

TRINITY CATHEDRAL BURYING GROUND
Sixth Avenue, Pittsburgh, Pennsylvania
CONSERVATION PROGRAM: PHASE II

Volume I
Report

PREPARED BY
THE ARCHITECTURAL CONSERVATION LABORATORY
at The University of Pennsylvania
Philadelphia, Pennsylvania

Project Director: Frank G. Matero
Project Manager: Joshua Freedland
Conservation Intern: Kurt Leahey
Conservation Intern: Michael A. Reigert

Table of Contents

Table of Contents.....	ii
Illustrations	iv
Acknowledgements.....	v
Preface.....	1
Introduction.....	2
Site Overview.....	4
Site History	6
Preservation History.....	7
Phase I.....	8
Phase II.....	8
Evaluation of Prototypical Treatments	10
Marker 3: Lewis Robinson.....	15
Marker 26: Sarah D. and Frances Antonia Williams	15
Marker 30: Rayfield.....	18
Marker 36: Red Pole	20
Marker 38: Oliver Ormsby.....	20
Marker 50A: W. T. E.	23
Marker 79A: Sarah Steele.....	23
Protective Measures: Geotextile Pillows	26
Protective Measures: Facings	29
Conservation Treatments	29
Excavation.....	30
Fragment Collection.....	31
Cleaning	33
Biogrowth	33
Soiling.....	34
Carbonate Stones	36
Sandstone (Noncalcareous).....	37
Metallic Staining.....	39

Cupric Markers	40
Grouting	40
Consolidation	42
Composite Repair.....	44
Adhesive Repair.....	45
Mechanical Pinning	47
Carbon Fiber Reinforced Plastic (CFRP) Reinforcement.....	49
Resetting Vertical Markers	49
Resetting Horizontal Markers.....	51
Clover Borders	51
Temporary Protective Measures	53
Facings	53
Protective Burials.....	55
Protective Borders.....	56
Recommendations.....	56
Conservation Treatments	58
Interpretation.....	59
Site Visitation.....	59
Yard Maintenance.....	59
Lighting.....	60
Landscaping	60
Research.....	61
Conclusions.....	61
Bibliography	62
Appendix A: Cost Estimate for Phase III	64
Appendix B: Suppliers.....	65
Appendix C: Photolog.....	70
Volume II: Treatment Reports	
Volume III: Fragments Collection	
Volume IV: Photodocumentation	

Illustrations

Acknowledgements

This project could not have been completed without the support of Dean George L. W. Werner, Dean Richard Pocalyko, and Cannon James D. Shoucair. During the entire project the entire Cathedral and Diocese staff was helpful and encouraging including Mary Lou Procacino, Mary Ellen Leigh, Lynn Wollber, James McCaskill, Bill Ogorodny, Pat Woodly, Tyrone Gannt, Rich Procacino, Bob Wine, Devvy Ridgill and Teri Dillon.

Green Prints, Inc. Landscaping and Design was responsible for the final landscaping of the site.

Dr. A. E. Charola (U Penn), Rick Johansen (ET Techtonics), Rynta Fourier (U Penn), Dorthy Krotzer, Jim Dossett (DPKA), and John Carr (Fairmount Park Trust) gave helpful advice on conservation treatments.

The hard work of Michael A. Riegert (University of Kentucky) and Kurt Leahey (School of the Art Institute of Chicago) was appreciated. I could not have finished the project if it had not been for their good spirits and hard work.

Preface

This report continues the program of conservation outlined in the earlier Phase One Report. Both reports must be read in conjunction with each other; since, most of the history and recommendations are only briefly referenced and minimally revised in this report. The most important aspect of this report is the evaluation of Phase I treatments and the documentation of Phase II treatments.

Introduction

In 1999, Trinity Cathedral contracted with the Graduate School of Fine Arts at the University of Pennsylvania to continue the work outlined in the 1990 Trinity Burying Ground Preservation Plan developed by the Architectural Conservation Laboratory (ACL) of the Graduate Program in Historic Preservation. Phase II of the project was undertaken in conjunction with the Advanced Certificate Program in Architectural Conservation at the University of Pennsylvania. The preservation plan initiated by the ACL is in accordance with international, national, and professional standards for preservation as set forth by the Secretary of the Interior's Standards for the Treatment of Historic Properties, the American Institute of Conservation's Code of Ethics and Guidelines for Professional Practice, and the various relevant international guidelines set forth by the International Council on Monuments and Sites (ICOMOS).

In September 1999, a yearlong preservation project focusing on the conservation of historic monuments in the center and west portions of Trinity Burying Ground in Pittsburgh, Pennsylvania began (Illustration 1). Conservation in this case refers to a cautious preservation approach, that respects the age-value of these outdoor monuments, and focuses on their stabilization in their current condition rather than compensating for previous deterioration. In short, the plan will extend the life of the historic grave markers by reducing the rate of decay through minimal material intervention and respect of the original fabric. Further, the preservation of individual monuments will improve the legibility of the site as a whole.

Specifically, the focus of Phase II included assessing the Phase I prototypical treatments after ten years, testing to develop new preservation treatments, implementing the revised conservation interventions, and establishing new recommendations for continued site preservation. During Phase II, 34 monuments were treated including two major early sandstone pedestal markers (Markers 31 and 60). A total of 78 historic monuments in the center and west portion of the yards await conservation in future phases of the preservation program. The markers in the east yard are not included in the current preservation efforts.

Site Overview

Trinity Burying Ground is listed as a contributing resource to the Pittsburgh Central Downtown Historic District that is included on the National Register of Historic Places. As one of the oldest historic sites in the city and region, the burying ground's significance is unmatched. In addition, Trinity Burying Ground, one of the few remaining greenspaces in downtown, serves as a retreat from the high rise offices of the surrounding business community, as well as, a tourist attraction (Illustration 2). It contains memorials of important founders of both the nation and the city of Pittsburgh (Illustration 3). Continued efforts to preserve this site are of critical importance.

Site History

In 1787, John Penn, Jr. and John Penn granted the land on Sixth Avenue to the Presbyterian and Episcopalian Congregations as a site for their respective churches and as a burying ground.¹ It should be noted that the use of this site as a burying ground predates this grant. The earliest legible tombstone in the yard is Captain Samuel Dawson's (Marker 33) dated September 6, 1779.

In the 1820s a new church was built and an unknown number of bodies were reinterred in a crypt beneath this larger structure. Additional land, east of the original land grant, was purchased in 1827 to expand the burying ground. Changing fashions resulted in the opening in 1844 of Allegheny Cemetery, a rural or garden cemetery located in an outlying residential area of Pittsburgh. Allegheny Cemetery and other similarly situated garden cemeteries in the region displaced Trinity Burying Ground as a resting place; an unknown number of bodies were removed from the crowded Trinity Burying Ground to these landscaped cemeteries.

The date of last interment at Trinity is unknown, the latest legible marker is that of Mary B. Robinson (Marker 9) dated 1857. Sources indicate that by 1869, when the church again began the construction of another new building, no interment had been made for

¹Elizabeth A. Bede and Lee Dassler, "Trinity Episcopal Cathedral Burying Ground Conservation Program: Phase I." Architectural Conservation Laboratory, University of Pennsylvania, 1991, p. 1-47.

many years.² This construction also led to the further relocation of burials in the churchyard and to other cemeteries.

Beginnings in 1903 significant portions of the burying ground were sold as the future site of the Oliver Building. This sale and the subsequent construction of the Oliver Building again led to the moving and removal of many monuments and remains. During this time, the remaining markers in the east yard were set into concrete. Since the construction of the Oliver Building, changes in the burying ground have been limited. In 1909, the significant monument of Dr. Nathaniel Bedford (Marker 31) and his body were moved to the churchyard. In addition, a handful of monuments have been modified or replaced throughout the 20th century. In 1961, the grave and marker of Nathaniel Irish (Marker 46A) from Haddonfield, New Jersey was relocated to the churchyard.

Preservation History

Care and maintenance of the burying ground has always been a part of the responsibilities of the cathedral, it was not until the beginning of the 20th century that the burying ground was recognized as an irreplaceable historic resource. The first step, a result of this recognition, was the documentation of all legible marker inscriptions by Vestryman Henry A. Phillips in 1913. Around the same time, replacement of specific weathered and deteriorated monuments began. This piecemeal replacement continued throughout the century. The Daughters of the American Revolution (DAR) implemented the next major preservation effort. Most notably, this included the erection of a number of new plaques and markers, commemorating the graves of early founders of the United States. An

² Elizabeth A. Bede and Lee Dassler, p. 16.

interpretive brochure was also produced in 1976 illuminating the life of some of the more prominent individuals buried in the yard.

Phase I

In 1990, a conservation team from the University of Pennsylvania established the foundation for preserving Trinity Burying Ground. First, the team researched the archival documents to identify the significance of the site and the changes over the centuries. Second, the conservators surveyed the existing conditions of the site. This included a detailed site plan, archival photographs, and a survey of legible inscriptions. In addition, a comprehensive survey of the existing conditions was conducted, specifically noting the active decay mechanisms. Finally, the team recommended a conservation plan, identifying necessary material interventions and long term preservation goals. This phase also included the test conservation treatment of seven tombstones to serve as the basis for future interventions (Illustration 4).

Phase II

Phase II contributes greatly towards the ultimate goal of stabilizing all historic monuments in Trinity Burying Ground. First, in accordance with Phase I recommendations, approximately 6 inches of soil were excavated in a portion of the center yard. Following the excavation, which uncovered numerous tombstone fragments, a 2 inch layer of 2B gravel was set. This layer of gravel will improve drainage, that will ultimately help reduce the decay rate of the monuments.

At the conclusion of the field season, topsoil and sod were replaced in the yard. Second, based on the results of the 1990 test treatments, material interventions to stabilize and improve the legibility of 34 monuments were completed (Illustration 5). The chosen treatments included cleaning, consolidating, mechanical repairs, fragment attachment, grouting, and composite fills. The treated horizontal markers were reset on a constructed brick base designed during Phase I.³ Around each treated marker, a border of clover was planted to serve as a low maintenance and low impact protective buffer. At the end of the season, protective coverings composed of geotextile, sand, and gravel were put in place to stabilize the untreated horizontal markers in the most danger until the next phase of the conservation project (Illustration 6). Temporary facings were adhered to untreated markers in serious risk of delamination (Illustration 7). A 4 inch border of gravel surrounds each untreated marker to reduce the risk of root damage and prevent grass from growing over horizontal markers (Illustration 8).

Evaluation of Prototypical Treatments

The 1990 prototypical treatments implemented during Phase I of the conservation program performed well over the last 10 years.⁴ Based on these results, similar conservation treatments were implemented during the Phase II Program. The earlier test treatments appear successful, it is vital that marker conservation is integrated into cyclical yard maintenance to ensure site preservation.

³ Elizabeth A. Bede and Lee Dassler, p. 102-104, and 199-201.

⁴ Elizabeth A. Bede and Lee Dassler, p. 96-176.

Specifically, removing the biological growth that appeared on many of the test treated markers should be repeated as necessary. Continued evaluation must also take place to monitor decay mechanisms and rates. A detailed evaluation of the specific monuments treated in 1990 follows.

Marker 3: Lewis Robinson

In 1990, the marble headstone of Lewis Robinson was cleaned using a calcium hypochlorite clay poultice to remove biological growth (Illustrations 9 and 10).⁵ A significant amount of biological growth reappeared on this marble headstone, but the treatment did not cause any harm or accelerate the decay rate of the marker. Since biological growth is a persistent problem at Trinity Burying Ground, this reappearance was expected and inevitable. The experience of this monument reaffirms the necessity, especially in regards to biological growth, for reapplication of selected treatments as needed as part of routine maintenance.

Marker 26: Sarah D. and Frances Antonia Williams

In 1990, the sandstone horizontal marker of Sarah D. and Frances Antonia Williams was treated (Illustrations 11 and 12). The conservation treatments included cleaning with an alkaline based cleaner, composite fills, grouting, and the resetting on a brick base.⁶ After 10 years of weathering, a significant amount of biological growth appeared on this stone. Some of the composite fills failed during the last ten years, but in no case did this failure lead to any further damage to the historic fabric.

⁵ Elizabeth A. Bede and Lee Dassler, p. 127-130.

⁶ Elizabeth A. Bede and Lee Dassler, p. 131-137.

The failures generally occurred in areas where the repair was intended to complete the profile of a molded edge. This failure resulted from inadequate adhesion of the repair to the historic substrate. The grout used in areas of delamination continues to perform well. A new course of bricks was laid on the base constructed in 1990 to raise the height of the marker following the excavation and landscaping of this portion of the yard. While the new course was laid, the 1990 base was repaired. In general, the treatments performed well and helped to reduce the decay rate of the marker. The decay to the composite repairs and the base are disappointing. The delay in excavation may have accelerated this decay; since, plant growth and water infiltration persisted contrary to original intentions. Again, the appearance of biological growth reaffirms the necessity of periodically maintenance.

Marker 30: Rayfield

In 1990, the headstone of Rayfield was cleaned using an alkaline based cleaner, losses were filled with a composite material, and fragments were pinned using epoxy seated nylon pins (Illustrations 13 and 14).⁷ The cleaning of the marker did not have any noticeable detrimental effect. Like the other markers, significant biological growth was noted during evaluation. The condition of the composite repairs including both integrity and adhesion remains good. More significantly, however, upon arriving to the site, the above grade portion of the marker, previously adhered using epoxy seated nylon pins, was found in a paper shopping bag in the fragments collection. This damage most likely resulted from vandalism or accidental human interaction.

⁷ Elizabeth A. Bede and Lee Dassler, p. 138-143.

Although the marker broke largely along the original failure, additional damage occurred. The above grade portion of the marker, previously one piece, was broken into four pieces. Additional loss was also evident along the breaks. Some of this damage resulted from "pop-outs" from the bending of the nylon pins. The damage may have been exacerbated, because the nylon pins used had a diameter slightly larger than recommended in the Phase I report. This treatment failure prompted laboratory research as a part of the Phase II Program.

Marker 36: Red Pole

The conservation treatments on Red Pole's sandstone headstone in 1990 included cleaning, grouting, composite fills, consolidating, and fragment attachment (Illustrations 15 and 16).⁸ All of these treatments weathered well during the last 10 years. Only limited biological growth was visible. Some microcracking was apparent in the composite fills; however, the fills remained in place and well adhered. The attached fragments comprising the crown of the marker also appeared to remain in good condition. No further treatments were performed on this marker during Phase II.

Marker 38: Oliver Ormsby

The monument of Oliver Ormsby was in a severely deteriorated condition in 1990 and significant conservation interventions including reassembly, cleaning, adhesive repairs, composite fills and pointing were required (Illustrations 17 and 18).⁹ The conservation treatments on this marker performed well.

⁸ Elizabeth A. Bede and Lee Dassler, p. 144-151.

⁹ Elizabeth A. Bede and Lee Dassler, p. 152-158.

Adhesion between composite repairs and the marker failed in limited situations mainly when the repair did not have a mechanical key to promote adhesion. The failure of these repairs did not harm the historic fabric of the marker. Like many of the other treated markers, significant biological growth was visible and treated as part of ongoing preservation maintenance during Phase II.

Marker 50A: W. T. E.

In 1990, the marble footstone of W.T.E was cleaned with an alkaline cleaner (Illustrations 19 and 20).¹⁰ Fragments were attached using epoxy seated nylon pins, and cracks were filled with composite material. The treatments on this stone weathered well. Biological growth near the fill line was removed during Phase II. The mechanical pinning repair remained in good condition; however, some of the composite fills between the two portions failed. This failure led to no additional decay of the historic portion of the marker. The marker was set according to the current grade during Phase II. When the west portion of the yard is excavated, the stone will need to be reset according to the final grade.

Marker 79A: Sarah Steele

The marker of Sarah Steele required the cleaning, grouting, and consolidating of the marker (Illustrations 21 and 22).¹¹ The severely deteriorated below grade portion of the marker was replaced with a new stone attached to the conserved above grade portion. This allowed for the setting of the marker at the appropriate height.

¹⁰ Elizabeth A. Bede and Lee Dassler, p. 159-164.

¹¹ Elizabeth A. Bede and Lee Dassler, P.168-175.

These two pieces were attached using epoxy seated nylon pins. The treatments weathered well. Limited microcracking was visible in some portions of the composite repair. The adhesion and integrity of the repairs remain in good condition. The two pieces of the stone remain well adhered. The marker was reset according to the current grade during Phase II.

Protective Measures: Geotextile Pillows

The geotextile pillows employed to temporarily protect the horizontal and below grade markers from root growth and vandalism until a full conservation intervention could be implemented were successful (Illustration 23).¹² Smaller pillows were also placed around the edges of some of the markers to protect them until excavation and resetting (Illustration 24). Upon removal of the pillows, no further damage was noted on these markers. These pillows were never intended to last ten years, but they successfully protected the markers during this entire time. The exposed geotextile had severely fragmented and ripped—due to ultraviolet (UV) light exposure (Illustration 25). The lower level of the geotextile, however, remained intact; since, it was protected from UV light by the layer of sand or soil. This lower level protected the monuments from root penetration. The pillows looked to be in poor condition upon site arrival, with grass growing on many of them, but this was only a cosmetic problem. Although, if left for a longer period of time, these roots may have eventually penetrated the second layer of geotextile. At the conclusion of the Phase II fieldwork, a modified protective burial was implemented that will hopefully have a longer life span.

¹² Elizabeth A. Bede and Lee Dassler, p. 124-125.

Protective Measures: Facings

The success of the protective facings implemented in Phase I was hard to ascertain; since, by 1999 they had completely deteriorated (Illustration 26).¹³ Biological growth, a result of the acrylic resin used to adhere the facings, was evident in locations where the facings once existed. It is vital that these facings are replaced annually so that they can provide the intended protection. In October 1999, the facings were replaced prior to the winter. At the conclusion of the field season in 2000, the facings were also replaced using cotton gauze to improve their durability.

Conservation Treatments

The conservation treatments were chosen individually for each marker based on its specific needs; considerations included size, shape, form, material, condition, and threats.¹⁴ This series of questions resulted in a complex program of material interventions including cleaning, consolidating, filling, adhesive repairing, mechanical pinning, resetting, and grouting. The specific interventions are based on current conservation standards chosen based on previous experience, published research, research conducted at the ACL, and *in situ* testing. In all cases, the tenet of minimal intervention for maximum stabilization was followed in accordance to current professional guidelines. Respect for the historic fabric, as well as, respect for the original form was also paramount in determining appropriate interventions. When possible, treatments were chosen that could be undone with minimal detrimental effect to the

¹³ Elizabeth A. Bede and Lee Dassler, p. 123-124.

¹⁴ Elizabeth A. Bede and Lee Dassler, p. 97-176.

historic fabric. Care was taken to try and ensure failure of a repair will not harm the historic material. As a result, the repairs are weaker than the historic material and may need to be replaced on occasion.

Excavation

The Phase I report recommended the regrading of the burying ground to minimize the detrimental effect of the industrial fallout and to expose previously buried markers or elements of visible markers.¹⁵ This regrading included the removal of 5-8 inches of soil and the placing of 2-3 inches of 2B gravel, 2-3 inches of topsoil, and sod. The excavation ultimately does not change the grade very much, but the gravel will help to improve the poor drainage in the yard, a continual problem at the burying ground that accelerates decay. Further, due to the excessive amount of water used during the conservation treatments, the gravel provides a suitable work area by limiting the amount of mud created. Financial constraints did not permit the excavation of the entire site. The excavation, therefore, was limited to the south portion of the center yard. This area became the focus of the conservation treatments.

The excavation was undertaken in the autumn of 1999 by Trinity maintenance staff and four high school students supervised by the project conservator. It was done using only hand tools to minimize the risk of damage to the historic markers. Immediately following excavation, the gravel was laid. Upon completion of the treatment phase, *Green Prints Landscaping & Design, Inc.* set topsoil and planted sod. The results of the excavation were very successful. The gravel served as an excellent place to conduct

conservation treatments and also served as a barrier to protect the public from the hazardous chemicals used during conservation. The improvement in appearance of the excavated section of the yard was dramatic (Illustrations 27 and 28). Further, the improved drainage will reduce the decay rate of the historic markers due to freeze-thaw cycling and salt crystallization. The remainder of the site should be excavated in a piecemeal fashion as treatments continue.

Fragment Collection

During the excavation of the southern portion of the center yard and around the monuments, numerous fragments were discovered. These fragments were cleaned with tap water and scrubbed with nylon bristled brushes and cataloged (Volume III). Due to the enormous number of fragments discovered during these limited excavations, if no carving existed, fragments from a limited area were collected and cataloged as a group according to the Phase I recommendations.¹⁵ If inscriptions or carvings were identified, the fragments were measured, drawn, and photographed. Many of the fragments will never be reintegrated into the site, but the fragments can serve as an important research tool and provide samples for materials and treatment testing.

¹⁵ Elizabeth A. Bede and Lee Dassler, p. 180-181.

¹⁶ Elizabeth A. Bede and Lee Dassler, p. 177-179.

Cleaning

After being exposed for approximately 150 years during Pittsburgh's industrial rise, the markers at Trinity Burying Ground are very soiled with a thick, greasy, dark, dirt accretion as a result of industrial pollutants.¹⁷ Cleaning each marker was not the ultimate goal of the preservation project, but it was generally necessary, because many of the other treatments require a clean marker. Further, given the uneven appearance of stones due to exfoliation and decay, cleaning was deemed necessary to restore a visual unity to each monument. In addition, cleaning monuments increases the legibility of the individual markers and the site as a whole. In all cases the gentlest cleaning method, that gives acceptable results, was used.

Cleaning was undertaken to give each marker a visual uniformity while respecting the patina of each stone. The goal was not to remove all traces of soiling, but rather to restore their appearance to that of a well cared for historic gravestone. Each stone needs an appropriate individual intervention, but given the similarity of soiling and stone composition of many of the markers, a basic technique, as described below, was used. The specific cleaning treatment of each stone has been recorded in the individual conservation treatment reports (Volume II).

Biogrowth

Biological growth will continue to be a problem at Trinity Burying Ground. Periodic cleaning of biological growth from tombstones will be necessary (Illustration 29).

During Phase II, *D/2 Architectural Biocide* replaced calcium hypochlorite as the chosen chemical to remove biological growth. No long term problems were noted with the tombstones cleaned in 1990 with a dilute calcium hypochlorite solution, but the risk of residual ions is less with the quaternary ammonium based *D/2 Architectural Biocide*. Nonionic detergents were also tested but did not give adequate results. The biocide was applied in a range of strengths according to product literature. The concentrations used ranged from 100% to 25% v/v *D/2 Architectural Biocide* diluted with tap water depending on the severity of the biological growth. Application techniques included applying the cleaning agent as a low-pressure spray or as a clay poultice (4 parts attapulgite, 1 part kaolin v/v). In general, the spray provided good results and was easier to use than the clay poultice. A five minute dwell time was used in both applications. In all cases following the application the marker was scrubbed with nylon bristled brushes and rinsed thoroughly with water. For especially stubborn biological growth, repeated applications were necessary. The same technique was used for all types of stone.

Soiling

The soiling due to atmospheric pollutants was severe especially on the sandstone monuments. Given the difference in the chemistry of the markers within the burying ground, two basic cleaning systems were ultimately most effective.

¹⁷ Elizabeth A. Bede and Lee Dassler, p. 114-121.

Both techniques used PROSOCO's *Sure Klean® 766 Limestone & Masonry Prewash*, followed either by *Sure Klean® Heavy Duty Restoration Cleaner* or *Sure Klean® 766 Limestone & Masonry Afterwash*. In addition to these systems, a variety of other chemicals were tried on both types of monuments. Other tested treatments included a prolonged water clay poultice, *Sure Klean® Heavy Duty Paint Stripper*, Vulpex, and various solvents including acetone, toluene, isopropanol, and xylene. These chemicals were applied in a variety of concentrations and dwell times that were deemed to be safe. In all cases, the stones were scrubbed with various shaped nylon bristled brushes including toothbrushes, nailbrushes, and larger cleaning brushes. Following all cleaning treatments the markers were rinsed with water thoroughly using a pressure washer set on the lowest possible pressure (less than 150psi). The use of a pressure washer provided better results than a garden hose and also used less water. The reduced water use was vital given the poor drainage at the site. More specific information about the cleaning of each marker is detailed in the treatment reports. Summaries of the most effective techniques are described below.

Carbonate Stones

Given the susceptibility of the marble and limestone markers to acids, a procedure that differs from that of sandstone was used (Illustration 30). Upon excavation the marker was scrubbed with a 3% w/w solution of *Triton® XL80N*, a nonionic surfactant, and rinsed with water to remove residual dirt in order to more effectively evaluate the condition and formulate an appropriate treatment. Also, the precleaning served as a preliminary test to ensure stronger chemicals were needed to obtain an acceptable level of clean. This cleaning treatment rarely produced any significant results and was followed

by stronger cleaning techniques. *Sure Klean® 766 Limestone & Masonry Prewash*, a sodium hydroxide based cleaner manufactured by PROSOCO, was found to be the most effective chemical to clean the monuments at Trinity Burying Ground. The *Sure Klean® 766 Limestone & Masonry Prewash* gel was applied using a paintbrush to a marker thoroughly saturated with water and allowed to dwell for an hour. Following scrubbing and water rinsing, the alkaline cleaner was neutralized using *Sure Klean® Limestone & Masonry Afterwash*, an acetic acid based cleaner manufactured by PROSOCO, diluted 1:1 v/v with water and applied with a low-pressure sprayer. The cycle was repeated up to three times to achieve an acceptable appearance. Scrubbing and water rinsing continued until the pH of the rinse water was neutral. Neutralization often required repeated *Sure Klean® Limestone & Masonry Afterwash* applications and continued rinsing for several days. In some instances, a stubborn stain corresponding to the level of atmospheric deposition remained even after repeated applications. Since no technique to remove this dark staining safely was discovered, the staining was left.

Sandstone (Noncalcareous)

Upon excavation the sandstone markers were scrubbed with a 3% w/w solution of *Triton® XL80N*, a nonionic surfactant, and water to remove residual dirt in order to more effectively evaluate the condition and determine the necessary treatments (Illustration 31). This cleaning treatment rarely produced any noticeable reduction in the level of soiling.

After excavation and preliminary scrubbing, *Sure Klean® 766 Limestone & Masonry Prewash* was applied to a thoroughly saturated marker with a paintbrush and allowed to dwell for two hours. Following scrubbing with nylon bristled brushes and water rinsing, the alkaline cleaner was neutralized and the stone further cleaned using *Sure Klean® Heavy Duty Restoration Cleaner*, a hydrofluoric acid based cleaner distributed by PROSOCO, diluted 1:2 v/v with water and applied with a low-pressure sprayer. A 3 minute dwell time was used. This cycle was repeated up to three times to achieve a uniform visual appearance. Scrubbing and water rinsing continued until the pH of the rinse water was neutral. Neutralization often required repeated *Sure Klean® Heavy Duty Restoration Cleaner* applications and continued water rinsing for several days. Extreme caution was necessary when using the *Sure Klean® Heavy Duty Restoration Cleaner*. Hydrofluoric acid can cause serious burns. At times, the acidic cleaner was applied in a clay poultice to limit the risk to both the conservators and the public. This was especially necessary on windy days. Spray application, however, was as effective as the clay poultice and easier to apply and remove.

Metallic Staining

On a few markers an orange metallic staining was noticed (Illustration 32). An ammonium citrate based clay poultice (60% water, 30% ammonium citrate, 10% ammonium hydroxide w/w) was applied to the staining as a clay poultice (1 part attapulgite: 4 parts kaolin v/v). This treatment removed a substantial amount of staining on sandstone markers; however, very minimal results were noticed on the marble markers.

Cupric Markers

The copper alloy markers, in the form of plaques commemorating veterans of the Revolutionary War were largely outside the scope of this phase of the conservation program; since, they are replacement and commemorative markers placed in the yard relatively recently (Illustration 33). When these markers were encountered, they were scrubbed with *Triton® XL80N* and nylon bristled brushes and rinsed thoroughly. The stakes on the medallions were severely corroded. They were removed and replaced with stainless steel rods and held in place with stainless steel shaft collars. Following cleaning and post replacement, these markers were reset in the burying ground. Some of these markers were not reset, because their appropriate locations, commemorating Revolutionary War Soldiers, could not be determined.

Grouting

Injection grouting of a lime-based grout through surgical needles was used to help stabilize delaminated areas in historic markers (Illustration 34). Delaminated areas largely occur in sandstone markers when the stone is set with its original bedding planes set perpendicular to the ground. The grouting technique used was the same as described in the Phase I recommendations.¹⁸ The technique for grouting remained basically the same as 1990, but the composition of the grout changed as a result of research conducted at the ACL.¹⁹

¹⁸ Elizabeth A. Bede and Lee Dassler, p. 109-112.

¹⁹ Angelyn Bass, "Design and Evaluation of Hydraulic Lime Grouts for In Situ Reattachment of Lime Plaster to Earthen Walls." Masters Thesis, University of Pennsylvania, 1998.

The grout was composed of 4 parts hydrated hydraulic lime: 4 parts microspheres: 1 part fine sand (<150 µm) v/v. The grout was mixed 2:1 v/v with a 10% v/v solution of *El Rey Super Additive 200*, an acrylic emulsion. It was then mixed in a high-speed mixer for 5 minutes and then injected into the void.

The basic grouting technique is as follows. After determining the extent of the delamination, the locations of a number of ports are selected, and if necessary, small holes to access the void are drilled. The void is cleaned thoroughly using dental picks and pressurized air. Dams of cotton are placed around the area to be grouted to reduce spillout when the grout is injected. The grout is mixed for 5 minutes in a high-speed mixer. The void is then thoroughly saturated by the injection of a 10% v/v solution of *El Rey Super Additive 200* through the predetermined ports. The grout is slowly injected through syringes until surplus grout spills from the port. The process is repeated for all the injection ports working from the lowest port to the highest port. Excess grout is cleaned from the surface and the cotton damming is removed after the grout has set. Composite fills are placed along the exposed edges of the delaminated area.

Consolidation

Conservare® OH Consolidation Treatment, a silicic ethyl esters based consolidant distributed by PROSOCO, was used to improve the intergranular adhesion of the most friable markers (Illustration 35).²⁰

²⁰ Elizabeth A. Bede and Lee Dassler, p. 122-123.

The solution was applied in cycles of three applications each after cleaning. First, the monument was saturated with the *Conservare® OH Consolidation Treatment* using a low-pressure hand sprayer until a gloss appeared on the surface. After 15 minutes, another application was applied. Following another 15 minutes, the final application was applied. After an hour, if there was no gloss remaining on the surface of the stone the entire cycle was repeated. The markers at Trinity Burying Ground were treated with either two or three cycles. At the conclusion of the one hour waiting period of the final cycle, the surface of the monument was rinsed with methyl ethyl ketone applied using a low-pressure hand sprayer. The monument was then covered in plastic to protect the monument from the weather while the consolidant cured. Extreme safety precautions must be used when handling and applying the consolidant and methyl ethyl ketone.

Composite Repair

Composite repairs were used to fill losses that promote water infiltration and may accelerate decay (Illustration 36).²¹ Occasionally, the fills also were used to complete the form of a marker. Fills were composed of ASTM Type N mortar and color matched using a selection of locally available sands and masonry pigments. Type N mortar was chosen because of its physical and material compatibility with the deteriorated markers, results from the test treatments from 1990, and laboratory research.²² In the case where the composite fill was greater than an inch, the marker was drilled to form negative keys to increase adhesion between the marker and the repair.

²¹ Elizabeth A. Bede and Lee Dassler, p. 108-109.

²² James Weldon Dossett, "Composite Repair of Sandstone." Masters Thesis, University of Pennsylvania, 1998.

These repairs were also completed in a series of lifts with each lift being scored to increase adhesion between the layers.

Adhesive Repair

Many of the monuments, especially the marble horizontal monuments had clean fractures. In these cases, the pieces were adhered with the *Sikadur* series of epoxy products.²³ Given the problems experienced with a solid bead of epoxy and research conducted at the ACL, these fragments were adhered using "spot-welds" to help protect against additional damage if the repair fails in the future (Illustrations 37 and 38).²⁴ Prior to the application of the epoxy, the broken edges to be attached were cleaned using acetone and isopropanol to remove any loose dirt and grease to ensure proper adhesion. These welds were placed randomly using a wood applicator approximately 0.5-1.0 cm apart and at least 0.5 cm from the edges. The markers were then clamped together with a variety of bar and Jorgenson clamps. They were covered with plastic and allowed to set. When adhesive repairs were undertaken on horizontal markers, the breaks were generally reinforced using carbon fiber reinforced plastic straps and epoxy spot welds on the underside as described below.

²³ Elizabeth A. Bede and Lee Dassler, p. 105-108.

²⁴ Dawn Melbourne, "A Comparative Study of Epoxide Resin and Cementitious Grouts for the Delamination of Sandstone at El Morro National Monument." Masters Thesis, University of Pennsylvania, 1994.

Mechanical Pinning

When larger fragments were reintegrated, in addition to spot-welding the fragments along the break as described above, the repair was reinforced with threaded nylon rods (Illustration 39). Prior to spot welding, the placement, length and diameter of the rods were determined using slightly modified guidelines from the Phase I report.²⁵ The diameter of the pins was less than 1/4 of the width of the stone. The total length of the pin was at least 8x the diameter. The pins were set no closer than 8x the diameter apart. After the placement was determined, the two portions of the marker were aligned and marked. Holes were drilled using masonry drill bits 1/8" greater than the diameter of the pins and 1/8" deeper than half the total length of the pin into both portions of the marker. The holes were cleaned and filled with *Siakdur* epoxy, the pins were set into one side of the marker. The spot welds were placed along the break and the holes on the other portion of the marker were filled with epoxy. The two adherends were carefully aligned and clamped together using a variety of clamps and allowed to cure. Generally, mortar fills along the break were necessary to protect the repair and compensate for loss of material.

In some cases, the original ferrous pins attaching the headstone to the base had corroded. These pins were mechanically removed and replaced with threaded stainless steel pins set in the original holes. These pins were set in Type O mortar. The entire marker was reset according to the standard guidelines.

²⁵ Elizabeth A. Bede and Lee Dassler, p. 105-108.

Carbon Fiber Reinforced Plastic (CFRP) Reinforcement

According to tests performed at the ACL and field observations, a new conservation technique was introduced at Trinity Cathedral Burying Ground to treat the horizontal markers. Following the necessary adhesive repairs, CFRP straps were cut and adhered to the back of the marker using spot welds of *Sikadur* epoxy (Illustration 40). The straps varied in length and placement depending on the specific orientation, location, and length of the breaks. As a general rule, the straps extended 3-4 inches on each side of the crack and were set every 6-8 inches (center to center) apart along the crack. Following the placement of the epoxy spot welds and CFRP straps, the straps were weighted and allowed to set.

Resetting Vertical Markers

Because of the excavation and changes in the grade at Trinity Burying Ground, it was necessary to reset nearly all treated monuments. Resetting will improve legibility of the individual markers and prevent possible future damage. The resetting was done in accordance with the recommendations described in the Phase I report.²⁶ Each marker was reset protected with a geotextile and a gravel border around and below it (Illustration 41). These precautions will improve water drainage away from the markers as well as prevent root damage.

²⁶ Elizabeth A. Bede and Lee Dassler, p.101-102.

Resetting Horizontal Markers

As described in the Phase I report, the horizontal markers rest on a low profile brick base (Illustration 42).²⁷ A three course base was used rather than the two course base designed in 1990 to raise the ultimate level of the markers several inches. Besides respecting the historic context of these markers, the base will serve as preventive preservation. First, the base will isolate the markers from damaging roots as well as from rising damp. The base will also serve as a physical barrier encouraging site visitors to respect the historic markers. Finally, the bases will allow easier yard maintenance and protect the markers from damage resulting from the abrasion of lawnmowers.

Clover Borders

Upon completing all conservation treatments, a 4 inch border of clover was planted around each marker (Illustration 43). Since clover is low growing, it will require only limited care and thus reduce the risk of damage during lawn maintenance. Further, given clover's simple root system, the risk of damage due to root penetration is highly reduced when compared to the risk posed by grass.

²⁷ Elizabeth A. Bede and Lee Dassler, p.102-104.

Temporary Protective Measures

Given the limited time and funds for the Phase II project, it was not possible to treat all the monuments in the yard.²⁸ Following the Phase I system, a series of temporary measures, that will protect the monuments until conservation can take place, was undertaken. Many of these treatments were modified from those commonly used on archaeological sites. While all of these treatments are temporary and will require reapplication and maintenance, minor changes in their execution will hopefully extend their durability beyond one year. It is necessary to monitor these treatments, and if conservation does not occur before they deteriorate, they should be replaced.

Facings

Monuments suffering from delamination are threatened especially by freeze-thaw damage during the winter. As a precaution, the protective facings that were applied at the conclusion of Phase I were replaced (Illustration 44).²⁹ For this process, wet strength tissue adhered with a 10% w/w solution of *Acryloid B-72*, an acrylic resin, in acetone, was applied to the surface of threatened portions of the monuments using a brush. To improve the durability of these facings, cotton gauze was applied over the wet strength tissue with the same *Acryloid B-72* solution. It is important to note that these facings are temporary. They should be replaced every year until the conservation treatments on these monuments can take place.

²⁸ Elizabeth A. Bede and Lee Dassler, p. 123-125.

²⁹ Elizabeth A. Bede and Lee Dassler, p.123-124.

Protective Burials

In 1990, a system based on archeological site conservation was established to stabilize the severely deteriorated monuments until a full conservation treatment can take place. The system, referred to in the 1990 report as geotextile sand pillows, served well.³⁰ Even though the pillows were intended only to last a single year, they preformed well during the decade between Phase I and Phase II. Little deterioration of these protected monuments was noticed when uncovered and evaluated during the summer of 2000. Based on these positive results, a slightly modified protective system was put in place (Illustration 45). After removing the previous geotextile pillow the monument was brushed with a dry soft brush and a layer of geotextile was placed over the monument. A 2-3 inch layer of washed sand was then set down in place around and over the excavated marker, followed by another layer of geotextile. On top of this second layer of geotextile, a 1-2 inch layer of pea gravel was placed. The pillows from 1990 performed very well, during the 10 years the top layer of the geotextile deteriorated largely due to its susceptibility to UV light degradation. The delay that occurred after Phase I illustrated the need to improve the durability of these pillows for Phase II given the uncertainty of funding. The gravel over the top layer of geotextile should protect the geotextile from UV light deterioration and extend the lifespan of the protective markers.

These coverings serve a number of purposes. First, the geotextile, sand, and gravel will deter plant growth on the monuments and thus prevent roots from entering small cracks

³⁰ Elizabeth A. Bede and Lee Dassler, p. 124-125.

and voids and further fragmenting the tombstones. Second, the thick layer will create a cushion in the event that people or animals walk on them.

Protective Borders

During the fall of 1999, significant amounts of grass had grown over the exposed horizontal markers. This growth increases risk of root damage, causes discoloration, and obscures the form and inscriptions of the markers. Until resources permit the resetting of horizontal markers on a brick base a 4 inch gravel border was put in place to help limit this problem for the untreated markers (Illustration 46). The gravel border will also help to improve drainage away from these markers to limit their susceptibility to freeze-thaw cycling and salt crystallization damage.

Recommendations

The future preservation of Trinity Burying Ground will require additional resources and a commitment from Trinity Cathedral. Strong leadership to continue the preservation efforts and ensure the continued care of the site upon completion of the master plan is required. Preservation is a process that is never complete. It requires continual vigilance and monitoring. The following are recommendations that will help form the foundation of a solid preservation plan, and largely echo the 1990 recommendations.³¹

³¹ Elizabeth A. Bede and Lee Dassler, p. 180-189.

Conservation Treatments

First, the 78 historic monuments in the west and center portions of the burying ground should be treated as soon as possible to prevent further decay. The treatments as outlined above summarize the latest preservation technology, but they should be reviewed prior to implementation and adjusted, as new research and techniques become available. Also, they may need to be adjusted as a result of the evaluation of both the 1990 and the 2000 treatments. The treatments should be done in conjunction with the piecemeal excavation of the yard to provide an adequate workspace and protect the public from the chemicals used during the treatment phase. It is recommended that the treatments be conducted over the course of two or three summer field seasons depending on the availability of funds. The schedule and budget are only estimates. During future excavations, additional markers may be found. For example, during the 2000 field season, what appeared to be intact horizontal markers were found below markers 47 and 48 (Illustration 47). A footstone used as a support for Marker 57 was also found and placed in the fragments collection. These and possibly other markers, buried as a result of grade changes in the yard, will require a careful plan. Further, a great deal of time during Phase II was devoted to replacing the protective treatments. If the next phase occurs soon, it will require less time devoted to protective treatments and allow more time for conservation treatments. If a long delay occurs, additional funds will be necessary to reapply the protective treatments.

Interpretation

Also, the 1976 interpretation of the burying ground needs revision to refocus and present the site to the public in a more effective manner. The new interpretation should expand beyond merely identifying significant individuals in the burying ground, and include a discussion of the landscape and the shift from urban to landscaped cemeteries. Further, given the level of care in the preservation at the site and the various techniques used, it would be a great opportunity to interpret the conservation techniques and theory used. The new interpretation should be readily accessible to the public. A permanent signboard, possibly located on the west edge of the burying ground, would be especially helpful.

Site Visitation

In addition to improved interpretation, other steps outlined in the Phase I report, should also be undertaken to improve the quality of site visitation. First, unobtrusive signs posted at either entrance to the burying ground should instruct visitors on the respect and rules of the burying ground. Benches and trash receptacles would also improve site visitation.

Yard Maintenance

Beyond material interventions, yard maintenance and improvements will significantly promote site preservation. Improvements in the landscaping of the yard will not only make the site a more inviting refuge, but will also help to protect the monuments before and after conservation efforts. Additional care in the maintenance of the yard, including

the bagging of cut grass, the use of a grass trimmer near and around markers, and tree pruning will also help preserve the burying ground for future generations. An annual survey followed by periodic conservation interventions will need to be ongoing. In short, the maintenance of the burying ground should be institutionalized within the operations of Trinity Cathedral with active involvement of its parishioners.

Lighting

Between Phase I and Phase II, vandalism led to severe damage of six monuments. Unfortunately, the best conservation can not protect the site from vandalism. To dissuade vandals, it is vital that lighting in the yard is improved. The lighting should visually intrude as minimally as possible on the site. Additional security may also need to be incorporated.

Landscaping

During the entire history of the burying ground, the plantings have continually changed to suit the tastes of the congregation. It is not recommended that the yard return to its most likely unlandscaped eighteenth-century past; it is necessary to exercise the utmost caution in any new yard plantings. The plantings should remain as minimal as possible with specific care given to ensure that plants that excrete acids, stain, or have large or complex root systems are not planted. Inappropriate plantings over the years have led to severe damage caused by roots as well as acid disintegration of marble markers.

Research

Additional historic research and conservation intervention research should continue as part of the future phases on the conservation program. Specifically, the appropriate location of the Revolutionary War plaques should be determined. The Daughters of the American Revolution may be of great assistance in this task.

Conclusions

Trinity Burying Ground is an important historic site unmatched in downtown Pittsburgh. Because the burying ground is a locally, regionally, and nationally significant site, Trinity Cathedral, as its caretaker, should continue to act to ensure the preservation of the site for future generations. Preservation is never complete and the Cathedral must maintain its vigilance to ensure the proper care of the site.

Bibliography

- Ashurst, John and Nicola Ashurst. *Practical Building Conservation*. New York: Halsted Press, 1988.
- Ashurst, Nicola. *Cleaning Historic Buildings*. London: Donhead, 1994.
- Bass, Angelyn. "Design and Evaluation of Hydraulic Lime Grouts for In Situ Reattachment of Lime Plaster to Earthen Walls." Masters Thesis, University of Pennsylvania, 1998.
- Bede, Elizabeth A. and Lee Dassler. "Trinity Episcopal Cathedral Burying Ground Conservation Program: Phase II." Architectural Conservation Laboratory, University of Pennsylvania, 1991.
- The Conservation Unit of the Museums and Galleries Commission. *Science for Conservators*. Routledge: New York, 1997.
- Dossett, James Weldon. "Composite Repair of Sandstone." Masters Thesis, University of Pennsylvania, 1998.
- Knack, Ruth Eckdish. "The Ultimate Open Space." *American Planning Association*. Vol. 56 No. 2, February 1990 p.13-15.
- Matero, Frank G. and Angelyn Bass. "Design and Evaluation of Hydraulic Lime Grouts for the Reattachment of Lime Plasters on Earthen Walls." *Conservation and Management of Archaeological Sites Vol. I, 1995 p. 97-108*.
- Matero, Frank. "Masonry Conservation Program Old Stone Church, Mission San Juan Capistrano." Architectural Conservation Laboratory, University of Pennsylvania, 1995.
- Mayer, Lance R. "The Care of Old Cemeteries and Gravestones. Association for Gravestone Studies, 1980.
- Melbourne, Dawn Marie. "A Comparative Study of Epoxide Resin and Cementitious Grouts for the Delamination of Sandstone at El Morro National Monument." Masters Thesis, University of Pennsylvania, 1994.
- Noisternig, J. F., and M. Maier. "Strengthening with a Carbon Fiber Composite Cable. A New Possibility?" p. 121-128. *Structural Studies of Historic Buildings IV – Volume 2 Dynamics, Repairs, and Restoration*. C. A. Brebbia and B. Leftheris (eds). Boston: Computational Mechanics Publications, 1995.
- Strangstad, Lynette. *A Graveyard Preservation Primer*. Nashville, TN :American Association for State and Local History, 1988.

Triantafillou, T. C., and M. N. Fardis. "Strengthening of Historic Masonry Structures with Fibre Reinforced Plastic Composites." p. 129-136. *Structural Studies of Historic Buildings IV – Volume 2 Dynamics, Repairs, and Restoration*. C. A. Brebbia and B. Leftheris (eds). Boston: Computational Mechanics Publications, 1995.

Venkataraman, Anuradha. "The Conservation of Salt-Contaminated Stone." Masters Thesis, University of Pennsylvania, 1992.

Zielinski, A. K. *Conservation of Cemeteries The Treatment, Repair and Maintenance of Cemetery Objects in Their Environment*. Robert Seymour & Associates Ltd., 1989.

Appendix A: Cost Estimate for Phase III

Estimate for Burying Conservation Program Center and West Yards

	Phase III	Phase IV	Total
Compensation	<u>71,320</u>	<u>71,320</u>	<u>142,640</u>
Principle Investigator	11,250	11,250	22,500
Research Assistant	36,000	36,000	72,000
Summer Interns	15,000	15,000	30,000
Administration	4,000	4,000	8,000
Subtotal	<u>66,250</u>	<u>66,250</u>	<u>132,500</u>
Full-Time Employee Benefits (28.7% of \$11,250)	3,230	3,230	6,460
Part-Time Employee Benefits (9.7% of \$19,000)	1,840	1,840	3,680
Subtotal	<u>5,070</u>	<u>5,070</u>	<u>10,140</u>
Tuition Remission (plus University Match)	<u>4,800</u>	<u>4,800</u>	<u>9,600</u>
Total Expenses	<u>51,000</u>	<u>51,000</u>	<u>102,000</u>
Travel	13,700	13,700	27,400
Accommodations	15,000	15,000	30,000
Supplies & Equipment	22,000	22,000	44,000
Postage, Telephone etc.	300	300	600
Direct Expenditures	127,120	127,120	254,240
Indirect Expenditures (18%)	22,880	22,880	45,760
Subtotal University Portion	<u>150,000</u>	<u>150,000</u>	<u>300,000</u>
Cathedral Expenses	50,000	50,000	
Landscaping & Excavation	40,000	40,000	80,000
Labor	10,000	10,000	20,000
Subtotal Cathedral Portion	<u>50,000</u>	<u>50,000</u>	<u>100,000</u>
Total	\$ 200,000	\$ 200,000	\$ 400,000

Appendix B: Suppliers

Carbon Fiber Reinforced Plastics

DFI Pultruded Composites, Inc.
1600 Dolwick Drive
Erlanger, KY 41018-3588
John Doyle
859.282.7300

Chemical/Lab Supplies

Fisher Scientific
385 Alpha
Pittsburgh, PA
412.963.3300

Burrell Scientific, Inc.
2223 Fifth Avenue
Pittsburgh, PA 15219

Consolidants

A R Chambers and Sons (Distributor)
111 35th Street.
Pittsburgh, PA, 15201
412.681.8955

D/2 Architectural Biocide

Cathedral Stone Products
7266 park circle drive
Hanover, MD 21076
410.782.9150
410.782.9155 Fax

Epoxies: SIKA

A R Chambers and Sons (Distributor)
111 35th Street.
Pittsburgh, PA, 15201
412.681.8955

Kempf Supply Company
5800 Lindberg Blvd.
Philadelphia, PA 19143
215.724.8000
215.724.0641 Fax

Fasteners

Diamond Tool and Fasteners
29th Street and Grays Ferry Avenue
Philadelphia, PA 19102
215.952-1919

MSC Industrial Supply
151 Sunnyside Boulevard
Plainview, NY 11803-9915
800.645.7270
800.255.5067 Fax
www.mscdirect.com

Geotextiles

A R Chambers and Sons (Distributor)
111 35th Street
Pittsburgh, PA, 15201
412.681.8955

Housing

Graham House Apartments
439 Graham Street
Pittsburgh, PA 15232
Adrian Westapol, Property Manager
412.661.2261

Masonry Cleaners

A R Chambers and Sons (Distributor)
111 35th Street
Pittsburgh, PA, 15201
412.681.8955

Masonry Supplies: Bricks, Lime, Cement, Sands

Allegheny Brick and Builders Supply
150 Perrysville Avenue
Pittsburgh PA
412.931.7341

George L. Wilson & Co., Inc. (Distributors)
220 East General Robinson Street
Pittsburgh, PA 15212
412.321.3217
412.321.2459 Fax

Microspheres

3-M
3M Center
St. Paul, MN 55144-1000
800.364.3577

Paper Pulp-Cotton Linters #27

Twinrocker Papermaking Supplies
P.O. Box 413
Brookston, IN 47923
317.563.3119

Photography Supplies

Sukolsky-Brunelle, Inc.
908 Penn Avenue
Pittsburgh, PA 15222
412.391.6440
412.391.9401 Fax
www.sbi-online.com

Pittsburgh Custom Darkroom
521 East Ohio Street
Pittsburgh, PA 15212
412.321.2100
www.photoprocess.com

Fotoshop Squirrel Hill
5836 Forbes Avenue
Pittsburgh, PA
412.421.7700

Resins/ Facing paper/ pH Strips

Talas
213 West 35th St.
New York, NY 10001-1996
212.736.7744

Safety

Lab Safety Supply, Inc.
401 South Wright Road
P.O. Box 5004
Janesville, WI 53547-5004

Forestry Suppliers, Inc.
Post Office Box 8397
Jackson, Mississippi 39284-8397
800.647.5368
800.543.4203
www.forestry-suppliers.com

Stainless Steel Sprayers

Residex
1001 Seco Road
Monroeville, PA 15146
800.828.4339

Stainless Steel Pins

MSC Industrial Supply
151 Sunnyside Boulevard
Plainview, NY 11803-9915
800.645.7270
800.255.5067 Fax
www.mscdirect.com

Surgical Supplies

Arista Surgical
67 Lexington Avenue
New York, NY 10010
212.679.3693

West Penn Surgical Supply
4782 Liberty Avenue
Pittsburgh, PA
412.621.3334

Threaded Nylon Rods

MSC Industrial Supply
151 Sunnyside Boulevard
Plainview, NY 11803-9915
800.645.7270
800.255.5067 Fax
www.mscdirect.com.

Landscaping

Green Prints, Inc. Landscaping and Design
Pittsburgh, PA
412.782.4417

Other Suppliers

Conservation Emporium
18124 Wedge Parkway
Suite 458
Reno, NV 89511
775.852.0404
775.852.3737

Home Depot

Lowe's

Mueller's Hardware
526 East Ohio Street
Pittsburgh, PA
412.321.6329

Utrecht
1930 East Carson Street
Pittsburgh, PA 15203
412.432.1945

Appendix C: Photolog

TRINITY BURYING GROUND PHOTO LOG ROLL A

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	1	Before	West	Pedestal Detail
2	1	Before	South	Pedestal Detail
3	1	Before	South	Pedestal Detail
4	1	Before	East	Pedestal Detail
5	1	Before	North	Pedestal Detail
6	1	Before	North	
7	1	Before	West	
8	1	Before	South	
9	1	Before	East	
10	2	Before	West	Protective Cover
11	2	Before	West	Protective Cover
12	3	Before	West	
13	3	Before	East	
14	P3	Before	West	
15	4	Before	West	
16	5	Before	West	
17	5	Before	East	
18	F5	Before	West	
19	6	Before	West	
20	8	Before	West	
21	9	Before	West	
22	9	Before	East	
23	F9A	Before	East	
24	10	Before	West	
25	10	Before	West	
26	10	Before	East	
27	F10A	Before	West	
28	P10A	Before	West	
29	11	Before	West	Protective Cover
30	12	Before	East	Protective Cover
31	13	Before	East	Protective Cover
32	14	Before	East	Protective Cover
33	15	Before	East	Protective Cover
34	16	Before	East	Excessive Vegetation Covering Tombstone
35	F16.1	Before	East	Protective Cover
36	P16	Before	West	

TRINITY BURYING GROUND PHOTO LOG
ROLL B

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	P16	Before	West	
2	R17	Before	West	
3	18	Before	West	
4	19	Before	West	
5	19	Before	East	
6	20	Before	East	
7	21	Before	East	Protective Cover
8	22	Before	East	Protective Cover
9	22	Before	East	
10	23	Before	East	Flash
11	23	Before	East	
12	X24	Before	West	Flash
13	X24	Before	West	
14	X24	Before	East	Flash
15	X24	Before	East	
16	25	Before	East	Flash
17	25	Before	East	Excessive Vegetation
18	26	Before	East	Excessive Vegetation-Flash
19	26	Before	East	
20	X27	Before	East	Flash
21	X27	Before	East	
22	R28	Before	West	Flash
23	R28	Before	West	Sign board misnumbered
24	R28	Before	West	Flash-sign board misnumbered
25	R28	Before	West	
26	X29	Before	West	Flash
27	X29	Before	West	
28	X29	Before	East	Flash
29	X29	Before	East	
30	30	Before	West	Flash
31	30	Before	West	Below grade grown over
32	31	Before	West	Flash
33	31	Before	West	Flash-pedestal
34	31	Before	West	Flash-pedestal
35	31	Before	West	
36	31	Before	North	

TRINITY BURYING GROUND PHOTO LOG
ROLL C

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	31	Before	North	Pedestal
2	31	Before	North	Flash-Pedestal
3	31	Before	North	
4	31	Before	North	Flash
5	31	Before	South	Pedestal
6	31	Before	South	Flash-Pedestal
7	31	Before	South	
8	31	Before	South	Flash
9	31	Before	Southeast	Pedestal
10	31	Before	Southeast	Urn
11	31	Before	Northeast	Pedestal
12	31	Before	Northeast	Urn
13	32	Before	West	
14	32	Before	West	Flash
15	32	Before	East	
16	32	Before	East	Flash
17	F32A	Before	Aerial	
18	F32A	Before	West	
19	F32A	Before	East	
20	F32A	Before	East	Flash
21	33	Before	East	
22	33	Before	East	Flash
23	P33	Before	West	
24	34	Before	West	
25	34	Before	West	Flash
26	35	Before	West	
27	35	Before	West	Flash
28	36	Before	West	
29	36	Before	West	Flash
30	36	Before	Northeast	
31	36	Before	Southeast	
32	37	Before	West	Flash
33	37	Before	West	
34	P37	Before	West	
35	39	Before	West	Protective Cover
36	40	Before	West	Protective Cover

TRINITY BURYING GROUND PHOTO LOG
ROLL D

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	41	Before	West	Protective Cover
2	42	Before	West	Protective Cover
3	38	Before	West	
4	38	Before	North	
5	38	Before	East	
6	38	Before	East	Flash
7	38	Before	South	
8	38	Before	South	Flash
9	42A	Before	East	
10	42A	Before	East	Flash
11	64A	Before	East	
12	64A	Before	East	Flash
13	64A	Before	East	Sign Board Mislabeled
14	X43	Before	East	Flash-Sign Board Mislabeled
15	X43	Before	East	
16	X43	Before	West	
17	X43	Before	East	
18	44,45,46	Before	West	Protective Cover
19	44,45,46	Before	West	Protective Cover-Flash
20	46A	Before	East	
21	46A	Before	East	Flash
22	47	Before	East	
23	47	Before	East	Flash
24	P47	Before	East	
25	48	Before	East	
26	48	Before	East	Flash
27	49	Before	East	
28	49	Before	East	Flash
29	50	Before	East	
30	50	Before	East	Flash
31	50	Before	East	Flash
32	50	Before	West	
33	50	Before	West	Flash
34	F50A	Before	West	
35	F50A	Before	West	Flash
36	F50A	Before	East	

TRINITY BURYING GROUND PHOTO LOG
ROLL E

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	51A	Before	West	Aerial
2	51A	Before	West	
3	51A	Before	East	
4	52	Before	East	
5	53	Before	West	
6	X53	Before	West	
7	X53	Before	East	
8	54	Before	East	Detail
9	54	Before	East	
10	54	Before	North	Detail
11	54	Before	North	
12	54	Before	West	
13	54	Before	South	Detail
14	54	Before	South	
15	55	Before	East	
16	X56	Before	East	
17	X56	Before	West	
18	56A	Before	East	
19	57	Before	East	Flash-Aerial
20	57	Before	East	Aerial
21	F57	Before	East	Aerial
22	58	Before	East	
23	58	Before	West	
24	59	Before	East	
25	F57	Before	East	Excessive Vegetation Covering
26	F57	Before	East	Excessive Vegetation Covering
27	60	Before	East	
28	60	Before	North	
29	60	Before	North	Flash
30	60	Before	West	
31	60	Before	West	Flash
32	60	Before	South	
33	60	Before	South	Flash
34	61	Before	East	
35	61	Before	East	Flash
36	61	Before	West	

TRINITY BURYING GROUND PHOTO LOG
ROLL F

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	62	Before	West	
2	62	Before	East	
3	62	Before	East	Flash
4	X63.1	Before	West	
5	X63.1	Before	West	Flash
6	X63.1	Before	Southwest	
7	R63.2	Before	East	
8	R63.2	Before	East	Flash
9	64A	Before	East	Protective Cover
10	67,68	Before	East	
11	69	Before	East	
12	70	Before	East	Protective Cover
13	71	Before	East	
14	71	Before	East	Flash
15	71	Before	West	
16	71	Before	West	Flash
17	71	Before	West	Fragment-reintegrated 2000
18	X72	Before	West	
19	X72	Before	East	
20	R73	Before	East	
21	74	Before	East	
22	74	Before	West	
23	75	Before	East	
24	75	Before	East	Flash
25	75	Before	West	
26	F75A	Before	East	
27	R76	Before	East	
28	R76	Before	East	Flash
29	R76	Before	West	
30	R76	Before	West	Flash
31	77	Before	West	
32	77	Before	East	
33	78	Before	East	
34	78	Before	East	Aerial
35	78	Before	West	
36		Before		Overview

TRINITY BURYING GROUND PHOTO LOG
ROLL G

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	79	Before	West	
2	79	Before	East	
3	79	Before	East	Flash
4	79A	Before	East	
5	79A	Before	West	
6	80	Before	East	
7	81	Before	East	
8	81	Before	West	
9	F81	Before	East	
10	X82,83,84	Before	East	Protective Cover
11	85	Before	East	
12	86	Before	East	Aerial
13	86	Before	East	
14	86	Before	East	Flash
15	86	Before	West	
16	86	Before	West	Flash
17	F86	Before	East	Aerial
18	F86	Before	East	
19	X87	Before	East	
20	X87	Before	East	Flash
21	X87	Before	West	
22	X87	Before	West	Flash
23	88	Before	East	
24	89	Before	East	Protective Cover
25	89	Before	East	Flash- Protective Cover
26	90	Before	East	Protective Cover
27	90	Before	East	Flash-Protective Cover
28	91	Before	East	Protective Cover
29	91	Before	East	Flash-Protective Cover
30	92	Before	East	Protective Cover
31	92	Before	East	Flash-Protective Cover
32	92A	Before	East	
33	92A	Before	West	
34	92A	Before	West	Flash
35	X94	Before	East	Aerial
36	X95	Before	East	Aerial

TRINITY BURYING GROUND PHOTO LOG
ROLL H

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	96	Before	East	
2	97	Before	East	
3	97	Before	East	Flash
4	97	Before	West	
5	97	Before	West	Flash
6	98	Before	East	
7	99,100,101	Before	East	Protective Cover
8	102	Before	East	
9	103	Before	West	
10	104	Before	East	
11	104	Before	West	
12	X105	Before	East	Aerial
13	X106	Before	East	Aerial
14	X106	Before	East	
15	X106	Before	West	
16	X107	Before	East	Aerial
17	X107	Before	East	
18	X107	Before	West	
19	108	Before	East	
20	108	Before	West	
21	108	Before	West	Aerial
22	109	Before	West	
23	109	Before	South	
24	109	Before	East	
25	109	Before	North	
26	110	Before	West	
27	111	Before	West	
28	112	Before	West	Flash
29	112	Before	West	
30	113	Before	West	
31	113	Before	West	Flash
32	114	Before	West	
33	115	Before	West	
34	115	Before	South	
35	115	Before	East	
36	115	Before	North	

TRINITY BURYING GROUND PHOTO LOG
ROLL I

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	116	Before	West	
2	117	Before	North	
3	118	Before	West	Fragment 176
4	119	Before	West	
5	R120	Before	West	
6	121	Before	West	
7	121	Before	West	Detail-Damage due to vines
8	121A	Before	West	
9	122	Before	West	
10	123	Before	West	
11	124	Before	West	
12	124	Before	North	
13	F124	Before	West	
14	F124	Before	East	
15	125	Before	West	
16	126	Before	West	
17	126	Before	West	
18	128	Before	West	
19	128	Before	West	
20	92	Before	East	
21	25	Before	East	After excess vegetation removed
22	30	Before	Fragments	Stone repaired in 1990 & 2000
23	71	Before	Fragments	
24	50	Before	Fragments	
25	49	Before	Fragment	Misnumbered sign board
26	X53	Before	Fragments	Misnumbered sign board-Fragment 178-9
27	78	Before	Fragments	Misnumbered sign board Fragment 177
28	?	Before	Fragments	Misnumbered sign board
29	F78	Before		Below Grade
30	F78	Before		After Removal of excess growth
31	64A	Before	East	Protective Covering Removed
32	67	Before	East	Protective Covering Removed
33	68	Before	East	Protective Covering Removed
34	70	Before	East	Protective Covering Removed
35	89	Before	East	Protective Covering Removed
36	90	Before	East	Protective Covering Removed

TRINITY BURYING GROUND PHOTO LOG
ROLL J

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	91	Before	East	
2	11	Before	East	
3	12	Before	East	
4	12	Before	East	Detail
5	13	Before	East	
6	16	Before	East	
7	18	Before	East	
8	20	Before	East	
9	23	Before	East	
10	26	Before	East	
11	22	Before	East	
12	25	Before	East	
13	33	Before	East	
14	35	Before	West	
15	39	Before	West	
16	34	Before	West	
17	8	Before	East	
18	6	Before	East	
19	2	Before	East	
20	4	Before	East	
21	15	Before	East	
22	15	Before	East	Flash
23	5	Before	West	During excavation
24	5	Before	East	During excavation
25	9	Before	East	During excavation
26	F5	Before	East	During excavation
27	F10A	Before	East	During excavation
28	F10A	Before	East	During excavation
29	F10A	Before	East	During excavation
30	9	Before	East	During excavation
31	-	Before	-	Misnumbered fragment #
32	-	Before	-	Misnumbered fragment #
33	Frag 210	Before	-	Misnumbered fragment #
34	Frag 210	Before	-	Misnumbered fragment #
35	5	Before	-	Repaired 2000
36	Frag 175	Before	-	Misnumbered fragment #

TRINITY BURYING GROUND PHOTO LOG
ROLL K

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 9/1999
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	Frag 175	Before		Misnumbered fragment #
2	9	Before		Treated 2000
3	F5	Before		Treated 2000
4	F10A	Before		Treated 2000
5	F9A	Before		Misnumbered Treated 2000#
6	5	Before		Treated 2000
7	5	Before		Treated 2000
8	F230	Before		Misnumbered-fragment # 173
9	X29	Before		Misnumbered fragment # 173
10	F32A	Before		
11	19	Before		Treated 2000
12		Before		Misnumbered fragment #
13	F229	Before		Misnumbered fragment #
14		Before		Misnumbered fragment #
15		Before		Misnumbered fragment #
16		Before		Misnumbered fragment #
17		Before		Misnumbered fragment #
18	F223-4	Before		Misnumbered fragment #
19	Frag219	Before		Misnumbered fragment #
20	60	Before	South	Protective shelter
21	79	Before	East	Protective Facings
22		Before		Center portion of the yard-after excavation
23		Before		W portion of yard-after excavation
24	74	Before	West	Protective Facing
25	3	Before	West	Excavation
26	1	Before	South	
27	1	Before	Northwest	Pedestal
28	1	Before	West	
29	10	Before	West	Excavation
30	31	Before	South	Protective shelter
31	31	Before	West	Protective shelter
32	32	Before	East	Excavation
33	32	Before	West	Excavation
34		Before	South	View of yard from 6 th Ave
35		Before	South	View of sign
36		Before	South	View of sign-detail

TRINITY BURYING GROUND PHOTO LOG
ROLL L

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 6/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A
9	N/A	N/A	N/A	N/A
10	N/A	N/A	N/A	N/A
11	N/A	N/A	N/A	N/A
12	N/A	N/A	N/A	N/A
13	N/A	N/A	N/A	N/A
14	N/A	N/A	N/A	N/A
15	N/A	N/A	N/A	N/A
16	N/A	N/A	N/A	N/A
17	N/A	N/A	N/A	N/A
18	N/A	N/A	N/A	N/A
19	N/A	N/A	N/A	N/A
20	N/A	N/A	N/A	N/A
21	N/A	N/A	N/A	N/A
22	N/A	N/A	N/A	N/A
23	N/A	N/A	N/A	N/A
24	N/A	N/A	N/A	N/A
25	N/A	N/A	N/A	N/A
26	N/A	N/A	N/A	N/A
27	N/A	N/A	N/A	N/A
28	N/A	N/A	N/A	N/A
29	N/A	N/A	N/A	N/A
30	N/A	N/A	N/A	N/A
31	42A	Before	Aerial	During excavation
32	42A	Before	Aerial	During excavation
33	Frag 66-71	Before	-	
34	Frag 65	Before	-	
35	Frag 64	Before	-	
36	Frag 59-63	Before	-	

TRINITY BURYING GROUND PHOTO LOG
ROLL M

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 7/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
0	50	Before		Marker with base
1	50	Before		
2	71	Before		
3	57	During	East	Resetting
4	59	During		
5	Frag 108	Before		
6	Frag 108	Before		
7	Frag 100	Before		
8	Frag 100	Before		
9	Frag 100	Before		
10	Mike	Before		
11	Frag 99	Before		
12	Frag 99	Before		
13	Frag 99	Before		
14	Frag 99	Before		
15	Frag 99	Before		
16	Frag 98	Before		
17	Frag 98	Before		
18	Frag 98	Before		
19	Frag 98	Before		
20	Frag 97	Before		
21	Frag 94-95	Before		
22	Frag 93	Before		
23	Frag 93	Before		
24	Frag 88-92	Before		
25	Frag 83-87	Before		
26	Frag 81	Before		
27	Frag 82	Before		
28	Frag 78	Before		Detail
29	Frag 78	Before		
30	Frag 77	Before		Detail
31	Frag 77	Before		
32	Frag 73-76	Before		Overexposed
33	Frag 73-76	Before		Overexposed
34				View of Trinity Cathedral
35	Frag 72	Before		
36	Frag 72	Before		

TRINITY BURYING GROUND PHOTO LOG
ROLL N

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	C/W Yard		North	From the roof of the Duquesne Club
2	N Yard		North	From the roof of the Duquesne Club
3	C/W Yard		North	From the roof of the Duquesne Club
4	C/W Yard		North	From the roof of the Duquesne Club
5	C Yard		North	From the roof of the Duquesne Club
6	W Yard		North	From the roof of the Duquesne Club
7	W Yard		North	From the roof of the Duquesne Club
8	CW Yard		North	From the roof of the Duquesne Club
9	W Yard		North	From the roof of the Duquesne Club
10			North	Gimbels Building
11	X29	Before		Fragment 173
12	92A	Before		Fragment 174
13	92A	Before		Fragment 174-Detail of inscription
14	78	Before		Fragment 177
15	X53	Before		Fragments 178 & 179
16	118	Before		Fragment 176
17	Frag #180	Before		Cut off sign board
18	Frag #180	Before		
19	1	After	South	Mislabeled sign board
20	1	After	East	
21	1	After	North	Mislabeled sign board
22	1	After	West	
23	1	After	North	
24	2, 4, 6, 8		West	Protective Burial
25	3	After	West	
26	3	After	East	
27	P3		West	
28	5	After	West	
29	5	After	East	
30	9	After	East	
31	9	After	West	
32	10	After	West	
33	10	After	East	
34	P10A		West	
35	F10A	After	West	
36	F10A	After	East	

TRINITY BURYING GROUND PHOTO LOG
ROLL O

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	44	Before	East	
2	44	Before	East	
3	45	Before	East	
4	45	Before	East	
5	46	Before	East	
6	X82	Before	East	
7	83	Before	East	
8	83	Before	East	
9	84	Before	East	
10	85	Before	East	
11	34	Before	South	
12	Plaques	Before		DAR Medallions
13	42	Before	East	
14	Plaques	After	Front	DAR Medallions
15	Plaques	After	Back	DAR Medallions
16	8	Before	East	
17	6	Before	East	
18	4	Before	East	
19	2	Before	East	
20	14	Before	East	
21	70	Before	East	
22	69	Before	East	
23	68	Before	East	
24	67	Before	East	
25	91	Before	East	
26	90	Before	East	
27	89	Before	East	
28	92	Before	East	
29	79A	During	East	Resetting
30	79A	During	East	Resetting
31	60	During	East	
32	60	During	East	Holes for composite fill
33	60	During	South	Holes for composite fill
34	60	During	South	Holes for composite fill
35	60	During	North	Holes for composite fill
36	60	During	West	Holes for composite fill

TRINITY BURYING GROUND PHOTO LOG
ROLL P

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	X56		East	Clover border
2	55		West	Clover border
3	R76		West	
4	R76		East	
5	54		East	
6	54		North	
7	54		West	
8	54		South	
9	39-42		West	Protective burial
10	37		West	Clover border
11	P36		West	Clover border
12	38	After	West	
13	38	After	North	
14	38	After	East	
15	38	After	South	
16	P33		West	Gravel border-Treated medallion
17	33		West	Mislabeled sign board-Gravel border
18	35		West	Gravel border
19	36		West	Clover border
20	F32A	After	Aerial	
21	F32A	After	West	
22	F32A	After	East	
23	32	After	East	
24	32	After	East	
25	32	After	West	
26	R28		West	
27	X27		West	Protective burial
28	25	After	East	
29	22		East	Facings/Gravel border
30	19	After	East	
31	19	After	West	
32	F5A	After	West	
33	F5A	After	West	
34	F5A	After	East	
35	F5A	After	East	
36	31	After	South	

TRINITY BURYING GROUND PHOTO LOG
ROLL Q

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	31	After	South	
2	31	After	West	
3	31	After	North	
4	31	After	Northeast	
5	31	After	Southeast	
6	116	After	West	
7	E Yard	After	West	
8	E Yard	After	North	
9	E Yard	After	West	
10	E Yard	After	Southwest	
11	E Yard	After	West	
12	E Yard	After	Southwest	
13	W Yard	After	East	
14	W Yard	After	Northeast	
15	C Yard	After	North	
16	W Yard	After	South	
17	W Yard	After	Northwest	
18	W Yard	After	West	
19	C Yard	After	Northwest	
20	C Yard	After	West	
21	W Yard	After	Northeast	
22	C Yard	After	Southwest	
23	W Yard	After	West	
24	W Yard	After	South	
25	W Yard	After	Southwest	
26	C Yard			
27	C Yard	After	Aerial	
28	W Yard	After	Aerial	
29	W Yard	After	Aerial	
30	C/W Yard	After	Aerial	
31	C/W Yard	After	Aerial	
32	C/W Yard	After	Aerial	
33	C/W Yard	After	Aerial	
34	C/W Yard	After	Aerial	
35	C Yard	After	Aerial	
36	W Yard	After	Aerial	

TRINITY BURYING GROUND PHOTO LOG
ROLL R

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	108		West	Facing
2	108		East	
3	79A	After	East	
4	79A	After	West	
5	80		East	
6	81		East	Mislabeled sign board
7	81		West	Mislabeled sign board
8	79A	After	West	Mislabeled sign board
9	79A	After	East	Mislabeled sign board
10	81		East	
11	81		West	
12	F81	After	West	
13	F81	After	East	
14	F81	After	Aerial	
15	62		East	Facings
16	62		West	Facings
17	X63.1		West	Facings
18	R63.2		East	
19	61		East	
20	61		West	
21	60	After	West	
22	60	After	North	
23	60	After	South	
24	60	After	East	
25	79		East	Facings
26	79		West	Facings
27	59	After	East	
28	58		East	
29	58		East	
30	58		West	
31	68		West	
32	57	After	East	
33	56A		East	
34	56A		West	
35	X56		West	
36	X56		East	

TRINITY BURYING GROUND PHOTO LOG
ROLL S

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	F86	After	East	
2	F86	After	West	
3	F86	After	Aerial	
4	85		East	
5	85		East	
6	X82,83,84		East	Protective burial
7	92A		Aerial	Protective burial
8	X94		Aerial	Protective burial
9	X95		East	Gravel border
10	X95		Aerial	Gravel border
11	X95		West	Gravel border
12	X95		Aerial	Gravel border
13	96		East	Gravel border
14	97		East	
15	97		West	
16	99,100,101		East	Protective burial
17	102		East	Gravel border
18	103		East	Gravel border
19	102, 103		East	Gravel border
20	77		East	
21	77		West	
22	78		West	
23	78		East	
24	F78	After	East	
25	F78	After	Aerial	
26	F78	After	West	
27	104		West	Gravel border
28	104		East	Gravel border
29	X105		Aerial	Gravel border
30	X106		East	Gravel border
31	X106		West	Gravel border
32	X107		West	Gravel border
33	X107		East	Gravel border
34	X107		East	Gravel border
35	X107		West	Gravel border
36	108		West	Facings

TRINITY BURYING GROUND PHOTO LOG
ROLL T

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	69		East	Gravel border
2	70		East	Protective burial
3	50	After	East	
4	50	After	West	
5	F50	After	West	
6	F50	After	East	
7	51A	After	East	
8	51A	After	West	
9	51		East	Protective burial
10	52	After	East	
11	34		East	Protective burial
12	53	After	East	
13	53	After	West	
14	53	After	Aerial	
15	X53		East	Clover border
16	X53		West	Clover border
17	F75	After	West	
18	F75	After	Aerial	
19	F75	After	East	
20	75	After	East	
21	75	After	West	
22	74		West	Facings
23	74		East	Facings
24	R73		East	Clover border
25	X72		East	Gravel border
26	X72		West	Gravel border
27	71	After	West	
28	71	After	East	
29	89-91		East	Protective burial
30	92		East	Protective burial
31	88		East	Gravel border
32	X87		East	
33	X87		West	
34	86	After	West	
35	86	After	East	
36	F86	After	East	

TRINITY BURYING GROUND PHOTO LOG
ROLL U

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	F9A	After	East	
2	F9A	After	West	
3	F9A	After	East	
4	14		East	Protective burial
5	16		East	Gravel border
6	18		East	Facings
7	20	After	East	
8	23	After	East	
9	26	After	East	
10	X24		East	
11	X24		West	
12	21		West	Protective burial
13	30	After	West	
14	30	After	East	
15	P16		West	
16	P16		West	
17	11		East	
18	12		East	
19	13		East	
20	15		West	
21	R17		West	
22	64A		East	Protective burial
23	42A	After	East	
24	X43		East	
25	X43		West	
26	46A		East	Gravel border
27	46A		East	Gravel border
28	47		East	Gravel border
29	P47		East	Gravel border
30	48		East	Gravel border
31	49	After	East	
32	49	After	West	
33	44		East	Gravel border
34	45		East	Protective burial
35	46		East	Gravel border
36	67 & 68		East	Protective burial

TRINITY BURYING GROUND PHOTO LOG
ROLL V

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	N/A			N/A
2	N/A			N/A
3	N/A			N/A
4	N/A			N/A
5	N/A			N/A
6	N/A			N/A
7	N/A			N/A
8	N/A			N/A
9	N/A			N/A
10	N/A			N/A
11	N/A			N/A
12	N/A			N/A
13	N/A			N/A
14	N/A			N/A
15	N/A			N/A
16	N/A			N/A
17	N/A			N/A
18	N/A			N/A
19	N/A			N/A
20	N/A			N/A
21	31	During	Northwest	
22	31	During	North	
23	31	During	North	
24	59	During	East	CFRP straps
25	51	Before	East	
26	X98	Before	East	
27	101	Before	East	Detail
28	101	Before	East	
29	100	Before	East	Detail
30	100	Before	East	
31	99	Before	East	Detail
32	99	Before	East	
33	42	Before	West	
34	41	Before	West	
35	40	Before	West	
36	39	Before	West	
37	33		East	Gravel border

TRINITY BURYING GROUND PHOTO LOG
ROLL W

Photographer: J. Freedland			Film: Kodak TMAX 100ASA	Date: 8/2000
Negative #	Marker #	Before/ During/ After	Orientation	Remarks
1	N/A			N/A
2	N/A			N/A
3	N/A			N/A
4	N/A			N/A
5	N/A			N/A
6	N/A			N/A
7	N/A			N/A
8	N/A			N/A
9	N/A			N/A
10	N/A			N/A
11	N/A			N/A
12	N/A			N/A
13	N/A			N/A
14	N/A			N/A
15	N/A			N/A
16	N/A			N/A
17	N/A			N/A
18	N/A			N/A
19	N/A			N/A
20	N/A			N/A
21	N/A			N/A
22	N/A			N/A
23	N/A			N/A
24	N/A			N/A
25	N/A			N/A
26	N/A			N/A
27	N/A			N/A
28	N/A			N/A
29	N/A			N/A
30	N/A			N/A
31	48		East	Excavation, monument beneath
32	47		North	Excavation, monument beneath
33	47		East	Excavation, monument beneath
34	48		East	Excavation, monument beneath
35	19-base	Before	-	
36	42A	Before	-	

Volume II

Treatment reports

Volume III

Fragment Sheets

Volume IV

Photodocumentation

CDs with images