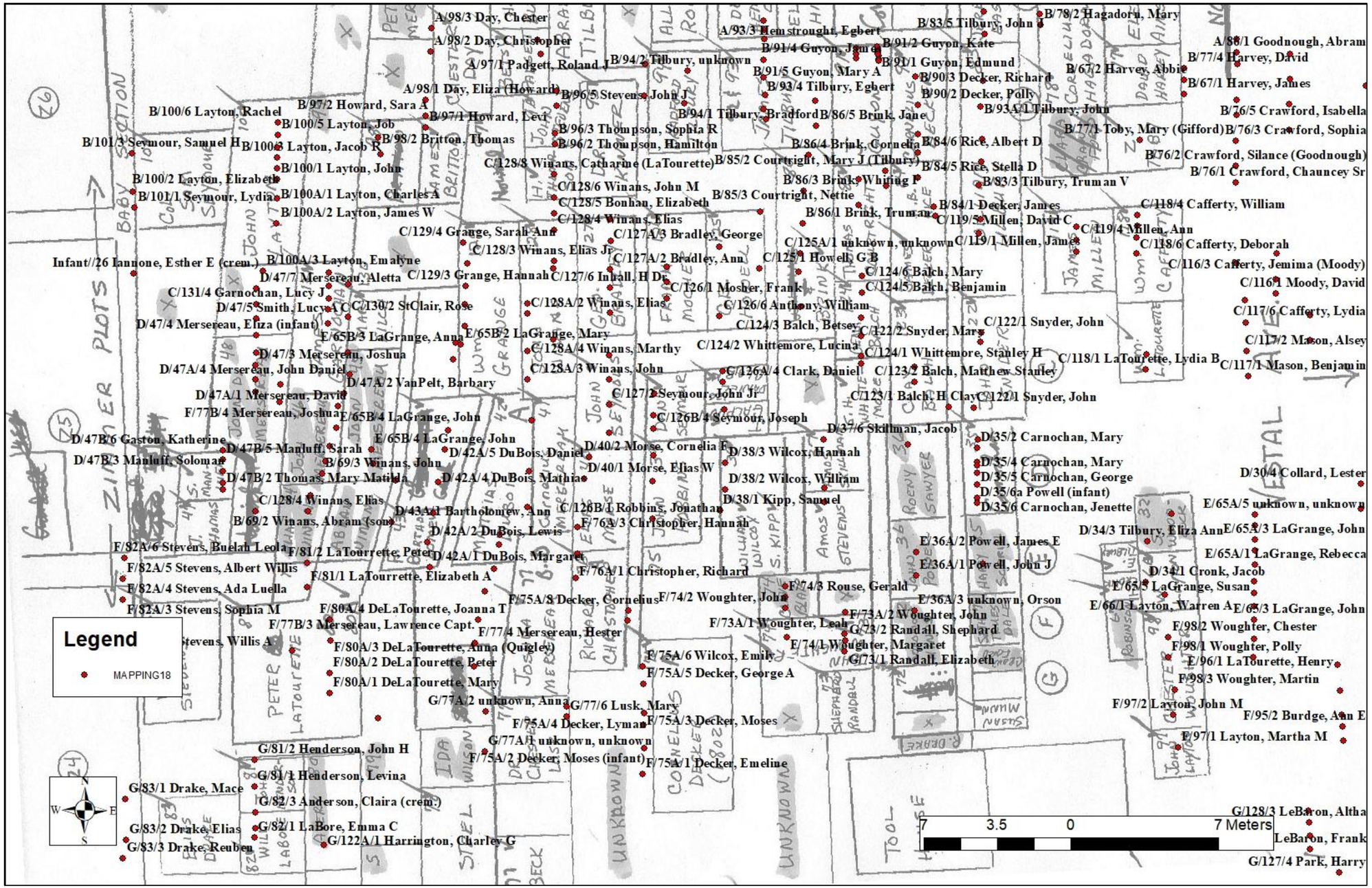
Surveyor: Date:

Appendix C

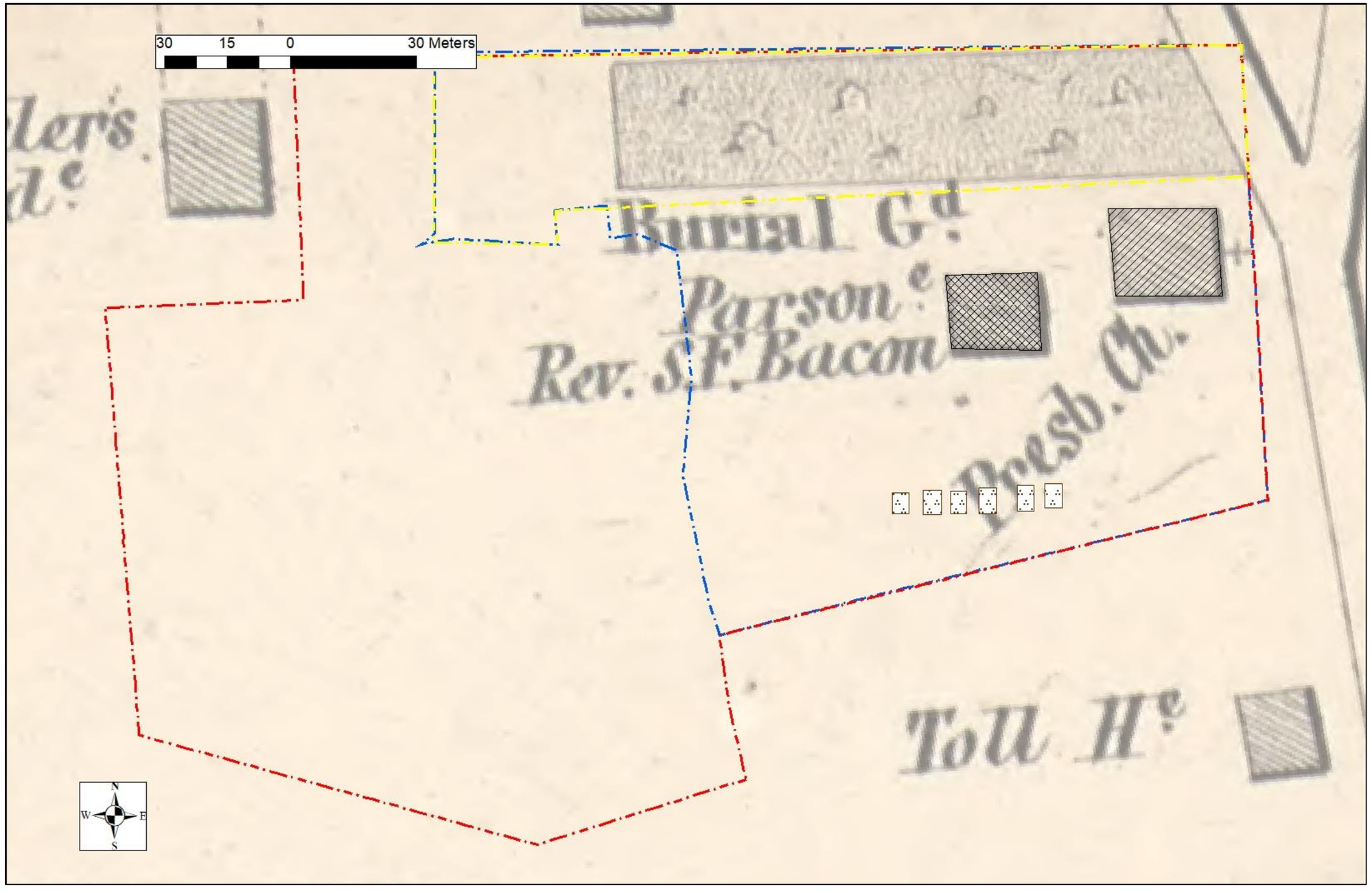
Maps



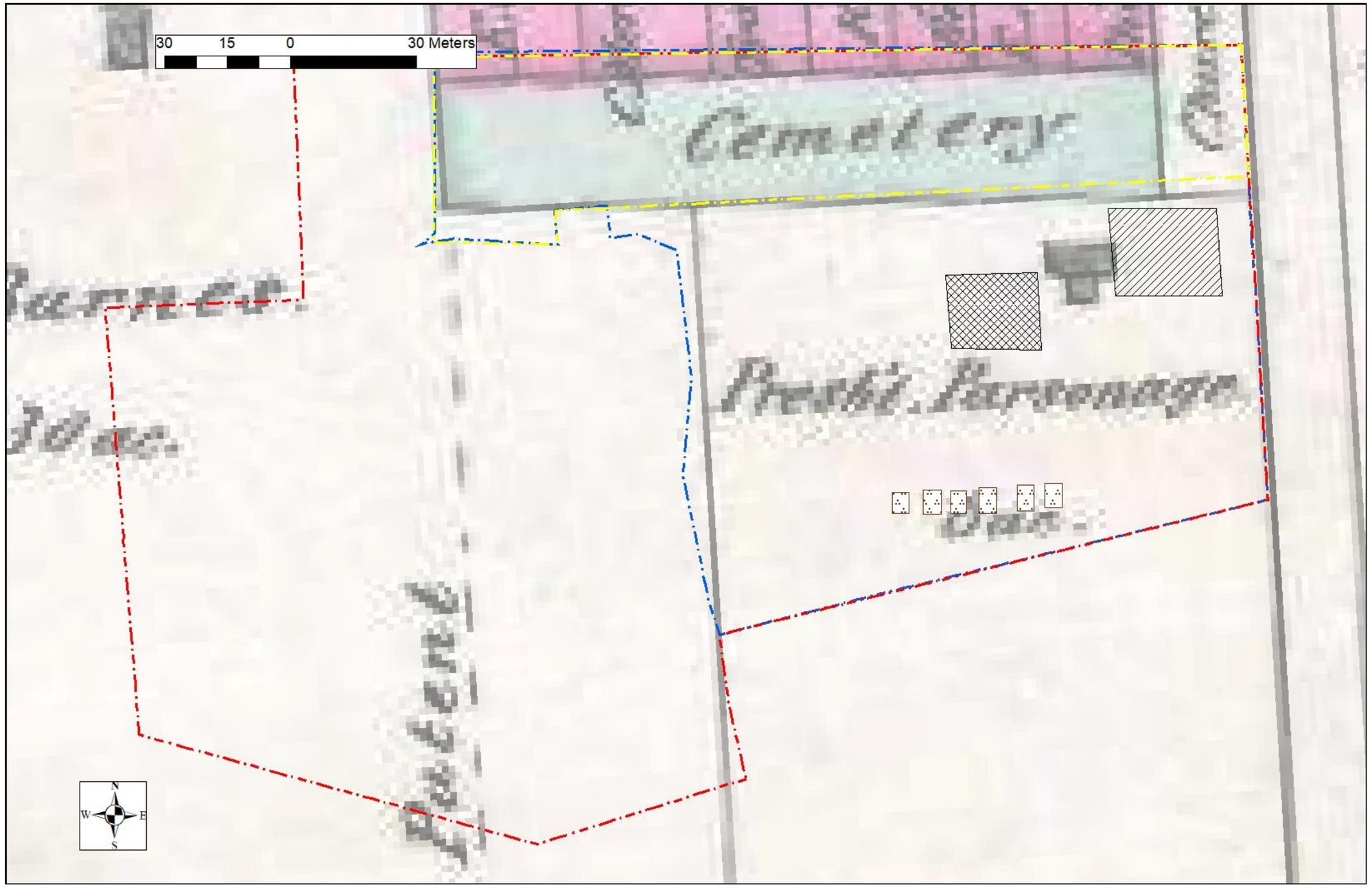
Map 1. Map of original plots.



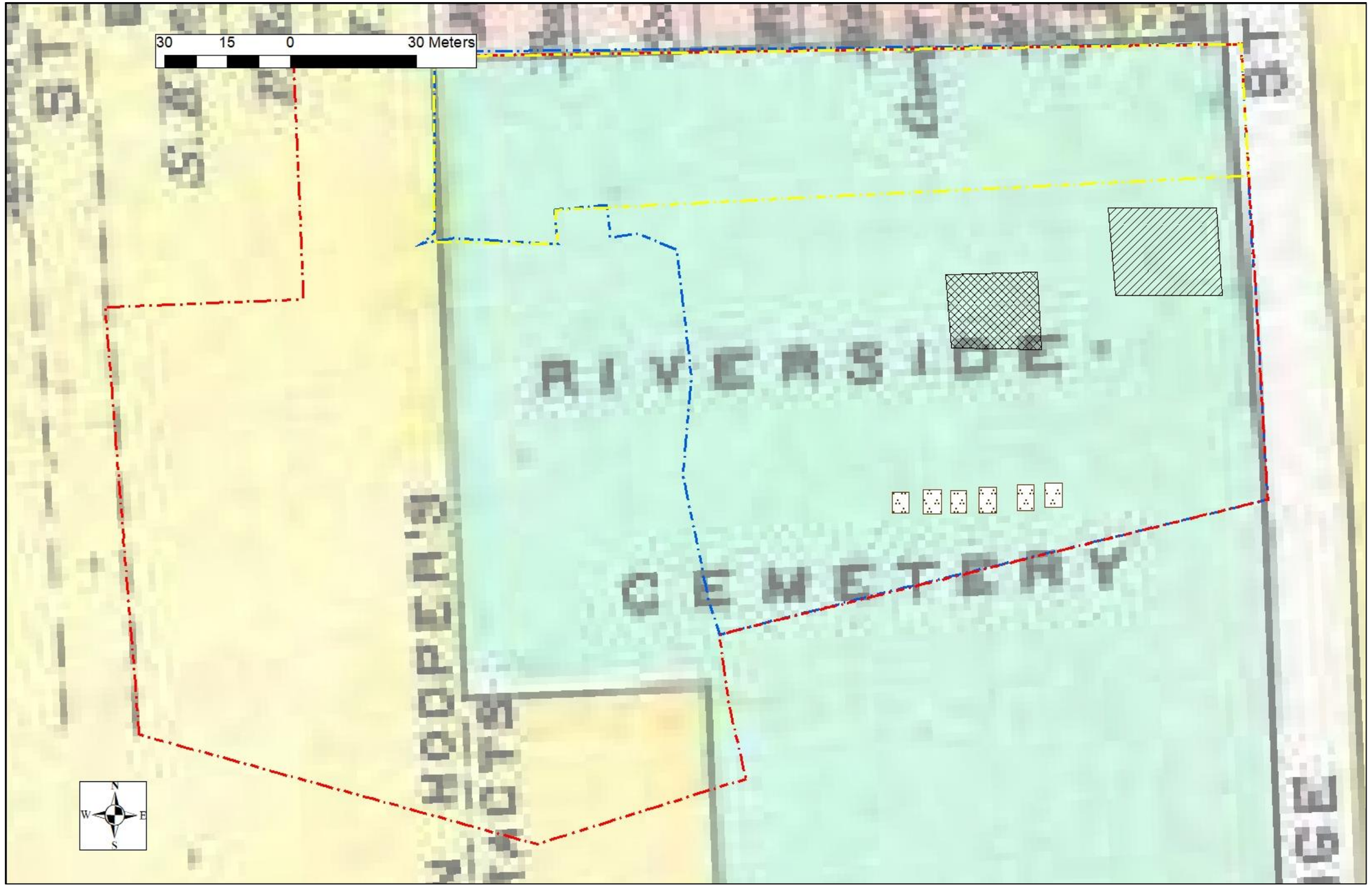
Map 2. Original plot showing how graves match up to the drawing.



Map 3. 1855 map showing cemetery.



Map 4. 1876 map showing cemetery.



Map 5. 1908 map showing cemetery.

Map 6. Map showing distribution of marker types.

Map 7. Map showing location of weathered stones, in blue.

Map 8. Map showing location of unattached stones in blue.

Map 9. Map showing location of biological growths on stones, in blue.

Map 10. Map showing location of cracked stones, in blue.

Map 11. Map showing location of loose stones, in blue.

Map 12. Map showing location of stained stones, in blue.

Map 13. Map showing location of broken stones, in blue.

Map 14. Map showing location of leaning stones, in blue.

Map 15. Map showing location of stones with missing portions, in blue.

Map 16. Map showing location of repaired stones, in blue.

Map 17. Map showing location of stones with other conditions, in blue.

Map 18. Map showing location of stones with line trimmer damage, in blue.

Map 19. Map showing location of veterans by war.