St. Ambrose Cemetery

A Preservation Master Plan

Prepared for:

City of Deadwood
Historic Preservation Commission
108 Sherman Street
Deadwood, SD 57732

Prepared By:

DREAM DESIGN
INTERNATIONAL, INC.

St. Ambrose Cemetery

A Preservation Master Plan

Acknowledgements

The collaboration between the preservation planning team, the Deadwood Department of Planning, Zoning and Historic Preservation, the Deadwood City Commission, the Deadwood Historic Preservation Commission, and the Cemetery Committee was critical to the development of a creative, yet site sensitive, preservation plan that will guide the Cemetery's future with respect for its historic fabric, artifacts, artistry, and history. The recommendations contained within this plan are the product of the best insights and perspectives of everyone involved, developed in a spirit of cooperation and high level of commitment to the preservation and overall welfare of St. Ambrose Cemetery.

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Background and Purpose

For the past several years, there has been an increasing interest in the preservation of Deadwood's deteriorating cemeteries. The City of Deadwood has made a strong commitment to preserve its historic cemeteries beginning with developing a preservation master plan for the Mount Moriah Cemetery in 1999 and two subsequent preservation projects.

In 2003, the St. Ambrose Catholic Parish in Deadwood deeded the St. Ambrose Cemetery to the City of Deadwood. This transfer helped ensure its preservation and future maintenance. The City has committed to preserving the St. Ambrose Cemetery and its important historic resources and maintaining the grounds from this point forward.

These cemeteries provide invaluable insight into Deadwood's development as a gold mining into a Victorian Era city. Recognizing the importance of its cemetery resources, the City of Deadwood hired Dream Design International, Inc. to steer the development of a Preservation Master Plan for the St. Ambrose Cemetery. This plan will guide the conservation and preservation of the St. Ambrose Cemetery over the next several years.

Quick Cemetery Facts:

Established:	*Approx. 1881*
Location:	*Burnham Hill – Deadwood, SD* *Lat: 44˚22'56"N* *Lon: 103˚43'36"W*
Interments:	*Exact number unknown (more than 600 interments)*
Recorded Interments:	*Over 254 (based on Maggie Rail's recordation completed in 2002 found on Internment.net)*
Acres:	*Approximately 3.9*
Ownership	*City of Deadwood (turned over to City in 2003 from St. Ambrose Catholic Parish)*

This Preservation Master Plan has been the culmination of the efforts of many people concerned with the preservation of the history contained within St. Ambrose Cemetery.

The master plan is an avenue to assist in preserving the cemetery and maintaining its role as a cultural and historic resource for Deadwood. The master plan examines the issues that face the cemetery, establishes goals for the future of the cemetery, and lays out a plan to achieve these goals.

View to Brown Rocks from St. Ambrose Cemetery.

View of entrance to St. Ambrose Cemetery located at Pleasant Street.

Historical Overview

Due to the discovery of gold, early pioneers and prospectors flocked to the area to seek their fortune. Many of these early explorers and prospectors were of the Catholic faith. And in 1876, the Catholic population had grown large enough to warrant the need for priests in the area. In May of 1877, Bishop John O'Conner from Omaha, sent Rev. John Lonergan to the Black Hills to serve this need. Father Lonergan was the first resident priest in the Black Hills although Father Pierre DeSmet had been visiting American Indians in the area for many years.

On May 23, 1877, Rev. John Lonergan conducted his first mass at a carpenter's shop on Sherman Street. In the late summer of 1877, a small church was constructed on Williams Street. The newly formed St. Ambrose Parish continued to grow in the following years.

Rev. Father B. Mackin's grave. Father Mackin died in 1880 and is buried in St. Ambrose just north and east of the entrance gate.

Father Lonergan was followed by Father P.N. O'Brien who had a brief stay in the area. In February of 1878, Father B. Mackin arrived in Deadwood and established churches at Lead City and at Central City. The town of Deadwood had by this time become a town full of disorder, lawlessness and bloodshed. There were many casualties due to the lawless atmosphere of Deadwood and the hazardous conditions involved with gold mining and prospecting. Father Mackin was able to begin a hospital for Deadwood in August of 1878 through the help of the Holy Cross Sisters from Notre Dame, Indiana. It is believed that around this time that the first burials began in the area of St. Ambrose Cemetery.

St. Ambrose Cemetery was consecrated around 1881 for use by St. Ambrose Catholic Church in Deadwood, South Dakota. However, it is reported that burials took place there since 1878, which would be consistent with the arrival of Fathers Lonergan, O'Brien and Mackin to Deadwood.

Although established in 1881 toward the end of the Victorian Era, the Cemetery does not reflect the Era in its design or layout. The layout of the cemetery is fairly utilitarian in nature with an orderly grid system of plots and aisles. However, the Late Victorian influence shines through in the Cemetery's ornate ironwork, Victorian inspired stone carvings, and plant material. The cemetery's view toward Brown Rocks is particularly inspiring and really helps create a contemplative and peaceful setting for the cemetery grounds. While many cemeteries within the Rural Cemetery Period tried to replicate nature and create landscapes inspired by nature, St. Ambrose was placed within the natural Black Hills environment and is a beautiful natural landscape in itself. Over the years, memorial plantings have placed throughout the cemetery adding to its Victorian charm.

Over the past 125 plus years, the cemetery has slowly deteriorated into its current condition. The cemetery became a liability to the St. Ambrose Catholic Parish. Due to its high maintenance needs and fragile historic materials, the Parish could no longer care for it in the degree needed. In 2003, the City of

St. Ambrose Cemetery in Context

1796 New Burying Ground, New Haven, CT. First chartered burial ground in United States. (Figure 1.1)

1804 Père-Lachaise Cemetery, Paris, France. Model for Mt. Auburn Cemetery and Rural Cemetery Movement.

1831 Mount Auburn Cemetery – Cambridge, MA. First large designed landscape open to the public in United States. (Figure 1.2)

1876 Ingleside Cemetery – Deadwood, SD. Located in Whitewood Gulch.

1878 Mount Moriah Cemetery – Deadwood, SD. Established because Ingleside area was desirable for development. (Figure 1.4)

1878-1881 St. Ambrose Cemetery – Deadwood, SD. Consecrated for use by St. Ambrose Catholic Church. (Figure 1.3)

1949 Oak Ridge Cemetery – Lawrence County, SD. Currently used for most burials in the Deadwood area.

Deadwood acquired the cemetery from the St. Ambrose Catholic Church and agreed to take over the maintenance and preservation of the cemetery.

The City of Deadwood has already completed a handful of projects within the cemetery including the reestablishment of the cemetery's boundary, the installation of chain-link security fencing along the southwest edge of the cemetery,

Currently, St. Ambrose is in dire need of preservation, stabilization, and repair. The foresight of the City of Deadwood has identified St. Ambrose as an invaluable resource to the City of Deadwood and its residents. In 2007, the leadership of the Deadwood Historic Preservation Commission and the Cemetery Committee initiated the development of a comprehensive Preservation Master Plan for St. Ambrose Cemetery.

A recent discovery of a historic photo showing this area of Deadwood revealed that the entrance walk to St. Ambrose Cemetery traveled up the hillside across from what is now the Lower Main Parking Lot. This photo reveals two gates one about half way up the hill and the other located where the current ornamental iron gate exists. The photo also reveals that there were gravesites below what is now Pleasant Street. This new information was the basis for conducting a preliminary investigative archaeological study which was performed by the South Dakota State Historical Society Archaeological Research Center (SARC) in October of 2006. The preliminary study concluded that evidence exists that supports the presence of gravesites below Pleasant Street. Further, more extensive investigation is needed to confirm the existence of gravesites and human remains below Pleasant Street. Should this further investigation burials occurred or are present, this area should become part of the recognized boundaries of the St. Ambrose Cemetery.

Circa 1900 photo of St. Ambrose Cemetery taken from White Rocks showing original entrance to the cemetery and early gravesites.

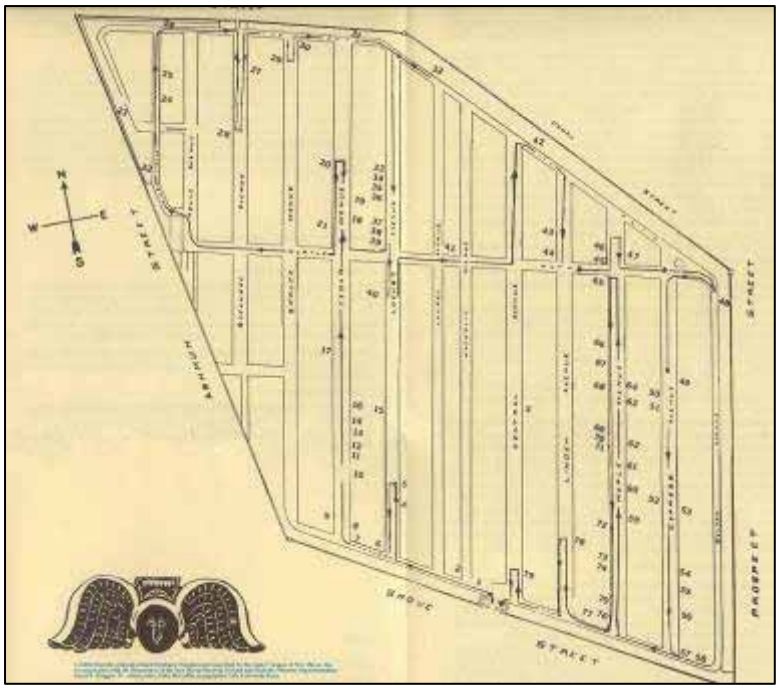


Figure 1.1 - Layout of the New Haven Burial Grounds (1796) in New Haven, CT. (http://www.grovestreet cemetery.org/)

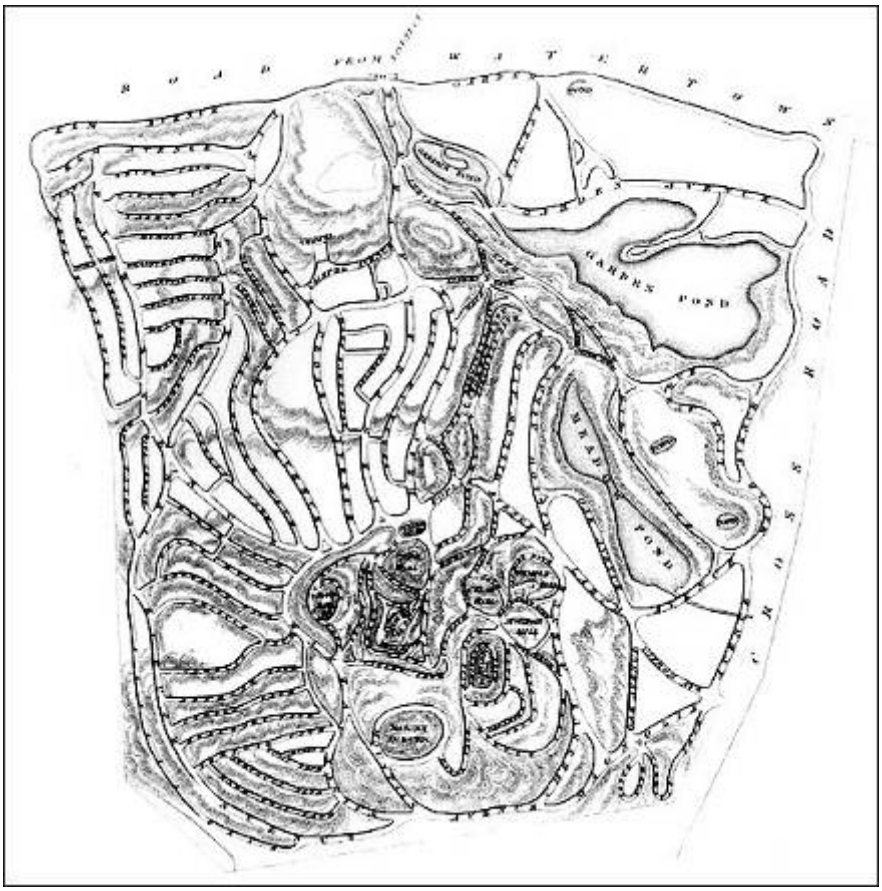


Figure 1.2 – Layout of the Mount Auburn Cemetery (1831) in Cambridge MA. (http://insight.library .yale.edu)

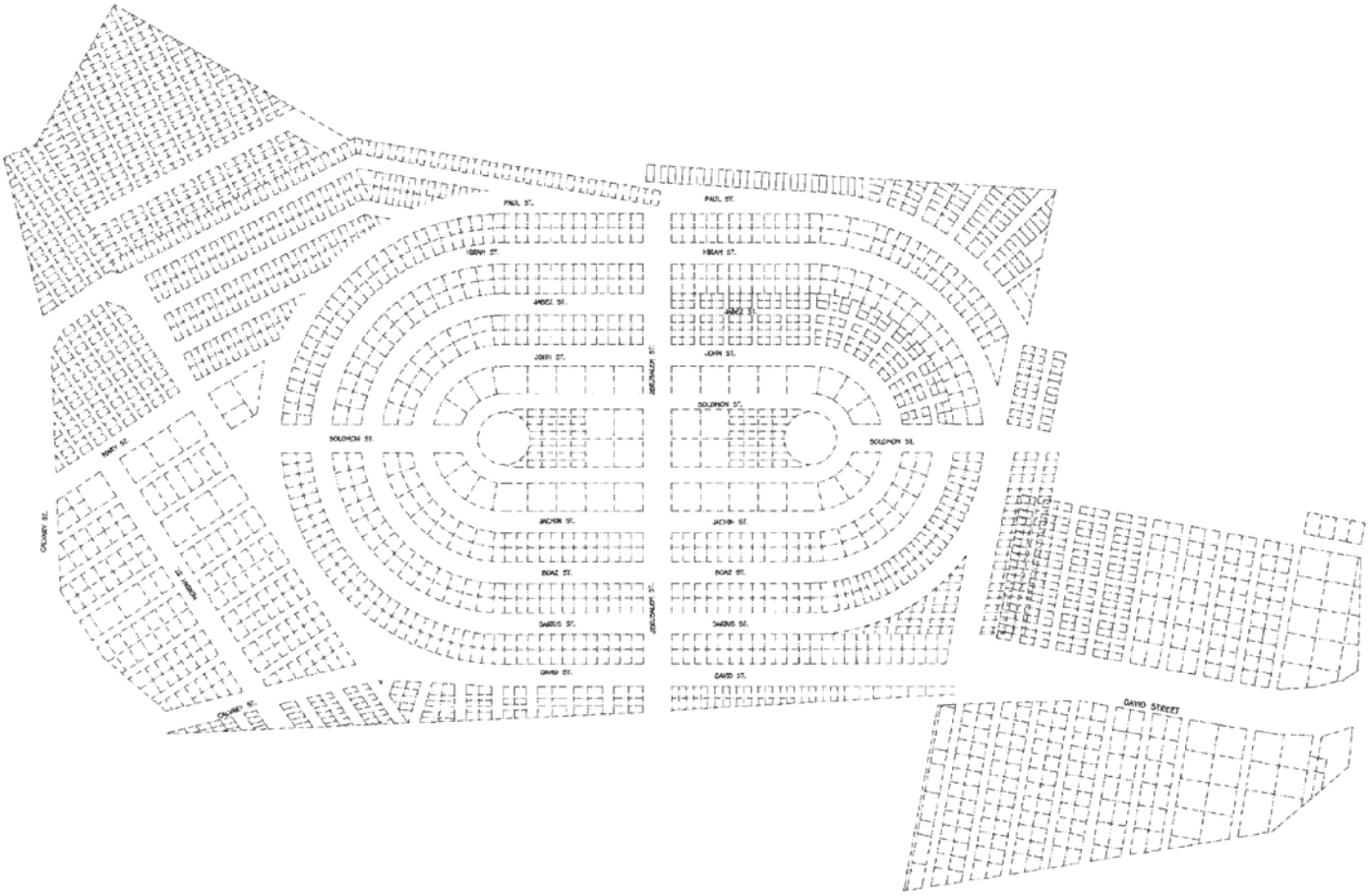


Figure 1.3
The layout of Deadwood's Mount Moriah Cemetery (1878) shows its overall symmetrical design. (Courtesy of the City of Deadwood Archives)

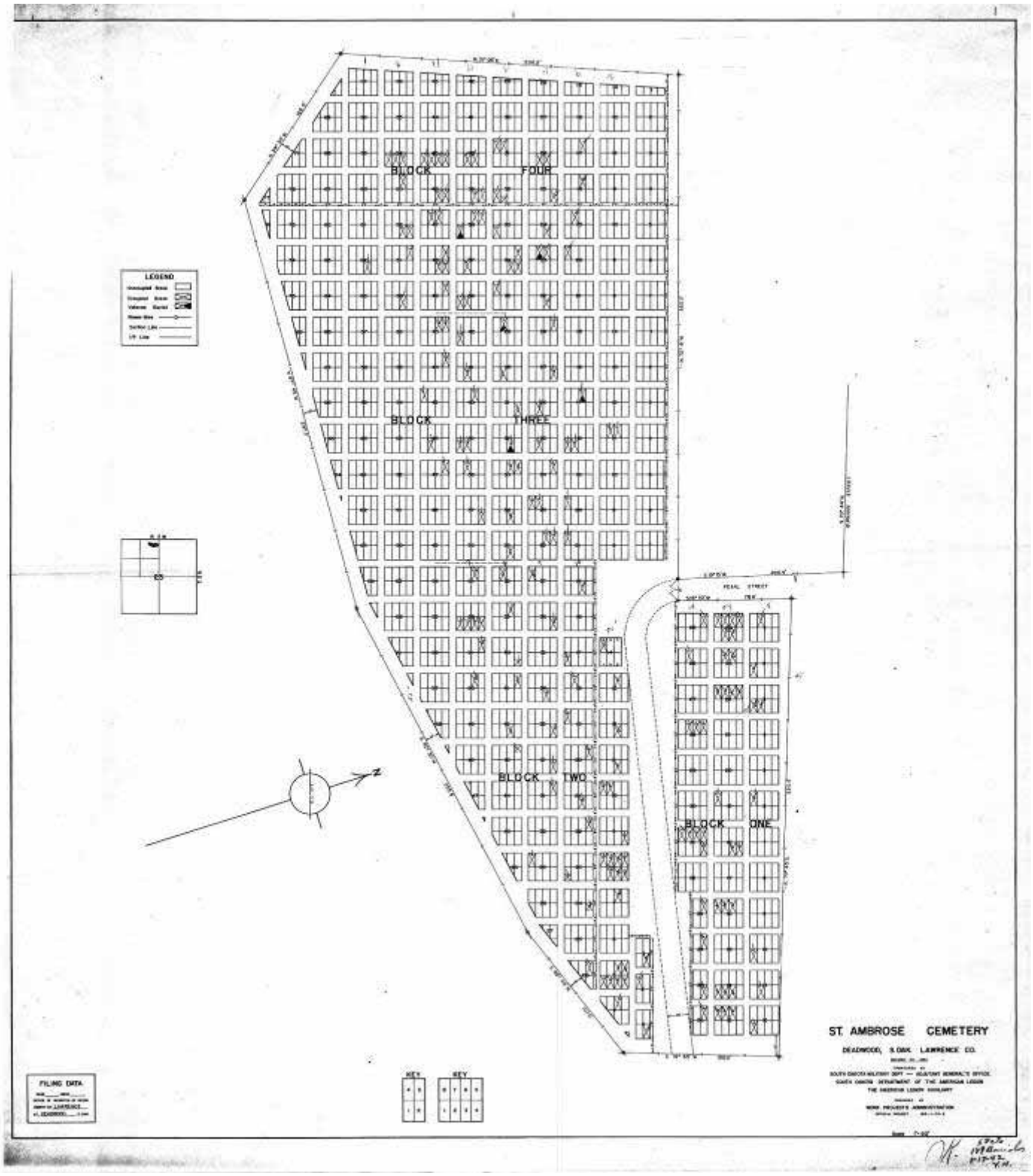


Figure 1.4 - St. Ambrose Cemetery (1881) in Deadwood, SD. Works Progress Administration map prepared in 1941 shows cemetery layout and lists 189 burials (five being veterans). (Courtesy of the City of Deadwood Archives)

The Master Plan Process

Site Assessment

During this phase of work, our design team performed a series of on-site investigations that reviewed the overall condition of the cemetery as it exists today. The following items were reviewed during the site assessment: monuments and markers, retaining walls, grave coping (curbs), ironwork, perimeter fencing, vegetation, paths, drainage and erosion, site security, parking, interpretive opportunities, and overall history of the site.

1. Our on-site investigations analyzed and assessed all of the physical objects located within the cemetery such as grave markers, walls, curbs, fences, paths, drainage, and plants.

2. We also analyzed and assessed the circulation, identified opportunities for interpretation, recommended procedures for security, maintenance, repairs, preservation and restoration of gravesites and the overall site.

3. In March of 2008, a public meeting was held at Deadwood City Hall to discuss the project and gather input on the various aspects of the project.

Master Plan Development Phase

During this phase, we reviewed and analyzed the information gathered during our on-site inventories, assessments and documentation and taking these issues into consideration developed the preservation master plan. This phase includes the following:

1. Development the overall guiding principals, goals and objectives for the project.

2. Identification of cemetery's needs and the development of preliminary recommendations concerning the overall site, individual gravesites, monuments, retaining walls, interpretation of the site, and areas where further study is needed.

3. Development of a series of guidelines for preservation, maintenance and repair to assist the City of Deadwood in meeting the uses and needs identified within this preservation plan.

4. Development of preliminary budget expectations for implementation of approved preservation master plan and recommended phasing of the plan.

5. Development of recommendations and priorities of the preservation plan.

6. A report prioritizing grave marker repair, including a list of every grave marker, its current condition, and its specific repair recommendations.

7. An inventory of gravestone symbols found in the cemetery and their meanings.

8. An inventory of all retaining walls and their conditions, recommended repairs and priorities.

9. An inventory of all ironwork, its current condition, recommended preservation activities and priorities.

10. An inventory of plant species which exist in the cemetery, an assessment of overall plant material conditions, maintenance practices, recommendations for tree removal, and appropriate landscape enhancements.

11. An archeological assessment of the cemetery and recommendations for possible future investigations.

Guiding Principles and Goals & Objectives

After reviewing the Cemetery's issues and its current and future needs, the following Guiding Principles and Goals and Objectives have been recommended for the Cemetery as part of the Preservation Plan. If adopted, these Guiding Principles will help protect the St. Ambrose Cemetery and its fragile, priceless historic resources for several future generations.

Guiding Principles

The following guiding principles have been proposed to guide development of the Preservation Master Plan and can be used to evaluate future proposed projects for preservation and maintenance activities within St. Ambrose Cemetery.

Principle 1: The St. Ambrose Cemetery is a historic resource and all activities, programs, and proposals shall preserve or enhance the historic integrity of the cemetery.

Principle 2: The cemetery landscape shall be managed to preserve the historic, aesthetic character of the cemetery. Canopy pine trees shall be maintained and removed as necessary to prevent damage to the cemetery's historic resources.

Principle 3: Sufficient staff and resources should be provided to ensure the continued maintenance and preservation of the cemetery's historic fabric.

Principle 4: All improvements and preservation work should be evaluated for their compatibility with the cemetery's historic character. All work within the cemetery shall comply with the *Secretary of Interior's Standards for the Treatment of Historic Properties.*

Principle 5: Architectural features, site furnishings, and other physical features shall contribute to, or complement the historic character of the cemetery.

Goals and Objectives

The goals for the Preservation Master Plan identify the major needs to be met by the plan's recommendations. The objectives help provide a course of action needed to achieve each goal. These objectives build upon the guiding principles by laying out an action plan to protect and strengthen them. These goals will assist the on-going process of long-range planning and preservation for St. Ambrose Cemetery, and should be reevaluated as preservation projects are implemented and conditions within the cemetery change over time.

Goal 1: Preserve and protect the Cemetery's visual character and historic integrity.

1. Proposed projects shall follow the Secretary of Interior's Standards for the Treatment of Historic Properties.

2. Provide regular and appropriate repairs, conservation, and maintenance for the cemetery's historic resources such as markers/monuments, retaining walls, plot caps, vegetation, ironwork, perimeter fencing, pathways, parking areas, and other infrastructure.

3. Provide adequate financial and staffing resources for the ongoing maintenance of the Cemetery.

4. Routinely monitor conditions of markers/monuments including ongoing deterioration, repairs, and stability.

5. Identify opportunities for additional study and research within the cemetery to ensure the cemetery's history is accurately depicted.

Goal 2: Protect the individual historic elements of the Cemetery.

1. Carefully document and assess the condition of each individual historic resource.

2. Secure loose elements and provide unique identifying numbers for cemetery ironwork.

3. Provide adequate security to the Cemetery and its resources help ensure their protection.

4. Remove or repair potentially damaging elements from the Cemetery (dead limbs, trees damaging walls or markers, severely deteriorating retaining walls, severely leaning or loose monuments)

5. Provide appropriate conservation measures for the Cemetery's historic resources.

Goal 3: Establish guidelines and treatments for the professional management of St. Ambrose Cemetery.

1. Develop a list of primary and secondary preservation priorities for the cemetery.

2. Develop appropriate conservation treatments and activities to be used on the various historic resources within the cemetery.

3. Develop design guidelines to guide future work within the Cemetery.

Goal 4: Reinforce an overall image that is compatible with the historic assets and overall design of St. Ambrose Cemetery.

1. Provide much needed landscape maintenance and rejuvenation to the Cemetery's plant and groundcover materials.

2. Restore key design elements and unique features within and adjacent to the Cemetery.

3. Reestablish major pathways and aisles within the cemetery where feasible and appropriate.

4. Identify areas of burial plots that were originally included within the original Cemetery boundaries.

5. If research and other evidence supports, work to reestablish the boundaries of St. Ambrose Cemetery to include all known and/or probable gravesites.

Goal 5: Enhance the visibility and security of the cemetery.

1. Develop a list of priorities to enhance the security of the site including new fencing, repair of existing fencing, gate repairs, and other security measures.

2. Secure loose, fragile or otherwise theft/vandal susceptible physical elements within the Cemetery i.e. ironwork, monument fragments or segments, wall materials, or other gravesite adornments.

3. Encourage increased visitation to the cemetery through education about cemetery's history, historic resources, and location.

Goal 6: Enhance interpretation of the St. Ambrose Cemetery's history, its valuable genealogical and historic resources and its tie to the City of Deadwood community.

1. Develop an educational brochure or walking tour booklet describing the various features, individuals and points of interest within St. Ambrose.

2. Provide additional parking opportunities near the cemetery, if possible and feasible.

3. Provide visitor comforts and amenities within and adjacent to the cemetery grounds such as period appropriate seating, receptacles and interpretive elements.

4. Work to re-establish the original boundary of the cemetery including the area below Pleasant Street, if additional study confirms graves existed or are present.

5. Re-establish the original entrance sequence (if only partial) to the St. Ambrose Cemetery up from Lower Main Street or down from Pleasant Street.

Cemetery Issues

Throughout the site assessment and site analysis, various preservation needs and issues were identified within St. Ambrose Cemetery. The following list of issues has been identified and has focused the development of the Preservation Master Plan.

Conservation Issues:

- documentation
- marble and stone deterioration
- fallen or unstable markers
- stone and brick masonry deterioration
- concrete deterioration
- damaged, eroding and missing ironwork

Circulation Issues:

- drives and pedestrian paths
- accessibility
- existing parking and future parking opportunities

Horticultural Issues:

- deferred maintenance of mature pine trees
- volunteer vegetation growth and subsequent damage
- historic accent/memorial plantings
- historic groundcovers/lawns
- weed control/turf reestablishment
- rejuvenation of historic shrubs
- tree removal
- plant litter and overall clean up

Cemetery Management Issues:

- site security and vandalism
- overall cemetery maintenance
- ironwork maintenance
- marker maintenance
- proper training of maintenance staff

Interpretation Issues:

- visitor comforts and amenities
- interpretation of cemetery history
- interpretation of artistic elements and symbolism
- relation to other significant Deadwood attractions
- possible restoration of original entrance sequence

Archeological Issues

- unknown locations of interments
- some interred separated from current perceived cemetery boundaries
- capacity of cemetery is unknown

Analysis and Recommendations

General

St. Ambrose Cemetery is a Victorian Era cemetery consecrated around 1881 with a rich collection of monuments reflective of the Victorian Era. At its entrance, a cast iron gate welcomes visitors to St. Ambrose Cemetery and gives the visitor the first impression that this is a very special place. A woven wire fence lies on each side of the gate. The 1941 plot map notes a woven wire fence surrounded the entire cemetery. Perhaps the only remains of the original fence are located on each side of the entrance gate. The fence is still standing but in need of repair as soil has pushed up against the backside of the fence in many places and causing it to tilt toward the south.

The plot arrangement within St. Ambrose Cemetery is primarily utilitarian in its arrangement with a center aisle and graves arranged in orderly rows on each side of the aisle. The site slopes severely from northwest to southwest which necessitated the need for the extensive use of retaining walls throughout the site to stabilize individual plots. The retaining walls are in various states of condition from stable to completely collapsed. There are a variety of materials that were used to construct the retaining walls such as rubble stone, cut stone, concrete, and concrete block to name a few.

The ironwork that exists within the Cemetery is surprisingly in good condition overall with a majority of the individual plot gates still intact. There are some instances where ironwork has been impacted by fallen tree branches, shifting retaining walls, or degradation due to lack of maintenance.

Overall, the site appears to be fairly well cared for in recent years. There is adequate vegetative groundcover and the site is fairly stable from soil erosion. One of the primary reasons for erosion not being much of an issue is this cemetery doesn't have the impact from visitors like Mt. Moriah Cemetery. This has allowed the groundcover to remain well-established and protect the site from extensive erosion.

Structures and Infrastructure

Introduction

Structures are important elements in St. Ambrose Cemetery offering visual character in the landscape as well as serving the functional needs of the Cemetery. The physical as well as the aesthetic contributions and historic significance of the site's structures were inventoried and assessed as part of the master planning process. The structures inventoried and assessed included monuments, retaining walls, curbing, iron fencing, perimeter fencing, and entrance gates.

Monuments

One of the most critical character-defining features of the St. Ambrose landscape is its collection of monuments. The monuments within the cemetery display important genealogical information as well as the socioeconomic, ethnic, religious and artistic influences of the times. Many of the monuments are significant works of art and others are significant because of their association with notable persons in Deadwood's history. In addition to their genealogical value, the monuments of a cemetery provide a great timeline of stone-carving techniques and gravestone symbolism.

Methodology

As part of this preservation plan, stone by stone inventories were conducted within the cemetery. The inventories recorded the number, materials, artistic and historic significance, previous repairs and overall condition of the monuments. These inventories will form the basis of for stone conservation projects within the cemetery. In addition to the physical characteristics of the monuments, headstone inscriptions and digital photographs were also recorded for each monument within the cemetery.

Figure 2.1 – A High Priority monument in need of conservation.

Figure 2.2 – A Medium Priority monument with heavy biological growth.

The digital photographs follow the same numbering system that was used in the Geographical Information Systems recordation that was conducted previously by Ferber Engineering of Rapid City, South Dakota. More specific information regarding grave marker inventory can be found in the St. Ambrose Monument Database on file with the City of Deadwood's Historic Preservation Office.

After the individual assessments were completed, a detailed map was developed indicating monuments that were identified as High Priority, Medium Priority or Low Priority. The following definitions have been developed for each condition:

1. High Priority – Monuments in jeopardy of being lost or damaged due to severe degradation, severe tilt, loss of material, loss of genealogical data (barely legible), or vegetation impact. Monuments with high artistic value which need repair or conservation also fall into this category.

2. Medium Priority – Monuments which are generally stable or have moderate deterioration but are not in an immediate need for conservation treatments. These monuments should be placed on a schedule to be monitored at regular intervals such as every two years to monitor their rate of deterioration and identify maintenance and conservation needs as they develop.

3. Low Priority – Monuments that are in good condition or a very stable condition which do not need any conservation treatments at this time. Most of the monuments in this category are comprised of highly durable material such as various granites or high quality marble; have crisp inscriptions, very little biological or general soiling, or have had previous conservation treatment with good results.

Figure 2.3 – A Low Priority gray marble monument with a limestone base in a stable condition.

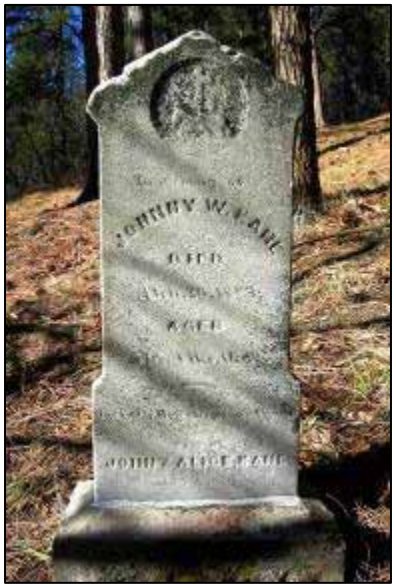


Figure 2.4 – Marble tablet displaying the effects of deterioration due to particle erosion or "sugaring."

Materials and Considerations

The deterioration of gravestones is a natural and unavoidable process. Stone is subject to deterioration by natural weathering and that weathering can be accelerated by environmental factors, the quality of the stone, and the type of stone used. Porous stones such as sandstone, limestone and marble are more subject to the effects of weathering than nonporous stones like granite.

Sandstone: These silicate stones were very commonly used for grave markers through the 17th, 18th and early 19th centuries. Sandstone was geologically formed in horizontal sedimentary layers (bedding). Typically, gravestones are set with the natural bedding set in a vertical position. This causes the bedding planes to be exposed and they often begin to delaminate or separate over time. When moisture migrates into the openings between the bedding planes, freeze-thaw cycles in our climatic region force the planes apart causing areas of the exposed face to spall or delaminate. Sandstones were popular for gravestones due to their soft nature making them easier to carve.

Sandstone also has the issue of being a granular stone comprised of silicate particles and a natural binding agent. The binder between the grains weathers more rapidly than the silica (sand) grains, causing erosion of the surface detail.

Marble and Limestone: These calcium carbonate stones came into popularity during the 1810's and remained popular up until early 19th century. The rural cemetery movement (in which St. Ambrose was established) became a showcase for highly detailed carving and artistic monuments. Most sites of this era (including St. Ambrose) contain a large number of marble markers. Many marble markers within St. Ambrose are comprised of marble tablets, columns, obelisks or dies set on limestone bases. Marbles are also susceptible to deterioration through impacts of acid deposition and other pollution damage. Most of the marble markers in St. Ambrose have lost surface detail due to particle erosion or sugaring of the stone. Most of the markers also have biological growth established on them which also contribute to the deterioration of the stones' surface.

Granite: Granite is by far the hardest and most durable stone to use as grave markers. During the 1870's and 1880's, the use of granite increased due to the improved methods of quarrying and stone carving as well as improved transportation methods to the area making granite more readily available. Granite has become the standard for grave markers due to its relatively impervious nature and endures very well in the outdoor environments.

Bronze & Other Metals: Bronze has been used in a number of locations for monuments. Bronze is extremely durable and usually does not have any associated problems besides the normal tarnishing (or patina) over time. In St. Ambrose, these have typically been set in flush, concrete bases and in a few cases are becoming covered by soil and other debris.

Figure 2.5 – Typical funerary markers that are found in St. Ambrose Cemetery. Many times these simple markers are the only remaining evidence of a gravesite.

Figure 2.6 – A large painted cobble at the Gordon Vas gravesite.

In one plot, steel bar was used to create a "folk art" monument. The bar was bent and welded to give the name of the deceased and their years of birth and death. While somewhat simple, this is a truly unique application in the cemetery.

Funerary Markers: These markers were usually intended to be temporary markers for the plot until a permanent monument was purchased and placed on the plot. There are two styles within the cemetery, one that is made of a light steel stake with a "certificate" holder at the top where the deceased person's information was placed. The other type is a small plaque where individual letters and numbers were placed to give the person's name and year of birth and death. In some cases, these have been placed in the top of walls to make them a permanent marker. The issues associated with these types of funerary markers is that the information is many times lost over time do fading, weathering and degradation of the paper certificate on the first type of funerary marker and the loss of letters due to adhesive failure on the latter type.

Concrete and Other Materials: There are a few examples of concrete used in the cemetery. There are a handful of concrete urns and bases that are constructed of pre-cast concrete. Also, at the Theresa Geis Ashe plot, a note "ERECTED BY GEO. A. GEIS" has been inscribed into the top of the concrete wall in front of her monument. In addition to the urns and inscription, concrete was used to create small block or flush monuments in which bronze plaques are set.

One of the more uncommon monuments exists at the Gordon Vas plot where a field stone has Mr. Vas' name painted on it in white. As with the funerary markers, it could be assumed that a manufactured monument could not be afforded for the Vas plot and one was created using what was available. This monument provides an interesting element to St. Ambrose nonetheless.

Monument Examples


AMY IRENE EDNA
FINNIGAN
U.S.A.
UNITED
CUBA
JOHN HUGHES
JAMES C.
CROCHAN
BORN
DIED

Gravestone Symbolism

St. Ambrose is full of interesting gravestone art and symbolism. The symbols, artwork and carvings can usually provide clues about the deceased person's life. Within St. Ambrose, there are over two dozen symbols represented in various shapes and forms. As can be expected since St. Ambrose is a Catholic cemetery, there are a large number of crosses depicted on monuments. Other symbols within the cemetery include fraternal organizations such as 3 chain links (International Order of Odd Fellows), and Modern Woodmen of America's shield. Many other symbols are present representing mourning, the after life, premature death, and service to God. Lambs, doves, weeping willows, palm leaves, roses, peace lilies, gates, angels and other symbols are represented.

Table 2.1 – Examples of gravestone symbols found in St. Ambrose Cemetery

Type of Symbol	**Meanings**	**Other Notes**	**Found on Monument No.**
Flora (Plants)			
Calla Lily	Majestic beauty and marriage.	Introduced into the United States in the second half of the 19th Century and soon after found its way into American art and funerary art.	2782, 2802, 2995, 3058 (Calla lily leaves laid on ground in front of gate)
Daisies	Innocence of the Christ child, youth, gentleness, purity of thought.	Usually found on graves of children.	2721, 3084
Evening Primrose	Eternal love, memory, youth, hope, and sadness.	These flowers open in the early evening and close by mid-morning.	2743, 3253, 3257, 3262
Ferns	Humility, frankness, sincerity, and sorrow.		2815
Ivy	Because it is evergreen, it is associated with immortality and fidelity. Because it clings makes it a symbol of attachment, friendship, and undying affection.	Its three pointed leaves can also be interpreted as a symbol of the Trinity.	2815, 2887, 2995, 3005, 3006, 3008, 3058
Lily	Majesty, innocence, purity, and resurrection.	Often used on women's graves.	2810
Madonna Lily (Easter Lily)	Purity	As a symbol of purity, its symbolism can be extended to mean casting off earthly things and attaining heavenly and spiritual qualities.	2848
Morning Glory	The Resurrection, morning, youth, and the bonds of love.	Morning glories are a symbol of the Resurrection, since they open in the morning sun.	2891
Oak Leaves	Strength, endurance, eternity, honor, liberty, hospitality, faith, and virtue.	All of the meanings when combined make the oak a symbol of the power of the Christian faith even in times of adversity.	3008

Palm Fronds	Victory, triumph over death.	Christians use palm fronds to symbolize a martyr's triumph over death and any believer's triumph over death (eternal life).	2812, 3012, 3015, 3027
Rose	Love, beauty, hope, and unfailing love. In Christianity, a red rose symbolized martyrdom and a white rose symbolizes purity.	In Victorian cemeteries, the rose often is associated with the graves of women.	3053, 3069, 3080
Rose bud	Normally symbolizes the death of a child.		3040
Treestones or tree stumps	A person's life cut down in their prime, mortality.	Popular during the late-Victorian period from about 1880 to 1905. Sometimes associated with the Woodmen of the World members.	2753
Weeping Willow	Nature's lament, a symbol of sorrow and mourning	In Christianity, it is associated with the gospel of Christ because the tree will flourish and remain whole no matter how many branches are cut off.	2818
Fauna (Animals and Birds)			
Dove	Peace, purity, devotion, and Devine Spirit	An important symbolic animal in Christianity representing the Holy Spirit. Also a symbol of purity and peace because God had made peace with man.	2995, 3058
Lamb	Purity and innocence.	Most commonly found on the graves of children.	2864, 2883, 3051
Elk with B.P.O.E.	Benevolent and Protective Order of Elks	See Societies, Clubs & Organizations	2966
Objects (Built Environment)			
Book (closed)	A completed life.	Any book can also represent the Bible.	2872
Book (open)	Can be compared to the human heart, its thoughts and feelings open to the world and to God.	Any book can also represent the Bible	3058
Curtain (Veil)	Passage from one type of existence to another.	Similar to gates in their meaning they represent passage into the Afterlife.	2706,
Drapery	Sorrow, mourning	Sometimes columns are shown with drapery over them.	2751, 2754, 2947
Gates	The entrance to Heaven, Heaven's gates.	In Christian symbolism, the gate represents the passage from one realm (Earth) into the next (Afterlife).	2812, 2872, 2885, 2995, 3058, 3062

Harp	Associated with heavenly aspirations.	Harps are mentioned frequently in the Bible as a musical entertainment and a source of devine music.	2692
Scroll	Symbol of life and time, the Scriptures.		2812, 2815, 2872, 2885, 2943, 2995, 3058
Torch	Upright - Eternity, Inverted – represents the end of life	Inverted without a flame simply means "life extinguished," inverted with a flame symbolizes death but suggests the soul (fire) lives on.	2933
Urn	Greek symbol of mourning.		2810
Objects (Natural World)			
Clouds	The Heavens		2827, 2916
Rock	In almost all cultures, rocks represent permanence, stability, reliability, and strength.	In Christian lore, rocks are a powerful symbol of the Lord.	2815
Star	Devine guidance.	A single star is almost always a symbol of of the Star of the East.	2812, 3005, 3006
Sun (rays of light)	Renewed life		2827, 2916
Religious Symbols			
Angels	The agent of God, guardians of the dead, messenger from God, an escort into Heaven.	Angels appear in many different forms such as flying, mourning, carrying a departed soul, etc.	2885, 2933
IHS	iota = I eta = H sigma = Σ (S)	IHS represents the first three letters of Jesus' name using the Greek alphabet: Iota, Eta, Sigma. The letters are many times overlaid on each other and resemble a dollar sign.	2807, 2829, 2831, 2887, 3005, 3006, 3012, 3128, 3266
Virgin Mary	Associated with Catholicism.		3132
Latin Cross	Cross which is most commonly associated with Christianity.		Numerous Latin crosses are located throughout the cemetery in various designs.
Cross w/ Crown	Christian symbol of the sovereignty of the Lord.	When the cross is combined with a cross, the cross means victory and the cross means Christianity.	2711

Societies, Clubs & Organizations			
American Legion - Star w/ U.S. inside of it surrounded by wreath, circle and "American Legion"	American Legion Member	The American Legion was chartered by Congress in 1919 as a patriotic, war-time veterans organization, devoted to mutual helpfulness.	3052
D.A.R. - Wagon Wheel Surrounded by Stars (DAR)	Daughters of the American Revolution	The DAR, founded in 1890, is women's service organization dedicated to promoting patriotism, preserving American history, and securing America's future through better education for children.	2980
D.F.D.	Member of the Deadwood Fire Department		2733, 2801, 2822, 2826, 2856, 2874, 2878, 3022
F.L.T. inside three links of chain	Symbol of the Independent Order of Odd Fellows. F.L.T. stands for Friendship, Love, & Truth.	Fraternal organization formed originally in England as a working-class social and benevolent association.	2782
MWA (Shield with ax and hammer)	Modern Woodmen of America symbol.	Original name of the Woodmen of the World. Many members have treestones as monuments.	2802
Woodmen of the World Shield	Woodmen of the World Member	Insurance type organization founded in 1890 by Joseph Cullen Root.	3123
Elk with B.P.O.E. and a clock with hands frozen at 11:00.	Benevolent and Protective Order of Elks	The Elks began as a drinking club but have grown to be one of the largest "animal" clubs. They are stong on patriotism, public service, and caring for fellow members who are experiencing hard times.	2966
V.F.W. – Ladies Auxiliary	Member of the Ladies Auxiliary to the Veterans for Foreign Wars	Since 1914 the Ladies Auxiliary to the Veterans of Foreign Wars of the United States has worked to ensure that America's veterans will not be forgotten and those who need assistance will get it.	2752

The symbolism of gravestones tells us a great deal about the people they memorialize. These symbols inform us of a person's religion, ethnicity, social membership, occupation, personality and views on the afterlife. If studied closely, St. Ambrose provides great insight into the individuals that rest there.

Epitaphs

Epitaphs are simple poems or sayings carved into a gravestone to memorialize the deceased. This form of remembrance is also a part of the cemetery's history. Epitaphs have been used to memorialize the deceased by both Greek and Roman cultures and probably older cultures as well. The term "epitaph" is of Greek origin, being derived from *epi-* for "at or over" and *taphos*, for "tomb or funeral rites." Epitaphs many times provide clues about the deceased such as whether they were a mother or father, how they died, how they lived their life, and what their personality was like. Both verse and prose are commonly used in epitaphs.

St. Ambrose Cemetery contains several interesting epitaphs. Most of these occur on older gravestones giving insight into the changing thoughts on death throughout the cemetery. Below is a list of some of the epitaphs found within St. Ambrose Cemetery. Several others can be found throughout the cemetery upon further investigation including several gravestones with the common epitaph of "Gone but not forgotten."

James C. Croghan
B. Mar. 13, 1852 D. July 19, 1900

Fear the Lord, and
serve him in truth
with all your heart,
for consider how
great things He
hath done for you. – I Samuel

Oscar Stanley Rewman
B. 8th October, 1888 D. 6th July, 1891

His mother is with him.

Frances O. Rewman
B. 17th September, 1859
D. 2nd June 1899.

A noble woman and loving wife.

Amy Irene Edna
Daughter of
Mr. & Mrs. W.J. Martin
Died August 21, 1902
of scarlet fever.
Aged 5 Yrs. 2Mo. 10da.

There was an angel hand in heaven
That was not quite complete
So God took our darling Edna
To Fill the vacant seat.

Alan McGillivray
B. 1853 D. 1929

Life's work well done.
He rests in peace.

In Loving Memory of
Henry Rosenkranz
B. Oct. 14, 1846 D. Jan. 13, 1919

A precious one from us has gone.
A voice we loved is stilled;
A place is vacant in our home,
Which never can be filled.

Peter Oneill
B. 1836 D. 1894

Teresa Oneill
B. 1845 D. 1931

There is no death an angel form
walks o'er the earth with silent tread
he bears our best loved ones away
and then we call them "dead."

Mary C.

Wife of

_ Nelson
B. July 4, 1847 D. Apr. 12, 1898

Sleep in Jesus
We shall sleep but not forever
In the lone silent grave, blessed
be the Lord that taketh, blessed
be the Lord that gave.

John Gillespie

To him we trust
a place is given,
Among the saints
with Christ in heaven.

Some of the more interesting epitaphs could be used in the interpretive program of the cemetery through inclusion in a walking tour of the cemetery. Monuments with unique epitaphs should also be given some priority when developing a conservation program.

Marker Preservation Treatments – Recommendations

Overall, there are only a small number of monuments that are currently in a fallen state and almost all are small footstones. There are a significant number of monuments that do require some type of repair or conservation treatment however. As discussed in the Methodology above, each maker was assessed during the documentation phase of the master plan and recommendations about conservation treatments provided. The following information expands upon and details repair methods, conservation treatments, cleaning processes and general handling of the cemetery's sensitive historic artifacts.

When conservation of monuments is necessary, there is a philosophical difference in the approaches to preserving historic cemeteries. The first approach is to preserve the integrity of the site as a collection of grave memorials placed at the site. The other approach is to preserve the integrity of the individual gravestones sometimes including their removal from the site for safekeeping to prevent theft and further damage by natural elements. It is this author's opinion that monuments shall remain in the cemetery and be repaired or conserved as quickly as funds allow. The removal of monuments from a cemetery for "safekeeping" also removes the original intent of memorializing a gravesite. Many times, the monument's "safe" storage can last longer than expected or intended. This can lead to the monument's misplacement over time.

Fragment Handling and Storage

If there is a need to store monument fragments, they may be able to be placed in a temporary structure on or immediately adjacent to the cemetery. If this is not possible, it may be possible to bury the fragments to keep them out of view of potential vandals or souvenir hunters. Only fragments comprised of sound stone should be buried below grade. When buried, a fragment or fallen marker is protected from theft and further damage by careless breakage. When buried only a few inches below ground, recovery using a soil probe is safe and easy. Good documentation is needed about the location of the fragments for future unearthing and repairs.

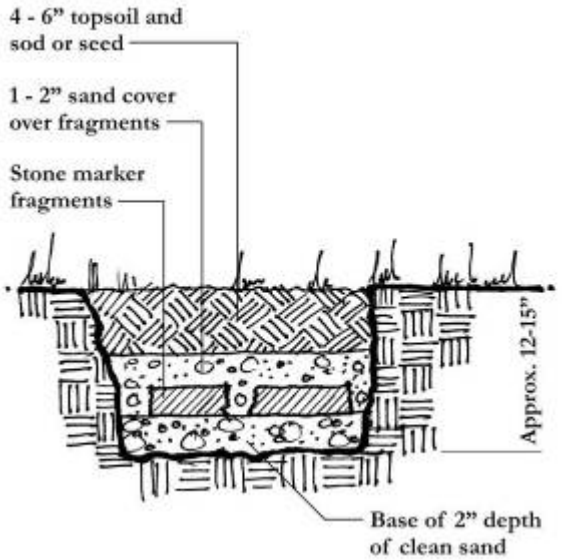
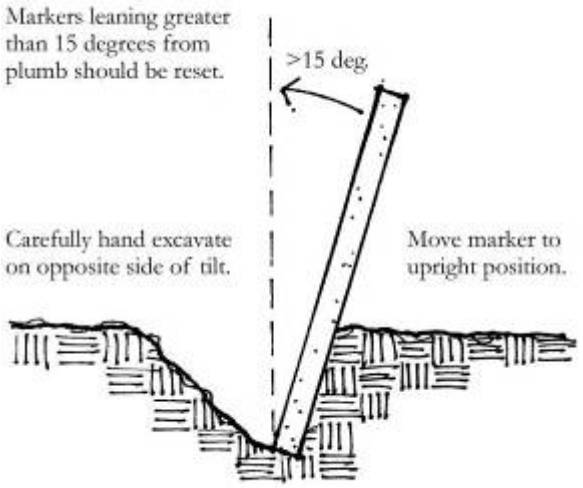


Figure 2.6 – Burial of marker fragments below grade for safekeeping.

Unidentifiable fragments should be buried at a known, common location within each plot such as next to a headstone or in a specified corner of each plot. The same location should be used consistently to aid in recovery of the fragments when a conservation project proceeds. This is an effective procedure that a volunteer group could accomplish. Figure 2.6 and the procedures listed below demonstrate the proper techniques for on-site storage of stone marker fragments.

1. Document the fragments' locations using field measurements and photography. A



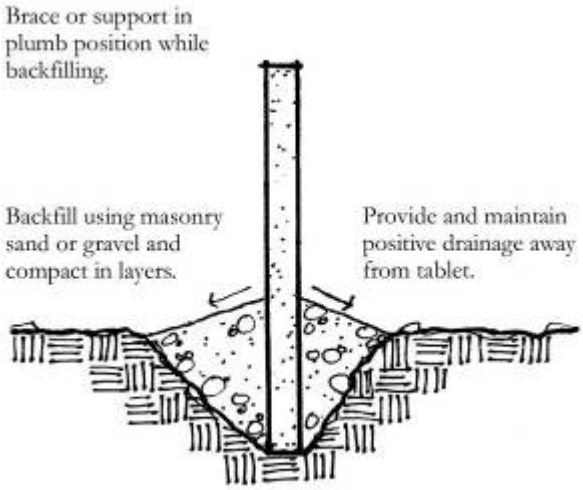


Figure 2.7 – Correcting tilted slab (tabletstone) markers.

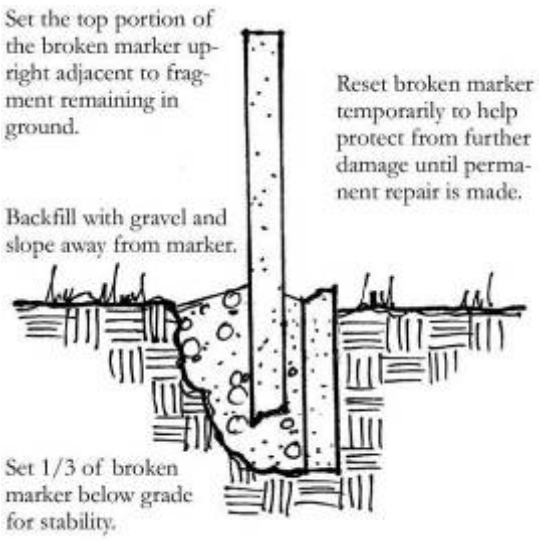


Figure 2.8 – Temporary resetting of broken tablet until permanent repair can be made.

quick field sketch of the plot and fragment locations would be also very useful.

2. Dig a hole 10 to 15 inches deep, depending on the thickness of the stone. The hole should be big enough in area to allow the stone to lie flat in the hole with a few inches clear all around the stone.

3. Place about two inches of clean, well-graded sand in the hole to provide good drainage. Level and lightly tamp the sand to provide a solid setting bed for the fragments and to support any irregularities in the stone.

4. Gently place the stone face up on the sand bedding.

5. Cover the stone with another 1-2 two inches of sand to help prevent staining of the stone from soil. Then add approximately 4-6 inches of soil. Sod or seed the bare patch to restore the turf grass.

6. Additional fragments might be found by soil probing using a pointed steel rod in the area around the grave.

Monument Resetting

One of the most common types of markers in historic cemeteries are simple stone slab markers. In St. Ambrose, these types of markers are almost exclusively used as footstones. In the cases where markers have been broken at ground level, severely tilting (greater than 15˚ from vertical), loose, or other fallen markers, these monuments should be reset permanently (Figure 2.7) or at a minimum temporarily (Figure 2.8) until a permanent repair can be made. The resetting of fallen or severely tilted parkers is on of the most important visual impressions that a cemetery is being watched over and is well cared for. Proper and timely maintenance not only helps in the preservation of the historic fabric of the cemetery, it helps deter vandalism.

In St. Ambrose Cemetery, the most probable causes of tilting monuments are due to the steep terrain which causes the monuments to shift over time. Other factors in tilting markers within the cemetery may include soil erosion, frost heave, tree root disturbance, adjacent mature tree loss, subsidence and sunken caskets adjacent to the

monuments. Severe marker tilting may cause damage to the stone through breakage due to its own weight or careless maintenance workers or visitors.

When considering resetting a tilting or sunken stone, only a stone whose inscription is noticeably obscured by its sunken state or a stone at risk of being broken or falling due to its extreme lean should be considered for resetting. Also, stones that are loose or lying flat on the ground should also be reset. Many times footstones have been placed near the headstone to ease grounds maintenance. These footstones should be reset in their original locations. Stones with minor tilts are better left untouched.

After deciding that resetting a stone is necessary, the next step is determining how fragile the stone is and whether resetting is worth the risk due to the possibility that a stone could be broken or damaged during resetting. Many stones are prone to internal fractures that may not be apparent during an initial survey. When these stones are moved, they are prone to break at the internal fractures at the lightest impact or stress causing additional conservation issues and costs. An experienced stone conservator will be able to advise whether a stone is a good candidate for resetting.

Resetting Simple Tabletstones:

1. Determine if the stone is stable enough for resetting. If necessary, consult an experienced stone conservator for an expert opinion.

2. Remove the earth from the backside of the marker (the uncarved side) to prevent damage to the face of the marker. If stone is leaning backward, it may not be possible to remove earth on the backside of the marker. If this is the case, carefully remove soil from the front of the marker staying about 2-3 inches away from the face of the marker when digging. Use hand trowels to remove remaining soil near the marker.

3. In most cases, you should expect to find 1/3 of the stone's total height below grade and possibly more if it has sunken over time. Stones can easily weigh 500 pounds and lifting equipment should be used carefully.

4. Once the stone is completely out, lay it on the ground carefully (preferably on a wood palette or a series of 2x4 pieces of lumber). This will keep it off of the ground and help it dry out if the stone is saturated with ground moisture.

5. The hole should be leveled and a setting bed should be prepared for the stone to rest on. This should be comprised of a highly compacted gravel layer or a small footing of oversized stone material or concrete. The stone should not be placed directly into concrete.

6. If setting in concrete, a slot should be made larger than the stone to accept the stone tablet. Use polystyrene board to create the slot in the concrete. Once the concrete has cured, the polystyrene can be stripped out and the slot will be ready to accept the tabletstone or tenon.

7. If possible, the concrete base should be located a minimum of 1-2 inches below the final finished grade at the lowest side of the monument to reduce the visual impact on the cemetery.

8. Use a soft limestone grout to point the gap between the stone and the concrete base. A monument should **never** be set directly in concrete;

The Herman Arntz monument as it existed in February of 2005. The monument was sunken and severely tilted backward.

The Herman Arntz monument in 2007 after conservation treatments including resetting, cleaning and stone repair mortars.

this is especially true of softer stones such as marble, limestone and sandstone.

9. The stone should be plumbed and secured in place. The bottom half of the hole should be backfilled with a mixture of sand and pea gravel. A well draining gravel mixture can also be used. This will help facilitate drainage away from the stone surfaces. Compact in levels as the hole is filled being careful to not damage the stone.

10. Fill the remainder of the hole with soil, tamping again in layers as the hole is filled.

11. Grade the top surface away from the stone in all directions and reseed or place salvaged sod around the monument. Another option would be to plant low groundcovers around the monument to reduce maintenance immediately adjacent to the monument.

Resetting Multi-segment Monuments

1. Multi-segment monument resetting may be best handled by a monument setter depending on the size and complexity of the monument.

2. Begin by separating the monument if the segments are loose or unstable.

3. Create a level, stable footing for the monument's base to rest on. This can be comprised of compacted gravel, oversized stone material or concrete.

4. Repair the monument's primary base as needed. Many times the base may have areas of stone that is broken or deteriorated. This is common on slotted bases. Whenever possible, the original stone should be repaired rather than replaced using an appropriate stone patching mortar. Jahn restoration mortars are an excellent choice for this application.

5. Place the base on the footing material and ensure it is level in both directions.

6. Replace any corroded pins with new stainless steel pins. Set the new pins into the stone with anchoring mortar or epoxy material which is compatible with the stone material.

7. Rebuild the monument sections using monument setting compound checking plumb for each section until the monument is completely rebuilt.

<u>Stone Conservation Measures</u>

In addition to repairing fallen, loose and tilting monuments, the stone monuments within St. Ambrose have additional needs such as stone cleaning, removal of biological growth, stone consolidation and the use of micro injection

grouts. Each monument will have its own individual needs depending on the type of stone, the quality of stone, the degree of degradation and/or damage and the integrity of previous repairs. Each treatment must be carefully considered and evaluated for its overall cost/benefit ratio and the overall effectiveness in preserving the individual resource.

The marble headstone and limestone base at the Demers gravesite would be a good candidate for cleaning.

The John Psotta monument prior to cleaning. This monument was included in a marker cleaning workshop in 2005.

Cleaning of Soiled Stones

A large number of stones within the cemetery would be suitable candidates for cleaning. This suitability is determined by the following factors: 1) condition of remaining historical/genealogical data, 2) type of stone to be cleaned, and 3) stability of the stone. Where the stone's inscription is completely eroded and the face does not have any legible lettering or designs, the stone should be placed in a low priority conservation category. If a stone appears to be unstable or loses particles or flakes at the touch, the stone should not be cleaned due to the potential for irreversible damage to the stone and its inscription and designs. Some stones may be candidates for cleaning after consolidation treatments depending on the success of the consolidation efforts.

Marbles and limestone will have similar cleaning techniques while granite will have other effective cleaning methods. Each cleaning method should be matched to the type of stone to ensure that the stone is not irreversibly damaged.

Cleaning stone monuments should only be performed by experienced personnel who have been properly trained in stone cleaning practices. The following are general guidelines for cleaning stone grave monuments:

1. Determine the type of stone: marble, sandstone, limestone, slate, etc. Each type of stone will have unique needs for cleaning products and techniques.

2. Determine the type of soiling on the stone: dirt, pine sap, bird droppings, or biological growth (lichens, fungi, etc.).

3. Determine if the stone is suitable for cleaning. Do NOT clean if the stone has cracks, loose or broken pieces, is severely tilted or otherwise unstable. Do NOT clean if grains come off the stone to touch. Do NOT clean if there are underlying hollow layers within the stone (gently tap the stone and listen for hollow sound).

4. Ensure that joints are sealed. If joints are open, first point with soft lime mortar and allow proper curing prior to cleaning.

5. Do not clean stones often. Even the mildest cleaning can remove small particles of stone with each cleaning. As a general rule, stones should not be cleaned more than once every 8 to 10 years.

6. Begin with the least aggressive cleaning method such as just using clean water and a soft, natural bristled brush.

7. Brush the stone free from loose dirt and soiling with a dry, soft bristled brush.

8. Test a small area for stability using water and a soft bristled brush in an inconspicuous area (preferably on the back of the stone).

The John Psotta monument as photographed in November, 2007. Biological growth has not returned in the 4 years since cleaning.

9. If determined stable, pre-wet the stone thoroughly with clean water. Pre-wetting the stone helps prevent staining of the stone due to cleaning chemicals drying on the stone.

10. Beginning at the bottom and working toward the top, clean the stone with the brush in a circular motion. Flush the stone with clean water often as you proceed. This prevents streaking on the stone.

11. When completed, flush the stone thoroughly to remove most surface dirt.

12. If determined necessary, using the same method as above, clean with an appropriate cleaning solution to remove additional soiling and biological growth.

    Prosoco, Inc. provides a variety of cleaning agents appropriate for use on stone. Prosoco's BioWash or 2010 All Surface Cleaner are good candidates for cleaning of lightly soiled stone.

13. The goal is not to get the stone completely clean because a completely clean stone will look out of place in a historic cemetery.

14. Cleaning should only be conducted when seasonal conditions are appropriate and there is no risk of freezing prior to the stone drying. If temperature is above 85˚ F, do not attempt to clean. The stone will dry too quickly and cleaning agents may streak or stain the stone.

This small sandstone monument is a high priority candidate for stone consolidation. Much of the gravestone data has been lost but what remains is in dire need of conservation.

Each phase of work should identify monuments suitable for cleaning to be included in that phase of work. Cleaned monuments should be monitored over the next few years to determine the effectiveness of the cleaning methods and how long it takes for soiling and biological growth to return. Monitoring will help determine a suitable schedule for cleaning for the stones.

Stone Consolidation

Stone is typically one of the most durable materials in the construction industry. Even though they are durable, they are not as durable as once believed. When left in the exterior environment, the stone St. Ambrose Cemetery's stone monuments and walls have been left to weather naturally over the past 130 years. Over time stone deteriorates due to many environmental and natural influences such as the type of stone, quality of stone, air pollution, acid rain, freeze/thaw cycles, soil types, and soil moisture.

A number of stones within the cemetery are showing signs of sugaring, particle erosion, spalling and delamination in various stages. A handful of monuments are in an advanced state of deterioration and have lost most, if not all, of their historical data and are unfortunately lost forever. Stone consolidation helps slow this natural stone deterioration by recreating the stone's natural

This small marble footstone exhibits a simple fracture and should be repaired with stone adhesive and reset as soon as possible.

bonding agents thus slowing the effects of the environment on the stone.

Using the proper product for each type of stone is critical in conserving the stone and not further damaging, staining or permanently scarring the stone. In addition to the type of stone, product selection also depends on the type and extent of deterioration. Effective consolidation efforts require thorough laboratory and in-field pretesting. One company that provides a range of stone consolidation treatments is Prosoco, Inc. in Lawrence, Kansas. They also provide stone cleaning products.

Fracture Repairs

Fractured monuments are generally classified in two ways: simple fractures and multiple fractures. Simple fractures are monuments that have been snapped in one location, commonly at the ground level or just below grade. There are a number of stone adhesives that are available for use on fractured stone. The product used really depends on the stone conservator's familiarity and comfort with a certain product. That being said, the product used should be a non yellowing adhesive. Fresh or clean breaks can use a higher viscosity adhesive because there will be good surface contact between the two stone fragments. When a fracture is more weathered, a lower viscosity (knife grade) adhesive should be used to ensure good surface to surface contact between the two fragments.

Fracture repairs are best performed by an experienced monument conservator or monument setter. The following is the process for repairing fractured monuments.

1. Identify the type of stone i.e. granite, marble, limestone, etc. and use an adhesive that is compatible with the type of stone.

2. Try to collect all broken portions of the monument. This may require some soil probing and limited shallow excavation work in the area of the monument. Soil probing using a sharp iron rod works well in finding stones hidden just below the ground surface.

   Many times, the monuments original base is found below grade and also needs repair or replacement. On some monuments, the base was intended to be below grade so further investigation is needed to determine the original setting of the monument and base.

3. Slotted bases should have any remaining stone or the original tenon removed from the base using hand tools or a power cut-off saw with a masonry blade. When using power tools on stone, extreme caution should be used so the base isn't damaged.

4. If the remaining slot is narrower than the tablet in width, a tenon and mortise was used to join the stone and base together. If the tabletstone is sound, a new tenon can be created at the bottom of the stone for resetting.

5. Fractured surfaces need to be cleaned of soil and other debris using water, compressed air, and possibly acetone. This will help provide good surface adhesion of the stone adhesive.

6. Any old adhesives should also be removed carefully using hand tools.

7. The fragments should be arranged on a table or portable workbench to provide proper alignment between the stones.

8. When both surfaces are prepped, new adhesive should be applied following the manufacturer's recommendations. The adhesive should be kept back from the faces of the stone about 1/4 inch to 1/2 inch. Any gaps along the face can be filled using stone mortar colored to match the stone as closely as possible. The stone mortar will also hide the adhesive which tends to darken or change color over time.

9. Carefully adhere the two stones fragments together and align faces and sides until they fit tightly together. Clamp pieces together with a combination of bar clamps and wood slats to prevent the clamps from damaging the stone.

10. Clean away any excess adhesive as soon as possible. Use clean water and a clean sponge to remove excess adhesive before it dries. If necessary, use acetone to remove excess adhesive.

11. Allow the adhesive to properly cure according to the manufacturer's recommendations and then point any gaps with stone restoration mortar. Jahn M125 Thin-set mortar may be a good product for this application. Jahn products are available from Cathedral Stone Products, Inc. of Hanover, Maryland.

Monument Recommendations

The following are recommendations for the St. Ambrose Cemetery Monuments:

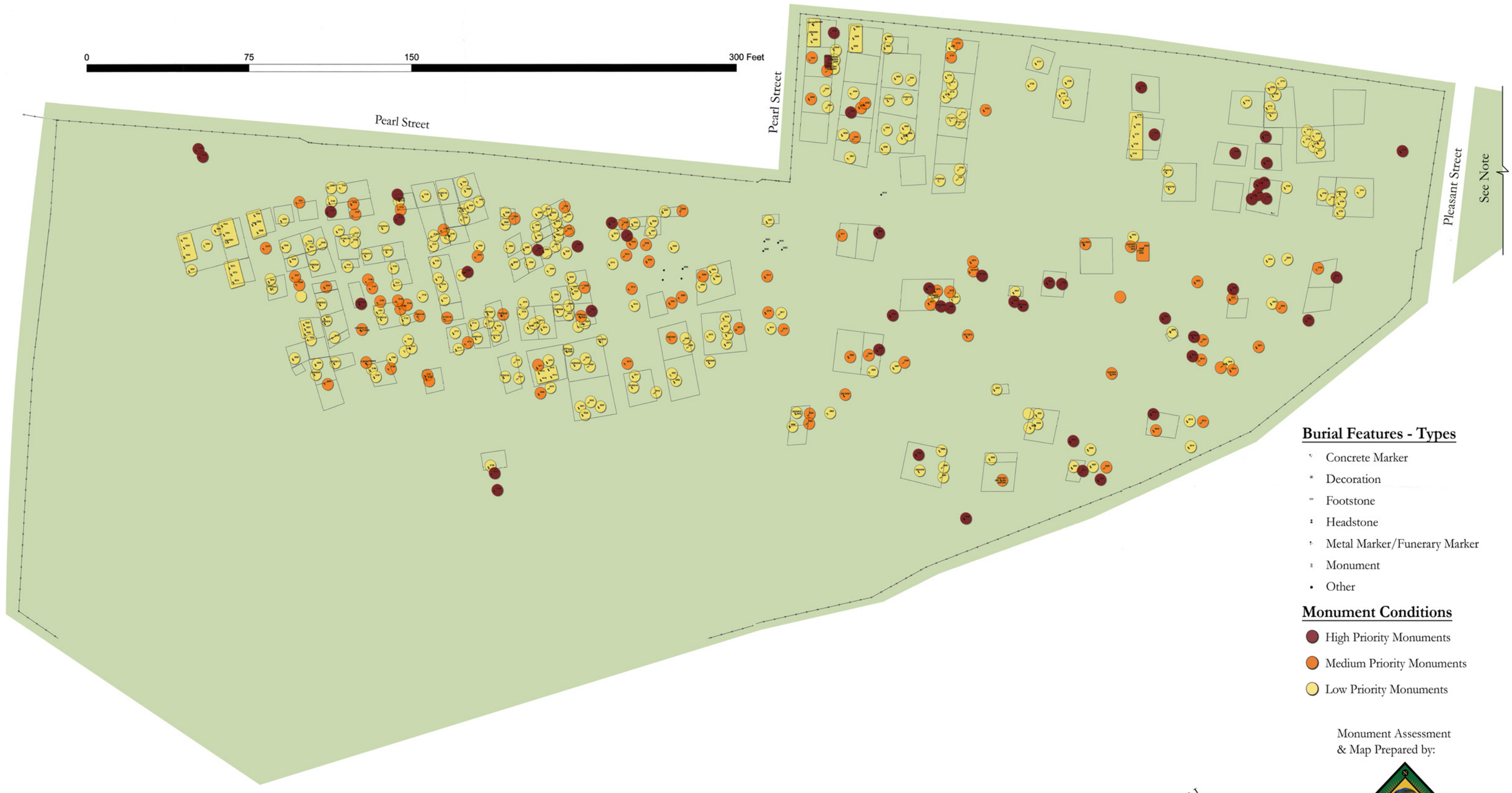
1. Provide appropriate conservation treatments for monuments designated as High Priority as soon as possible to help preserve the historic integrity of the cemetery.

2. Provide repairs, stabilization measures and appropriate conservation measures for monuments designated as Medium Priority as soon as funding becomes available. Until funds become available, monitor the continued degradation of the monuments to help prevent major losses.

3. If Medium Priority monuments are within plots that are having other historic resources (i.e. retaining walls, ironwork) repaired or restored, repairs and/or conservation treatments should be completed in conjunction with other conservation work.

4. The Cemetery Sexton, in conjunction with the Historic Preservation Office, shall develop a program to regularly monitor the conditions of the cemetery's monuments to help prevent ongoing deterioration or major losses of historic fabric. A monument assessment performed no greater than every three (3) years should be adequate to monitor the conditions within the cemetery.

5. The cemetery's monuments should be checked on after major storm events such as unusually heavy snow falls, high winds, major lightning storms and other significant weather. Damage to monuments from storm events should be repaired as soon as possible.



Burial Features - Types

- Concrete Marker
- Decoration
- Footstone
- Headstone
- Metal Marker/Funerary Marker
- Monument
- Other

Monument Conditions

- High Priority Monuments
- Medium Priority Monuments
- Low Priority Monuments

Monument Assessment & Map Prepared by:

DREAM DESIGN INTERNATIONAL, INC.

Existing Monument Priority Ratings

Note: Full area below Pleasant Street is not shown on map. Exact boundary is unknown and further investigation is needed to determine extents of cemetery.

St. Ambrose Cemetery

Deadwood, South Dakota

Retaining Walls

Retaining walls are a very dramatic and necessary feature within St. Ambrose Cemetery. Due to the steep slopes at the cemetery, retaining walls were necessary to create level gravesites suitable for family plots. Several materials and construction techniques comprise the historic retaining walls and include rubble stone, cut stone, concrete, concrete block masonry and brick masonry. Some of these materials and construction techniques may require highly specialized craftsmanship to replicate during the conservation process. The following text discusses the various materials, techniques, conditions, and gives preliminary recommendations about their repair and conservation.

Process for Documentation

Several site visits were made to document the existing retaining walls at the cemetery. Prior to our visits, base maps were assembled using existing data obtained from the City of Deadwood. This information was printed out at a certain scale and used in the field to verify the wall locations. During the site visits, each cemetery plot with a retaining wall was numbered, measured, photographed and assessed as to their condition. The assessment included the dimensions of each wall of the plot (length, thickness, height), the type of wall material, the condition, possible causes of deterioration, recommended corrective actions, and additional remarks.

Wall Types and Materials

As discussed previously, there were several different types of retaining walls and several materials used to construct them. Cut stone, rubble stone, cast-in-place concrete, concrete block, and brick were all used throughout the cemetery. Along with the various materials, there were also several variations on the construction techniques used. For instance, cast-in-place concrete walls in the cemetery have several different finishes on them. They are as follows: smooth trowel finish, board formed finish, rippled finish with tooled joints (this resembles rusticated stone), stucco finish, and there is even a plot which has colored concrete.

Along with the various concrete techniques, there are several other techniques such as dry laid stone, mortared cut stone, mortared field stone, concrete masonry units (CMU's), and mortared brick. Figures x.x – x.x display some of the various materials used for the walls.

History of the Cemetery's Retaining Walls

There appears to be a very distinct timeline relationship to certain construction techniques used on the retaining walls. Similar to the retaining walls within Mt. Moriah Cemetery, the earliest walls at graves dating in the late 1800's and very early 1900's are primarily comprised of stone walls either dry-laid or cut stone with mortared joints. During the 1920's and 30's it appears the popular choice of retaining walls in the area were concrete walls the rippled concrete look (rusticated stone replication). After that period, it appears that almost all walls were constructed of cast-in-place concrete with smooth finishes. It should be noted that smooth concrete finishes appear on gravesites throughout many different years, early and late. The concrete walls at early graves may have been added to remedy erosion problems or preserve the integrity of the plot.

In addition to those listed above, concrete block, brick and stone cribbing were also used in a few locations throughout St. Ambrose Cemetery. Concrete caps

Photo 3.1 - Vegetation Forces

Photo 3.2 – Freeze-Thaw Deterioration

are also prevalent throughout the cemetery added during the construction of the original wall or added after to help reduce plot maintenance.

Retaining Wall Condition Ratings

During the inventory and assessment of the retaining walls, photos of each wall were taken and consequently, each wall measured and rated for its condition. The condition rating were based on the degree of deterioration, stability, and repair needs and listed as good, fair or poor. Comments were also made about the possible causes of deterioration or failure, what specific repairs are needed to restore the wall and other recommendations.

Several factors influenced the wall ratings including quality of construction, materials used, missing elements, damage by external factors such as water, freeze/thaw processes, plant material impacts, settling, and overall visual appearance. Walls of the same material are used for comparison to make the distinctions between the ratings easier. The Photo Inventory Sheets included at the end of this report document each wall rating in the Comments section of the form.

Concrete:

The first step in concrete repair is to determine the cause of failure. The most common modes of failure for concrete are inadequate design and deterioration. Many times the design may have been adequate at the time of installation, however, became inadequate due to unforeseen forces such as vegetation. As a tree grows next to a concrete wall it can easily move or break the concrete as shown in Photo 3.1.

In these cases the vegetation should be removed before repairs are made. Deterioration of concrete can be caused by several different sources such as rebar corrosion and freeze-thaw.

Deterioration due to rebar corrosion will occur if water and free oxygen are present and the surface of the rebar begins to rust. When this happens the outer surface begins to expand, creating large internal bursting stresses that can crack the concrete. Once cracked, the steel becomes even more exposed to water and free oxygen, increasing the potential for rust to form. This type of deterioration also commonly occurs at connection points of ironwork to concrete walls.

Freeze-thaw deterioration is commonly associated with inadequate air-entrainment in the concrete. There is a limited amount of air that is naturally entrained in concrete by the mixing process. Additional air can be entrained in the concrete with chemical admixtures. Once the concrete has hardened these

Photo 3.3 - Surface Spalling

Photo 3.4 – Small Crack

Photo 3.5 – Large Crack

air voids provide room for water to expand during freezing. If there are not enough voids in the concrete, and subsequently no room for the water to expand, the internal bursting pressures can begin breaking down the mortar in the concrete. After time what is left is sand and aggregate. See Photo 3.2.

After determining the cause of concrete failure the second step is to remove any loose and/or contaminated concrete. The least destructive tools possible should be used so that damage to the remaining concrete does not occur.

Once all deteriorated concrete had been removed the new surface needs to be prepared properly so that the patch will be effective. The prepared surface should be free of dust, loose material, rust or any other possible contamination. The surface roughness is also critical. The patch will not bond well to a smooth surface. Depending on the amount of concrete that was removed there may be a need to provide dowels into the existing concrete. Surface spalling and small cracking may not require dowels as shown in Photo 3.3 and 3.4 respectively, whereas Photo 3.5 shows a large crack that would be an appropriate location for dowels. The dowels should be drilled and epoxied into the existing concrete with high-strength epoxy a minimum of the thickness of the wall. The dowel should extend into the new patch an equal distance. Depending on the extent of the patch, additional reinforcement may be necessary beyond the dowels. Immediately prior to placing the patch material the bond surface of the concrete should have a saturated, surface dry (SSD) condition. SSD means that the surface is wet, but has no standing water. If multiple layers of patch material are required a SSD condition is required between each new layer. The finish of the concrete should match as closely as possible to the original surface to provide the desired, original look.

The next step is proper curing of the fresh concrete. Proper curing is essential and if done properly will provide reduced shrinkage cracks, maximum strength, reduced permeability from future

Figure 3.6 – Wall Replacement Example

Figure 3.7 – Stacked Dry Stone Wall

contaminates and create the strongest bond. For vertical surfaces a curing compound applied to the surface and then covered with a plastic sheet is usually the most effective. Curing compounds should not be used on intermediate layers of multi-layered repairs. Seven days of wet curing is preferred, however a minimum of three days may be used if there are time constraints.

If a portion of wall needs to be completely replaced the new concrete wall should match the existing in height and width as well as surface texture. The new concrete should have the appropriate amount of steel rebar to satisfy the current code requirements set forth by the American Concrete Institute (ACI) for retaining walls.

A free-draining material should be placed behind the wall whenever possible. Also, weepholes at the base of the wall should be installed to allow water to drain freely from the backside of the wall. The weepholes should be covered with a screen or filter on the backside to prevent clogging. Photo 3.6 shows a portion of wall that needs to be completely replaced.

<u>Stacked Dry Stone:</u>

Stacked dry stone walls are typically less than three feet in height and are not intended to hold back large amounts of soil. If the soil being retained does not allow water to flow freely there is a higher probability the wall will bulge out or fail as shown in Figure 3.7. Steps that can be taken to reconstruct this type of wall are as follows:

1. If the wall needs to be completely disassembled a concrete footing or large stone footing should be incorporated approximately 1'-0" below the finished grade if possible.

2. If possible use the original stones in the reconstruction of the wall.

3. Use larger stones at the base, gradually decreasing the wall depth at a rate of 2" for every 12" rise. The base of the retaining wall should be at least half of the wall height.

4. At any given elevation the stone size should be approximately the same.

5. The stone should be stacked in a running bond. That is, the stone joints should not line up vertically with the stones of the courses above and below. Ensure that the stones run level left to right.

6. Backfill after each course is complete. If possible, use a free-draining material behind the wall to prevent excessive water pressures.

7. If possible, provide "deadman" stones at approximately every 16 square feet of wall. Deadmen stones are relatively long stones that are placed perpendicular to the wall and help tie the wall into the material being retained. These will need to be placed very carefully depending upon proximity to graves.

8. The wall should be capped with a large capstone. The capstone should be flat and have a significant mass. This will help hold the stones beneath it and provide a finished look to the retaining wall. As always, the original look of the wall should be maintained.

Figure 3.8 – Uneven settlement of brick wall with mortar

Figure 3.9 – Uneven Settlement of Stone Wall with Mortar

<u>Stacked Brick, Block or Stone with Mortar:</u>

Initial assessment of the wall is the first step in determining the extent of repairs needed. If the wall is not aligned within acceptable tolerances or the wall has shifted, settled or portions of the wall are missing, repairs will be necessary. Figures 3.8 and 3.9 are examples of brick and stone walls that have settled. If repairs are necessary, identifying the cause is important to help prevent future problems. The following steps are guidelines for repairing stacked brick, block or stone with mortar.

1. Check for missing components of wall. In walls with cut stone, if some stones are missing, note the location in the wall and accurately measure the piece for replacement. Photographs of existing elements should be incorporated into the documentation process.

2. Check all wall components for stability and alignment. If any components are loose or misaligned, they may need to be documented and numbered for removal and resetting.

3. If the wall needs to be completely disassembled a concrete footing should be incorporated approximately 1'-0" below the finished grade if possible.

4. Where partial deterioration of stone occurs, masonry features may be repaired by patching with a stone mortar, piecing in, or consolidating the masonry using recognized preservation methods. If using a stone

mortar, the Jahn M70 or M70 Self Cure (SC) patching mortars would be excellent choices for limestone and sandstone wall components.

5. The new mortar should match the historic mortar in color, texture and tooling. Matching the sand is extremely important when attempting to match color and texture. The new mortar must have greater vapor permeability and be softer than the brick, block or stone that it is in contact with. This will prevent damage to the units themselves by allowing the mortar to absorb the stresses that come with expanding and contracting. The surface of the masonry units should be saturated, surface dry before mortar is placed.

6. Free-draining material should be placed behind the wall whenever possible. Also, weepholes at the base of the wall should be installed to allow water to drain freely from the backside of the wall. The weepholes should be covered with a screen or filter on the backside to prevent clogging.

7. Walls should be covered with burlap or plastic to keep the walls damp and protected from direct sunlight for at least three days. Periodic wetting of the surface will be as often as every hour initially and gradually decreasing to every three or four hours depending on conditions. This can be accomplished with a hand sprayer with a fine nozzle.

Photo 3.10 – Masonry Wall with Different Levels of Repair

Photo 3.10 shows a masonry block wall with different levels of repair needed. The far wall will need to be completely reconstructed while the close wall may only need the mortar repointed. If the brick, block or stone wall only needs repair to the mortar the following steps should be followed.

1. Joint preparation is extremely important. All deteriorated mortar should be hand raked from joints. The use of power tools should never be used due to possible damage to wall components. The old mortar should be removed to a minimum depth of 2 to 2-1/2 times the width of the joint to ensure an adequate bond and to prevent mortar "pop-outs." For most brick joints, this will require removal of the mortar to a depth of approximately ½ to 1 inch. For stone masonry with wide joints, several inches of the mortar may need to be removed. Any loose or disintegrated mortar beyond this minimum depth should also be removed. Extreme care should be taken not to damage the brick, block or stone.

2. Mortar preparation is extremely important. The new mortar should match the historic mortar in color, strength, consistency, material composition, texture and tooling. Matching the sand is extremely important when attempting to match color and texture.

3. Use a mortar composition of 2.5 parts locally available aggregate and 1 part hydrated lime. Only add enough water to make the mixture easy to work with. On historic stone, the use of Portland cement should be avoided, if possible, due to the possible damage it may cause to softer masonry materials.

4. The new mortar must have greater vapor permeability and be softer than the brick, block or stone that it is in contact with as well as the remaining mortar. This will prevent damage to the existing structure by allowing the new mortar to easily expand and contract, absorbing the associated stresses. The surface of the masonry units should be saturated, surface dry before mortar is placed.

5. Where the existing mortar has been removed to a depth greater than 1 inch, the new mortar should be compacted in several different layers of approximately ¼ inch per layer. It is important to allow each layer to harden before the next layer is applied. This will minimize shrinkage. There should be a SSD condition before each new layer is applied.

6. When the final layer of mortar is thumb-print hard, the joint should be tooled to match the historic joint. Proper timing is critical to ensure uniform color, appearance and closure of the mortar against the masonry units. It is best to recess the final mortar slightly from the face of the masonry if possible.

7. Walls should be covered with burlap or plastic to keep the walls damp and protected from direct sunlight for at least three days. Periodic wetting of the surface will be as often as every hour initially and gradually decreasing to every three or four hours depending on conditions. This can be accomplished with a hand sprayer with a fine nozzle.

Retaining Wall Recommendations

Preventive maintenance of existing walls should be a high priority for preserving and protecting the integrity of the retaining walls and the gravesites at St Ambrose Cemetery. With proper, regular maintenance, the retaining walls should be able to withstand the tests of time. A maintenance schedule and checklist should be set up and performed on a yearly basis. Some of the items on the schedule may include sealing of cracks in concrete, backfilling of soil along bases and possibly backs of walls, reseeding adjacent lawn areas, realignment of stone members and caps, and tuckpointing of mortar joints. Specialized work to retaining walls should only be done by qualified craftsmen.

Appropriate building materials and sound construction techniques must be used when repairing or rebuilding retaining walls. New concrete should have reinforcement bars placed in it as recommended by a structural engineer and shall have properly installed isolation and contraction joints. Concrete mix design is critical in the construction of walls that will last over time. The use of appropriate aggregate sizes is also a very important factor in the overall stability in concrete walls.

The following list of recommendations and priorities regarding retaining walls has been developed:

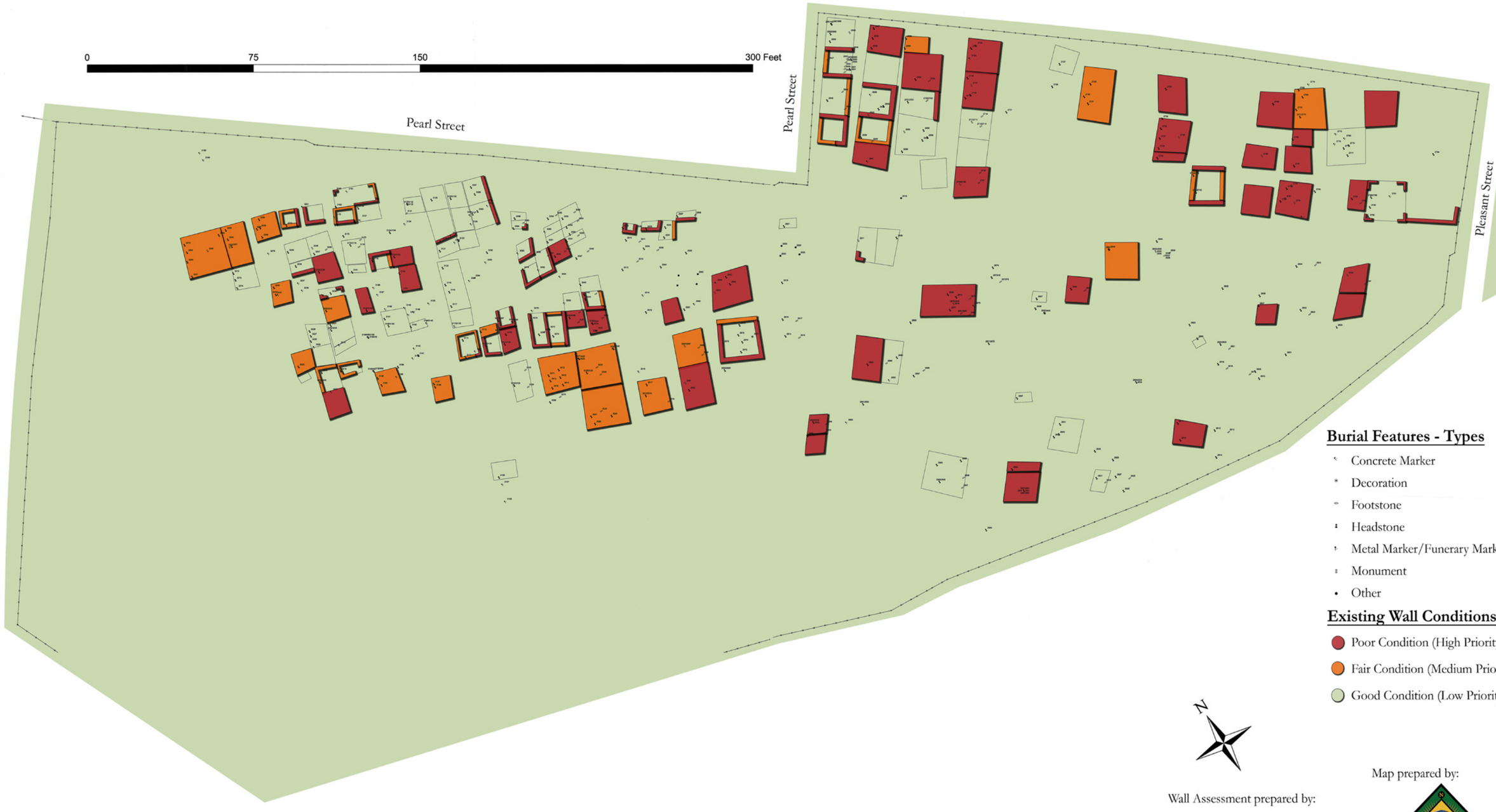
8. Stabilize and repair all retaining walls listed as “poor” in appropriate phases of preservation work. If possible, the site should be broken down into areas of work to help organize the site and reduce overall impact of preservation activities. Walls listed as fair within each area of work should be carefully considered for repairs and if possible be included within that phase of work.

9. Priority should be given to plots that contain other elements listed with high priority needs such as ironwork and monuments. When completed, each plot will have all of the high priority items completed and will be restored as a whole.

10. After all of the high priority walls have been completed, a project to repair the medium priority walls should be developed and implemented.

11. Retaining walls listed as “good” (low priority) should continue to be monitored on a yearly or biennial basis to help prevent serious deterioration of these walls.

12. A maintenance program should be developed to provide needed maintenance on the walls such as mortar pointing, caulking of cracks, replacement of stucco, monitoring footing stability, restoration of grades surrounding walls, concrete repair, and other wall related issues.



Burial Features - Types

- Concrete Marker
- Decoration
- Footstone
- Headstone
- Metal Marker/Funerary Marker
- Monument
- Other

Existing Wall Conditions

- Poor Condition (High Priority)
- Fair Condition (Medium Priority)
- Good Condition (Low Priority)

N

Wall Assessment prepared by:

Albertson Engineering Inc.

Map prepared by:

DREAM DESIGN INTERNATIONAL, INC.

Retaining Wall & Plot Coping Conditions

Note: Full area below Pleasant Street is not shown on map. Exact boundary is unknown and further investigation is needed to determine extents of cemetery.

St. Ambrose Cemetery

Deadwood, South Dakota

Ornamental Iron Fencing

There are fifteen examples of ornamental ironwork adorning gravesites within St. Ambrose Cemetery. In addition to the fifteen plot surrounds, an elaborate ornamental iron arch and set of gates welcomes the visitor to St. Ambrose Cemetery and two Stewart Ironworks' gates are located along the Pearl Street edge of the cemetery. The ironwork displayed represents the Victorian Era in which St. Ambrose was established and the iron plot surrounds include ornate cast iron, wrought iron and woven wire fence panels and other ornaments.

Iron Work Manufacturers

A handful of ironwork manufacturers are represented in the collection including Stewart Iron Works of Cincinnati, Ohio; E.T. Barnum Wire and Iron Works of Detroit, Michigan; F.A. Colver & Company Up-To-Date Manufacturing Co. of Terre Haute, Indiana; and most likely Sears Roebuck and Company. Several of the fences have no manufacturer's marks so it would be difficult to tell who manufactured the fences. However, it is known that Stewart Iron Works had a 23 year contract to provide fencing and fence components to Sears Roebuck and Company. Other fencing companies also supplied Sears Roebuck with fence materials that were sold under the Sears Roebuck name and appeared in their mail order catalogs. A number of other fence companies may have also been selling and installing fences in the area.

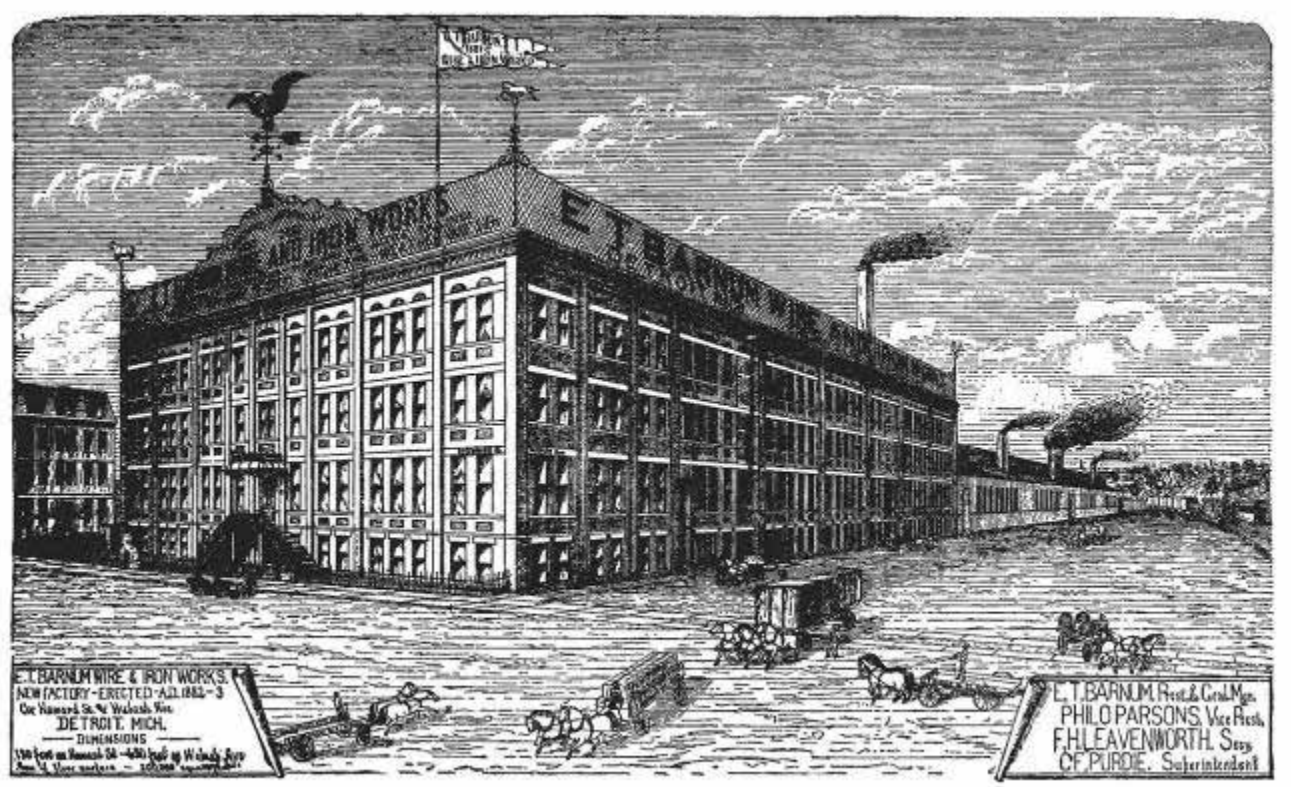
E.T. Barnum Wire & Iron Works
Detroit Michigan

F.A. Colver & Company
Frankfort, Indiana

Up-To-Date Manufacturing
Company - Terre Haute, Indiana

The Stewart Iron Works
Cincinnati, Ohio

E.T. Barnum Wire & Iron Works was incorporated in the spring of 1882 in Detroit, Michigan as written in a New York Times Article. Prior to this date, catalogs dated as early as 1775 for E.T. Barnum Wire Ware were found and include wire plant stands, chairs and other ornamental wire items. Its business quickly expanded and in December of 1883 was reorganized into a broader company. The following spring Barnum Wire & Iron Works built a larger facility on Wabash Avenue in Detroit. Also in the spring of 1884, branch factories and sales rooms were established in Chicago and Windsor [assumed to be Windsor, Ontario]. A book entitled "The History of Detroit and Michigan" published in 1884 states that E.T. Barnum began in 1863 and grew to be the largest wire and iron works manufactory in the world by the mid 1880's shipping all over the United States as well as to



The E. T. Barnum Wire and Iron-Work Manufactory. Erected 1882–1883.

Australia, Africa, Brazil, Canada, England and Mexico. In 1884, they were listed as having "about 600 skilled workmen and … over 100 at the branch concern." They manufactured over 1500 articles including but not limited to wrought iron fencing, iron balcony and steps, fire escapes, bank counter fencing, jail work, wire cloth, weather vanes, iron and brass bedsteads, fountains, vases and wire goods of all sorts.

F.A. Clover & Company was located in Frankfort, Indiana. As written in "A Portrait And Biographical Record of Boone and Clinton Counties, Ind.," published in 1895, machinist Arthur L. Cooper " became associated F.A. Colver under the firm name of F.A. Colver & Company, [established in 1883] which the Excelsior machine works has since been known." The company produced steam engines, boilers, specialty wrought iron and steel fencing, malleable iron cresting and rail work. The company produced over 70 different styles of fences which were shipped all over the United States. F.A. Colver & Company was one of the most important manufacturing institutions in Frankfort, Indiana in the late 19th Century. There is very little more known about the F.A. Colver & Company machine works and it is unknown how long they were in existence.

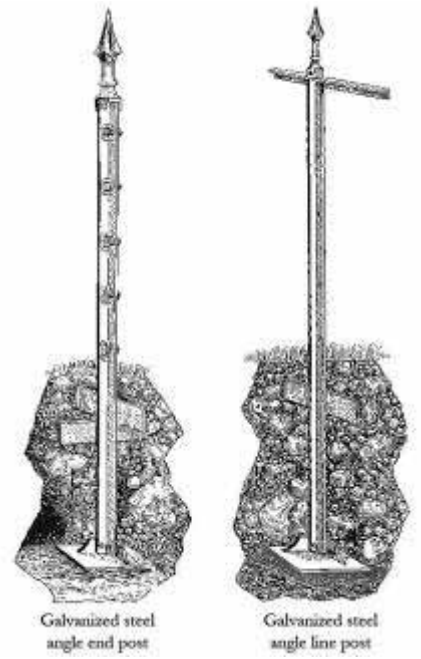
Up-To-Date Manufacturing Co. was located in Terre Haute, Indiana and was organized by Jesse H. Srofe upon his arrival in Terre Haute after he sold his interest in the Kokomo Fence Company in Kokomo, Indiana which he also established. Up-To-Date Manufacturing was a stock based company and was incorporated in 1899. A 1911 mail order catalogue listed a variety of products including a variety of steel and cast iron fence posts, steel picket and woven wire fencing, malleable cresting, pedestrian and drive gates, wire tree guards, window guards, bank counter cages, railings, garden arches and trellises, and fire escapes. It is unclear how long the company remained in business.

A view of the Up-To-Date Manufacturing Company's factory in Terre Haute, Indiana as shown on their 1911 product catalog. Up-To-Date Manufacturing incorporated in 1899.

The Stewart Iron Works was started by the third son of Scottish immigrant, Thomas Stewart. Richard C. [R.C.] Stewart has developed a blacksmith business in the Louisville, Kentucky area and by 1862 had relocated his family to Covington, OH where he established what would eventually be known as The Stewart Iron Works. The company is still in operation today and replacement parts and restoration services are still available for their fencing products.

Sears & Roebuck Company also sold "cemetery fencing" in their mail order catalogs. Cast iron fences and woven wire fences were available in their late 19th Century and early 20th Century catalogs. Much of this ironwork was provided by The Stewart Iron Works who held a contract with Sears & Roebuck for 23 years to provide the company with ornamental iron fencing. Other companies also provided fencing that was sold under the Sears & Roebuck namesake.

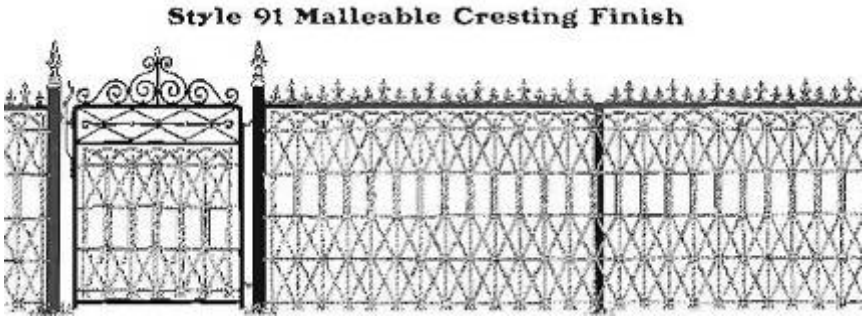
A brief introduction and description of the ironwork companies that are represented could be included as part of the interpretive program for St. Ambrose Cemetery. The ironwork examples found in the cemetery should be included in a walking tour of the cemetery. Each type of ironwork could be indicated on a map and described within the walking tour brochure.



Above is a steel angle end post and at right is a steel angle line post. Both were used in woven wire fences that Up-To-Date Manufacturing offered to its customers in its 1911 product catalog.

<u>Ironwork Issues & Considerations</u>

As a whole, the collection of ironwork within St. Ambrose is fairly stable. However, there are a variety of issues associated with each iron fence. These issues include deteriorating connection hardware, maintenance issues (rust protection and painting), instability caused by retaining wall movement or failure, impact damage from trees or vehicles, deterioration associated with environmental issues, unsecured gates and



Above is an example of Style 91 woven wire fence which was available from Up-To-Date Manufacturing. This style of fence with the "malleable cresting finish" is located on a plot in the center of St. Ambrose Cemetery.

panels, theft and vandalism. To preserve the ironwork collection, all of these issues need to be carefully considered and addressed appropriately during Phase 1 of the implementation of preservation activities.

One of the primary factors in the deterioration of ironwork is rust. When not properly maintained and painted, cast iron and woven wire is extremely susceptible to rust. This can cause irreversible damage to the ironwork and its individual components. While the formation of rust is slow in the absence of water, it is far more rapid when water is present and a layer of hydrated iron oxide (rust) forms on the ironwork's surface. Since rust is permeable to air, the reaction continues to eat away the iron's surface working deeper and deeper into the iron. Unless this rust is removed or stabilized, the rust will continue until the iron is completely destroyed. Even if painted, once a surface has developed rust, it becomes more sensitive to further corrosion.

Another area of concern with ironwork is the connection of the ironwork to stone and concrete walls. Fence posts were commonly set using drilled sleeves with molten lead poured in around the post. Sometimes, posts were set directly into concrete. In either case, water seeping in around the posts or moisture contained in the concrete or stone began the rusting process. The rust expanded greatly causing immense pressures on the stone or concrete and resulted "rust jacking." The destructive force of "rust jacking" causes the stone or concrete to fracture from the pressure and destroys the structural integrity of the iron fence. This is visible on several fences in the cemetery.

Some of the materials for ironwork conservation are still available today from ironwork manufacturers. Much of the stabilization and conservation work will need custom fabrication by a qualified and experienced blacksmith or steel fabricator. Rapid City has a couple of such companies that may be qualified to perform such work. One company was involved with the ironwork conservation efforts at Mount Moriah Cemetery and achieved very acceptable results. During the bidding processes, ironwork companies should be pre-qualified based on their past experience in historic ironwork preservation and restoration.

Ornamental Iron Fencing Recommendations

The following recommendations have been developed for the ornamental iron fencing which exists within the cemetery.

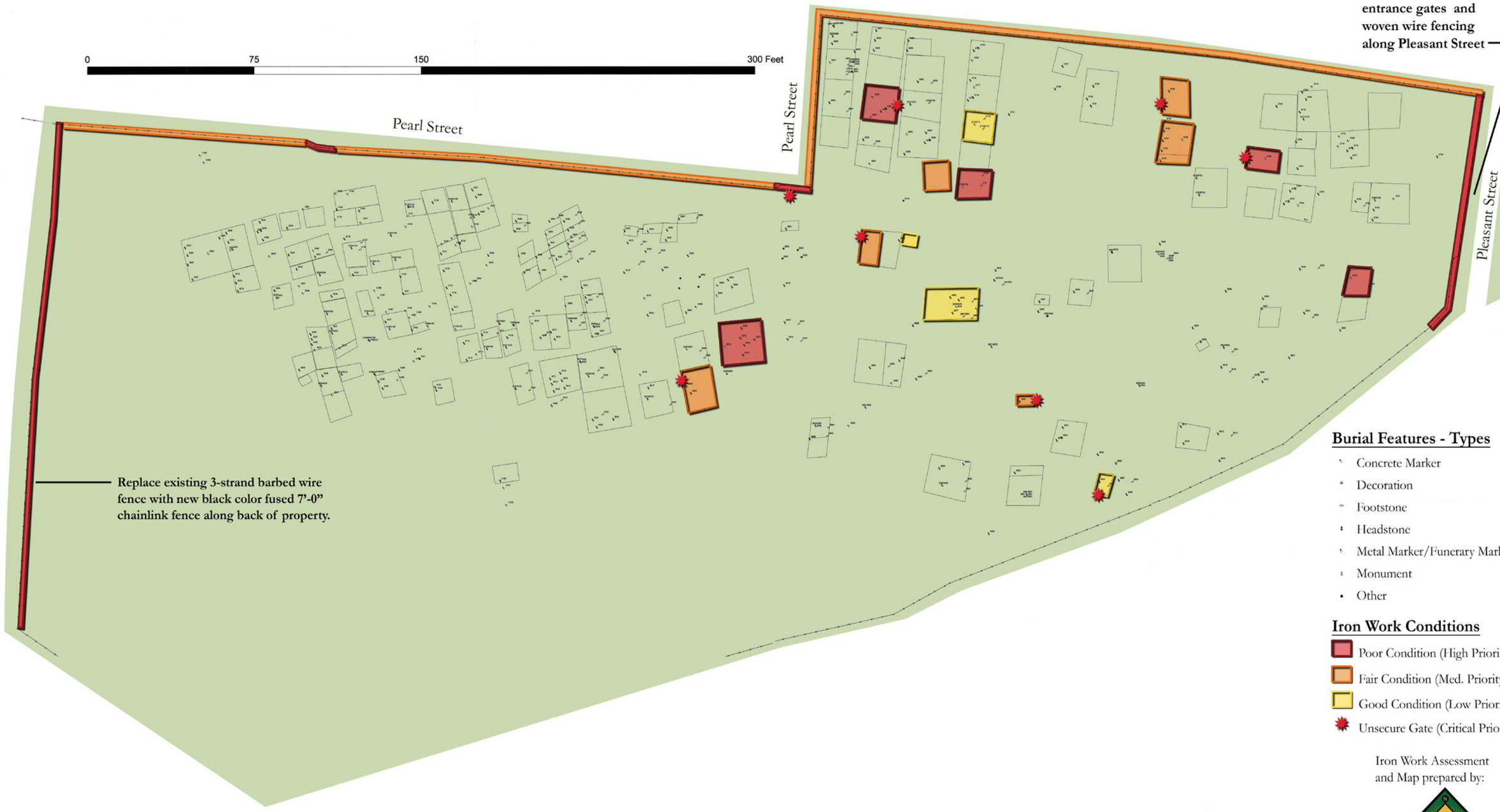
1. All ornamental iron fencing should be repaired, restored, repainted and reinstalled during the proposed Phase 1 Preservation Project.

2. All of the entrance gates (1 on Pleasant Street, 2 on Pearl Street) should be repaired and restored during the proposed Phase 1 Preservation Project.

3. Woven wire fencing along Pleasant Street should be restored during the proposed Phase 1 Preservation Project.

4. After conservation is complete, a program to monitor the conditions of the ornamental iron fencing should be developed to assess the stability, connection integrity and protective coatings of all the ironwork.

5. Any failed protective coatings should be restored as soon as possible. A good layer of paint is the ironwork's primary protection from corrosive rust.



Burial Features - Types

- Concrete Marker
- Decoration
- Footstone
- Headstone
- Metal Marker/Funerary Marker
- Monument
- Other

Iron Work Conditions

- Poor Condition (High Priority)
- Fair Condition (Med. Priority)
- Good Condition (Low Priority)
- Unsecure Gate (Critical Priority)

Iron Work Assessment and Map prepared by:

DREAM DESIGN INTERNATIONAL, INC.

Iron Work Conditions and Priorities

Note: Full area below Pleasant Street is not shown on map. Exact boundary is unknown and further investigation is needed to determine extents of cemetery.

St. Ambrose Cemetery

Deadwood, South Dakota

Landscape Character

Overview

As in most cemeteries, the landscape plantings provide an important role in creating a desirable, relaxing, and contemplative park-like setting. The cemetery's setting can best be described as natural with accent plantings. There does not appear to be any organized planting scheme for the cemetery other than the intended plantings used as memorials at individual family plots. Mature coniferous trees (Ponderosa Pine) are the predominant plant material in St. Ambrose Cemetery and for the most part they should be maintained. The canopy of pines provides a peaceful, natural image for visitors and adjacent neighbors. In some areas, the dense cover provides problems for the establishment of adequate turf and groundcovers. The existing vegetation also provides a buffer from adjacent land uses and in some areas the perimeter buffer may need to be enhanced as development fills in along Pearl Street.

The majority of plants found in the St. Ambrose Cemetery consist of plants from the Black Hills Forest plant community such as Ponderosa Pine (Pinus ponderosa) and Bur Oak (Quercus macrocarpa), Common Chokecherry (Prunus virginiana), and various wildflowers and native grasses. Overall, the plant material seems to be fairly healthy and vigorous. A number of plant species have been introduced through the years. They include Common Lilacs (Syringa vulgaris), Thunberg Spirea (Spiraea thunbergii), Periwinkle (Vinca minor), and various Clovers (Trifolium spp.). Much of the introduced plant material is at individual gravesites and was planted in remembrance of a deceased loved one. Lilacs were traditionally planted as memorials at graves and are a good indicator of gravesites even if a monument is no longer present.

A majority of the remaining vegetation is naturalized vegetation including indigenous grasses, wildflowers, shrubs and other common pine forest groundcovers and understory plants. A mix of clover and Kentucky bluegrass has also been used as ground cover in the maintained area of the cemetery. Along the northeast fence line, a row of Thunberg Spirea helps buffer the site from Pearl Street and helps direct the view inward.

Much of the vegetation is in need of rejuvenation and general pruning. The Ponderosa Pines that exist onsite should be carefully evaluated for crown raising, crown thinning, and in some cases, removal. The Bur Oaks found throughout the site are a combination of naturally occurring or volunteer growth and most are fairly juvenile in age and may thrive if the pine canopy is thinned or opened around them. Many gravesites have been impacted by plants by being covered by or surrounded by plant growth, damaged by fallen limbs, or impacted through root or trunk growth. Where damage to individual gravesites has occurred, action must be taken to remove the vegetation impacting the gravesites.

Documentation Process

Several site visits were made throughout the spring and summer to document the various plants and hopefully capture them during their blooming season. Each plant species found was photographed and identified. Wherever possible, field identification of the plant material was made. However, if a plant couldn't be identified in the field, identification was made through the use of photographs and additional research. Various characteristics of each plant were researched including genus, species, native origin, and significance.

Plant Material

A list of plant material found at St. Ambrose Cemetery has been compiled in Table 1 and is divided into categories according to the general plant type.

Table 4.1 – St. Ambrose Plant List

Plant Image	Botanical Name	Common Name	Origin	Description
Wildflowers/Forbs				
	Achillea millefolium	Common Yarrow	N*	Perennial native to most areas of South Dakota. Very common throughout the Black Hills area at all elevations. This is found throughout the cemetery. Blooms June through August.
	*Chrysanthemum leucanthemum*	Ox-eye Daisy	I*	This perennial, introduced from Eurasia as an ornamental, has naturalized itself in throughout North America. Very common in the mid to low elevation of the central and northern Black Hills. This is found on the north edges of the cemetery. Blooms June through August.
	*Cynoglossum officinale*	Hound's-tongue	I	Introduced from Eurasia and established throughout United States and Canada. This was identified on the eastern edge of the cemetery along the fence line. Often found along roadsides, waste places, and meadows. Blooms May through July.
	*Galium borcale*	Northern Bedstraw	N	Native wildflower found in open woods and along wood edges. One of the most common forbs in the Black Hills. This was found along the eastern edge of the cemetery just outside the fence.

	*Hesperis matronalis*	Dames Rocket	I	Introduced from Europe, this is a garden escape that has naturalized itself throughout much of North America. Found along roadsides and wood edges. Blooms May through July.
	*Melitotus officinalis*	Yellow Sweet Clover	I	This non-native is found in pastures, roadsides, and disturbed areas. Blooms June through August
	*Taraxacum oficinale*	Common Dandelion	I	The Common Dandelion is a European Native that has invaded most of temperate North America. Dandelions are found intermixed with the groundcover and lawn throughout the cemetery.
	*Thermopsis rhombifolia*	Prairie Goldenpea	N	This native perennial herb grows on open banks and eroded slops. Blooms April though May. Prairie Goldenpea was found growing along the south (front) fenceline of the Cemetery near the entrance gate.
	*Trifolium pratense*	Red Clover	I	Introduced from southern Europe. Very common clover found along roadsides and in fields. Blooms May through September.
	*Vicia americana*	American Vetch	N	The common vetch of the prairies was found growing along the perimeter of the cemetery's fence lines. Blooms in May through June.

	*Vinca minor*	Common Periwinkle	I	This groundcover was commonly used in Victorian Era cemeteries. Lavender-blue flowers bloom in April-May. Makes an excellent groundcover and should be considered as an alternative to turfgrass in shaded areas of the cemetery. Native to Europe and western Asia.
	*Iris 'Khedive'*	Khedive Tall Bearded Iris	I	These plants found along the northeast fence line are either Khedive Tall Bearded Irises (introduced 1884) or Larger Blue Flag (*Iris versicolor*) which is native to the United States. Either of the species blooms in May-June.
Coniferous Trees				
	*Picea omorika*	Serbian Spruce	I	These trees are some beautiful examples of this species and are located at the Oscar Stanley Rewman gravesite within the cemetery. This spruce species is native to Yugoslavia and was introduced into the United States around 1880.
	*Pinus ponderosa*	Ponderosa Pine	N*	Native to the Black Hills. The Pines have naturalized in the cemetery and are present in historic cemetery photos.
Deciduous Trees				
	*Prunus americana*	American Plum	N	Wild plum is common throughout the Midwest occurring in draws and thickets. These shrub-like trees typically 6-10 feet in height. Small white flower clusters bloom in April and May.

	*Quercus macrocarpa*	Bur Oak	N	One of the most majestic deciduous trees in North America. Native to the site and is found along the perimeter.
	*Crataegus succulenta*	Fleshy Hawthorn	N	Small tree native to South Dakota and the Black Hills area. Fleshy Hawthorn has white flowers in early May with fruit maturing in September-October. Volunteer plants exist along plot fences in walls within St. Ambrose Cemetery.
	*Prunus virginiana*	Common Chokecherry	N	Native to the Black Hills. While classified as a shrub, Common Chokecherry can grow to over 20 feet tall. Flowers from May-June with fruit maturing in late July into early August. Volunteer plants are found along the perimeter fence and along plot fences.
Deciduous Shrubs				
	*Berberis repens (Mahonia repens)*	Oregon Grape Holly	N	This low growing "sub-shrub" is found throughout the Black Hills from foothills to high limestone. Small yellow flowers emerge from May to July. Berries form in grape-like clusters in the fall. Leaves turn red/maroon in fall. Makes an attractive groundcover plant.
	*Lonicera tatarica*	Tatarian Honeysuckle	I	Introduced from Europe in mid 1750's, it has naturalized in North America and now grows like a native shrub. Popular plant with attractive flowers and fruit.

	*Parthenocissus quinquefolia*	Virginia Creeper	N	Native to the Black Hills Region and can be found along wrought iron fences in several locations throughout the cemetery.
	*Spiraea nipponica*	Nippon Sprirea	I	Native to Japan, thought to be introduced in the 1860's. Blooms profusely with white flower clusters in April and May. This plant is found on a handful of gravesites and planted as a hedge along the eastern fence line of the cemetery.
	*Syringa vulgaris*	Common Lilac	I	Native to southern Europe. Lilacs are primarily known for their flowers and have much nostalgia associated with them due to their planting around farmsteads and gardens. In cemeteries, they are commonly planted at family plots as memorials.

Unique Plant Material

Throughout the documentation of the plant material, several unique plants were found to exist at St. Ambrose Cemetery. Most plants found within St. Ambrose are naturally occurring or volunteer growth but there are several places where introduced species are used to adorn gravesites. Some of the interesting species found at gravesites include Common Lilac (Syringa vulgaris), Nippon Spirea (Spiraea nipponica), Periwinkle (Vinca minor), Serbian Spruce (Picea omorika), and Khedive Bearded Iris (Iris 'Khedive').

Plant Conditions

The plant material was reviewed for overall health, maintenance needs and sometimes removal. Because this site has naturalized over time and because upon close examination, no formal planting design can be discerned, the gravesites should take priority to the plant material when deciding a course of action in the plant management.

Vegetation Management

After analyzing the cemetery's plant material, various site photos, and on-site observations, a number of issues were identified and a series of recommendations was developed to improve the vegetative condition of the site. St. Ambrose Cemetery possesses an interesting mix of both very good qualities and very challenging issues. The site appears to have potential for a very rewarding and visual experience, if managed properly. It is a project that contains some element of trial and error, and may require some "ground truth" experimentation to tailor a successful solution.

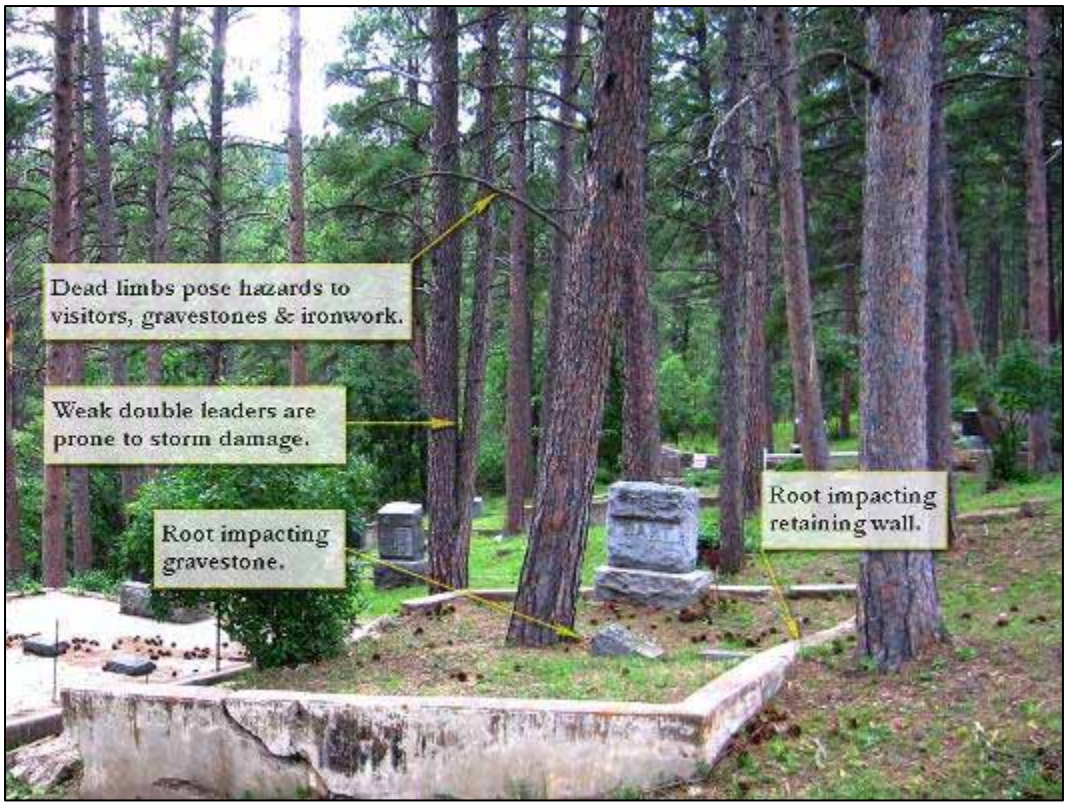


Figure 4.1 – Photo exhibiting some of the issues associated with mature trees within St. Ambrose Cemetery.

Recommendations

The following recommendations have been developed to provide maintenance to the mature plantings within the cemetery.

Inspection

Regular inspections of the mature tree population are critical in minimizing the potential hazards within the cemetery. Trees should be inspected to safeguard against threats to gravestones, retaining walls and ironwork from root system development and falling branches. It is recommended that inspections be made on a yearly basis, after each storm event where wind speed exceeds 60 mph, and after uncommonly heavy snowfall events.

Once the initial tree pruning is completed, trees should be pruned to remove potentially hazardous dead wood on a yearly basis but a pruning schedule of every 5 years by a state certified arborist would be acceptable. Developing a regular 5 year pruning schedule will help maintain and preserve the large, mature trees as well as protect the historic fabric of the cemetery.

Example of ironwork damaged from falling tree limb.

Pruning

The goal of tree maintenance is to maintain healthy mature trees free of dead wood which could fall on people, gravestones or ironwork. The reasons for pruning trees may include reducing hazards, maintaining or improving tree health and structure, improving aesthetics, improving light penetration to underlying turf and groundcovers, or satisfying specific needs such as: removing disease; removing dead, dying or interfering branches; or providing adequate clearances for utilities, or pedestrian traffic.

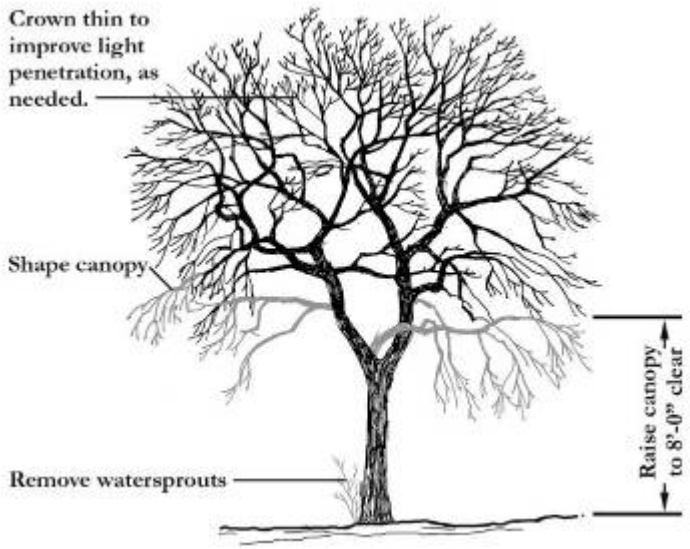


Figure 4.2 – Recommended pruning for deciduous trees within St. Ambrose Cemetery.

Tree Pruning: Decidious trees such as Bur Oak (*Quercus macrocarpa*), Serviceberry (*Amelanchier*), Chokecherry (*Prunus*) and Hawthorne (*Crataegus*) should all be pruned during dormancy. This is especially important for the Bur Oaks to prevent the spread of diseases or pests through open pruning cuts during the growing season. Ideal times for this pruning would be between October and early March.

Trees should be selectively pruned in such a manner to preserve the natural shape and character of the tree species and should also meet the standards of the American National Standards Institute (ANSI) document ANSI A300 "Standards for Tree Care Operations."

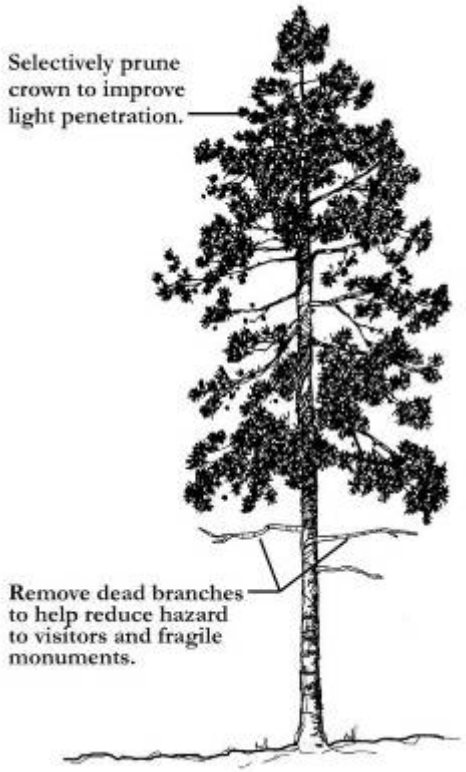
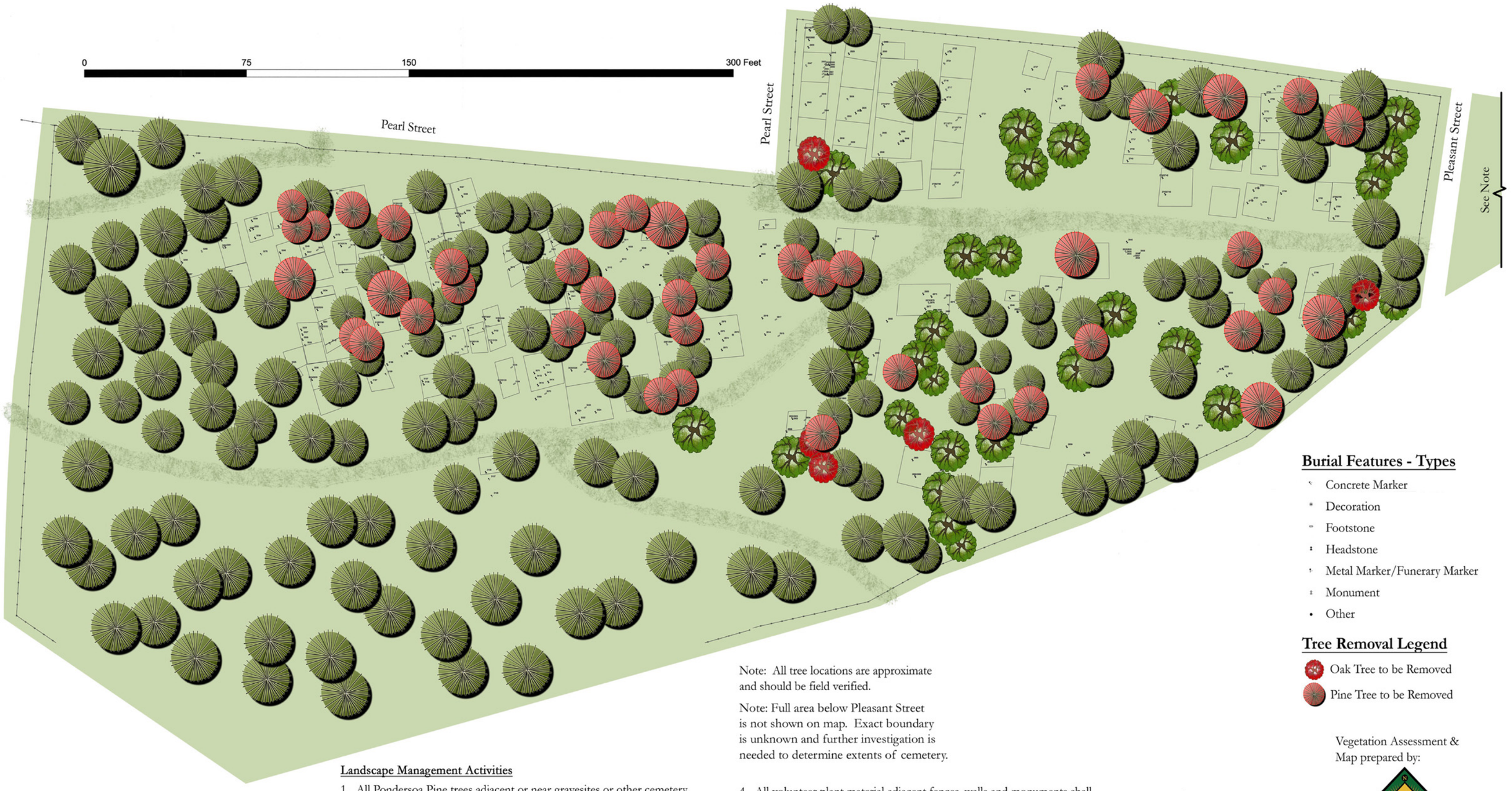


Figure 4.3 – Recommended pruning for coniferous trees within St. Ambrose Cemetery.

Ponderosa Pine trees are considered "self-pruning" which means as they age, their lower branches will die out and the tree will eventually drop them. This can be detrimental to fragile gravestones located near or below them. To prevent damage to gravestones, ironwork and walls, the Ponderosa Pines should be pruned to remove the dead branches. The crowns should also be thinned since many of the interior branches will die-out due to lack of light. The best time of year to prune Ponderosa Pine is during late summer, fall and early winter to reduce pruning shock and reduce the flow of pitch or sap.

Ornamental Shrub Pruning: Ornamental material such as Common Lilacs (*Syringa vulgaris*), Honeysuckle (*Lonicera spp.*) and Nippon Spirea (Spiraea nipponica) should be pruned with slightly different techniques. These techniques are done to achieve removal of older, leggy growth. This pruning is best done early in the spring, with bud emergence to be indicative of when pruning should conclude. The older canes, particularly on the lilac, need to be removed. A general rule of thumb would be to remove stems larger than 1 inch. Some heading and shaping would also be in order to clean up the areas



Landscape Management and Tree Removal Plan

Landscape Management Activities

1. All Pondersoa Pine trees adjacent or near gravesites or other cemetery structures should be pruned to remove dead limbs and weak branch structure to help prevent damage to cemetery objects and structures.
2. Trees indicated for removal shall be cut down level with the ground surface. Where the stump interferres with preservation activities such as wall restoration, the stump shall be carefully removed using appropriate stump grinding methods.
3. Ornamental Shrubs shall be pruned for plant rejuvenation and overall shape. No more than 1/3 of the plant material shall be removed during one growing season to reduce the visual impact on the cemetery.
4. All volunteer plant material adjacent fences, walls and monuments shall be cut to the ground and have a non-selective herbicide painted on the pruning cuts immediately after pruning. Care shall be taken not to touch stone or ironwork with herbicide.
5. Clean-up and remove excessive plant litter within cemetery including leaf litter, pine needles, pine cones, fallen twigs and branches, and turf clippings to reduce possible deterioration to cemetery elememts due to moisture retention.
6. Refer to the Preservation Plan Section entitled "Landscape Character" for additional landscape management recommendations and techniques.

Note: All tree locations are approximate and should be field verified.

Note: Full area below Pleasant Street is not shown on map. Exact boundary is unknown and further investigation is needed to determine extents of cemetery.

Burial Features - Types

- Concrete Marker
- Decoration
- Footstone
- Headstone
- Metal Marker/Funerary Marker
- Monument
- Other

Tree Removal Legend

- Oak Tree to be Removed
- Pine Tree to be Removed

Vegetation Assessment & Map prepared by:

DREAM DESIGN INTERNATIONAL, INC.

St. Ambrose Cemetery

Deadwood, South Dakota

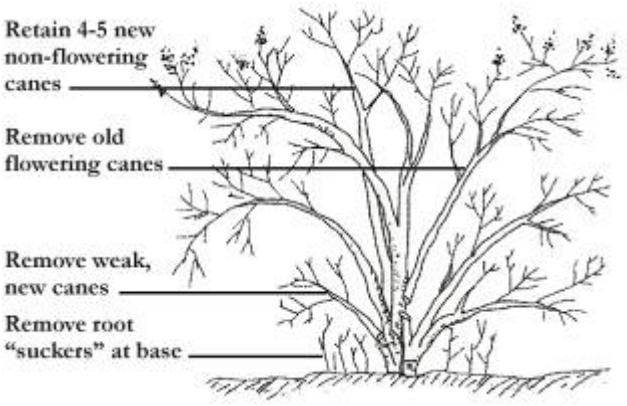


Figure 4.4 – Rejuvenation pruning of Common Lilacs. Remove 1/3 of oldest stems each year for three consecutive years and prune to rounded shape.

around the bases of the shrubs and to give some uniformity in the landscape. In some cases, rejuvenation pruning will be needed where the shrub may need to be pruned approximately 3 inches above ground level. Rejuvenation pruning should be performed over a three year period to reduce the visual impact on the cemetery. About a third of the plants oldest stems should be removed each year for three consecutive years. This will allow new growth to emerge and develop into a "renewed" shrub. The initial pruning would compass a considerable amount of work, with yearly maintenance after that.

All pruning should be done using professional equipment and techniques. Pruning tools should be sharp and clean. The use of bleach or Lysol is recommended between pruning different species or diseased specimens in order to sterilize the tools and to limit the spread of disease. Care should be taken to ensure no chemicals come in contact with iron or stonework. Cuttings should be removed from the site and disposed of in order to avoid harboring pests and disease. Limbs should be removed in a manner that avoids tearing the bark of the trunk. Any wounds should be sealed using a latex material not more than 24 hours following cutting.

Due to the extremely sensitive nature of the monuments, walls, and ironwork, the use of plant fertilizers, herbicides and pesticides is strongly discouraged. In special cases where significant plants need chemical intervention, the application of the appropriate treatment should be considered on a case by case basis with precautions set-up to protect the surrounding historic features.

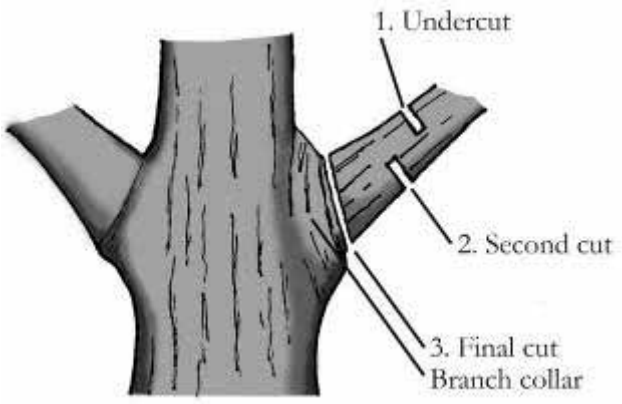


Figure 4.5 – Pruning a Large Limb (applies to both coniferous and deciduous trees)
1. Undercut 12-24" up from the branch collar to prevent the bark from tearing.
2. Make the second cut from the top all the way through the branch, 2-3" above cut #1.
3. The final cut should be just beyond the branch collar. Support the stub so it does not tear the bark.

<u>Plant Removal and Volunteer Growth Management</u>

As the cemetery has matured over the last 120 plus years, many plants have found a foothold next to cemetery walls, gravestones, and fences. While seeming innocent at first, these plants grow to become destructive forces upon the cemetery's historic features causing walls to crack, monuments to tilt, and ironwork to be damaged. If left in place, these trees will continue to damage the historic fabric of the cemetery and cause increased maintenance and repair costs within the cemetery.

Each tree removal case should be evaluated individually with the preservation of gravesites being the prime consideration. The following recommendations have been developed for removing select existing plant material and managing volunteer growth within the cemetery:

1. As plots are repaired, remove any naturalized or volunteer trees that have negatively impacted the gravesite.

2. If trees die or need to be removed due to conflicts with gravestones, walls, or ironwork, the trees should be cut to ground level and the stump and root system left in place to decompose naturally. Chemicals are available to aid in the decomposition process but are discouraged due to the possible negative effects they may have on surrounding gravestones, ironwork, and wall materials. If stump removal is necessary to repair walls or properly reset grave monuments, the stump should be removed through stump grinding to an adequate depth in a method which minimizes disturbance to the surrounding area.

3. After a tree stump has decayed sufficiently or been removed by grinding, topsoil fill should be added to fill the depression and blend into the surrounding landscape. The area should be reseeded using an appropriate seed mix that is compatible with the established turf.

4. Small trees should be pruned to ground level and have a non-selective herbicide (i.e. Round-up, Reward, Ranger or Kill Zall) applied to the pruning cut with a foam paint brush dipped in the herbicide solution. Spray application of the herbicide should be avoided due to the opportunity for overspray onto sensitive monuments, ironwork and stonework.

5. A yearly review of plant material should be conducted to prevent the establishment of unwanted volunteer plant growth. The review should pay close attention to wall edges, fence lines, and the perimeter of monuments.

Plant litter and soil building up along plot fence is a factor in deterioration of the bottom portion of this ornamental iron fence.

Plant Litter & Clean-up

Excessive plant litter within the cemetery can be detrimental to the historic fabric by covering gravesites, flush or low headstones, building up along ironwork, and hindering the growth of groundcovers and lawn. The natural Ponderosa Pine stand creates a large amount of litter through needle drop. The deciduous trees drop leaf litter every fall and tall grasses also add to the plant litter.

Plant litter includes pine needles, pine cones, fallen twigs or branches, leaves, weeds, turf clippings, and many times soil that eroded from slopes above the gravesite. Over the growing seasons, this litter builds up and eventually, begins to cover bottom rails of fences, small grave markers, groundcover plantings, and turf grass. The excess plant litter holds moisture throughout the year and when added to the seasonal freeze-thaw cycles, causes accelerated deterioration of ironwork, stone monuments, monument bases, plot caps, and walls.

The management and clean-up of plant litter within the cemetery should include:

1. Remove eroded soil, twigs, and built-up plant litter along edges of walls, plot fences, and marker bases and dispose of off-site. This material could be

developed into garden compost for use by Deadwood residents.

2. After initial plant litter clean-up is complete, identify areas where erosion control measures and turf/groundcover reestablishment are needed.

3. Prepare and overseed bare areas with an appropriate shade tolerant turf mix containing a mix of fescue, clover, ryegrass and bluegrass varieties.

4. Develop an annual schedule for the removal of plant litter from the cemetery, preferably performed in the early to late fall.

Planting Considerations

Once a satisfactory status is established with the existing material, it would be an ideal time to implement additional plant material that provided additional landscape interest, conserves erosion, and beautifies the site. Due to the historic nature of St. Ambrose Cemetery, trees and shrubs should only be added where they once existed or replaced with identical plant species, if needed. New plant material should be confined to the perimeter areas to buffer the cemetery from objectionable views. If family members wish to plant memorial plantings at their family's plot, the plantings should be limited to plant species that are appropriate to the late 19th and early 20th Century (Late Victorian Era).

In certain areas where plant material is essential to stabilize the soil, new plant material might be considered. However, the type and placement of the new plant material should carefully be considered. The addition of lilacs or Thunberg Spirea to form more continuous hedgerows along the perimeter would be very effective in buffering the cemetery from objectionable views or contrasting land uses.

Another idea would be to plant groundcovers rather than lawn on the grounds. Due to the shady understory, several materials would be just as effective as grasses. Groundcovers when placed around sensitive monuments would also provide a safety buffer between the monuments and weed whips and other mowing equipment. Periwinkle (*Vinca minor*) would be first and foremost an ideal alternative since it has been identified within the cemetery at family plots and in some other areas of the site. Groundcovers would help reduce mowing, overall maintenance, would spread and naturalize the various stones and walls, and would be effective erosion protection. Spreading Euonymus (*Euonymus turkestanii*) or experimenting with Oregon Grape Holly (*Berberis repens* 'Compacta') as a groundcover would be satisfactory as an alternative.

Wildflowers, perennials, and vines should all fit the local plant palette and be used as a transition from native material to the maintained areas of the cemetery. For an aesthetic and low maintenance effect, wildflowers like Yarrow, Lupine, Flax and Asters could be blended with ornamental grasses like Western Wheatgrass, Little Bluestem, Gramas, and Fescues. Bugleweed would be a fine accent perennial combined with groundcovers, and native Bittersweet and Virginia Creeper would be an effective vine to climb on ironwork and gates without too much weight. Wildflowers and native grasses should be allowed to grow naturally where they currently occur or in areas that have been historically been left un-manicured.

Where the cemetery has traditionally been maintained, the turfgrass should be renovated and/or rejuvenated where needed. This would also include the reestablishment of turf in areas of construction activity. Turf renovation should

follow the typical standards for turfgrass renovation and reestablishment. Weed killers and fertilizers should be avoided if at all possible and not used within five feet of monuments, stone walls or ironwork.

Visitor Comforts and Site Amenities

Consideration should be given to providing additional visitor comforts and site amenities within the site and immediately adjacent to the site. These amenities should include historically appropriate seating, trash receptacles, and interpretive signage. It is recommended that if any trash receptacles and interpretive signage are provided, they should be placed just outside the entrance gates on Pearl Street and Pleasant Street. Period appropriate seating would be acceptable at strategic points within the cemetery boundaries.

Site Security & Perimeter Fencing

Additional site security is needed for St. Ambrose Cemetery. Much of the perimeter fencing is in need of repair or reinstallation. All of the entrance gates have been damaged and are no longer serving their intended purpose. It is recommended that new fencing be installed along the "back" of the cemetery from the southwest corner of the property to Pearl Street. A 6'-0" high color fused chain link fence at a minimum would be appropriate along this edge. The chain link fence along Pearl Street down to Pleasant Street should be removed and replaced with a 6'-0" high ornamental steel, pressed spear picket fence (black in color) to secure this edge of the site. The entrance gates should be repaired to a functional state so the site can be locked during the nighttime hours.

Site Access & Visitor Parking

Currently, there is only a small area for parking south of Pleasant Street. This is in an area that is thought to be once part of St. Ambrose Cemetery. If additional archaeological investigation confirms the existence or historic existence of graves, this area should not be used for parking in the future. The City of Deadwood should explore the opportunity of providing a small parking area (6 vehicles or so) along Pearl Street. The City should also explore the opportunity for the improvement of Pearl Street to the East Entrance Gate (near the Angel monument). This would provide a nice additional entrance point to the cemetery.

Archaeological Assessments & Recommendations

The primary goal of the archaeological contribution to this plan is to insure that all extant graves and unmarked, unidentified graves are protected during restoration activity; that the interment areas and outlines reflect the historic character of the cemetery; and that future maintenance of the cemetery is directed toward the continued safeguard of all interments.

The purpose of archaeological investigations is: 1) to assist in determining the limits of the cemetery or boundaries of interment sites inside existing fence lines and possible interments exterior to these boundaries; 2) to locate and delineate unmarked interments and document them with limited or no disturbance; 3) and to establish areas of absence of burials and determine those boundaries. These areas include the main cemetery land the locale on the opposite side of Pleasant Street. The purpose does not comprise an attempt to identify the location of all existing interments.

The principal objective of the archaeological investigations is to use appropriate methodologies to determine locations of unmarked, unknown grave shafts, coffin burials, areas of burial vacancies, disinterment activity, and to build a map of the site area. These objectives include:

1. Establish areas and limits of interments
2. Establish areas that are vacant or unused
3. Establish areas that can be used for development of parking areas and use areas for visitation of individuals
4. Establish areas for future interments or determine full occupancy
5. Endeavor to find burials of historic accounts in the cemetery vicinity (as in the account of the burial of Cha Nopa Uhah, alias Two Sticks).
6. Establish current plot map of interments

Specified Areas

Determining the boundaries and orientation of unmarked and unidentified interments and areas of vacancy will help in developing the Master Plan for the restoration, protection, and preservation of the St. Ambrose Cemetery. The specific areas of concern include unmarked areas within the fence boundaries of the cemetery, the area across Pleasant Street, not within the cemetery gates or fence boundary; and small areas outside of the limits of interments, however continue to be within cemetery boundaries. Identifying areas where burials are non existent will help in determining possible areas for development of parking areas or visitation use areas for individuals without having any potential to disturb graves. These investigation areas are described and designated as follows (see attached map for plotted areas):

- **Area 1** is located in the upper northeast in the main cemetery
- **Area 2** is located outside of the fenced and gated area in the northeast portion of the main cemetery
- **Area 3** is vacant of markers inside fence boundaries along the upper west side and northwest portion of the main cemetery

- **Area 4** is the vacant of markers in the front of the main cemetery
- **Area 5** is vacant of markers located in the eastern central gap of the main cemetery
- **Area 6** is separated from the cemetery across Pleasant Street
- **Area 7** is the pathway leading up from Main Street and the entrance area to the separated portion of the cemetery across Pleasant Street

Archaeological Techniques and Methods of Excavation

Initially, all specified areas require a comprehensive pedestrian survey to discern any evidence of burials or auxiliary use of the area, and an examination and study of all available historic photographs and documentation of the cemetery and immediate boundaries. Locales that are anticipated to be encountered are:

1. Features indicating burials remain in tact
2. Indication that the burial remains have been exhumed
3. Areas of non-use

Non-invasive Investigation

Non-invasive methods of exploration and investigation in locating and delineating unmarked graves consist of geophysical and remote sensing technology. This technology may include the use of electromagnetic induction, ground penetrating radar (GPR), magnetic gradiometry, and electrical resistance. There are limitations that relate to singular geophysical methods. Interpretations of data set are based on a combination of evidence, some of which may be very weak, educated guesswork, and reliance of experience of the professional. Conducting all or at least some of these technologies can result in complementary information and a comprehensive view of previous subsurface disturbance.

Invasive Investigation

Invasive methods can include trenching, stripping, or scrapping with use of a backhoe, hand excavations, and soil probing or sample coring.

Trenching can be used to identify extant burial areas and areas that are vacant of graves and are the most expedient, but generally the most invasive. This method would be used in areas that have no marked evidence of burials.

Backhoe stripping or scrapping of top soils is used to cautiously expose the subsurface to identify the uppermost portion of a feature. In this case, the feature is expected to be an indication of a grave shaft. This method would be recommended in areas that are unmarked and are in alignment with more obvious burial patterns, or that have shallow depressions. Hand excavations can articulate the feature to finish with excavation and documentation of that particular feature.

Hand excavating test units is a non-destructive method that can further investigate grave shafts (not to excavate burials). Hand excavations can be taken to an adequate depth to determine presence or absence of coffin or

human remains in a non-destructive fashion. The advantage of hand excavations is the ability to gain a certainty of presence or absence of human remains with the smallest possible footprint and is recommended when there is a question of disinterment activity.

Soil probing and core sampling can be used in areas of suspected interment. The limitations of this method centers on soil matrix and presence of stone or tree roots in the matrix. This is the least invasive method of trying to locate burials but is limited in its effectiveness.

Documentation

All work will be documented providing analysis, interpretation, and understanding of the areas that are investigated.

Photographs will be taken of all work areas and during all stages of invasive or non-invasive activities to document indications of features, for example grave shafts; and all artifacts.

Measurements will be taken of any potential or identified features (grave shaft dimensions may provide some suggestion of a child or an adult grave).

Field forms will be completed to document and describe all work conducted during investigations of each separate area of excavation.

Mapping will be conducted in the field to generate GIS produced maps indicating the presence and location of extant graves and bounded areas that investigations indicate absence of interments or plot vacancies.

Presence/Discovery of Artifacts

Artifacts that may be encountered during archaeological investigations or restoration activity may include associated grave items including grave goods or funerary objects, grave or burial offerings, and grave adornments. Items that appear to be related to the burial process will be reburied at or near their point of discovery. Items not associated with burial activities and are part of the archaeological record of the history of the cemetery may be collected for further documentation.

Previous Investigations

Two previous archaeological investigations have been conducted within the boundary areas of St. Ambrose Cemetery. A preliminary investigation in the separated section of St. Ambrose Cemetery, across Pleasant Street, was led and conducted by Rose Estep Fosha of the South Dakota State Historical Society, Archaeological Research Center in October 2006. This investigation consisted of using soil probes and an Oakfield soil sampler in areas surrounding the depressions and in the depression interiors seeking differences in soil compaction, and taking small core samples of soil to determine the outline of grave shafts and recognize the presence of contents, if any. Dr. Kenneth L. Kvamme, Archeo-Imaging Lab of the Department of Anthropology, University of Arkansas, conducted geophysical investigations in St. Ambrose cemetery in October 2006. Geophysical methods used in this investigation included magnetic gradiometry, electrical resistance, ground-penetrating radar (GPR), and electromagnetic induction.

Results and Recommendations of Previous Investigations

Investigations in separated section of the cemetery. Historic records such as previously located deed records and historic photographs of the cemetery are very useful in providing confirmation of the historic site boundary and historic site overview of the St. Ambrose Cemetery. The deed record indicates that the lower section of St. Ambrose Cemetery, divided by Pleasant Street from the main section, is inclusive in the historic boundaries of the cemetery. The Lawrence County Courthouse Register of Deeds holds Quitclaim Deed #51371 dated April 25, 1890 in which Mrs. Pamela M. Burnham deeded to St. Ambrose Cemetery a triangular piece of property in the southeastern part of townsite Lot No. 297, "…being 150 feet in length at its base…and 160 feet in length…on each of its two sides…" (Record of Deeds, pg.155)

Historic photo taken from White Rocks looking toward St. Ambrose. The photo provides evidence of the entrance sequence and existence of graves below Pleasant Street.

A map was built of this section's boundary of the cemetery using a sub-meter accurate GPS unit (Figure 5.1). Included in the map are the following site features: investigated Features 1 through 6 (refer to Figures 3-6 in Fosha 2006), Features 7 and 8 discussed in this report; an area of distinct depressions that have not been investigated; an overgrown area that is the location of several additional uninvestigated depressions; the old road bed and path bordering this section of the cemetery; the rise and platform of a pedestrian stairway leading to and from the cemetery from Williams Street, as seen in the 1900 historic photograph; a depression with remnants of stone from an historic structure; and Pleasant Street separating this section of the cemetery from the main part.

After using the probing and coring field methodology through the course of the field day in six separate features, it was decided that the work and time was not yielding data that was necessary to recover conclusive results of intact grave shafts, coffin burials, or a vacant grave site. It was determined that continuation of these methods would be redundant and would not accomplish the objectives set forth for this project. It was recommended that further investigations using different field methods be conducted to locate and map individual grave shafts and to determine interment or disinterment.

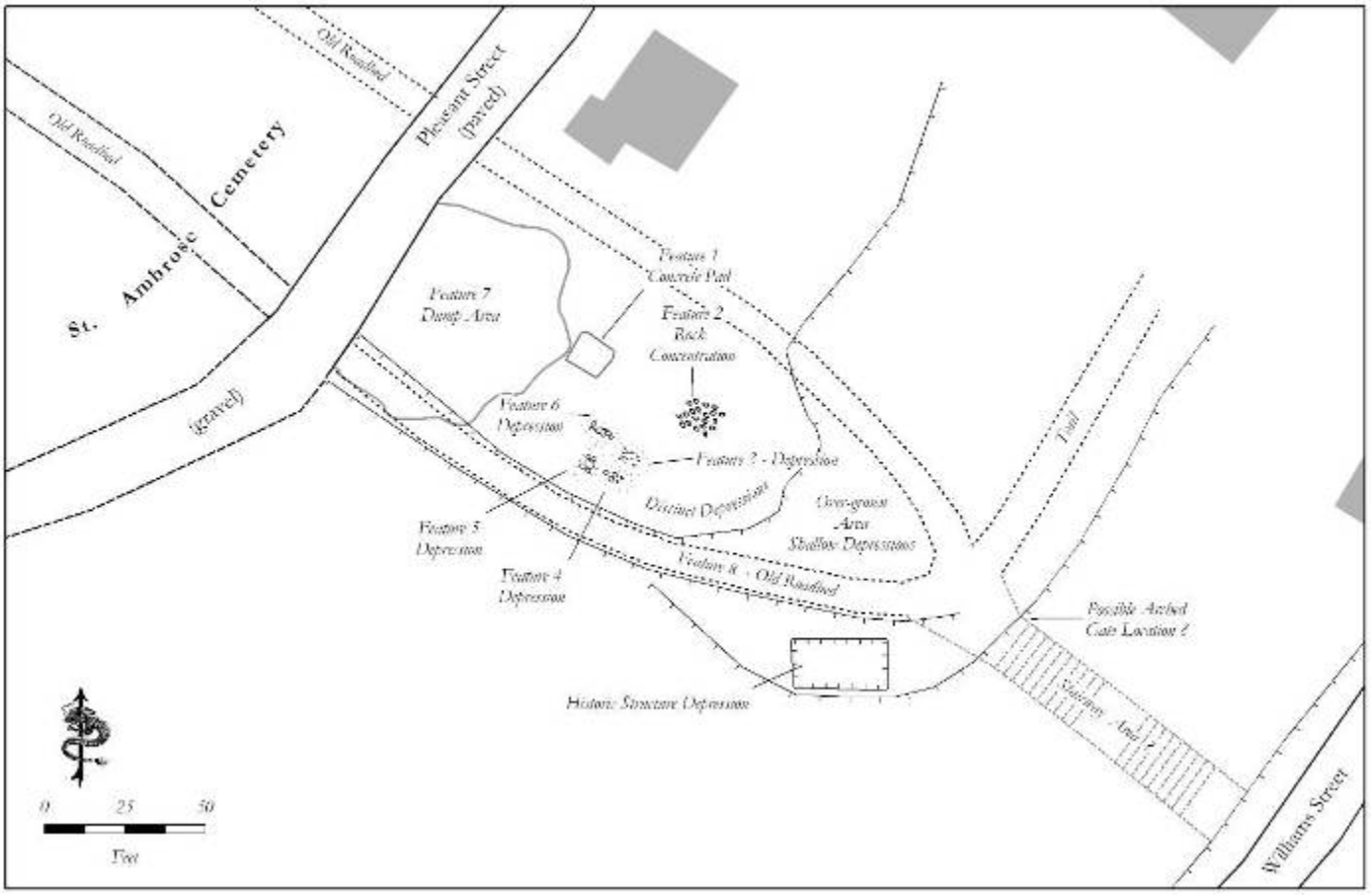


Figure 5.1 – Results of preliminary archaeological investigation in area below Pleasant Street confirm graves exist outside the current cemetery boundary.

Geophysical Investigations. An 800m2 region lacking known or marked graved received primary attention by the geophysical methods of magnetic gradiometry, electrical resistance, ground-penetrating radar (GPR), and electromagnetic induction. The electrical resistance data revealed a series of broad arcing lineations that are likely composed of stone and may represent burial plot boundaries. The GPR data provided greater detail and illustrate small rectangular and square enclosed spaces that could bound burial plots or individual burials. Within the defined burial plots the electrical resistance and conductivity data showed subtle anomalies of the correct form, size, and distribution in rows to be interpreted as graves, with 7 defined. A smaller survey area near the original cemetery entrance using electrical resistance methods suggested the presence of perhaps five graves in addition to a single marked grave. All areas surveyed exhibited an extremely dense distribution of ferrous metals as revealed by magnetic gradiometry anomalies. Some of these anomalies can point to iron components of hidden graves, but most probably represented historic and recent metallic litter (Kvamme 2006). Most of the metallic litter was removed from the surface during the course of the investigations (Figure 3; or refer to Kvamme 2006 and Figure A2-2 on page 26.)

Recommendations

No single methodology described above may be considered adequate to fulfill the needs of future preservation or planning. More than one method of investigation will give the highest resolution and understanding of the cemetery site. It is recommended in the use of geophysics that this work be conducted by an individual familiar with the geology of the area and a long duration of familiarity with the equipment and software, and an archaeologist familiar with the specific cultural context of the site being studied. The knowledge of how to best utilize geophysical instruments in a given setting permits a more precise and time effective site investigation. Together Recognize cultural and natural patterns and visualize the physical phenomena causing the detected anomalies. Correlations between data sets (or lack of correlation) can be as important as either data set by itself to our interpretation of the site. At a minimum, the surface should be inspected for evidence of anomaly sources.

Investigations in the separated section of the cemetery. Recommendations in this portion of the cemetery include designated **Areas 6 and 7**. It is known that snow removal has deposited debris over this area and overtime has created an artificial surface including the creation of a debris berm (Figure). Furthermore, this area has been used as a vehicle turn-around and parking area further impacting the ability to use the ground surface to possibly identify locations of past interments. It is recommended that the historical surface of this portion of the cemetery be restored. This action would add to the historical integrity of the cemetery restoring this portion to its original state.

To establish the location of this surface a trench should be carefully dug through the berm using a backhoe and bucket having a smooth cutting edge. The wall profile of the trench will expose the matrix enabling recognition of the original surface. This exposure would then be used as a guide to remove the remaining artificial berm.

Currently, surface features are expressed on portions of the project area. Mapping of each feature prior to further investigations is needed to record the current site condition and to reveal possible patterning of cemetery interment which can be used as a guide for subsequent procedures and sampling strategies.

Following detailed mapping, it is recommended to cautiously remove (peel back) the accumulated top soil and growth of undercover using a backhoe and bucket with a smooth cutting edge. This activity should expose the limits of an excavated gravesite. Feature indications will be changes in soil color, texture, compaction, and dark stains. This technique may not be as effective as hand excavations, however much more cost effective. Close proximity of depressions and the possibility that the depressions would fill in as the backhoe removed soil obscuring the original feature may require using hand excavation to complete the desired outcome of interment or disinterment.

Replacing the backhoe and bucket by hand excavating a one meter wide trench across each depression catching the outer edge of each side and interior would be a less invasive method than using a backhoe. The trade off is time. The trench would be approximately 8 ft in length. By peeling back the top matrix by hand, grave shafts can be discerned at their original surface and excavation can continue until the desired outcome of interment or disinterment is exposed.

To determine the remains of a coffin burial or gravesite vacancy, further excavating into the depression's interior by hand excavating in the interior of the depressions can result in revealing a coffin burial or plot vacancy. It is recommended sampling of depressions in various portions of the area to make a convincing presumption that all or most of the grave shafts retain coffin burials.

Geophysical Investigations. No geophysical archaeology is recommended in this area of the cemetery. It has previously been determined by Dr. Kvamme, Department of Anthropology, University of Arkansas, that this are would most likely not be conducive to geophysical methods due to high density of woody plant and tree roots and topography of the area.

Investigations in the main cemetery. It is recommended that ground truthing, or had excavation, is conducted on selected anomalies from previous geophysical work conducted in the cemetery that include designated **Areas 1 and 4**. Ground truthing is locating a geophysical anomaly by hand excavation to verify or refute the geophysical data. Ground truthing will allow more definitive interpretation of the geophysical data and provide data on a range of previously unexplored areas within the cemetery site. Test excavations would include a sampling of each of the various burial stipulations recorded by Kvamme in 2006: graves, probable grave, and possible grave.

For the purpose of planning and preservation plans it is important to demonstrate if the anomalies identified by previous and recommended geophysical investigations can be determined to represent cultural activity in the form of burials or if they are echoes of natural geology in the cemetery area. The results of a geophysical investigation will be better understood and will greatly inform interpretation of these data if ground truthing is performed. Verification (or refutation) of preliminary interpretations can allow us to revise or elaborate our interpretations with greater confidence.

Geophysical Investigations. It is recommended that geophysical survey is conducted within designated **Areas 2, 3, and 5**, if it is determined that this method of data recovery is possible to yield directive results. It is further recommended that more invasive techniques be applied such as very limited trenching, or scrapping or stripping of top soil if geophysical testing is not conducted within these designated areas.

If ground truthing is conducted on Areas 1 and 4 and similarly verifies the results of the geophysics data, and exhibits positive effectiveness, the results of ground truthing may (with caution) be interjected and predictive to untested areas of the site, i.e. additional Areas 2, 3, and 5 where it is recommended to perform geophysical testing. More information concerning the geophysical method is gained and interpretation by archaeologists familiar with the regional archaeology becomes increasingly detailed.

Complementary Opportunities

1. Develop map of occupied, disinterred, and vacant areas, and possibly plots
2. Possible pathway improvements
3. Identify areas for possible additional plot space
4. Sale/Resale of plot space

The development of the complementary opportunities listed above would depend on the opinions of the City of Deadwood and the St. Ambrose Parish. If the archeological investigations conclude there is additional space available, the sale/resale of plot space could help generate revenue to assist in the preservation and maintenance of the cemetery. Prior to proceeding with this revenue opportunity, design guidelines would need to be developed to help ensure the new plot areas would not negatively impact the rest of the cemetery visually and functionally.

Implementation

With a highly detailed preservation project such as this one, the implementation of the project is key in the successful preservation of the historic fabric of the site. Developing highly detailed construction documents, specifications, preservation techniques, construction observation procedures, and cooperation between the contractors, owners, and preservation professionals is essential throughout the entire preservation project. Several steps are needed to fully implement the preservation plan such as:

1. Developing a series of priorities for the cemetery and identifying phases for the work.

2. The Proposed Project Phasing Plan included at the end of this section indicates the proposed areas of phasing. The site is broken into three main areas of preservation work. The timeline of implementation depends on availability of funding for each phase. Theoretically, the plan could be implemented over the next 6 years (2 years for each phase) allowing time for preparation of drawings, bidding and construction activities.

3. Securing adequate funding for each phase of preservation and conservation and its continued annual maintenance & repairs. Funding should include adequate contingencies for unforeseen circumstances encountered during the preservation project.

4. Developing specialized construction documents and specifications for bidding.

5. Identifying and pre-qualifying experienced and knowledgeable contractors, subcontractors and conservators.

6. Reviewing and identifying responsible proposals after bidding period.

7. After bidding, developing a strong cohesive project team between the Contractor, Owner and Preservation Professional.

8. During construction, developing a series of “standards” plots and performance mock-ups to set quality expectations and guide preservation work throughout each phase. The standards plots should have a variety of materials and construction methods displayed and should preferably be in highly visible areas of the cemetery to serve as additional visitor interpretative displays during the preservation project.

9. Developing a long term maintenance plan and secure long term funding for maintenance. This may include additional personnel resources dedicated to the yearly maintenance of the cemetery. These personnel resources could be shared between St. Ambrose Cemetery, Mount Moriah Cemetery and Oak Hill Cemetery.

With the above steps, a stable, long range plan for the preservation of the historic fabric and genealogical data can be realized. These resources will be able to be used, studied and enjoyed for several future generations.

Phase 1 Preservation Project

Phase 1 as proposed includes the area northeast of the primary pathway from the cemetery entrance on Pleasant Street up to the first entrance gate on Pearl Street. Some additional plots have been included that are in severe need of repair and are shown on the Proposed Project Phasing Plan. The following list of Phase 1 priorities is as follows:

1. Stabilization and conservation of all monuments indicated as "High Priority" within the area shown as Phase 1. This includes any necessary resetting, fracture repair, stone consolidation and stone cleaning activities.

2. Stabilization, repair, reconstruction and restoration of all retaining walls listed in "Poor Condition." Repair any walls within Phase 1 listed as "Fair Condition."

3. Stabilize and repair all ironwork within the entire cemetery. This includes the perimeter fence and entrance gate along Pleasant Street and both entrance gates along Pearl Street. All walls associated with ironwork should also be stabilized and repaired to provide an adequate foundation for the ironwork.

4. Install steel picket perimeter fencing along the northeast side of the site (Pearl Street edge) to enhance site security.

5. Install a vinyl-coated or thermal fused black chain link fence along the Northwest edge of the site beginning at Pearl Street and traveling to the southwest property corner.

6. Prune all pine trees and oak trees of dead wood and crown raise all trees to a height of 8'-0" clearance.

7. Remove all ponderosa pine trees and oak trees shown for removal within Phase 1 on the Landscape Management and Tree Removal Plan.

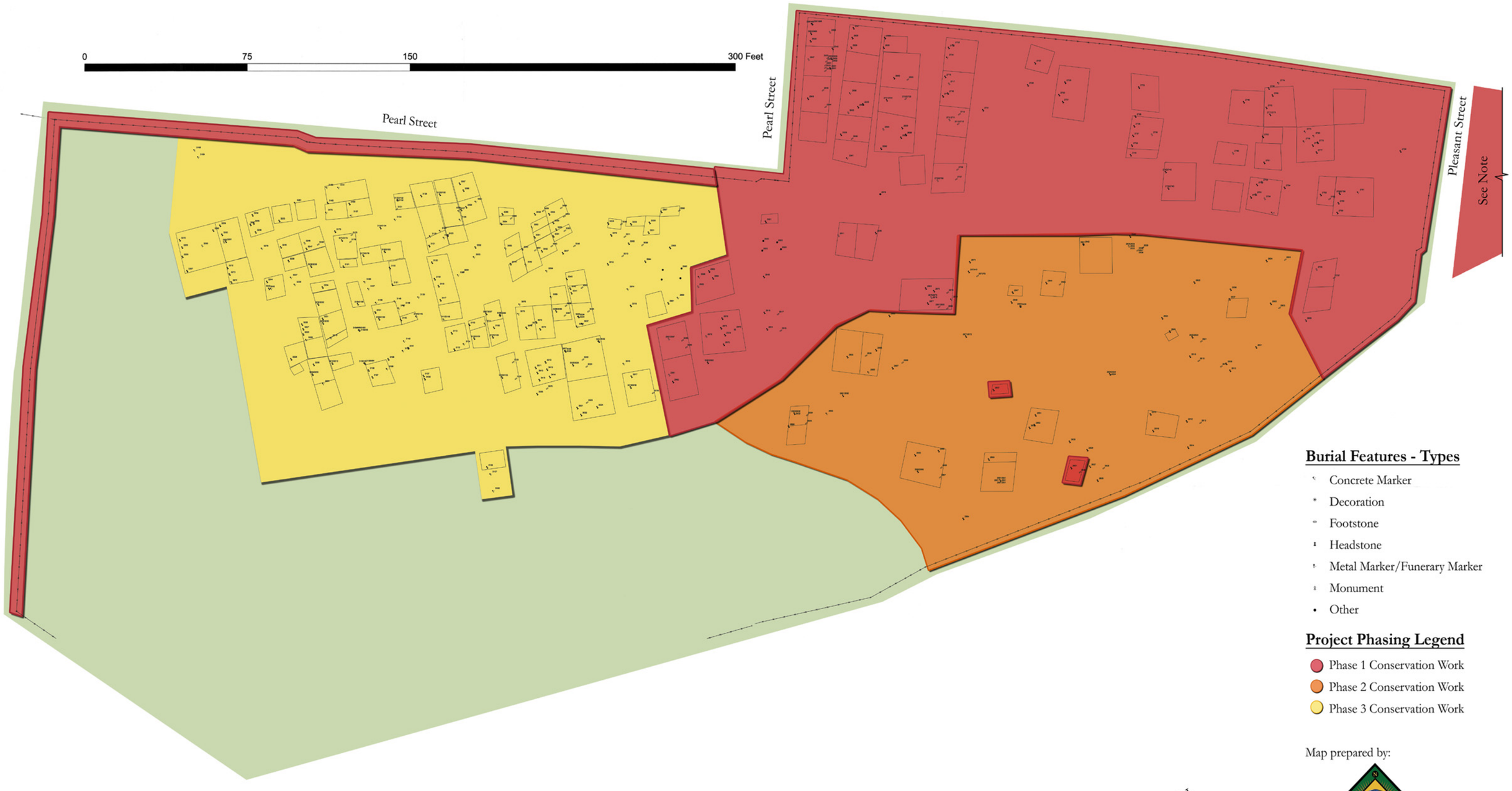
8. Conduct an archaeological investigation in Archaeological Investigation Area No. 6 as described in the Archaeological Assessments and Recommendations Section and as shown on the Proposed Archaeological Studies map. This basically is described as the area below Pleasant Street excluding the pathway leading down to Lower Main Street.

9. Remove volunteer woody plant growth which is negatively affecting monuments, walls and/or ironwork.

10. Develop small parking area along Pearl Street for use by visitors to the cemetery. The parking area should be approximately 6-10 spaces depending on availability of land.

Future Phases of Preservation Activities

As additional funding is secured, each Preservation Project should be uniquely tailored to match the funds available. It is recommended that each project be no less than $250,000 in preservation work to be feasible and draw adequate potential bidders. Each future phase of work may need to be broken down into smaller projects depending on the availability of funding.



Burial Features - Types

- Concrete Marker
- Decoration
- Footstone
- Headstone
- Metal Marker/Funerary Marker
- Monument
- Other

Project Phasing Legend

- Phase 1 Conservation Work
- Phase 2 Conservation Work
- Phase 3 Conservation Work

Map prepared by:

DREAM DESIGN INTERNATIONAL, INC.

Proposed Project Phasing Plan

Note: Full area below Pleasant Street is not shown on map. Exact boundary is unknown and further investigation is needed to determine extents of cemetery.

St. Ambrose Cemetery

Deadwood, South Dakota

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