



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 I
TECHNICAL REPORT

HDR

IN ASSOCIATION WITH

PDP

Preservation Design Partnership, LLC

AND

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JOINT LEGISLATIVE AND EXECUTIVE TASK FORCE CAPITOL BUILDING REHABILITATION AND RESTORATION

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Section 1 : Introduction

PREAMBLE

The state of Wyoming has been contemplating the Rehabilitation and Restoration of the Capitol Building since 2004.

On August 21, 2012, an RFQ / RFP was issued for the selection of an A/E team to undertake Level I and Level II studies for this project and continue with its implementation based on the results of the studies and an approved Scope of Work.

In April, 2013, the Joint Legislative and Executive Task Force on Capitol Building Rehabilitation and Restoration and the Design Team began meetings to undertake Level I Reconnaissance and Level II Feasibility studies for the Rehabilitation and Restoration of the Wyoming State Capitol project. As the work progressed, a project constitution was developed to establish the vision and guide decision making for the project. [Figure 1.1]

During the course of the study, it became clear that the needs of both the public and the daily users of the Capitol could not be met within the footprint of the building, requiring additional space for critical uses and updated infrastructure for code compliance. To understand the State's options for supporting the increased needs of the Capitol, on September 25, 2013, the State Building Commission authorized AICM to add the Herschler building to the study.

**The Wyoming State Capitol Restoration
Project Constitution
Adopted September 25, 2013**

The Wyoming Capitol is a National Historic Landmark [NHL] and the state's most significant building. The first two sections of the building were constructed in 1888 and 1890 in anticipation of statehood and the last section was added in 1917.

Over the course of its history, the venerable structure has undergone a series of building campaigns; yet it still maintains its historic character and integrity and continues to be the pride of the residents of Wyoming. It welcomes all visitors in an open and friendly way that is unique to, and reflective of, the culture of the state.

In 2003, the Wyoming Legislature established an account to begin setting aside funds to renovate the Capitol and has appropriated funds for this purpose over the past decade. The Task Force made the commitment to restore and renovate this treasure for the next 50 years and continue its tradition and function as a working Capitol.

The Task Force is committed to respecting the past and those who have created and contributed to the building, providing for the building's present occupants and its visitors, and planning for the future to ensure the building will be available to successive generations of Wyoming residents.

The goals of the project are the following:

- protecting and preserving the character, identity, dignity and significance of this historic landmark by following the highest standards and best practices of planning, architecture, historic preservation, engineering and sustainability;
- creating long-term value for the residents of Wyoming by following the tradition of the original intent and design of the building and the proven practices outlined in the United States Secretary of the Interior's *Standards for the Treatment of Historic Properties*;
- providing all necessary systems, infrastructure, technology and technical support to allow the government to perform its function in an efficient manner;
- ensuring that life safety and property protection are addressed at the highest level possible; and
- maintaining the hallmark openness and welcoming nature of the building that visitors have experienced over the last 125 years.

The Task Force pledges its support and makes the commitment to uphold the values of this project, without prejudice or personal preferences. The Task Force hopes to complete this challenging project by 2017, in time for the centennial celebration of the completion of the 1917 wing.

Figure 1.1: Project Constitution



The results of the studies are presented in this set of four volumes:

- **Volume I – Technical Report** focuses on reporting the investigations and key findings associated with the Rehabilitation and Restoration of the Capitol.
- **Volume II – Applied Research** includes significant supporting information on the Capitol derived from the applied research.
- **Volume III – Design Team Reports and Findings** includes technical reports on the Capitol produced by the participating disciplines in this project.
- **Volume IV – Herschler Supplement** includes the findings of the Design Team regarding the options that exist outside the footprint of the Capitol, focusing on the Connector and the Herschler Building. Estimated Costs and Schedule discussions for this portion of the work are included in Volume I – Technical Report to avoid fragmenting this important data.

Although presented in multiple volumes, the intent is to treat the project as one project. The multiple components of the work are integrated and dependent on each other.

A separate document, **Executive Summary and Frequently Asked Questions**, dated February, 17, 2013 was also produced for quick reference.

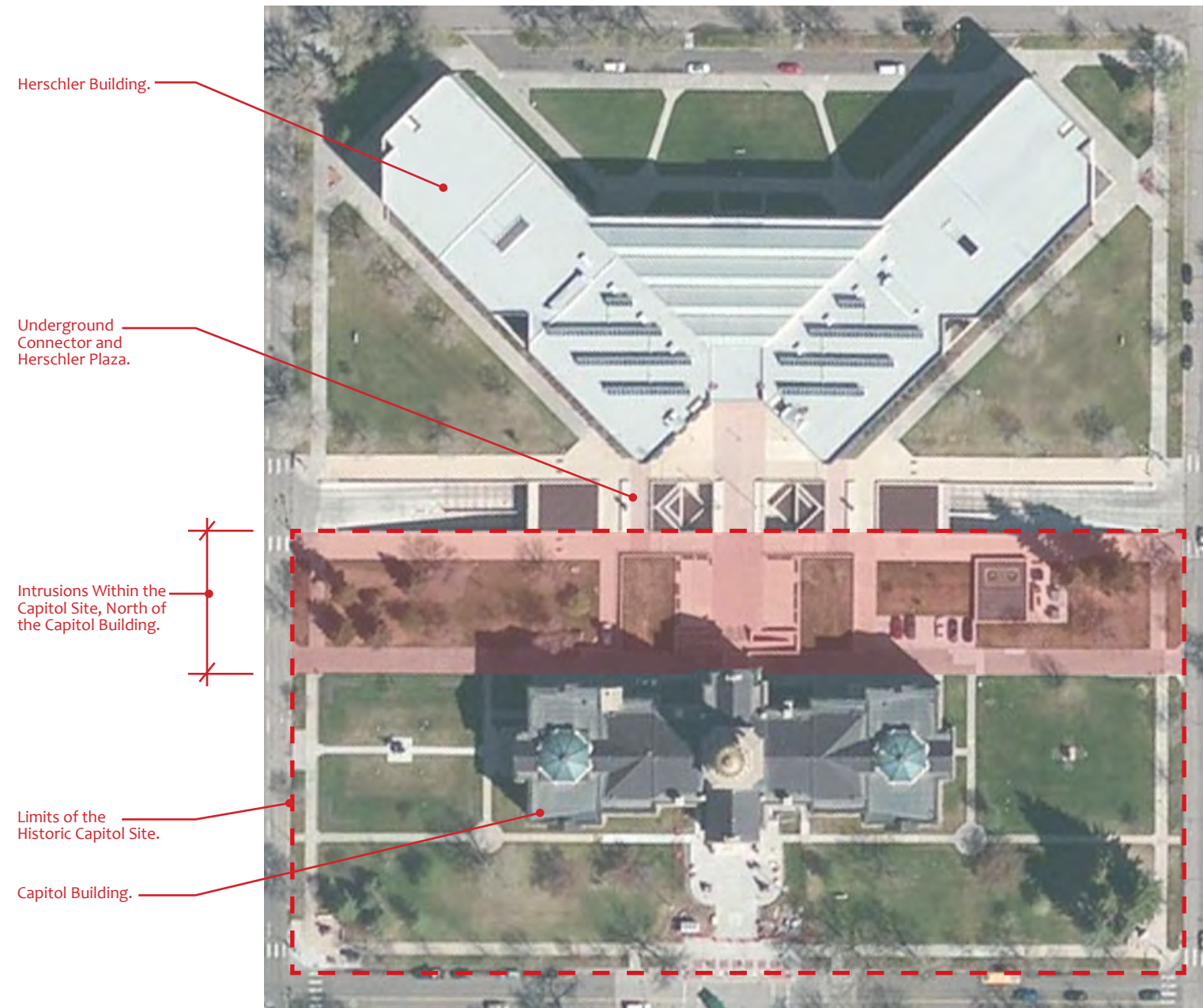


Figure 1.2: Aerial Photograph of the Capitol Grounds, Illustrating the Relationship Between the Capitol Building, the Herschler Building and the Underground Connector.



Section 2 : Goals of the Project

2. Goals of the Project

The Rehabilitation / Restoration of the Wyoming Capitol has been a concern of the State of Wyoming for several years. The building:

- Has significant code deficiencies and critical life safety issues
- Has not been substantially renovated for over 30 years; the last major renovation was completed in 1980 and focused on less than 40% of the building
- Has failing, obsolete and inadequate building infrastructure
- Has substandard working space and space utilization issues that impair the open participation and engagement of the residents of the state in the government process
- Is not accessible for people with disabilities ensuring that all citizens of Wyoming are provided with equal and dignified access and accommodations throughout the Capitol

This project was conceived, organized and undertaken to address all of these issues.

In addition, the state of Wyoming has made clear that the following items are priorities for the project, as reflected in the Request for Qualifications and Proposals [RFQ / RFP]:

- Determining accurate project cost and a reliable, transparent budgeting process
- Developing a sensible sequence of implementation and schedule for the rehabilitation / restoration of the building
- Considering phasing and possible project synergies, such as occupant relocation and the procurement of furniture, fixtures and equipment for operation of the renovated and restored building
- Improving the user experience of the Capitol for both visitors and employees after the completion of the project
- Optimizing the investment of the state while providing a modern Capitol building
- Maintaining a safe, efficient and dignified environment, respectful of Wyoming's culture and traditions

These are the major goals of the project as they were articulated through the RFQ / RFP, the selection process and the kick-off meetings.

The end result of this Level I / Level II Study would be to create:

- A clear Scope of Work for the Rehabilitation / Restoration of the building and its site
- A logical sequence of implementation and schedule
- A reliable budget based on evidence as opposed to generic assumptions

This study will provide a customized plan to address the needs of the state while extending the life of the Capitol and preserving a remarkable resource for all the residents of Wyoming.



Figure 2.1: Exterior View looking East

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Section 3: Methodology / Approach

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3. Methodology / Approach

PREAMBLE

Intervening in a National Historic Landmark is a project type that requires careful planning and a systematic and scientific approach. This is especially critical with a capitol building as significant and complex as the Wyoming Capitol Building. This process will enable the state of Wyoming to undertake the project with:

- A carefully crafted Scope of Work
- A logical and sensible Implementation Sequence and Schedule
- A reliable Construction Cost Estimate

As a consequence, the state will be equipped to make informed decisions leading to a responsible rehabilitation and restoration of this unique resource, while creating long term value.

To achieve these goals, the recommendations need to be based on **factual evidence, sound building and conservation science and technology, in-depth understanding of construction issues associated with historic buildings** and **market-tested cost indices**, based on projects of similar nature.

The Design Team utilized its experience with several projects involving monumental National Historic Landmarks, specifically several state capitol buildings that have challenges similar to the Wyoming State Capitol, to create an approach specifically designed to address the issues of this venerable resource.



Figure 3.1: Historic Photograph of the Wyoming State Capitol Building, Historic American Building Survey, ca. 1979.



Figure 3.2: Historic Photograph of the Wyoming State Legislators in House Chamber, ca. 1901.



Figure 3.3: Historic Photograph of the House Chamber [not in session], ca. 1917.



Figure 3.4: Historic Photograph of the Wyoming State Legislators in Senate Chamber, ca. 1901.



Figure 3.5: Historic Photograph of the Senate Chamber [not in session], ca. 1917.





Figure 3.6: Historic Photograph of the Recently-Completed [Phase II] Capitol Building From the Southwest, ca. 1890.



Figure 3.7: Similar View of the Capitol Building From the Southwest, ca. 1979. The highlighted area delineates the Phase III [1917] west wing. The Phase III additions had a significant impact on both the exterior and interior of the Capitol. Details can be found in Section 4.

This approach included the following components:

1. Applied Research

Many projects require that historic research be conducted before any decisions are made regarding the treatment of the building. While this is essential to the success of the project, the question is what type of historic research is needed and what specific items need to be researched.

The Design Team's experience indicates that this task should not be intended to produce a definitive **Historic Structure Report [HSR]**, but it should be designed to focus on specific issues that will inform all the project participants as to what:

- The flexibility for change of the building
- Levels of intervention are permissible

These help guide the preparation of the design and construction documents for the long term treatment of the building. We refer to this type of research as **Applied Research**.

For this project, the Applied Research yielded significant findings that will inform the design process in the following ways:

- Identified the historic construction sequence of the building
- Provided a basic understanding of the structural framing and pinpointed areas requiring further review and confirmation
- Located cavities and interstitial spaces for potential use as pathways for building systems
- Delineated areas where historic building fabric was in place and where it may be found today

This last item is critical in completing the **Historic Building Identification and Analysis**, i.e. the process of locating original / historic building fabric, assessing its condition and significance and determining what level of additional research would be needed / recommended.

The most significant contribution to developing an in-depth understanding of the building was the information relating to the details of the 1917 Phase of the building, a major and very extensive intervention that transformed both the exterior and the interior of the Capitol [Figures 3.6 - 3.7; See also Section 4: Historic Analysis, pp 4.82 – 4.91].

2. “As – Found” Conditions Documentation

Historic buildings that have a history of over 100 years have a series of generations of documents and relevant information, ranging from artist’s renderings to high quality historic photographs and from basic drawings to full construction documents of a specific building campaign.

The quality, reliability and accuracy of this information ranges from completely inaccurate and irrelevant to very accurate and extremely valuable. Experience indicates that in the vast majority of these projects, there are no drawings that depict the existing “as-found” conditions of the building in an accurate, comprehensive and reliable way. This is the case for the Wyoming State Capitol.

For this reason, the Design Team proposed the preparation of an “as-found” conditions set of documents. This set was prepared using laser scanning and modeling the building three-dimensionally [Figure 3.8].

The 3-D model became the basis to create plans, sections and elevations, as well as layers of information on the historic evolution of the building from 1888 to the present day. It was also used as a tool by all disciplines that are participating in the project.

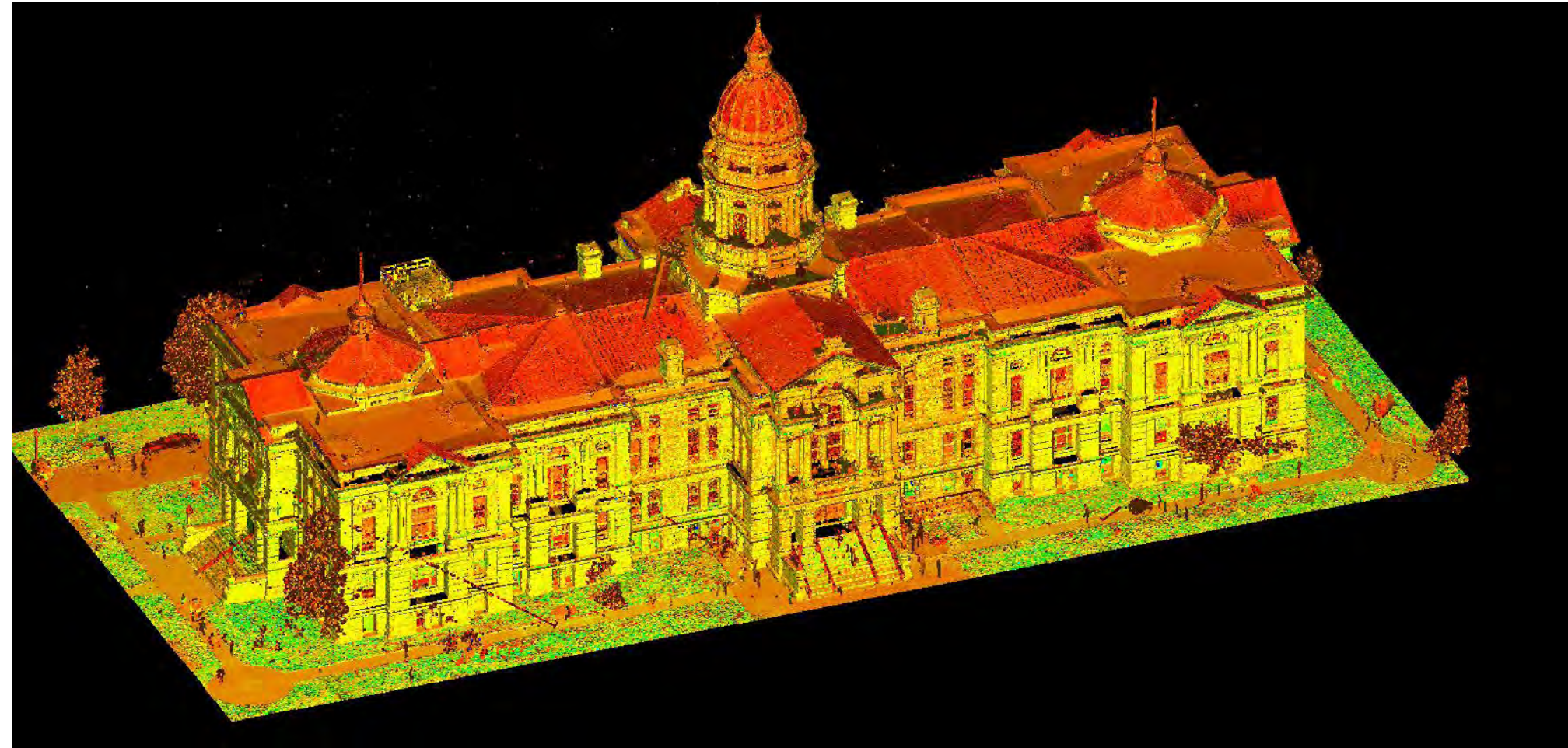


Figure 3.8: Point Cloud Data of the Exterior Building Envelope, as Generated from Detailed Laser Scanning of the Building Exterior and Interior.



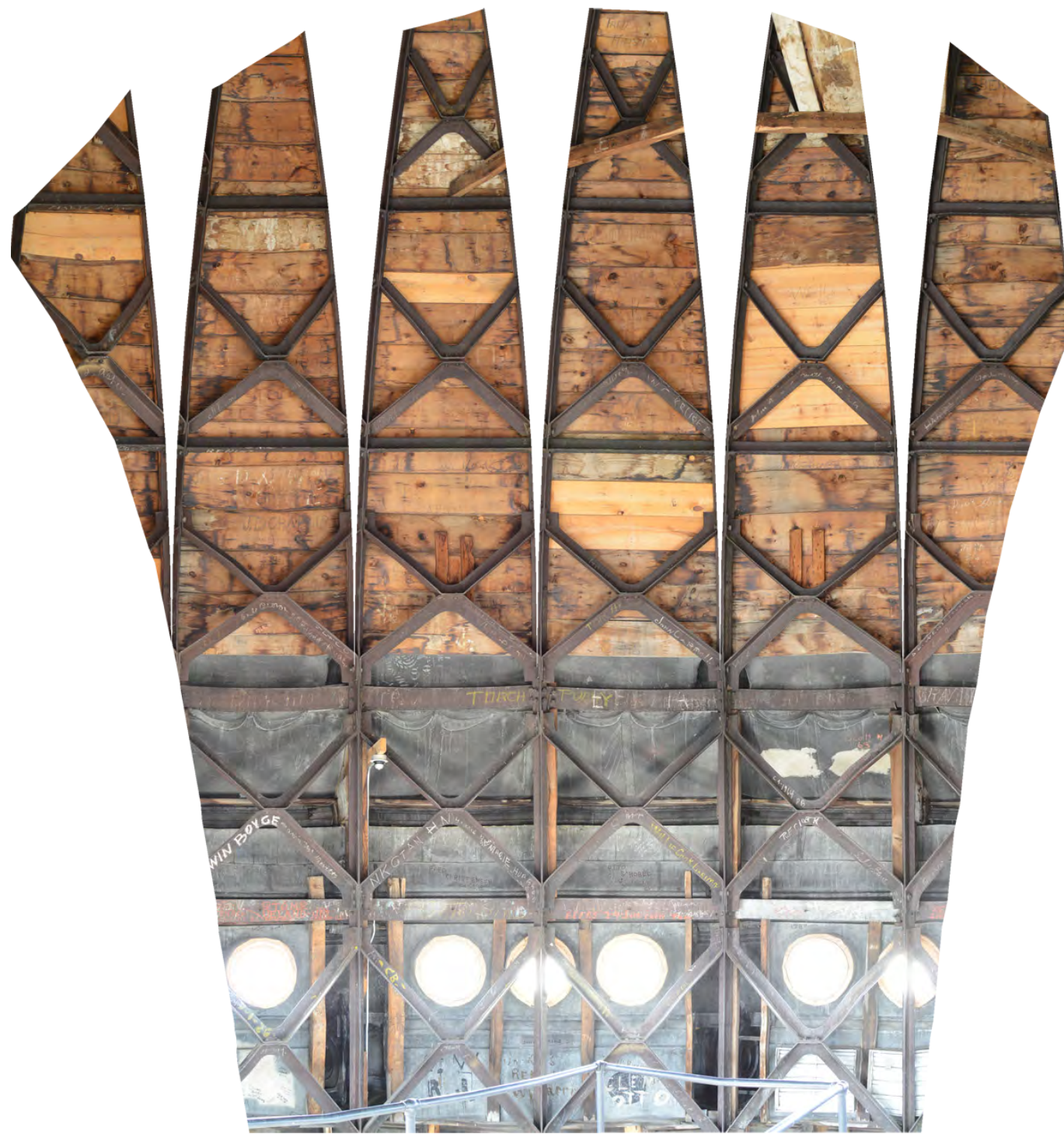


Figure 3.9: Orthophotography of the Dome Interior.

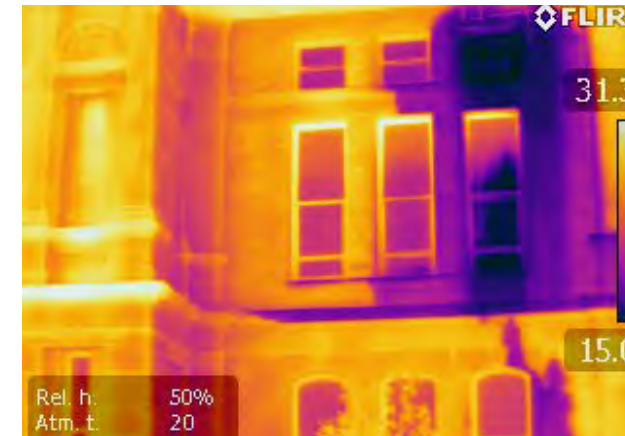


Figure 3.10: Thermal Image Illustrating Retained Moisture Around and Below Windows 10 Minutes After Being Sprayed by Water. Darker areas [Purple] indicate moist areas, while lighter areas [yellow] indicate dryer areas.

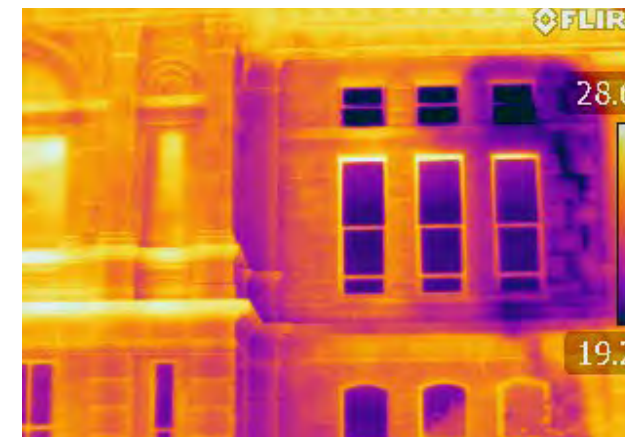


Figure 3.11: Thermal Image Illustrating Retained Moisture Around and Below Windows 75 Minutes After Being Sprayed by Water.

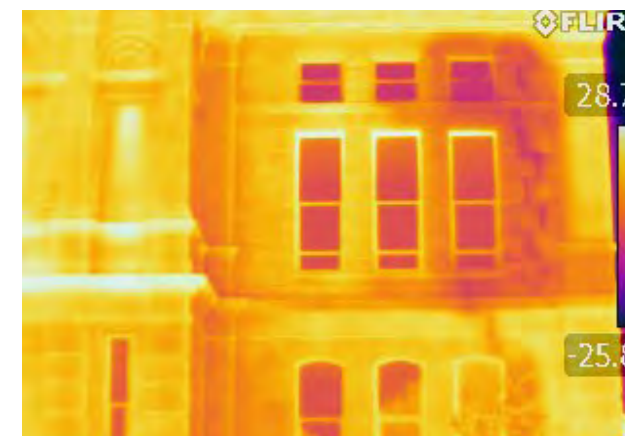


Figure 3.12: Thermal Image Illustrating Retained Moisture Around and Below Windows 135 Minutes After Being Sprayed by Water.

3. Non – Destructive Evaluation [NDE]

The Design Team engaged an internationally recognized entity specializing in the **Non – Destructive Evaluation [NDE]** of historic buildings [GB Geotechnics, Inc.] to perform a series of evaluations to help identify whether significant concealed deterioration exists in any area of the building [Figures 3.10 to 3.12].

The findings were encouraging in that there were no surprises that were not anticipated, allowing the Design Team to create a reliable cost model.

4. Interdisciplinary Assessment

The Core Team of the project includes the following disciplines:

- Architecture / Historic Preservation
- Space Use / Planning
- Code Compliance
- Structural Engineering
- Electrical Engineering
- Plumbing Engineering
- Fire Protection
- Lighting

A comprehensive [visual] assessment of the Capitol was performed. Given the architecture and historic construction of the building, the team engaged an internationally recognized expert in code analysis [AON]. Instead of applying prescriptive code analysis, they performed a **Performance Based Code Analysis**, which included extensive modeling and testing of several scenarios regarding the creation of a safe environment for all occupants of the Capitol without compromising its architectural and historic integrity.

The findings of the Design Team are synthesized in [Section 5 : Site and Building Analysis](#).



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