STATE OF WYOMING

JOINT LEGISLATIVE AND EXECUTIVE TASK FORCE

DEPARTMENT OF ADMINISTRATION & INFORMATION
CONSTRUCTION MANAGEMENT

WYOMING STATE CAPITOL
REHABILITATION & RESTORATION

LEVEL I RECONNAISSANCE / LEVEL II FEASIBILITY STUDY

VOLUME III
DESIGN TEAM REPORTS AND FINDINGS

HDR

IN ASSOCIATION WITH

PDP
Preservation Design Partnership, LLC

AND

PLAN ARCHITECTS

24 FEBRUARY 2014

Volume III : Design Team Reports and Findings
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DEPARTMENT OF ADMINISTRATION & INFORMATION
CONSTRUCTION MANAGEMENT

WYOMING STATE CAPITOL
REHABILITATION & RESTORATION

LEVEL I /LEVEL II

CAPITOL DOME CONDITIONS SURVEY REPORT

PREPARED BY

VERTICAL access

FOR

HDR

IN ASSOCIATION WITH

PDP
Preservation Design Partnership, LLC

AND

PLAN ARCHITECTS

24 FEBRUAR Y 2014

K. Capitol Dome Conditions Survey Report

Preamble

As part of the comprehensive envelope assessment, Vertical Access [VA] visually surveyed the existing conditions at the Wyoming State Capitol dome interior and exterior using industrial rope access techniques. Design Team members from Preservation Design Partnership, LLC [PDP] and Robert Silman Associates [RSA], observed the existing conditions of the dome from adjacent roof surfaces, and reviewed documentation related to the original dome design and subsequent repair projects. As part of the Level I / Level II Services, the Design Team performed a comprehensive evaluation of the dome in order to:

- Review and document the existing conditions of all surfaces and components
- Establish a set of recommendations for repairs to the dome interior and envelope

VA's scope of work included:

- The investigation and documentation of existing conditions at the exterior of the drum, dome, and lantern
- The investigation and documentation of existing conditions at the interior of the dome
- Measurement of sheet metal thickness at representative locations
- Paint adhesion testing at the gilded panels and the painted formed metal
- Selective removal of paint coatings at representative locations on the exterior of the dome for analysis
- Live-feed video to review and discuss conditions with the project team

Vertical Access' visual observations of the Capitol dome note that the dome is in good condition. However, there were several notable types and patterns of deterioration observed at the interior and exterior, including:

- Coating failure over large portions of the exterior
- Dents, tears and punctures to virtually all metal surfaces across the dome envelope, including the gilded copper panels, the galvanized sheet metal, and the sheet lead ornament
- Poor condition of the lead ornament. Temporary repairs installed in 2010 and 2011 included clear silicone sealant and automotive metal patching compounds ["Bondo"]. While these emergency repairs temporarily addressed damage incurred during severe weather events, they are non-historic and have altered the historic form, assembly, and performance of the dome envelope.
- Spot corrosion at cast iron and galvanized sheet metal elements, particularly at the applied decorative elements, including the consoles as well as the lowest section of the drum
- Limited water infiltration in isolated locations, possibly related to open seams
- Moisture damage at the interior of the dome, specifically at the wood roof decking, exposed wood structural members [e.g. outriggers] and wood flooring
- Unsecured or non-existent connections at interior structural members

The *Capitol Dome Conditions Survey Report*, presented on the subsequent pages, presents both the full assessment along with selected "raw data" collected during the survey. This raw data is helpful not only in the initial assessment and evaluation of the dome. It also provides a great deal of photographic, audiovisual, and scientific information that, when interwoven with additional survey – such as Non-Destructive Evaluation – begins to create a more comprehensive understanding of the dome and how it functions. This information has and will continue to assist the Design Team as it analyzes the dome and works toward developing recommendations for repair, restoration and rehabilitation.

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Report Narrative

Wyoming State Capitol
Dome Investigation
Cheyenne, WY

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Vertical Access (VA) was retained by HDR Architecture to assist with the investigation of the dome of the Wyoming State Capitol in Cheyenne, WY as part of the Level 1 Study for the restoration of the building. The project team for the investigation also included Preservation Design Partnership (PDP), Robert Silman Associates (RSA) and GB Geotechnics (GBG). VA's scope of work was to investigate and document existing conditions on the exterior of the drum, dome, and lantern; document conditions at the interior of the dome; perform adhesion testing at representative painted and gilded surfaces; remove samples of paint coatings from representative locations on the exterior of the dome; and perform live-feed video to review and discuss conditions with the project team.

VA technicians Keith Luscinski, Berta de Miguel Alcalá and Evan Kopelson were on-site May 13th to 16th, 2013 to investigate and document conditions of the exterior of the State Capitol Dome using industrial rope access techniques. Suzanne Norton, Project Coordinator with the State of Wyoming Office of Construction Management Department of Administration & Information, was on site for the duration of Vertical Access' investigation to assist with site access and for discussion of the investigation findings. George Skarmeas, Lisa Soderberg and Pierson Booher of PDP were all on site May 13th to May 16th for discussion of Vertical Access' findings. George Skarmeas and Lisa Soderberg participated in the live-feed video documentation performed May 15th. Tom Whetstone of HDR was on site May 14th to 15th for discussion of the findings.

The cladding materials at the exterior of the dome of the Capitol vary, and include a cast iron base, with galvanized sheet metal cladding at the drum and dome, gilded copper panels at the main dome and lantern and applied sheet lead ornament. Vertical Access documented existing conditions such as missing and dented sheet metal elements; tears, punctures and open seams in the sheet metal; surface corrosion and paint coating failures. The gilded copper panels at the dome and lantern, installed in 2009, are dented from hail impact but otherwise are sound with no perforations or failed seams. The sheet lead ornament exhibits tears and punctures, most likely a result of hail damage, as well as widespread paint coating failure. Much of the sheet lead ornament is dented, with some elements missing as well. The galvanized sheet steel, most likely original to the dome, is in good condition with some dents, open seams, discrete areas of surface corrosion and widespread failure of the paint coatings. The cast iron at the lowest section of the drum is also in good condition, with some surface corrosion and failed paint coating noted. The rivet fasteners at the cast iron appear to be in good condition.

The interior of the dome exhibits water staining at the wood decking. Some, but not all of the wood decking appears to be original to the dome, and other sections have clearly been replaced. No significant corrosion or deformation was noted at the steel framing composing the structure of the dome. At one level of the framing, there is a gap at the horizontal seam between the diagonal members that span between the structural columns and dome ribs. Square head and hex head carriage bolts are used to connect the members at this level, as opposed to riveted fasteners used at similar connections at other areas of the dome structure. There is no evidence of movement within the connections where these gaps are present, indicating that the existing gaps are most likely an "as-built" condition.

This *Report Narrative* with supporting photographs, annotated AutoCAD elevation drawings, and spreadsheet of extracted survey conditions constitute VA's *Condition Survey Report* (full report was provided to the State of Wyoming Administration and Information Division of Construction Management) for the Capitol dome. Vertical Access' *Guide to TPAS™ Annotated Drawings* is included with VA's *Condition Survey Report*. Appendix A to the report includes a table and drawings documenting the locations of paint samples removed from the exterior of the dome by Vertical Access on May 15th and 16th. Appendix B describes the access approach used by Vertical Access for the Dome Investigation and considerations for future access to the dome exterior. Digital copies of the *Report Narrative*, AutoCAD files, photographs, extracted condition quantities, *Guide to TPAS™ Annotated Drawings* and appendices were also provided on a DVD. The recording made during the May 15th live-feed video documentation of the east side of the Wyoming State Capitol Dome is also included on the DVD.

Description of Deliverables

This *Report Narrative* includes a description of the project deliverables, the scope of work and the findings of the investigation of the Wyoming State Capitol Dome. Conditions documented by Vertical Access and described in the *Report Narrative* are based on VA's Conditions Glossary. Examples of materials and conditions contained in Vertical Access' Visual Conditions Glossary are available on our web site at http://www.vertical-access.com/glossary.html. The last section of the *Report Narrative* includes conclusions and preliminary interpretations of the survey findings.

The *Photographs* section of VA's *Conditions Survey Report* includes images of representative and notable conditions taken during the survey using digital still cameras. Each of the photographs included in the report is hyperlinked to a condition code within the AutoCAD drawing so that it can be viewed easily as a digital file. Each photograph has a three-part name. The first part is specific numeric nomenclature (x-y coordinates) that corresponds to the coordinates within the AutoCAD drawing where the conditions are located. The second part of the photograph name gives the type of material and description of the condition documented. The third part of the name is the year that the photograph was taken. The Cartesian grid used to name the photographs is shown on the elevation drawings. For reference, the table below lists the x-coordinates of the dome views:

X-Coordinate	Elevation View	Sheet
0 to 40	North	Sheet 1, Drawing 1A
70 to 120	Northwest	Sheet 1, Drawing 1B
150 to 200	Northeast	Sheet 1, Drawing 1C
225 to 270	East	Sheet 2, Drawing 2A
295 to 340	West	Sheet 2, Drawing 2B
370 to 410	South	Sheet 3, Drawing 3A
440 to 480	Southeast	Sheet 3, Drawing 3B
510 to 550	Southwest	Sheet 3, Drawing 3C
570 to 660	Dome interior	Sheet 4

Full-size 24” by 36” and reduced-scale 11” by 17” drawings are provided herein and in the *Annotated Drawings* section, the third section of VA’s *Condition Survey Report*. The annotated drawings document the condition of the exterior materials of the drum, dome and lantern of the Wyoming State Capitol and observations on the interior structure and decking of the dome. For base drawings for the survey of the exterior, Vertical Access used AutoCAD drawings provided by GBG showing each of the eight sections of the dome. For the interior, Vertical Access used an orthophotograph of the dome interior unfolded into sixteen sections provided by GBG. VA placed the eight exterior dome views and the orthophotograph of the interior of the dome into a single AutoCAD drawing so that each view has a unique set of x-y coordinates.

Existing conditions were documented using VA’s Tablet PC Annotation System (TPAS)^{TM}. TPAS allows direct input of survey information into an AutoCAD drawing so that there is no loss of information in the transfer of notes from paper to computer. The severity and amount of each condition was recorded in the field using AutoCAD, which streamlines the process of take-offs and the transformation of condition notes to construction documents. A spreadsheet of the survey quantities is included in printed form and as a digital file with this report.

TPAS utilizes a library of previously drawn fault code symbols to annotate digital survey drawings in the field. Each permutation of fault code is placed on a unique layer in the AutoCAD drawings to allow for easier manipulation and viewing of the survey data. The fault code symbols are part of an AutoCAD block library and are composed of a grouping of fault attributes:

Material
Condition
Type
Severity
Amount

When all of the information collected in the survey is shown on an elevation drawing, the printed drawing may become difficult to interpret due to the density of data and resolution of the printed drawings. Therefore, TPAS is optimized for digital analysis of survey data. The following processes can be used to better understand and interpret the conditions and material data.

1. Any TPAS symbol can be queried directly in AutoCAD.
2. Because each combination of material and fault condition is on a separate layer in AutoCAD, the survey data can be viewed selectively within AutoCAD by switching layers on and off and by constructing different combined layer “views.”
3. The numerical survey data can be extracted or exported from AutoCAD into spreadsheets or databases.
4. Digital photographs are hyperlinked to asterisk symbols indicating photo links, so survey photographs can be opened and viewed directly from the AutoCAD drawing.

Following the *Annotated Drawings* is a *Spreadsheet of Survey Conditions*, included herein, containing quantities, notes and photograph references for each condition documented at the building. The conditions listed in the spreadsheet are extracted from the data blocks in the AutoCAD drawing of the survey and are sorted by condition type. The data can be extracted from the AutoCAD drawing or Excel file to other spreadsheet and database programs.

A *Guide to TPAS^{TM} Annotated Drawings* is included in VA’s *Condition Survey Report*. This document highlights features of the annotated drawings provided in paper, pdf and dwg formats. The guide describes in greater detail the properties included in the TPAS condition blocks, the process of creating views within AutoCAD to show information about specific conditions, the steps of extracting information contained in the AutoCAD drawing for export into a spreadsheet or database and how to set up the electronic drawing and the photograph files to create hyperlinks.

Appendix A, included herein, to the *Condition Survey Report* includes information on the paint sampling performed by Vertical Access at the request of PDP. The Paint Sampling appendix contains a table listing the paint samples removed from the exterior of the lantern, dome and drum with initial observations on the coatings present at representative locations. The locations of the paint samples are shown in elevation drawings included in Appendix A of the *Condition Survey Report* and herein.

Appendix B of the *Condition Survey Report* and *Appendix B* herein, describes the access approach used by Vertical Access to perform the hands-on investigation of the exterior of the Wyoming State Capitol Dome. It also includes considerations for future access to the exterior for inspection, maintenance or repair work.

All of the documents composing this *Condition Survey Report* are provided in digital format on a single DVD. Digital files include this *Report Narrative* in pdf format; jpg image files of all survey photographs; annotated drawings in AutoCAD dwg and pdf formats; the spreadsheet of extracted quantities in Microsoft Excel xls format; the *Guide to TPAS^{TM} Annotated Drawings* in pdf format; and the appendices in pdf format.

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The DVD with the project deliverables contains video and audio commentary describing representative and notable conditions observed during VA's live-feed video investigation on May 15th, 2013. The live-feed video was recorded on the east side of the dome from the lantern to the bottom of the drum.

Scope of Work

Vertical Access utilized industrial rope access techniques to gain hands-on access for the investigation of the exterior materials of the Wyoming State Capitol Dome. In general terms, technicians are suspended on one rope termed the "work positioning line" with a redundant "fall protection line" used as backup. Hands-off descent control and fall protection devices are integrated into site-specific rigging systems, along with industry-specific climbing and suspension harnesses. Vertical Access technicians are third-party certified for industrial rope access work by SPRAT, the Society of Professional Rope Access Technicians. Vertical Access technicians also documented general conditions at the interior of the dome. To gain up-close access to the upper areas of the dome interior, Vertical Access used an extension ladder brought into the dome for rigging the rope access drops at the exterior. VA used 1000-watt theater lights to assist in viewing the conditions at the interior.

The primary focus of VA's investigation of the Wyoming State Capitol Dome was to document the condition of the exterior materials at the drum, dome and lantern. During the hands-on investigation of the exterior the location, severity and quantity of conditions such as punctures, tears, dents, failed seams, corrosion, paint coating failure and missing and loose elements were recorded on elevation drawings. VA also performed an up-close review of the interior of the dome and lantern. Photographs were taken of representative and notable conditions of deterioration at the exterior and interior. The condition photographs are hyperlinked to the annotated AutoCAD drawings.

Vertical Access also performed one live-feed video "drop" on the east side of the dome. The conditions at this side of the dome were documented using high definition video with audio commentary. Preservation Design Partnership participated in the live-feed video, which allowed for discussion of conditions during the recording of the video.

To assist with the assessment of the condition of the existing paint coatings and to gain a better understanding of the chronology of the coatings at the exterior of the dome, VA performed paint adhesion tests and paint sampling at representative areas. The locations of the paint adhesion tests and sampling were photographed and are shown in the annotated drawings. [*see page K.13*]

Building Description

The Wyoming State Capitol was designed by David W. Gibbs, an architect from Toledo, Ohio. The Renaissance revival design resembles many other state capitols, including the Colorado State Capitol designed by Elijah Myers, who lost the Wyoming commission to Gibbs under protest. Construction of the central portion of the Capitol, including the dome, commenced in 1886 when Wyoming was still a territory. The central portion with small east and west wings were completed in 1890. The current House and Senate Chambers, designed by William Dubois, were added to the east and west wings between 1915 and 1917.[1]

The Capitol is oriented with the main entrance to the south, facing downtown Cheyenne and the Union Pacific railroad depot. The three-story base of the building is constructed of sandstone quarried near Rawlins, Wyoming. Above the stone base, the dome of the Capitol rises 146 feet above grade. The drum of the Wyoming State Capitol Dome has eight identical facets, with large openings at the colonnade level and smaller round windows at the drum attic. Above the drum attic, the dome has sixteen facets, each with ten rows of gilded copper panels. The lantern that surmounts the dome has eight facets and a sloped roof consisting of gilded copper panels topped by a finial. The elevation below shows the parts of the dome referenced in this report.

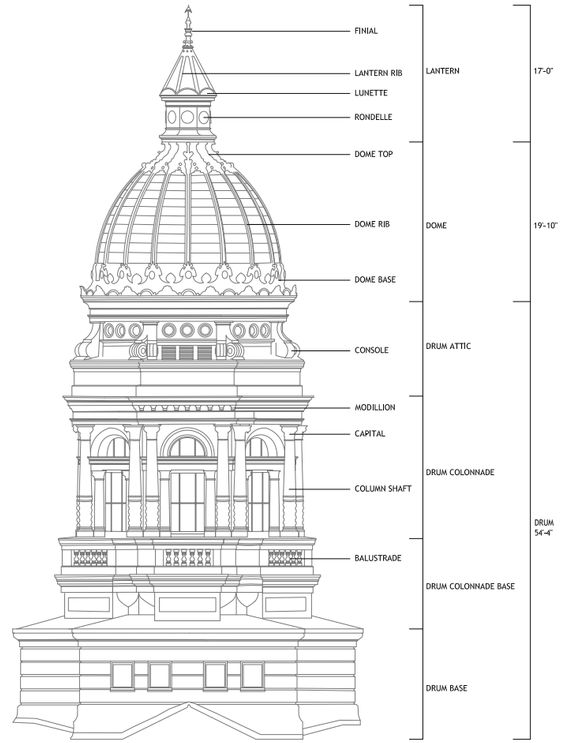

Figure 1: Wyoming State Capitol Dome Nomenclature

[1] Mark Junge and Dr. Page Putnam Miller, "Wyoming State Capitol Building and Grounds National Register of Historic Places Nomination Form," 1987.

The base of the drum, which meets the copper roof of the lower portion of the building, is clad in cast iron panels. Above the cast iron, the cladding of the drum and its ornament are galvanized sheet metal, including the blind balustrades of the colonnade base and engaged columns of the drum colonnade. The dome itself is clad in gilded copper panels, as is the roof of the lantern. The ribs of the dome, the ribs of the lantern roof, and most of the cladding of the lantern are painted galvanized sheet metal. The sheet metal is hot dipped galvanized and for the most part is in good condition and appears to be original, based on the dates of graffiti found inside the dome. Zinc-coated sheet metal was in use in the United States by the end of the 1830s, with galvanized sheets up to 24 inches wide by 72 inches long available by the 1850s.[2] Sheet lead is used for the high relief ornament applied to the consoles at the drum attic, the base of the dome and the top of the dome. Since the copper dome was first gilded in 1900, it has been regilded several times, most recently in 2009 when the existing copper panels were removed by Sheet Metal Products, Inc. (SMP) and new copper panels were gilded by Glenn Otto & Son Painting and then installed by SMP. Similar installation of new gilded copper panels at the dome was reportedly carried out in 1986 and before that in 1979-80, also by SMP and Glenn Otto & Son Painting.[3]

Exterior Conditions

Overall, the galvanized sheet metal and gilded sheet copper of the Wyoming State Capitol Dome are in good condition with the paint coatings showing signs of failure but the gilding in excellent condition. There are dents in the gilded copper panels caused by hail impact, but no punctures or tears. On the other hand, dents, puncture and tears were noted in much of the sheet lead ornament at the top and base of the dome, likely due to hail impact. There are some open seams and loose fasteners at the sheet metal cladding.

Below is a summary of the conditions identified during VA's investigation of the exterior of the Capitol dome, with representative photographs of each condition cited.

Drum

- Overall, the cast iron base of the drum is in good condition. Minor paint coating failure and light surface corrosion were noted on all sides of the drum at the lower portion of the cast iron base, near the intersection with the roof of the wings of the Capitol. At one location on the cast iron base, Vertical Access performed a paint adhesion test using the X-cut test method of ASTM D3359, *Standard Test Methods for Measuring Adhesion by Tape Test*. The paint coatings at the cast iron have poor paint adhesion to the substrate.
- The deck coatings at the wash surfaces of the drum above the base, at the colonnade and at the attic are in poor condition. Typically the deck coatings are in place but have bubbled and lifted from the sheet metal substrate. At some areas of the wash surface above the drum base, there is loss of the deck coating at the inside corners adjacent to the vertical walls of the drum. Most of the wash surfaces slope away from the walls of the drum; the wash surfaces at the balustrade level and the drum attic do not adequately slope away, allowing water to pond on the deck coatings at these levels.
- There are scuppers at some of the wash surfaces and downspouts on four sides of the drum. The scuppers, which are formed from sheet lead, are typically bent and deformed but do not appear to be blocked. The square-section downspouts run from a galvanized box gutter that sits on the outer edge of the wash surface at the drum attic to the next wash surface below and empty above the colonnade level. The paint coatings at the downspouts and gutter are in poor condition and there is surface corrosion on the inside of the gutter.
- The paint coatings at the galvanized sheet metal cladding of the drum are in poor condition, with widespread paint loss and peeling. Failed paint coatings are most common at edges and inside corners of the drum elements. In some locations, especially at the cornice elements of the drum, the more recent paint coatings are separating from underlying coatings. In other areas the paint loss exposes the galvanized sheet metal substrate below. Six paint adhesion tests performed at the galvanized sheet metal of the drum indicate there is good adhesion between the existing paint coatings and the galvanized sheet metal where there is not visible paint failure, although the outermost paint layer is chalking.
- At some areas where paint loss was observed, minor surface corrosion of the galvanized sheet metal was also noted. Surface corrosion was noted at the console scrolls of the consoles at the drum attic.
- There are many instances of nails at the sheet metal cladding that have popped out of place. The small round-head nails are used to attach the sheet metal cladding to wood blocking at the interior of the dome. Typically the popped nails are still in place and are not loose.
- Dents in the sheet metal of the drum were noted at the bases of the engaged columns and the balusters. No tears or perforations were noted at these elements or other areas of the galvanized sheet metal cladding at the drum level.
- The inoperable semicircular windows at the colonnade and the inoperable round windows at the drum attic have wood frames and sash. These windows are in fair condition, with minor weathering of the wood and failed paint coatings.

[2] Margot Gayle and John G. Waite. *Metals in America's Historic Buildings: Uses and Preservation Treatments*. Washington, DC: United States Department of the Interior National Park Service, 1992.

[3] Preservation Design Partnership Notes from April 12, 2013 meeting with Jay Otto of Glenn Otto & Son Painting.

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Dome

- There are sixteen facets of the main dome, each with ten rows of gilded copper panels with flat seams. The gilded copper panels presently on the dome were installed in 2009. The copper panels are dented from hail impact, reportedly from a severe hailstorm that took place in 2011. The denting is most severe at the upper half of the dome. No perforations or tears were noted in the copper panels and the seams between the panels are sound. Above the top row of the new copper panels is an older copper panel, one on each facet. This copper panel is currently painted, but was originally gilded.
- The rib covers between the gilded facets of the dome are galvanized sheet metal. The sheet metal is in good condition, with some denting and open seams noted. Some sections of the rib covers appear to be replacement pieces. The previous paint coatings at the ribs appear to have been completely removed prior to the last painting campaign.
- The base of the dome and top of the dome have galvanized sheet metal cladding with applied sheet lead ornament. The galvanized sheet metal is in fair condition, with some open seams, failed paint coatings and minor surface corrosion noted. There is more loss of paint coatings on the east side than the other areas of the dome.
- The lead ornament is in poor condition with dents, tears and punctures noted at many locations. The tears and punctures occur on all sides of the dome, but are most numerous on the east side. Some of the perforations have been filled with clear silicone sealant, automotive metal patching compounds such as “Bondo” or other materials.
- The cornice at the base of the dome has a band of projecting foliated ornament. Many of the individual leaves of the ornament are missing. Some pieces of ornament have tears and are loose.
- The most recent paint coatings at the dome date to 2010, when the new gilded copper panels were installed. The coating is darker and glossier than the current paint coating at the drum. Paint adhesion tests performed using the X-cut test method of ASTM D3359, *Standard Test Methods for Measuring Adhesion by Tape Test* at four locations found a strong adhesion to the sheet metal substrate where there are no visible signs of paint failure.

Lantern and Finial

- The lantern at the top of the Wyoming State Capitol Dome is in fair condition. Similar to the drum and dome, the galvanized sheet metal of the lantern exhibits paint failure. The gilded copper panels of the lantern roof, installed in 2009, are in good condition, with dents from hail damage but no tears or punctures.
- The eight rondelles on the vertical walls of the lantern appear to be newer than the rest of the cladding at the lantern based on the crimped edges of the rondelles visible at the exterior and cleaner spangle finish of the hot dip galvanized coating visible at the interior. They may have been installed to cover windows or other openings at this level.
- The galvanized sheet metal finial at the top of the lantern is in good condition. There is a missing crocket on the north side of the finial. The paint coatings at the finial exhibit discrete areas of loss. Where the paint coatings are missing, traces of gilding as the earliest coatings on the sheet metal are visible.

Interior Conditions

At the interior of the dome, the steel frame of the dome and wood decking below the gilded sheet copper panels are visible. Overall, the steel frame appears to be in good condition, with no deformation of members or obvious corrosion noted. There is a gap at the horizontal seam between sections that make up the X-bracing of the frame at one level, but there are no signs of stress associated with the gap. Water staining was noted at the wood decking, but overall the decking materials appear to be sound. At the interior of the lantern, decay was noted at some of the wood blocking behind the lunettes.

Below is a summary of the conditions observed at the interior of the dome, with representative photographs of each condition cited.

- Overall, the steel frame visible at the interior of the dome is in good condition. There does not appear to be deformation or corrosion of the framing members. At one level of the X-bracing, there is a gap in the horizontal seam between members. The gap is as large as two inches but is typically between one and one and a half inches wide at most of the seams. On the west side of the dome, there is one seam that is closed. At most of the horizontal seams between members that make up the X-bracing, rivets are used, but at the level with the gap, hex-head and some square-head carriage bolts are used at the horizontal seam. Some of the bolts are missing. The bolts are loose, and do not appear to have ever been tight. There is also no cracking or other signs of stress indicating that the gap is due to movement in the structural frame. It is likely that it is an as-built condition.
- Inside the lantern, the frame consists of angles supporting the outer walls with 3/4” diameter tension rods running diagonally from the outer walls to two connection hubs at the center of the lantern. Another tension rod, two inches in diameter, runs vertically to connect these hubs. One of the diagonal tension rods on the southeast side of the lantern is loose, with the nut at the connection hub not fully threaded.
- The steel framing terminates near the top of the lantern’s sloped roof, with wood members supporting the finial. A wood pole extends down from the finial’s

center and terminates without any connection approximately three feet above the two-inch diameter tension rod.

- The wood decking at the interior of the dome exhibits water staining but is otherwise in good condition. A split was noted in one of the decking boards on the north side of the dome. Most of the wood decking appears to be original, with replacement boards evident by the lack of water staining and dated by graffiti to previous reroofing campaigns. During a brief thunderstorm the afternoon of May 14th, water was observed running down the inside of the dome in line with a rib at the northwest side. Water was also noted coming in the dome at the north side above the round window of the drum attic.
- Decay was noted at wood blocking at the interior of the lantern at the level of the lantern cornice. The rot is most widespread on the south side of the lantern interior.

Conclusions and Preliminary Interpretations

The dome of the Wyoming State Capitol is comprised of a cast iron base, with galvanized sheet metal cladding at the drum and dome, gilded copper panels at the main dome and lantern and applied sheet lead ornament. Vertical Access documented existing conditions such as missing and dented sheet metal elements, tears, punctures and open seams in the sheet metal, surface corrosion and paint coating failures. The gilded copper panels at the dome and lantern, installed in 2009, are dented from hail impact but otherwise sound with no perforations and failed seams observed. The sheet lead ornament exhibits tears and punctures, most likely a result of hail damage, as well as widespread paint coating failure. Much of the sheet lead ornament is dented, with some missing elements as well. The galvanized sheet steel, most likely original to the dome, is in good condition with some dents, open seams, discrete areas of surface corrosion and widespread failure of the paint coatings. The cast iron at the lowest section of the drum is also in good condition, with some surface corrosion and failed paint coatings noted.

The interior of the dome exhibits water staining at the wood decking, some of which appears to be original to the dome. No significant corrosion or deformation was noted at the steel framing comprising the structure of the dome. At one level of the framing, there is a gap between bracing members. Square head and hex head carriage bolts are used to connect the members at this level, as opposed to riveted fasteners used at similar connections at other areas of the dome structure. There is no evidence of movement at the connections where the gaps are present, indicating that it may be an “as-built” condition.

Vertical Access remains on call to assist with additional investigations or to elaborate on the work already completed.

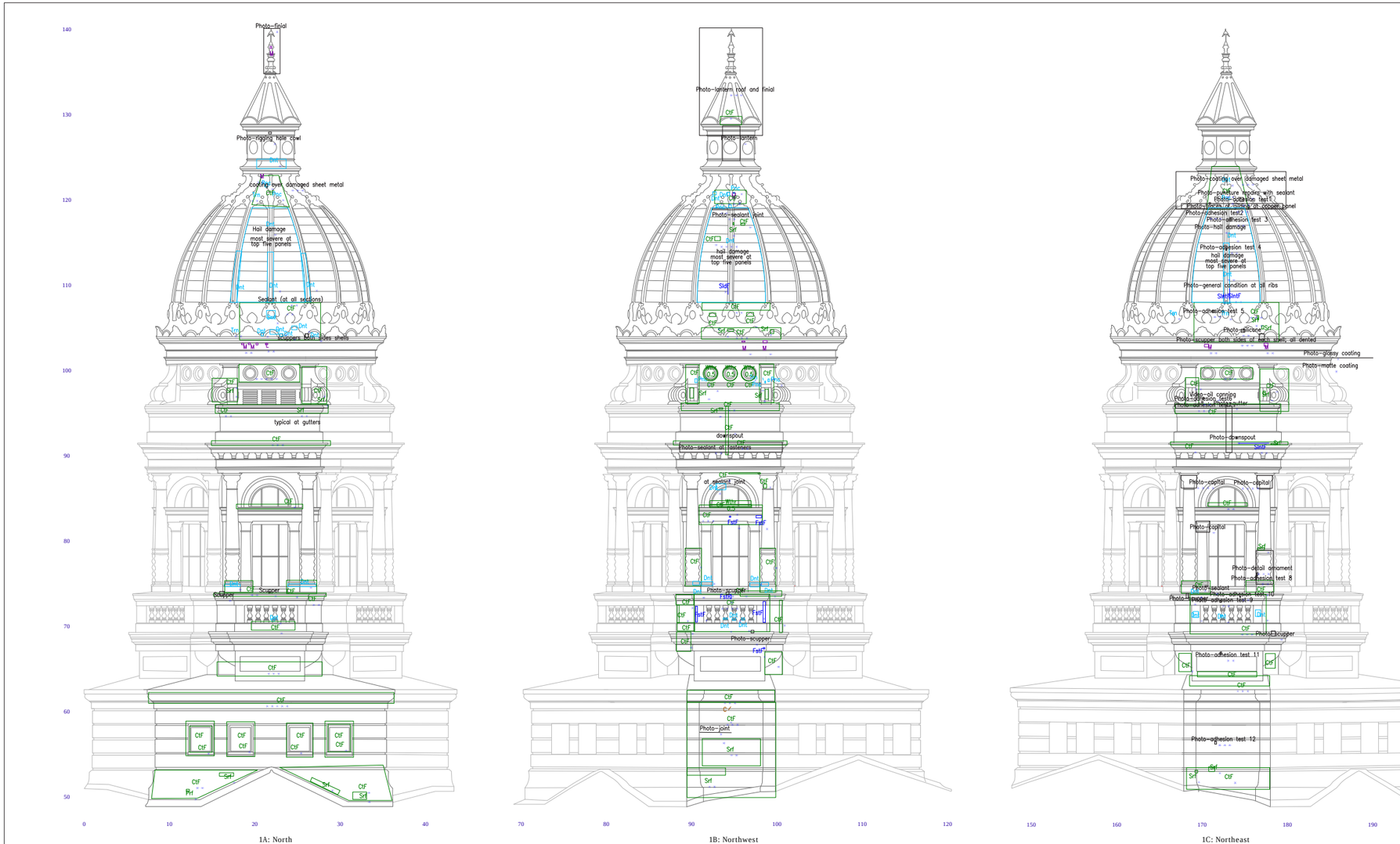
Respectfully submitted for Vertical Access LLC by:

Evan Kopelson

May 23, 2013

Wyoming State Capitol
Dome Investigation
Cheyenne, WY

Vertical Access LLC
Report Narrative
May 24, 2013



KEY TO SYMBOLS

Each TPAS annotation is comprised of a graphical symbol and text label.

Four types of graphical symbols are used:
--Target symbols depict faults having discrete locations, such as spalls or patch repairs.
--Box symbols are rectangular symbols delineating conditions that span an area too large to be effectively represented with target symbols.
--Polyline symbols depict cracks and specific joint conditions.
--Picture Link symbols indicate the location of survey photographs.

Text labels include a code describing the type of conditon, and if applicable, a severity code and Picture Link.

This target symbol indicates a 20 square inch spall, which was removed during the survey and photographed: (Fault Code R, Severity 20, Target Symbol, Picture Link)

This box symbol indicates an area of biological soiling, which was not photographed: Bio

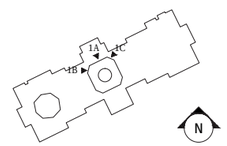
This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed: CJ 3

Abbreviations:
G = Graffiti
PntSm = Paint Sample

KEY TO SURVEY CODES

Condition	Symbol		Fault Type	Severity	Amount
Coating		Ct	Coating	Not applicable	Area in sq. ft.
		CtF	Coating Failed		
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Checked Crack		Chk	Checked	Width in 1/16" increments	Length in lin. ft.
		C	Crack		
Damaged		Dnt	Dented	Not applicable	Area in sq. ft.
		Pnc	Punctured		Diameter in in.
		Trn	Torn		Length in lin. in.
Deteriorated		Rot	Rotted	Not applicable	Area in sq. in.
		Wthr	Weathered		
Prev. Repair		P	Patch sound	Not applicable	Area in sq. in.
		PF	Patch Failed		
Seams Failed		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Soiled/Stained		Gua	Guano	Not applicable	Area in sq. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.
		M	Missing		

KEY PLAN



SURVEYED USING TPAS BY: RAM, EK, KL
MAY 13-16, 2013

PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com

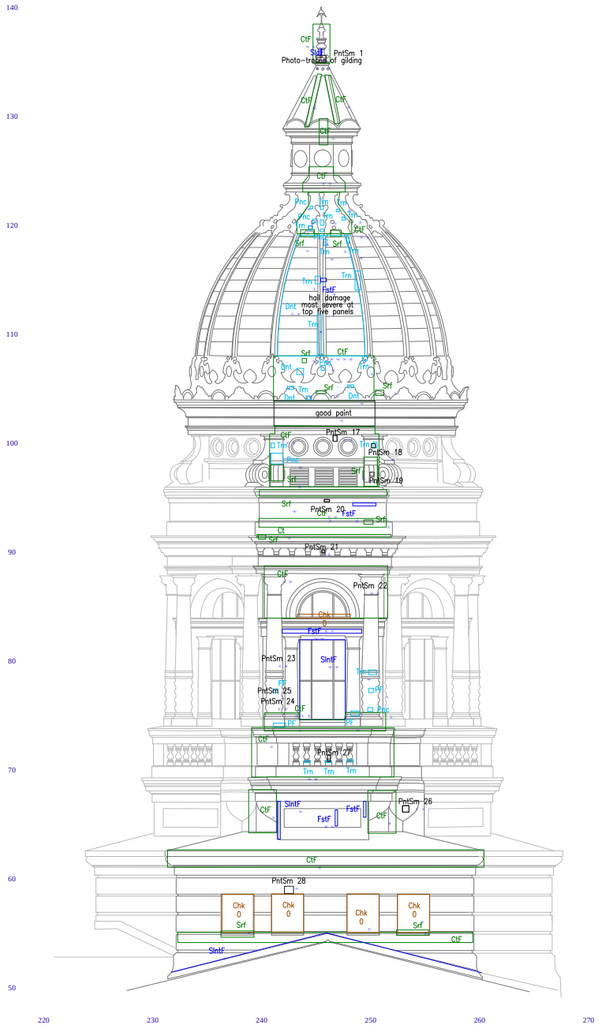
ISSUE DATE: MAY 24, 2013

ELEVATIONS
NORTH, NORTHWEST, NORTHEAST

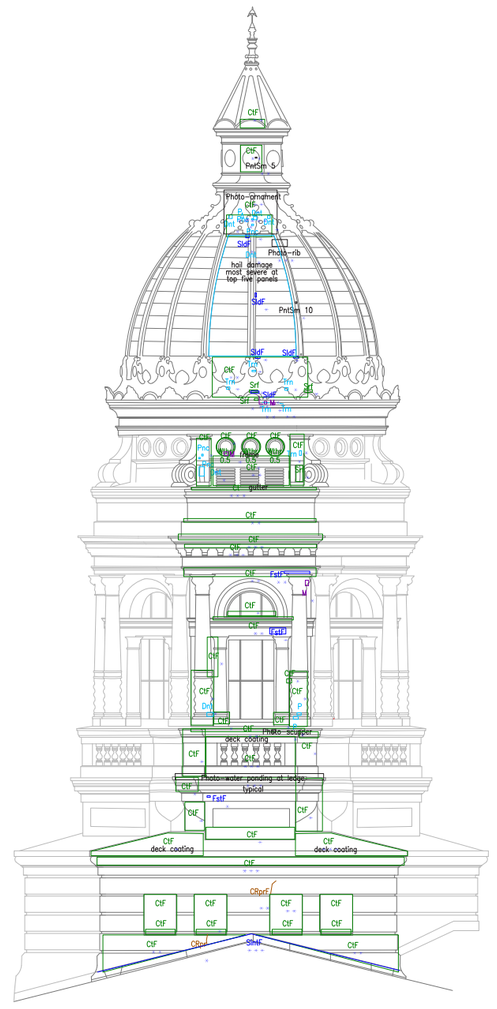
FROM DRAWINGS PROVIDED BY: GB GEOTECHNICS USA, INC. SCALE: 3/16" = 1'-0" WHEN PLOTTED ON 24X36 SHEET

Wyoming State Capitol
Dome Investigation
Cheyenne, Wyoming

VA PROJECT NUMBER: 12-1387



2A: East



2B: West

KEY TO SYMBOLS

Each TPAS annotation is comprised of a graphical symbol and text label.

Four types of graphical symbols are used:
--Target symbols depict faults having discrete locations, such as spalls or patch repairs.
--Box symbols are rectangular symbols delineating conditions that span an area too large to be effectively represented with target symbols.
--Polyline symbols depict cracks and specific joint conditions.
--Picture Link symbols indicate the location of survey photographs.

Text labels include a code describing the type of conditon, and if applicable, a severity code and Picture Link.

This target symbol indicates a 20 square inch spall, which was removed during the survey and photographed: (Fault Code: R; Severity: 20; Target Symbol; Picture Link)

This box symbol indicates an area of biological soiling, which was not photographed: (Bio)

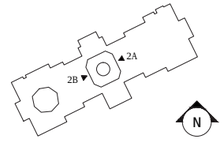
This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed: (CJ 3)

Abbreviations:
G = Graffiti
PntSm = Paint Sample

KEY TO SURVEY CODES

Condition	Symbol		Fault Type	Severity	Amount
Coating		Ct	Coating	Not applicable	Area in sq. ft.
		CtF	Coating Failed		
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Checked		Chk	Checked	Width in 1/16" increments	Length in lin. ft.
Crack		C	Crack		
Damaged		Dnt	Dented	Not applicable	Area in sq. ft.
		Pnc	Punctured		Diameter in in.
		Trn	Torn		Length in lin. in.
Deteriorated		Rot	Rotted	Not applicable	Area in sq. in.
		Wthr	Weathered		
Prev. Repair		P	Patch sound	Not applicable	Area in sq. in.
		PF	Patch Failed		
Seams Failed		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Soiled/Stained		Gua	Guano	Not applicable	Area in sq. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.
		M	Missing		

KEY PLAN



SURVEYED USING
MAY 13-16, 2013 BY: MM, EK, KL

PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com

ISSUE DATE: MAY 24, 2013

ELEVATIONS
EAST & WEST

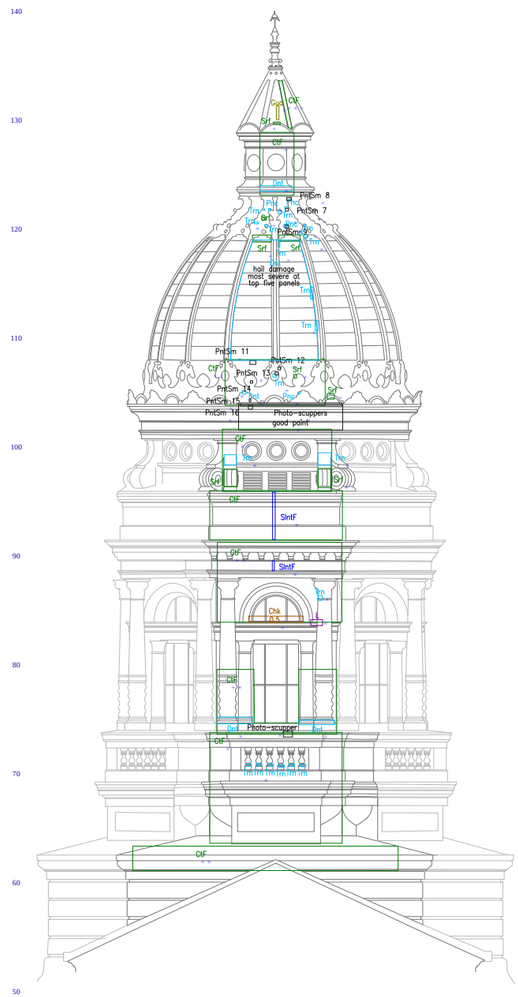
SCALE: 3/16" = 1'-0" WHEN PLOTTED ON 24X36 SHEET

FROM DRAWINGS PROVIDED BY: GB GEOTECHNICS USA INC.

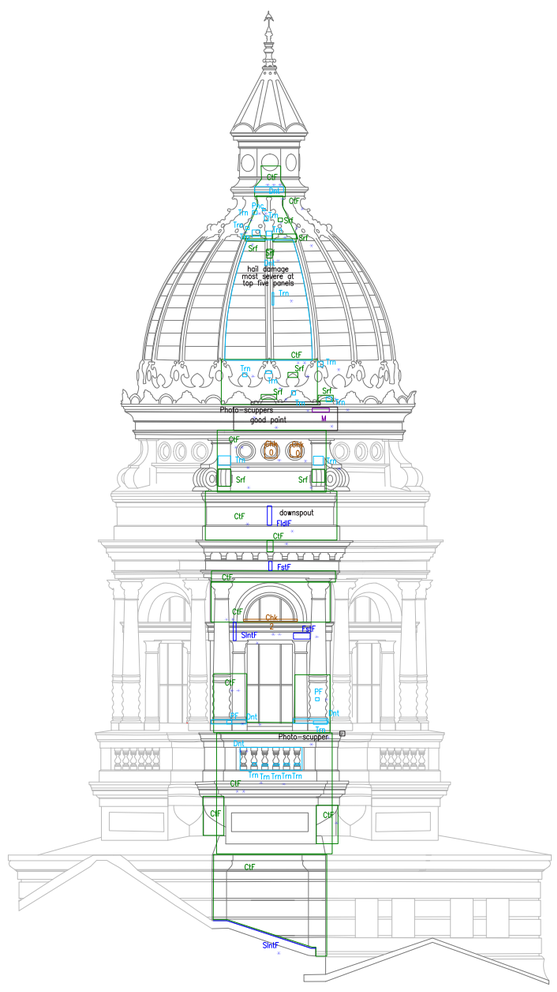
Wyoming State Capitol
Dome Investigation
Cheyenne, Wyoming

VA PROJECT NUMBER: 12-3387

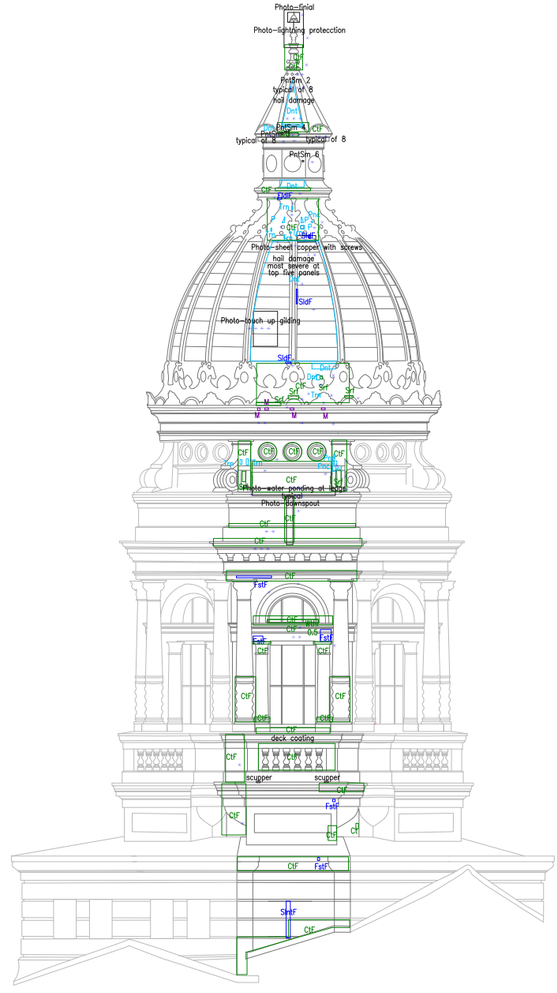
2



3A: South



3B: Southeast



3C: Southwest

KEY TO SYMBOLS

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Four types of graphical symbols are used:
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This box symbol indicates an area of biological soiling, which was not photographed: Bio

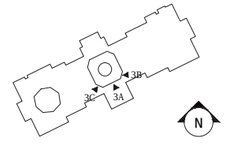
This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed: CJ 3

Abbreviations:
G = Graffiti
PntSm = Paint Sample

KEY TO SURVEY CODES

Condition	Symbol		Fault Type	Severity	Amount
Coating		Ct	Coating	Not applicable	Area in sq. ft.
		CtF	Coating Failed		
Corroded		Srf	Surface	Not applicable	Area in sq. ft.
		Prf	Perforated		
Checked Crack		Chk	Checked	Width in 1/16" increments	Length in lin. ft.
		C	Crack		
Damaged		Dnt	Dented	Not applicable	Area in sq. ft.
		Pnc	Punctured		Diameter in in.
		Trn	Torn		Length in lin. in.
Deteriorated		Rot	Rotted	Not applicable	Area in sq. in.
		Wthr	Weathered		
Prev. Repair		P	Patch sound	Not applicable	Area in sq. in.
		PF	Patch Failed		
Seams Failed		FstF	Fastener Failed	Not applicable	Count
		FldF	Folded Seam Failed		Length in lin. ft.
		SldF	Solder Failed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.
Soiled/Stained		Gua	Guano	Not applicable	Area in sq. ft.
Unsecured		L	Loose	Not applicable	Area in sq. ft.
		M	Missing		

KEY PLAN



ELEVATIONS
SOUTH, SOUTHWEST, SOUTHEAST

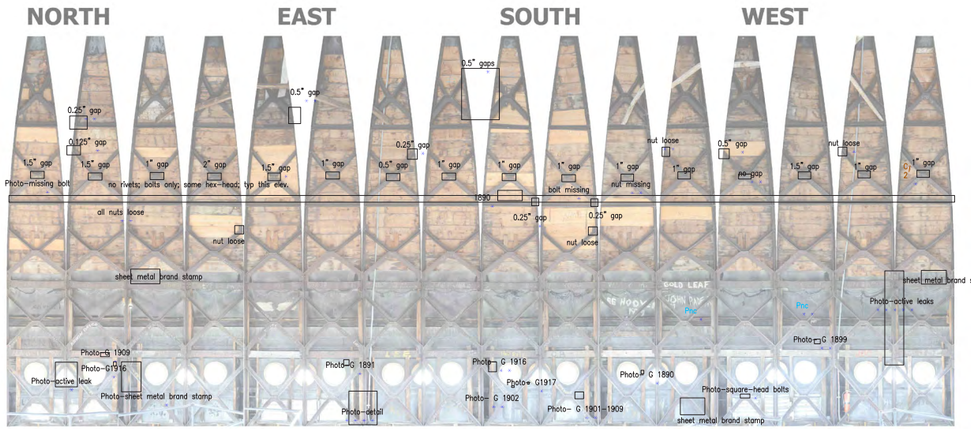
SURVEYED USING: Vertical Access
MAY 13-16, 2013 BY: R&M, Dc, KL
PO Box 4135 Ithaca, NY 14852
607-257-4049 www.vertical-access.com
ISSUE DATE: MAY 24, 2013

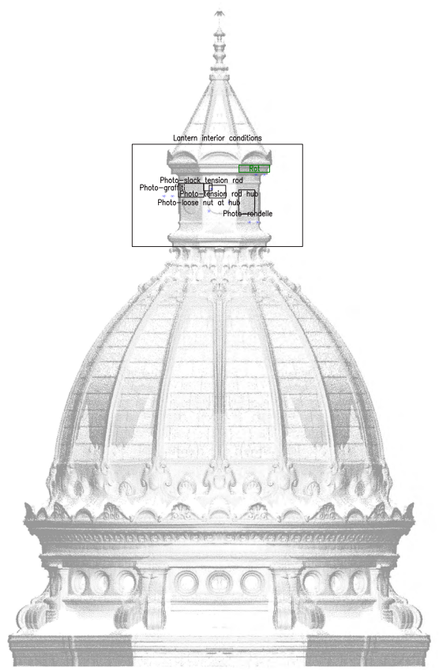
FROM DRAWINGS PROVIDED BY: GB GEOTECHNICS USA INC. SCALE: 3/16" = 1'-0" WHEN PLOTTED ON 24X36 SHEET

Wyoming State Capitol
Dome Investigation
Cheyenne, Wyoming

VA PROJECT NUMBER: 12-1387

3





KEY TO SYMBOLS

Each TPAS annotation is comprised of a graphical symbol and text label.

Four types of graphical symbols are used:
--Target symbols depict faults having discrete locations, such as spalls or patch repairs.
--Box symbols are rectangular symbols delineating conditions that span an area too large to be effectively represented with target symbols.
--Polyline symbols depict cracks and specific joint conditions.
--Picture Link symbols indicate the location of survey photographs.

Text labels include a code describing the type of condition, and if applicable, a severity code and Picture Link.

This target symbol indicates a 20 square inch spall, which was removed during the survey and photographed: Fault Code R, Severity 20, Target Symbol, Picture Link

This box symbol indicates an area of biological soiling, which was not photographed: Bio

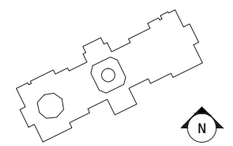
This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed: CJ 3

Abbreviations:
G = Graffiti
PntSm = Paint Sample

KEY TO SURVEY CODES

Condition	Symbol	Fault Type	Severity	Amount
Coating		Ct Coating CtF Coating Failed	Not applicable	Area in sq. ft.
Corroded		Srf Surface Prf Perforated	Not applicable	Area in sq. ft.
Checked Crack		Chk Checked C Crack	Width in 1/16" increments	Length in lin. ft.
Damaged		Dnt Dented Pnc Punctured Trn Torn	Not applicable	Area in sq. ft. Diameter in in. Length in lin. in.
Deteriorated		Rot Rotted Wthr Weathered	Not applicable	Area in sq. in.
Prev. Repair		P Patch sound PF Patch Failed	Not applicable	Area in sq. in.
Seams Failed		FstF Fastener Failed FldF Folded Seam Failed SldF Solder Failed SlntF Sealant Failed	Not applicable	Count Length in lin. ft. Length in lin. ft. Length in lin. ft.
Soiled/Stained		Gua Guano	Not applicable	Area in sq. ft.
Unsecured		L Loose M Missing	Not applicable	Area in sq. ft.

KEY PLAN



SURVEYED USING GIS
MAY 13-16, 2013 BY: MM, EK, KL

PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com

ISSUE DATE: MAY 24, 2013

FROM DRAWING PRINTED BY: GB GEOTECHNICS USA INC. SCALE: 1-1/4" = 1'-0" WHEN PLOTTED ON 24X36 SHEET

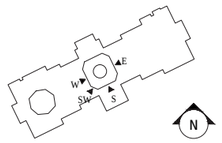
PARTIAL ELEVATION
DOME INTERIOR

Wyoming State Capitol
Dome Investigation
Cheyenne, Wyoming

VA PROJECT NUMBER: 12-1387

4

PntSm = Paint Sample



SURVEYED DSHC
MAY 13-16, 2013 BY: R&M, Dc, KL

PO Box 4135 Ithaca, NY 14852
607-257-4049 www.vertical-access.com

ISSUE DATE: MAY 24, 2013

ELEVATIONS

PAINT SAMPLES: EAST, WEST, SOUTH, SOUTHWEST

FROM DRAWINGS PROVIDED BY: GB GEOTECHNICS USA INC. SCALE: 3/16" = 1'-0" WHEN PLOTTED ON 24X36 SHEET

Wyoming State Capitol
Dome Investigation
Cheyenne, Wyoming

VA PROJECT NUMBER: 12-1387

Spreadsheet Data Key

Block	Condition	Code	Severity	Amount
ArchMetal_Coating	Coating Failed	CtF	N/A	Area in square feet
ArchMetal_Corrosion	Perforated	Prf	N/A	Area in square feet
ArchMetal_Corrosion	Surface	Srf	N/A	Area in square feet
ArchMetal_Crack	Crack	C	Width in 1/16" increments	Length in linear feet
ArchMetal_Crack	Repair Sound	CRpr	Width in 1/16" increments	Length in linear feet
ArchMetal_Crack	Repair Failed	CRprF	Width in 1/16" increments	Length in linear feet
SheetMetal_Coating	Coating Failed	CtF	N/A	Area in square feet
SheetMetal_Coating	Coating Sound	Ct	N/A	Area in square feet
SheetMetal_Corrosion	Surface	Srf	N/A	Area in square feet
SheetMetal_Damaged	Dented	Dnt	N/A	Area in square feet
SheetMetal_Damaged	Punctured	Pnc	N/A	Diameter in inches
SheetMetal_Damaged	Torn	Trn	N/A	Length in linear inches
SheetMetal_Repair	Patch Failed	PF	N/A	Area in square feet
SheetMetal_Repair	Patch Sound	P	N/A	Area in square feet
SheetMetal_Seam	Sealant Failed	SlntF	N/A	Length in linear feet
SheetMetal_Seam	Fastener Failed	FstF	N/A	Count
SheetMetal_Seam	Solder Failed	SldF	N/A	Length in linear feet
SheetMetal_SoilStain	Guano	Gua	N/A	Area in square feet
SheetMetal_Unsecured	Loose	L	N/A	Area in square feet
SheetMetal_Unsecured	Missing	M	N/A	Area in square feet
Wood_Coating	Coating Failed	CtF	N/A	Area in square feet
Wood_Crack	Crack	C	Width in 1/16" increments	Length in linear feet
Wood_Crack	Checking	Chk	Width in 1/16" increments	Length in linear feet
Wood_Deteriorated	Rotten	Rot	N/A	Area in square feet
Wood_Deteriorated	Weathered	Wthr	N/A	Area in square feet
Wood_Unsecured	Missing	M	N/A	Area in square feet

Wyoming State Capitol Dome
Exterior Investigation
Cheyenne, WY

Vertical Access LLC
Job Number 12-1387
May 24, 2013

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
ArchMetal_Coating	Coating Failed	13	51	CtF		28.7	Pr3	2
ArchMetal_Coating	Coating Failed	13	57	CtF		14.0	Pr3	
ArchMetal_Coating	Coating Failed	18	57	CtF		14.0	Pr3	
ArchMetal_Coating	Coating Failed	25	57	CtF		14.0	Pr3	
ArchMetal_Coating	Coating Failed	30	57	CtF		14.0	Pr3	
ArchMetal_Coating	Coating Failed	33	51	CtF		35.1	Pr3	1
ArchMetal_Coating	Coating Failed	95	59	CtF		116.0	Pr3	3
ArchMetal_Coating	Coating Failed	173	52	CtF		24.8	Pr3	1
ArchMetal_Coating	Coating Failed	258	54	CtF		25.0	Pr3	
ArchMetal_Coating	Coating Failed	309	54	CtF		22.3	Pr3	2
ArchMetal_Coating	Coating Failed	328	54	CtF		22.3	Pr3	2
ArchMetal_Coating	Coating Failed	531	56	CtF		20.0	Pr3	
ArchMetal_Corrosion	Perforated	12	50	Prf		0.1	Pr2	1
ArchMetal_Corrosion	Surface	17	52	Srf		0.7	Pr2	1
ArchMetal_Corrosion	Surface	28	51	Srf		1.9	Pr2	1
ArchMetal_Corrosion	Surface	33	50	Srf		1.4	Pr2	1
ArchMetal_Corrosion	Surface	92	52	Srf		3.9	Pr3	2
ArchMetal_Corrosion	Surface	95	55	Srf		21.7	Pr3	2
ArchMetal_Corrosion	Surface	169	52	Srf		0.1	Pr3	1
ArchMetal_Corrosion	Surface	171	53	Srf		0.4	Pr3	1
ArchMetal_Crack	Crack	94	59	C		0.5	Pr2	1
ArchMetal_Crack	Repair failed	319	58	CRprF		1.4	Pr2	2
ArchMetal_Crack	Repair sound	313	53	CRpr		1.0	Pr2	1
ArchMetal_Sealant	Sealant Failed	529	57	SlntF		4.0	Pr3	
SheetMetal_Coating	Coating Failed	14	56	CtF		13.6	Pr3	1
SheetMetal_Coating	Coating Failed	16	95	CtF		13.5	Pr2	2
SheetMetal_Coating	Coating Failed	17	98	CtF		8.3	Pr2	1
SheetMetal_Coating	Coating Failed	20	74	CtF		4.6	Pr3	2
SheetMetal_Coating	Coating Failed	22	121	CtF		11.3	Pr3	
SheetMetal_Coating	Coating Failed	22	99	CtF		14.8	Pr2	5
SheetMetal_Coating	Coating Failed	22	65	CtF		20.6	Pr3	3
SheetMetal_Coating	Coating Failed	22	70	CtF		5.2	Pr3	1
SheetMetal_Coating	Coating Failed	23	92	CtF		7.7	Pr2	3
SheetMetal_Coating	Coating Failed	23	61	CtF		36.3	Pr3	5
SheetMetal_Coating	Coating Failed	24	84	CtF		4.3	Pr3	1
SheetMetal_Coating	Coating Failed	24	74	CtF		5.6	Pr3	1
SheetMetal_Coating	Coating Failed	24	107	CtF		41.5	Pr3	3
SheetMetal_Coating	Coating Failed	27	73	CtF		5.3	Pr3	2
SheetMetal_Coating	Coating Failed	27	97	CtF		12.5	Pr2	1
SheetMetal_Coating	Coating Failed	89	71	CtF		1.0	Pr3	1
SheetMetal_Coating	Coating Failed	89	68	CtF		3.8	Pr3	1
SheetMetal_Coating	Coating Failed	89	70	CtF		2.0	Pr3	1
SheetMetal_Coating	Coating Failed	89	73	CtF		2.5	Pr3	1
SheetMetal_Coating	Coating Failed	90	99	CtF		7.2	Pr3	1
SheetMetal_Coating	Coating Failed	90	77	CtF		8.5	Pr3	1
SheetMetal_Coating	Coating Failed	92	83	CtF		17.1	Pr3	3
SheetMetal_Coating	Coating Failed	92	115	CtF		0.3	Pr3	1
SheetMetal_Coating	Coating Failed	92	105	CtF		0.3	Pr3	1
SheetMetal_Coating	Coating Failed	94	87	CtF		0.5	Pr3	1
SheetMetal_Coating	Coating Failed	94	96	CtF		20.0	Pr3	2
SheetMetal_Coating	Coating Failed	94	61	CtF		14.4	Pr3	3
SheetMetal_Coating	Coating Failed	94	93	CtF		4.0	Pr3	1
SheetMetal_Coating	Coating Failed	94	130	CtF		0.3	Pr3	1
SheetMetal_Coating	Coating Failed	95	73	CtF		39.0	Pr3	4
SheetMetal_Coating	Coating Failed	95	120	CtF		0.1	Pr3	3
SheetMetal_Coating	Coating Failed	95	107	CtF		6.8	Pr3	2

Wyoming State Capitol Dome
Exterior Investigation
Cheyenne, WY

Vertical Access LLC
Job Number 12-1387
May 24, 2013

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
SheetMetal_Coating	Coating Failed	96	74	CtF		10.0	Pr3	1
SheetMetal_Coating	Coating Failed	96	104	CtF		12.5	Pr3	3
SheetMetal_Coating	Coating Failed	96	91	CtF		20.0	Pr3	2
SheetMetal_Coating	Coating Failed	96	117	CtF		0.1	Pr3	1
SheetMetal_Coating	Coating Failed	97	106	CtF		0.4	Pr3	1
SheetMetal_Coating	Coating Failed	98	87	CtF		0.2	Pr3	1
SheetMetal_Coating	Coating Failed	99	99	CtF		7.6	Pr3	1
SheetMetal_Coating	Coating Failed	99	77	CtF		9.6	Pr3	1
SheetMetal_Coating	Coating Failed	99	66	CtF		5.4	Pr3	1
SheetMetal_Coating	Coating Failed	100	71	CtF		2.0	Pr3	1
SheetMetal_Coating	Coating Failed	168	65	CtF		3.1	Pr3	1
SheetMetal_Coating	Coating Failed	169	91	CtF		4.9	Pr3	1
SheetMetal_Coating	Coating Failed	169	98	CtF		5.2	Pr3	2
SheetMetal_Coating	Coating Failed	170	75	CtF		5.0	Pr3	1
SheetMetal_Coating	Coating Failed	171	95	CtF		14.1	Pr3	
SheetMetal_Coating	Coating Failed	173	121	CtF		20.2	Pr3	2
SheetMetal_Coating	Coating Failed	174	64	CtF		0.0	Pr3	
SheetMetal_Coating	Coating Failed	175	63	CtF		11.3	Pr3	3
SheetMetal_Coating	Coating Failed	175	69	CtF		41.4	Pr3	3
SheetMetal_Coating	Coating Failed	176	107	CtF		46.0	Pr3	3
SheetMetal_Coating	Coating Failed	177	74	CtF		4.4	Pr3	1
SheetMetal_Coating	Coating Failed	178	65	CtF		2.0	Pr3	
SheetMetal_Coating	Coating Failed	178	98	CtF		16.7	Pr3	1
SheetMetal_Coating	Coating Failed	240	73	CtF		59.3	Pr3	1
SheetMetal_Coating	Coating Failed	240	66	CtF		10.1	Pr3	1
SheetMetal_Coating	Coating Failed	242	88	CtF		54.5	Pr3	2
SheetMetal_Coating	Coating Failed	242	100	CtF		55.0	Pr3	2
SheetMetal_Coating	Coating Failed	244	75	CtF		15.9	Pr3	6
SheetMetal_Coating	Coating Failed	244	137	CtF		5.6	Pr3	2
SheetMetal_Coating	Coating Failed	244	131	CtF		1.9	Pr3	1
SheetMetal_Coating	Coating Failed	245	61	CtF		46.6	Pr3	1
SheetMetal_Coating	Coating Failed	246	124	CtF		7.3	Pr3	2
SheetMetal_Coating	Coating Failed	246	93	CtF		9.4	Pr3	1
SheetMetal_Coating	Coating Failed	246	128	CtF		1.9	Pr3	1
SheetMetal_Coating	Coating Failed	247	131	CtF		2.2	Pr3	1
SheetMetal_Coating	Coating Failed	247	108	CtF		38.6	Pr3	4
SheetMetal_Coating	Coating Failed	249	119	CtF		14.8	Pr3	2
SheetMetal_Coating	Coating Failed	251	66	CtF		10.1	Pr3	1
SheetMetal_Coating	Coating Failed	310	56	CtF		8.0	Pr3	
SheetMetal_Coating	Coating Failed	311	63	CtF		30.0	Pr3	1
SheetMetal_Coating	Coating Failed	312	68	CtF		2.6	Pr3	1
SheetMetal_Coating	Coating Failed	313	66	CtF		4.7	Pr3	1
SheetMetal_Coating	Coating Failed	313	71	CtF		9.0	Pr3	1
SheetMetal_Coating	Coating Failed	314	100	CtF		5.9	Pr3	
SheetMetal_Coating	Coating Failed	314	77	CtF		10.3	Pr3	1
SheetMetal_Coating	Coating Failed	315	56	CtF		8.0	Pr3	1
SheetMetal_Coating	Coating Failed	315	80	CtF		3.6	Pr3	1
SheetMetal_Coating	Coating Failed	316	74	CtF		1.6	Pr3	1
SheetMetal_Coating	Coating Failed	316	106	CtF		32.2	Pr3	2
SheetMetal_Coating	Coating Failed	317	90	CtF		6.0	Pr3	3
SheetMetal_Coating	Coating Failed	318	74	CtF		20.0	Pr3	2
SheetMetal_Coating	Coating Failed	318	61	CtF		40.0	Pr3	3
SheetMetal_Coating	Coating Failed	318	71	CtF		31.1	Pr3	3
SheetMetal_Coating	Coating Failed	318	122	CtF		8.3	Pr3	1
SheetMetal_Coating	Coating Failed	318	88	CtF		9.7	Pr3	2
SheetMetal_Coating	Coating Failed	318	93	CtF		4.1	Pr3	2

Wyoming State Capitol Dome
Exterior Investigation
Cheyenne, WY

Vertical Access LLC
Job Number 12-1387
May 24, 2013

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
SheetMetal_Coating	Coating Failed	318	127	CtF		4.8	Pr3	2
SheetMetal_Coating	Coating Failed	318	98	CtF		18.9	Pr3	2
SheetMetal_Coating	Coating Failed	318	64	CtF		8.9	Pr3	1
SheetMetal_Coating	Coating Failed	318	130	CtF		4.8	Pr3	2
SheetMetal_Coating	Coating Failed	318	83	CtF		8.0	Pr3	2
SheetMetal_Coating	Coating Failed	318	91	CtF		20.0	Pr3	3
SheetMetal_Coating	Coating Failed	321	74	CtF		1.7	Pr3	1
SheetMetal_Coating	Coating Failed	322	56	CtF		8.0	Pr3	
SheetMetal_Coating	Coating Failed	322	79	CtF		0.2	Pr3	1
SheetMetal_Coating	Coating Failed	322	77	CtF		8.2	Pr3	1
SheetMetal_Coating	Coating Failed	323	100	CtF		6.1	Pr3	1
SheetMetal_Coating	Coating Failed	323	66	CtF		12.0	Pr3	1
SheetMetal_Coating	Coating Failed	323	72	CtF		1.0	Pr3	1
SheetMetal_Coating	Coating Failed	325	63	CtF		30.0	Pr3	3
SheetMetal_Coating	Coating Failed	326	56	CtF		8.0	Pr3	
SheetMetal_Coating	Coating Failed	384	62	CtF		54.7	Pr3	2
SheetMetal_Coating	Coating Failed	385	107	CtF		38.6	Pr3	2
SheetMetal_Coating	Coating Failed	386	73	CtF		123.3	Pr3	1
SheetMetal_Coating	Coating Failed	387	78	CtF		45.2	Pr3	2
SheetMetal_Coating	Coating Failed	387	95	CtF		55.0	Pr3	
SheetMetal_Coating	Coating Failed	387	90	CtF		83.7	Pr3	2
SheetMetal_Coating	Coating Failed	388	101	CtF		57.3	Pr3	2
SheetMetal_Coating	Coating Failed	391	128	CtF		18.0	Pr3	1
SheetMetal_Coating	Coating Failed	393	132	CtF		1.4	Pr3	3
SheetMetal_Coating	Coating Failed	454	66	CtF		6.8	Pr3	
SheetMetal_Coating	Coating Failed	455	88	CtF		11.7	Pr3	
SheetMetal_Coating	Coating Failed	455	78	CtF		37.8	Pr3	2
SheetMetal_Coating	Coating Failed	456	100	CtF		56.7	Pr3	2
SheetMetal_Coating	Coating Failed	456	69	CtF		117.8	Pr3	2
SheetMetal_Coating	Coating Failed	456	85	CtF		40.3	Pr3	4
SheetMetal_Coating	Coating Failed	456	93	CtF		54.2	Pr3	1
SheetMetal_Coating	Coating Failed	457	61	CtF		76.2	Pr3	
SheetMetal_Coating	Coating Failed	459	125	CtF		6.3	Pr3	3
SheetMetal_Coating	Coating Failed	460	92	CtF		0.6	Pr3	1
SheetMetal_Coating	Coating Failed	461	122	CtF		13.2	Pr3	1
SheetMetal_Coating	Coating Failed	461	108	CtF		36.6	Pr3	2
SheetMetal_Coating	Coating Failed	464	66	CtF		7.0	Pr3	1
SheetMetal_Coating	Coating Failed	524	71	CtF		12.0	Pr3	1
SheetMetal_Coating	Coating Failed	524	66	CtF		12.0	Pr3	1
SheetMetal_Coating	Coating Failed	525	99	CtF		5.0	Pr3	1
SheetMetal_Coating	Coating Failed	525	77	CtF		7.9	Pr3	
SheetMetal_Coating	Coating Failed	526	91	CtF		20.0	Pr3	3
SheetMetal_Coating	Coating Failed	527	81	CtF		0.4	Pr3	
SheetMetal_Coating	Coating Failed	527	75	CtF		2.0	Pr3	
SheetMetal_Coating	Coating Failed	527	93	CtF		8.0	Pr3	2
SheetMetal_Coating	Coating Failed	527	123	CtF		0.8	Pr3	1
SheetMetal_Coating	Coating Failed	529	129	CtF		0.6	Pr3	1
SheetMetal_Coating	Coating Failed	529	88	CtF		11.7	Pr3	1
SheetMetal_Coating	Coating Failed	529	93	CtF		3.7	Pr3	
SheetMetal_Coating	Coating Failed	529	74	CtF		25.0	Pr3	
SheetMetal_Coating	Coating Failed	529	97	CtF		20.4	Pr3	2
SheetMetal_Coating	Coating Failed	529	83	CtF		12.0	Pr3	2
SheetMetal_Coating	Coating Failed	529	120	CtF		17.8	Pr3	1
SheetMetal_Coating	Coating Failed	529	71	CtF		17.3	Pr3	
SheetMetal_Coating	Coating Failed	529	61	CtF		13.0	Pr3	
SheetMetal_Coating	Coating Failed	529	135	CtF		3.8	Pr3	2

Wyoming State Capitol Dome
Exterior Investigation
Cheyenne, WY

Vertical Access LLC
Job Number 12-1387
May 24, 2013

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
SheetMetal_Coating	Coating Failed	530	136	CtF		0.0	Pr3	1
SheetMetal_Coating	Coating Failed	530	105	CtF		30.7	Pr3	1
SheetMetal_Coating	Coating Failed	532	129	CtF		2.5	Pr3	2
SheetMetal_Coating	Coating Failed	532	81	CtF		0.4	Pr3	
SheetMetal_Coating	Coating Failed	532	75	CtF		2.0	Pr3	
SheetMetal_Coating	Coating Failed	533	64	CtF		1.0	Pr3	
SheetMetal_Coating	Coating Failed	534	99	CtF		6.4	Pr3	1
SheetMetal_Coating	Coating Failed	534	77	CtF		7.9	Pr3	
SheetMetal_Coating	Coating Failed	534	68	CtF		3.2	Pr3	
SheetMetal_Coating	Coating Sound	242	92	Ct		3.3	Pr3	1
SheetMetal_Coating	Coating Sound	317	96	Ct		6.0	Pr3	3
SheetMetal_Coating	Coating Sound	535	65	Ct		0.1	Pr3	
SheetMetal_Corrosion	Surface	17	97	Srf		0.0	Pr2	1
SheetMetal_Corrosion	Surface	25	95	Srf		0.0	Pr2	2
SheetMetal_Corrosion	Surface	28	96	Srf		0.0	Pr2	1
SheetMetal_Corrosion	Surface	91	97	Srf		0.5	Pr3	1
SheetMetal_Corrosion	Surface	93	95	Srf		0.1	Pr3	1
SheetMetal_Corrosion	Surface	94	104	Srf		1.0	Pr3	1
SheetMetal_Corrosion	Surface	95	116	Srf		0.0	Pr3	1
SheetMetal_Corrosion	Surface	98	97	Srf		0.4	Pr3	1
SheetMetal_Corrosion	Surface	99	105	Srf		1.0	Pr3	1
SheetMetal_Corrosion	Surface	176	106	Srf		0.1	Pr3	2
SheetMetal_Corrosion	Surface	177	79	Srf		0.2	Pr3	1
SheetMetal_Corrosion	Surface	177	97	Srf		0.1	Pr3	1
SheetMetal_Corrosion	Surface	178	105	Srf		0.1	Pr3	
SheetMetal_Corrosion	Surface	179	91	Srf		0.1	Pr3	
SheetMetal_Corrosion	Surface	238	56	Srf		1.8	Pr2	1
SheetMetal_Corrosion	Surface	241	91	Srf		0.3	Pr2	
SheetMetal_Corrosion	Surface	242	94	Srf		6.8	Pr2	1
SheetMetal_Corrosion	Surface	243	96	Srf		1.8	Pr2	1
SheetMetal_Corrosion	Surface	243	118	Srf		0.8	Pr2	1
SheetMetal_Corrosion	Surface	244	108	Srf		0.2	Pr2	1
SheetMetal_Corrosion	Surface	246	105	Srf		0.2	Pr2	1
SheetMetal_Corrosion	Surface	247	118	Srf		0.6	Pr2	1
SheetMetal_Corrosion	Surface	249	97	Srf		3.3	Pr2	1
SheetMetal_Corrosion	Surface	251	93	Srf		0.3	Pr2	1
SheetMetal_Corrosion	Surface	252	105	Srf		0.4	Pr2	1
SheetMetal_Corrosion	Surface	254	55	Srf		1.4	Pr2	1
SheetMetal_Corrosion	Surface	318	104	Srf		0.1	Pr3	1
SheetMetal_Corrosion	Surface	319	105	Srf		0.3	Pr3	1
SheetMetal_Corrosion	Surface	323	97	Srf		0.9	Pr3	1
SheetMetal_Corrosion	Surface	323	105	Srf		0.3	Pr3	1
SheetMetal_Corrosion	Surface	386	97	Srf		2.0	Pr2	1
SheetMetal_Corrosion	Surface	390	118	Srf		1.1	Pr3	1
SheetMetal_Corrosion	Surface	390	121	Srf		0.1	Pr3	1
SheetMetal_Corrosion	Surface	390	130	Srf		0.1	Pr3	1
SheetMetal_Corrosion	Surface	393	118	Srf		1.1	Pr3	1
SheetMetal_Corrosion	Surface	393	107	Srf		0.1	Pr3	1
SheetMetal_Corrosion	Surface	396	105	Srf		0.3	Pr3	1
SheetMetal_Corrosion	Surface	397	97	Srf		2.1	Pr3	1
SheetMetal_Corrosion	Surface	456	97	Srf		1.8	Pr2	1
SheetMetal_Corrosion	Surface	457	118	Srf		0.9	Pr2	
SheetMetal_Corrosion	Surface	459	118	Srf		0.4	Pr2	1
SheetMetal_Corrosion	Surface	460	105	Srf		0.6	Pr2	1
SheetMetal_Corrosion	Surface	461	121	Srf		0.1	Pr2	1
SheetMetal_Corrosion	Surface	462	107	Srf		0.4	Pr2	1

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
SheetMetal_Corrosion	Surface	462	97	Srf		1.4	Pr2	1
SheetMetal_Corrosion	Surface	462	119	Srf		1.6	Pr2	1
SheetMetal_Corrosion	Surface	464	105	Srf		0.7	Pr2	1
SheetMetal_Corrosion	Surface	525	96	Srf		0.3	Pr3	1
SheetMetal_Corrosion	Surface	528	104	Srf		0.7	Pr3	1
SheetMetal_Corrosion	Surface	529	105	Srf		0.3	Pr3	1
SheetMetal_Corrosion	Surface	532	105	Srf		0.1	Pr3	1
SheetMetal_Corrosion	Surface	534	97	Srf		0.7	Pr3	1
SheetMetal_Corrosion	Surface	535	105	Srf		0.2	Pr3	1
SheetMetal_Damaged	.	22	110	Dnt		5.5	Pr3	1
SheetMetal_Damaged	Dented	18	75	Dnt		0.5	Pr3	1
SheetMetal_Damaged	Dented	18	109	Dnt		4.0	Pr3	
SheetMetal_Damaged	Dented	21	104	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Dented	22	117	Dnt		75.0	Pr3	
SheetMetal_Damaged	Dented	22	106	Dnt		0.9	Pr3	1
SheetMetal_Damaged	Dented	22	124	Dnt		3.8	Pr2	1
SheetMetal_Damaged	Dented	22	71	Dnt		0.1	Pr3	1
SheetMetal_Damaged	Dented	23	105	Dnt		0.5	Pr2	1
SheetMetal_Damaged	Dented	24	104	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Dented	26	105	Dnt		0.3	Pr3	1
SheetMetal_Damaged	Dented	26	75	Dnt		1.1	Pr3	1
SheetMetal_Damaged	Dented	27	110	Dnt		4.4	Pr3	1
SheetMetal_Damaged	Dented	27	104	Dnt		0.0	Pr2	1
SheetMetal_Damaged	Dented	91	74	Dnt		0.5	Pr2	1
SheetMetal_Damaged	Dented	92	75	Dnt		1.0	Pr2	1
SheetMetal_Damaged	Dented	93	86	Dnt		0.8	Pr2	1
SheetMetal_Damaged	Dented	93	120	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Dented	94	120	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Dented	94	70	Dnt		0.5	Pr2	1
SheetMetal_Damaged	Dented	95	115	Dnt		75.0	Pr3	4
SheetMetal_Damaged	Dented	95	71	Dnt		0.5	Pr2	1
SheetMetal_Damaged	Dented	96	70	Dnt		0.5	Pr2	1
SheetMetal_Damaged	Dented	97	75	Dnt		1.0	Pr2	1
SheetMetal_Damaged	Dented	99	74	Dnt		0.4	Pr2	1
SheetMetal_Damaged	Dented	169	74	Dnt		0.0	Pr3	1
SheetMetal_Damaged	Dented	169	71	Dnt		0.5	Pr3	1
SheetMetal_Damaged	Dented	172	71	Dnt		0.0	Pr2	1
SheetMetal_Damaged	Dented	173	122	Dnt		1.0	Pr2	1
SheetMetal_Damaged	Dented	173	111	Dnt		7.8	Pr3	2
SheetMetal_Damaged	Dented	173	116	Dnt		75.0	Pr3	1
SheetMetal_Damaged	Dented	177	71	Dnt		0.5	Pr3	1
SheetMetal_Damaged	Dented	242	107	Dnt		0.4	Pr3	
SheetMetal_Damaged	Dented	243	104	Dnt		0.2	Pr3	
SheetMetal_Damaged	Dented	243	112	Dnt		80.6	Pr3	2
SheetMetal_Damaged	Dented	248	104	Dnt		0.2	Pr3	1
SheetMetal_Damaged	Dented	314	76	Dnt		1.0	Pr2	1
SheetMetal_Damaged	Dented	315	97	Dnt		0.4	Pr2	1
SheetMetal_Damaged	Dented	316	120	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Dented	318	117	Dnt		31.6	Pr3	1
SheetMetal_Damaged	Dented	319	121	Dnt		0.1	Pr2	5
SheetMetal_Damaged	Dented	320	120	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Dented	387	74	Dnt		1.9	Pr3	1
SheetMetal_Damaged	Dented	389	104	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Dented	391	117	Dnt		75.0	Pr3	
SheetMetal_Damaged	Dented	391	124	Dnt		1.5	Pr2	1
SheetMetal_Damaged	Dented	395	74	Dnt		1.4	Pr3	1

Wyoming State Capitol Dome
Exterior Investigation
Cheyenne, WY

Vertical Access LLC
Job Number 12-1387
May 24, 2013

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
SheetMetal_Damaged	Dented	456	73	Dnt		11.9	Pr3	2
SheetMetal_Damaged	Dented	457	75	Dnt		1.3	Pr3	1
SheetMetal_Damaged	Dented	459	117	Dnt		75.0	Pr3	
SheetMetal_Damaged	Dented	459	123	Dnt		1.3	Pr2	1
SheetMetal_Damaged	Dented	465	75	Dnt		1.3	Pr3	
SheetMetal_Damaged	Dented	527	129	Dnt		0.5	Pr2	2
SheetMetal_Damaged	Dented	529	124	Dnt		1.4	Pr2	1
SheetMetal_Damaged	Dented	529	131	Dnt		6.0	Pr2	3
SheetMetal_Damaged	Dented	530	115	Dnt		27.2	Pr2	2
SheetMetal_Damaged	Dented	531	106	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Dented	532	107	Dnt		1.1	Pr2	1
SheetMetal_Damaged	Dented	533	98	Dnt		0.1	Pr2	1
SheetMetal_Damaged	Punctured	21	122	Pnc		0.0	Pr2	1
SheetMetal_Damaged	Punctured	23	120	Pnc		41313.0	Pr2	1
SheetMetal_Damaged	Punctured	91	99	Pnc		3.0	Pr2	1
SheetMetal_Damaged	Punctured	93	119	Pnc		2.0	Pr2	2
SheetMetal_Damaged	Punctured	95	121	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	98	98	Pnc		1.0	Pr2	1
SheetMetal_Damaged	Punctured	100	99	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	173	120	Pnc		1.0	Pr2	1
SheetMetal_Damaged	Punctured	243	98	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	244	122	Pnc		1.0	Pr2	1
SheetMetal_Damaged	Punctured	244	121	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	245	119	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	246	107	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	251	75	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	314	99	Pnc		1.0	Pr2	1
SheetMetal_Damaged	Punctured	314	98	Pnc		1.0	Pr2	1
SheetMetal_Damaged	Punctured	317	120	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	318	119	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	391	122	Pnc		1.0	Pr2	1
SheetMetal_Damaged	Punctured	392	104	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	393	120	Pnc		4.0	Pr2	1
SheetMetal_Damaged	Punctured	393	122	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	458	122	Pnc		1.0	Pr2	2
SheetMetal_Damaged	Punctured	531	121	Pnc		2.0	Pr2	1
SheetMetal_Damaged	Punctured	532	98	Pnc		3.0	Pr2	2
SheetMetal_Damaged	Punctured	533	99	Pnc		1.0	Pr2	1
SheetMetal_Damaged	Punctured	615	104	Pnc		0.2	Pr2	1
SheetMetal_Damaged	Punctured	623	104	Pnc		0.1	NA	2
SheetMetal_Damaged	Torn	18	104	Trn		1.0	Pr2	2
SheetMetal_Damaged	Torn	20	120	Trn		1.0	Pr2	3
SheetMetal_Damaged	Torn	97	99	Trn		1.0	Pr2	1
SheetMetal_Damaged	Torn	167	106	Trn		0.8	Pr2	1
SheetMetal_Damaged	Torn	173	106	Trn		0.6	Pr2	1
SheetMetal_Damaged	Torn	242	100	Trn		2.0	Pr2	
SheetMetal_Damaged	Torn	243	120	Trn		8.0	Pr2	1
SheetMetal_Damaged	Torn	244	105	Trn		3.0	Pr2	1
SheetMetal_Damaged	Torn	244	115	Trn		12.0	Pr2	1
SheetMetal_Damaged	Torn	244	70	Trn		12.0	Pr2	2
SheetMetal_Damaged	Torn	245	111	Trn		5.0	Pr2	1
SheetMetal_Damaged	Torn	246	122	Trn		1.0	Pr2	
SheetMetal_Damaged	Torn	246	117	Trn		6.0	Pr2	1
SheetMetal_Damaged	Torn	246	121	Trn		5.0	Pr2	1
SheetMetal_Damaged	Torn	246	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	247	122	Trn		1.0	Pr2	1

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
SheetMetal_Damaged	Torn	248	115	Trn		24.0	Pr2	
SheetMetal_Damaged	Torn	248	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	248	121	Trn		2.0	Pr2	1
SheetMetal_Damaged	Torn	248	117	Trn		8.0	Pr2	1
SheetMetal_Damaged	Torn	249	79	Trn		6.0	Pr2	1
SheetMetal_Damaged	Torn	249	107	Trn		6.0	Pr2	1
SheetMetal_Damaged	Torn	249	100	Trn		2.0	Pr2	
SheetMetal_Damaged	Torn	316	105	Trn		1.0	Pr2	1
SheetMetal_Damaged	Torn	318	107	Trn		1.0	Pr2	1
SheetMetal_Damaged	Torn	320	103	Trn		3.0	Pr2	2
SheetMetal_Damaged	Torn	321	103	Trn		1.0	Pr2	2
SheetMetal_Damaged	Torn	322	105	Trn		2.0	Pr2	1
SheetMetal_Damaged	Torn	322	99	Trn		2.0	Pr2	1
SheetMetal_Damaged	Torn	389	99	Trn		14.0	Pr2	1
SheetMetal_Damaged	Torn	389	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	389	121	Trn		6.0	Pr2	1
SheetMetal_Damaged	Torn	389	121	Trn		3.0	Pr2	
SheetMetal_Damaged	Torn	390	70	Trn		12.0	Pr2	1
SheetMetal_Damaged	Torn	391	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	391	120	Trn		2.0	Pr2	
SheetMetal_Damaged	Torn	391	106	Trn		4.0	Pr2	1
SheetMetal_Damaged	Torn	392	118	Trn		5.0	Pr2	1
SheetMetal_Damaged	Torn	392	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	392	121	Trn		3.0	Pr2	1
SheetMetal_Damaged	Torn	393	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	394	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	394	114	Trn		10.0	Pr2	1
SheetMetal_Damaged	Torn	394	111	Trn		6.0	Pr2	1
SheetMetal_Damaged	Torn	394	120	Trn		3.0	Pr2	1
SheetMetal_Damaged	Torn	395	119	Trn		5.0	Pr2	1
SheetMetal_Damaged	Torn	395	86	Trn		3.0	Pr2	1
SheetMetal_Damaged	Torn	397	99	Trn		24.0	Pr2	1
SheetMetal_Damaged	Torn	456	120	Trn		1.0	Pr2	1
SheetMetal_Damaged	Torn	456	99	Trn		16.0	Pr2	1
SheetMetal_Damaged	Torn	457	121	Trn		2.0	Pr2	1
SheetMetal_Damaged	Torn	457	119	Trn		6.0	Pr2	1
SheetMetal_Damaged	Torn	457	107	Trn		4.0	Pr2	1
SheetMetal_Damaged	Torn	457	70	Trn		12.0	Pr2	1
SheetMetal_Damaged	Torn	459	69	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	459	106	Trn		8.0	Pr2	1
SheetMetal_Damaged	Torn	459	121	Trn		3.0	Pr2	1
SheetMetal_Damaged	Torn	460	70	Trn		12.0	Pr2	1
SheetMetal_Damaged	Torn	460	120	Trn		3.0	Pr2	1
SheetMetal_Damaged	Torn	460	114	Trn		2.7	Pr2	1
SheetMetal_Damaged	Torn	461	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	461	70	Trn		12.0	Pr2	
SheetMetal_Damaged	Torn	462	104	Trn		2.0	Pr2	1
SheetMetal_Damaged	Torn	464	74	Trn		3.0	Pr2	1
SheetMetal_Damaged	Torn	465	108	Trn		3.0	Pr2	1
SheetMetal_Damaged	Torn	465	98	Trn		16.0	Pr2	1
SheetMetal_Damaged	Torn	465	104	Trn		8.0	Pr2	1
SheetMetal_Damaged	Torn	523	98	Trn		1.0	Pr2	1
SheetMetal_Damaged	Torn	526	98	Trn		2.0	Pr2	1
SheetMetal_Damaged	Torn	527	119	Trn		1.0	Pr2	1
SheetMetal_Damaged	Torn	529	122	Trn		2.0	Pr2	1
SheetMetal_Damaged	Torn	529	119	Trn		1.0	Pr2	1

Wyoming State Capitol Dome
Exterior Investigation
Cheyenne, WY

Vertical Access LLC
Job Number 12-1387
May 24, 2013

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
SheetMetal_Damaged	Torn	530	120	Trn		1.0	Pr2	1
SheetMetal_Damaged	Torn	531	105	Trn		1.0	Pr2	1
SheetMetal_Repair	Patch Failed	242	78	PF		0.2	Pr2	1
SheetMetal_Repair	Patch Failed	243	74	PF		0.4	Pr2	1
SheetMetal_Repair	Patch Failed	248	74	PF		0.3	Pr2	1
SheetMetal_Repair	Patch Failed	251	77	PF		0.2	Pr2	1
SheetMetal_Repair	Patch Failed	456	75	PF		0.2	Pr2	1
SheetMetal_Repair	Patch Failed	464	77	PF		0.1	Pr2	1
SheetMetal_Repair	Patch Sound	317	121	P		0.1	Pr3	1
SheetMetal_Repair	Patch Sound	322	74	P		0.1	Pr3	1
SheetMetal_Repair	Patch Sound	323	76	P		0.1	Pr3	
SheetMetal_Repair	Patch Sound	528	121	P		0.1	Pr3	1
SheetMetal_Repair	Patch Sound	531	121	P		0.1	Pr3	1
SheetMetal_Repair	Patch Sound	531	120	P		0.1	Pr3	
SheetMetal_Seam	Fastener Failed	91	71	FstF		3.0	Pr2	1
SheetMetal_Seam	Fastener Failed	94	73	FstF		2.0	Pr2	1
SheetMetal_Seam	Fastener Failed	95	82	FstF		2.0	Pr2	1
SheetMetal_Seam	Fastener Failed	98	71	FstF		5.0	Pr2	1
SheetMetal_Seam	Fastener Failed	98	67	FstF		1.0	Pr2	1
SheetMetal_Seam	Fastener Failed	98	82	FstF		3.0	Pr2	1
SheetMetal_Seam	Fastener Failed	245	82	FstF		6.0	Pr2	2
SheetMetal_Seam	Fastener Failed	246	65	FstF		3.0	Pr2	2
SheetMetal_Seam	Fastener Failed	246	114	FstF		0.5	Pr2	1
SheetMetal_Seam	Fastener Failed	248	93	FstF		4.0	Pr2	1
SheetMetal_Seam	Fastener Failed	248	66	FstF		3.0	Pr2	
SheetMetal_Seam	Fastener Failed	315	67	FstF		1.0	Pr3	1
SheetMetal_Seam	Fastener Failed	321	88	FstF		4.0	Pr2	2
SheetMetal_Seam	Fastener Failed	321	82	FstF		4.0	Pr2	1
SheetMetal_Seam	Fastener Failed	460	89	FstF		3.0	Pr2	
SheetMetal_Seam	Fastener Failed	463	83	FstF		6.0	Pr2	1
SheetMetal_Seam	Fastener Failed	526	82	FstF		3.0	Pr2	1
SheetMetal_Seam	Fastener Failed	526	87	FstF		3.0	Pr2	1
SheetMetal_Seam	Fastener Failed	532	61	FstF		1.0	Pr3	
SheetMetal_Seam	Fastener Failed	532	82	FstF		3.0	Pr2	1
SheetMetal_Seam	Fastener Failed	533	67	FstF		1.0	Pr3	
SheetMetal_Seam	Folded Failed	460	93	FldlF		4.3	Pr2	1
SheetMetal_Seam	Folded Failed	529	123	FldlF		0.3	Pr2	1
SheetMetal_Seam	Sealant Failed	173	108	SlntF		0.4	Pr2	2
SheetMetal_Seam	Sealant Failed	174	108	SlntF		1.3	Pr2	2
SheetMetal_Seam	Sealant Failed	177	91	SlntF		3.5	Pr2	2
SheetMetal_Seam	Sealant Failed	236	53	SlntF		29.4	Pr3	1
SheetMetal_Seam	Sealant Failed	243	67	SlntF		7.5	Pr2	1
SheetMetal_Seam	Sealant Failed	246	80	SlntF		23.1	Pr3	2
SheetMetal_Seam	Sealant Failed	318	54	SlntF		40.0	Pr2	3
SheetMetal_Seam	Sealant Failed	392	89	SlntF		2.2	Pr2	1
SheetMetal_Seam	Sealant Failed	392	93	SlntF		9.2	Pr2	1
SheetMetal_Seam	Sealant Failed	457	82	SlntF		3.9	Pr2	1
SheetMetal_Seam	Sealant Failed	459	54	SlntF		9.8	Pr2	1
SheetMetal_Seam	Solder Failed	94	110	SldF		0.8	Pr2	1
SheetMetal_Seam	Solder Failed	245	136	SldF		1.3	Pr2	1
SheetMetal_Seam	Solder Failed	318	118	SldF		0.5	Pr2	1
SheetMetal_Seam	Solder Failed	319	108	SldF		0.5	Pr2	1
SheetMetal_Seam	Solder Failed	319	113	SldF		0.3	Pr2	1
SheetMetal_Seam	Solder Failed	320	104	SldF		1.0	Pr2	1
SheetMetal_Seam	Solder Failed	322	108	SldF		0.5	Pr2	1
SheetMetal_Seam	Solder Failed	529	108	SldF		0.5	Pr2	1

Wyoming State Capitol Dome
Exterior Investigation
Cheyenne, WY

Vertical Access LLC
Job Number 12-1387
May 24, 2013

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
SheetMetal_Seam	Solder Failed	531	113	SldF		1.0	Pr2	1
SheetMetal_Seam	Solder Failed	531	119	SldF		0.3	Pr2	1
SheetMetal_SoilStain	Guano	391	131	Gua		0.3	Pr3	1
SheetMetal_Unsecured	Loose	21	103	L		0.0	Pr2	2
SheetMetal_Unsecured	Loose	319	104	L		0.1	Pr2	2
SheetMetal_Unsecured	Loose	395	84	L		0.6	Pr2	1
SheetMetal_Unsecured	Missing	19	103	M		0.0	Pr2	2
SheetMetal_Unsecured	Missing	20	102	M		0.0	Pr2	
SheetMetal_Unsecured	Missing	21	122	M		0.0	Pr2	4
SheetMetal_Unsecured	Missing	22	137	M		0.0	Pr2	
SheetMetal_Unsecured	Missing	95	120	M		0.1	Pr2	1
SheetMetal_Unsecured	Missing	96	102	M		0.0	Pr2	1
SheetMetal_Unsecured	Missing	99	102	M		0.1	Pr2	1
SheetMetal_Unsecured	Missing	171	102	M		0.2	Pr2	2
SheetMetal_Unsecured	Missing	178	102	M		0.2	Pr2	2
SheetMetal_Unsecured	Missing	320	103	M		0.0	Pr2	1
SheetMetal_Unsecured	Missing	323	86	M		0.2	Pr2	1
SheetMetal_Unsecured	Missing	464	102	M		0.6	Pr2	1
SheetMetal_Unsecured	Missing	526	103	M		0.1	Pr2	2
SheetMetal_Unsecured	Missing	527	104	M		0.1	Pr2	
SheetMetal_Unsecured	Missing	529	103	M		0.1	Pr2	1
SheetMetal_Unsecured	Missing	532	103	M		0.1	Pr2	1
Wood_Coating	Coating Failed	19	56	CtF		0.0	Pr3	1
Wood_Coating	Coating Failed	25	56	CtF		0.0	Pr3	1
Wood_Coating	Coating Failed	30	56	CtF		8.5	Pr3	1
Wood_Coating	Coating Failed	92	98	CtF		1.0	Pr3	1
Wood_Coating	Coating Failed	93	84	CtF		3.3	Pr3	
Wood_Coating	Coating Failed	95	98	CtF		1.0	Pr3	
Wood_Coating	Coating Failed	97	98	CtF		1.0	Pr3	
Wood_Coating	Coating Failed	173	84	CtF		1.9	Pr2	2
Wood_Coating	Coating Failed	173	99	CtF		8.1	Pr2	3
Wood_Coating	Coating Failed	310	57	CtF		6.0	Pr3	
Wood_Coating	Coating Failed	314	57	CtF		6.0	Pr3	
Wood_Coating	Coating Failed	316	100	CtF		2.0	Pr3	1
Wood_Coating	Coating Failed	318	85	CtF		1.9	Pr3	1
Wood_Coating	Coating Failed	318	100	CtF		2.0	Pr3	
Wood_Coating	Coating Failed	320	100	CtF		2.0	Pr3	
Wood_Coating	Coating Failed	321	57	CtF		6.0	Pr3	2
Wood_Coating	Coating Failed	326	57	CtF		6.0	Pr3	
Wood_Coating	Coating Failed	527	99	CtF		4.0	Pr3	1
Wood_Coating	Coating Failed	529	84	CtF		3.0	Pr3	1
Wood_Coating	Coating Failed	529	99	CtF		4.0	Pr3	
Wood_Coating	Coating Failed	532	99	CtF		4.0	Pr3	
Wood_Crack	Checking	238	56	Chk	0	12.8	Pr2	
Wood_Crack	Checking	242	57	Chk	0	12.8	Pr2	
Wood_Crack	Checking	246	83	Chk	0	6.0	Pr2	2
Wood_Crack	Checking	249	56	Chk	0	12.9	Pr2	1
Wood_Crack	Checking	254	56	Chk	0	12.8	Pr2	1
Wood_Crack	Checking	391	84	Chk	0.5	6.0	Pr2	1
Wood_Crack	Checking	459	99	Chk	0	0.0	Pr2	1
Wood_Crack	Checking	459	83	Chk	2	6.0	Pr2	2
Wood_Crack	Checking	462	99	Chk	0	4.3	Pr2	1
Wood_Crack	Crack	630	113	C	2	0.4	Pr3	1
Wood_Deteriorated	Rotten	655	128	Rot		1.0	Pr2	2
Wood_Deteriorated	Weathered	92	99	Wthr	0.5	1.0	Pr2	
Wood_Deteriorated	Weathered	95	99	Wthr	0.5	1.0	Pr2	

Wyoming State Capitol Dome
Exterior Investigation
Cheyenne, WY

Vertical Access LLC
Job Number 12-1387
May 24, 2013

Extracted Survey Conditions

Block Name	Condition	X	Y	Code	Severity	Amount	Priority	Photos
Wood_Deteriorated	Weathered	95	84	Wthr	0.5	1.9	Pr2	1
Wood_Deteriorated	Weathered	97	99	Wthr	0.5	1.0	Pr2	1
Wood_Deteriorated	Weathered	316	98	Wthr	0.5	18.9	Pr2	
Wood_Deteriorated	Weathered	318	98	Wthr	0.5	18.9	Pr2	1
Wood_Deteriorated	Weathered	320	98	Wthr	0.5	18.9	Pr2	
Wood_Deteriorated	Weathered	531	83	Wthr	0.5	1.5	Pr2	
Wood_Unsecured	Missing	316	99	M		0.1	Pr3	1

Paint Sample Log

Sample No.	Dome Facet	Element	Substrate Material	Observations	Photograph
PntSm 1	East	Finial: Ornament	Galv. sheet metal	Gilding followed by at least two paint campaigns	246-135
PntSm 2	Southwest	Lantern roof: Cap below finial	Galv. sheet metal	Gilding followed by at least two paint campaigns	530-134
PntSm 3	Southwest	Lantern cornice: Surround of lunette	Galv. sheet metal	Two or three paint campaigns	528-129
PntSm 4	Southwest	Lantern cornice: Recessed face of lunette	Galv. sheet metal	Two to four paint campaigns	529-129
PntSm 5	West	Lantern drum: Rondelle	Galv. sheet metal	One or two paint campaigns	319-125
PntSm 6	Southwest	Lantern drum: Flat panel	Galv. sheet metal	Two or three paint campaigns	530-127
PntSm 7	South	Top of dome: Flat panel	Galv. sheet metal	Two or three paint campaigns	394-121
PntSm 8	South	Top of dome: Applied foliated ornament	Sheet lead	Two or three paint campaigns	395-123
PntSm 9	South	Top of dome: Inset semi-circle in flat panel	Galv. sheet metal	Two or three paint campaigns	393-119
PntSm 10	West	Dome: Rib cover	Galv. sheet metal	One paint campaign	322-112
PntSm 11	South	Base of dome: Flat panel below gilded copper	Galv. sheet metal	Two to four paint campaigns	388-101
PntSm 12	South	Base of dome: Volute surrounding oval shield	Galv. sheet metal	Two to four paint campaigns	392-108
PntSm 13	South	Base of dome: Applied oval shield	Sheet lead	Two to four paint campaigns	389-107
PntSm 14	South	Base of dome: Fleur de lis ornament	Galv. sheet metal	Two to four paint campaigns	387-105
PntSm 15	South	Base of dome: Shell ornament	Galv. sheet metal	Two to four paint campaigns	386-104
PntSm 16	South	Drum attic: Leaf at cornice	Sheet lead	Two to four paint campaigns	386-103
PntSm 17	East	Drum attic: Flat panel between round windows	Galv. sheet metal	Two to four paint campaigns	247-101
PntSm 18	East	Drum attic: Applied foliated ornament at console	Sheet lead	Two to four paint campaigns	251-99
PntSm 19	East	Drum attic: Bottom scroll of console	Galv. sheet metal	Two to four paint campaigns	No photo
PntSm 20	East	Drum: Flat panel above entablature	Galv. sheet metal	Two to four paint campaigns	246-94
PntSm 21	East	Drum entablature: Modillion	Galv. sheet metal	Two to four paint campaigns	245-90
PntSm 22	East	Drum colonnade: Column capital	Galv. sheet metal	Two to four paint campaigns	250-87
PntSm 23	East	Drum colonnade: Column shaft	Galv. sheet metal	Two to four paint campaigns	242-80

Wyoming State Capitol
Dome Investigation
Cheyenne, WY

Vertical Access LLC
Project Number 12-1387
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Paint Sample Log

Sample No.	Dome Facet	Element	Substrate Material	Observations	Photograph
PntSm 24	East	Drum colonnade: Flat panel at lower decoration of column shaft	Galv. sheet metal	Two to four paint campaigns	241-76
PntSm 25	East	Drum colonnade: Foliated ornament at lower decoration of column shaft	Galv. sheet metal	Two to four paint campaigns	241-77
PntSm 26	East	Drum balustrade: Corner ornament	Galv. sheet metal	Two to four paint campaigns	254-67
PntSm 27	East	Drum balustrade: Baluster	Galv. sheet metal	Two to four paint campaigns	247-71
PntSm 28	East	Drum base	Cast iron	Two to four paint campaigns	243-60

Wyoming State Capitol
Dome Investigation
Cheyenne, WY

Vertical Access LLC
Project Number 12-1387
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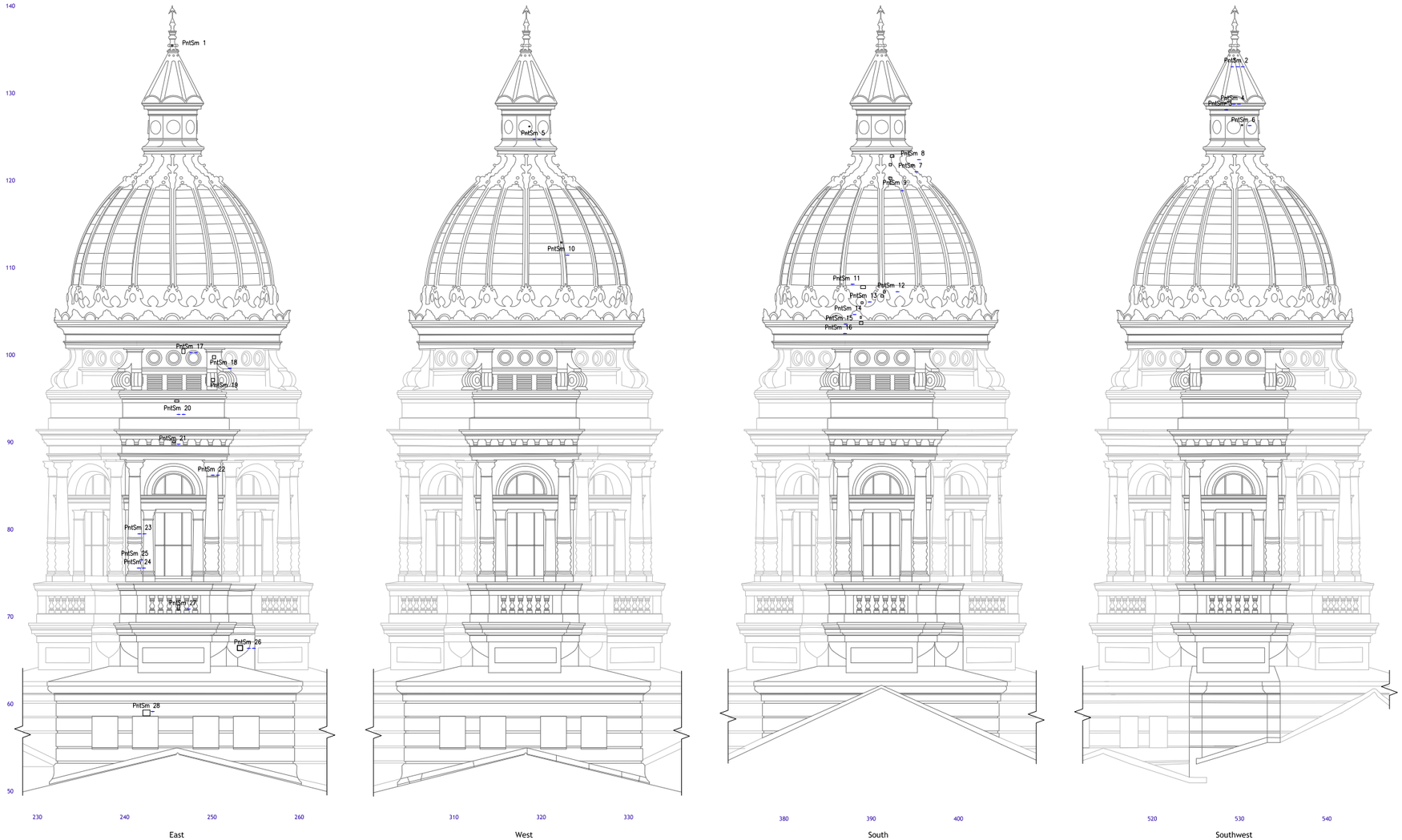
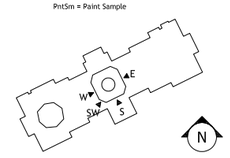


PntSm = Paint Sample



SURVEYED USING trpas
MAY 13-16, 2013 BY: BMA, EK, AL

PO Box 4135 Ithaca, NY 14852
607.257.4049 www.vertical-access.com

ISSUE DATE: MAY 24, 2013

ELEVATIONS
PAINT SAMPLES: EAST, WEST, SOUTH, SOUTHWEST

FROM DRAWINGS PROVIDED BY: GB GEOTECHNICS USA INC. SCALE: 3/16" = 1'-0" WHEN PLOTTED ON 24X36 SHEET

Wyoming State Capitol
Dome Investigation
Cheyenne, Wyoming

VA PROJECT NUMBER: 12-1387

Access Approach

Wyoming State Capitol
Cheyenne, WY
Dome Investigation

Vertical Access LLC
PO Box 4135, Ithaca, NY 14852
Tel: 607 257 4049 / Fax: 607 257 2129

The Capitol is not equipped, on the exterior or interior, with any means to easily access locations above the drum attic. To reach the lantern interior from the drum attic floor, VA used a 40-foot extension ladder (see Figure 1). From the lantern interior, a 1-1/4 inch diameter rigging hole was drilled through the galvanized sheet metal above the rondelle on the lantern's north side. The rondelles were originally able to be opened, permitting access to the lantern exterior, but have since been painted and fastened shut. A pair of ropes was lowered through the rigging hole, down to the adjacent low-slope roof of the lower part of the Capitol building. Inside the lantern, the ropes were anchored to structural steel members in a location that minimized the ropes' loading on the sheet metal, to both protect the ropes from abrasion and prevent deformation of the sheet metal.

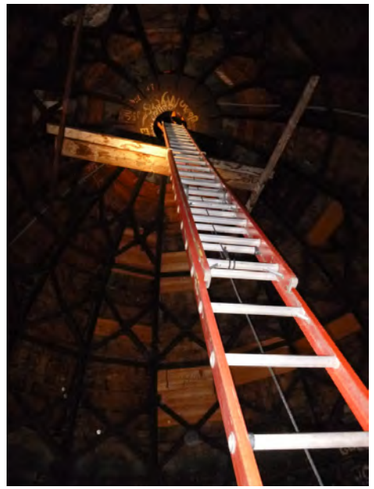


Figure 1. A 40-foot extension ladder was used to access the lantern interior.

From the exterior, one technician ascended the pair of ropes to the lantern, where he encircled the lantern base with temporary anchor slings. Additional pairs of ropes were connected to these anchor slings and used to perform all of the inspection drops. The ropes through the rigging hole were used solely for the installation and removal of the encirclement anchors.

At project completion, VA removed all rigging equipment from the building and installed a cowl over the rigging hole to prevent water infiltration. The copper cowl was painted to match the lantern exterior (with paint supplied by Suzanne Norton) then was screwed and caulked in place over the rigging hole (see Figure 2). The cowl permits future use of the rigging hole without requiring removal. From the interior, VA installed an expandable rubber plug to prevent bats, debris and other material from going through the rigging hole (see Figure 3).

Figure 2. The painted copper cowl was screwed and caulked in place from the exterior.

Figure 3. An expandable rubber plug was installed from the interior of the rigging hole

Future Access

Vertical Access recommends that future inspections of the Capitol lantern, dome and drum be performed using industrial rope access, in a manner similar to their recent inspection. All technicians working on rope should be certified by the Society of Professional Rope Access Technicians (SPRAT) or the Industrial Rope Access Trade Association (IRATA). As part of future restoration work, a caged ladder or ladder with a fall protection system should be installed from the floor of the drum attic to the interior of the lantern.

Light maintenance and painting may also be performed by technicians using industrial rope access techniques. However, work requiring large or heavy tools and materials needs to be performed using a different access method. The work conducted in 2009 on the dome's gilded copper panels was performed from a mobile crane equipped with an aerial work platform. Such a system would accommodate larger tools and materials than industrial rope access, but is discouraged by OSHA 1926.1501(g)(2):

> "The use of a crane or derrick to hoist employees on a personnel platform is prohibited, except when the erection, use, and dismantling of conventional means of reaching the worksite, such as personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold, would be more hazardous, or is not possible because of structural design or worksite conditions."

Larger scale repair and maintenance of the dome would require a pipe frame scaffold to be erected on the adjacent low-slope roofs.