



OKLAHOMA STATE CAPITOL RESTORATION  
*Exterior Rehabilitation*

EXTERIOR DESIGN BUILD TEAM | JE DUNN | TREANOR ARCHITECTS | ADG

SEPTEMBER 2016



15039DB MONTHLY CONSTRUCTION PROGRESS REPORT



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## Exterior Rehabilitation

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### *Summary:*

In September, progress has been accelerating on the exterior rehabilitation. Scaffolding is now fully erected on the North face of the North wing and has begun on the East face of the North wing. In addition to the state of the art safety systems in place, lights and electrical outlets have been installed throughout the structure. Having lighting and outlets installed in close proximity to all the areas in which restoration operations are taking place not only allows work to be performed in dusk or dawn time frames, but also increases the efficiency of the workers. Nearly all windows on the West face of the North elevation have been removed and shipped off site for restoration, as well having all lead paint removed to allow in-place cast iron restoration.

Also this month, we have begun preliminary construction mock ups. Multiple cleaning methods have been being tested on several structural variations of the exterior to ensure both effectiveness, as well as safeguarding the structure. Tests on the removal of grout between the stones (raking), and the re-installation of joint mortar (re-pointing), have been performed on the West face of the North wing with great success. The completion of the installation of permanent electrical power is right around the corner. Underground boring is in its final stages and electrical power transformers are set to be in place the first of October. Finalizing the power requirements will allow us to fully tarp the scaffolding and connect the cooling and heating units, creating a controlled environment in which all workers and material will used with optimal efficiency.

### *Key Activities:*

- Completion of the second phase of scaffolding
- Lighting and electrical outlet installation on scaffolding
- Underground boring near completion
- Hazardous material removed from the exterior of the second phase
- Windows removed and sent off-site for restoration on first phase
- Surface stone cleaning mock-up complete
- Raking and re-pointing mock-ups complete





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### Safety:

The safety of our workforce and the general public during the course of construction is the most important task that we must deliver. To that end, every craftsmen involved with the project receives a detailed project orientation, and prior to performing any task, the teams develops detailed task specific work plans. These work plans are often called Job Site Analysis (JSA) and assist project teams with analyzing different hazards associated with each work activity prior to beginning work. See page three (3) for an example of a detailed JSA document that we require all trade partners to complete prior to completing any activity.

Safety Data and Metrics	
Orientations Performed through 09.30.16	98
First Aid Incidents	0
OSHA Recordable Incidents	0



# JOB SAFETY ANALYSIS



<b>DATE:</b>	<b>TIME:</b>	
<b>PROJECT:</b>	<b>TASK/ACTIVITY:</b>	<b>LOCATION:</b>

**WEATHER IMPACTS:**

<input type="checkbox"/> High Winds	<input type="checkbox"/> Heat
<input type="checkbox"/> Lightning	<input type="checkbox"/> Cold
<input type="checkbox"/> Snow/Ice	<input type="checkbox"/> Rain

<b>COMPANY NAME:</b>	<b>TRADE CREW PERFORMING WORK:</b>	<b>FOREMAN OR SUPERVISOR:</b>
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**SPECIALIZED PERSONAL PROTECTIVE EQUIPMENT AND/OR PERMITS:**

<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Eye/Face Protection	<input type="checkbox"/> Hand Protection	<input type="checkbox"/> Hearing Protection	<input type="checkbox"/> Respirator Protection	<input type="checkbox"/> Reflective Vest
<input type="checkbox"/> Critical Lift Plan	<input type="checkbox"/> Hot Work Permit	<input type="checkbox"/> Excavation Permit	<input type="checkbox"/> Confined Space Permit	<input type="checkbox"/> Lock-out/Tag-out Permit	<input type="checkbox"/> Kevlar Sleeves
<input type="checkbox"/> Eye Wash	<input type="checkbox"/> Barricades	<input type="checkbox"/> Signage	<input type="checkbox"/> MSDS	<input type="checkbox"/> GFCI	

<b>COMPLETED BY:</b>	<b>REVIEWED BY:</b>	<b>APPROVED BY:</b>
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STEPS:	LOCATION(S):	POTENTIAL HAZARDS:	HAZARD CONTROLS:	TOOLS/EQUIPMENT REQUIRED:
			How:  Who:	





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### JE Dunn Fall Protection Training



### JE Dunn Safety Stand Down 09.13.16



### JE Dunn Interior Safety Signage



**DUNN** safety<sup>®</sup>





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### *Progress Photos*

The photos attached in the subsequent pages represent progress photos taken during the month of September for the Exterior Rehabilitation of the State Capitol of Oklahoma.

### *Drone Footage*

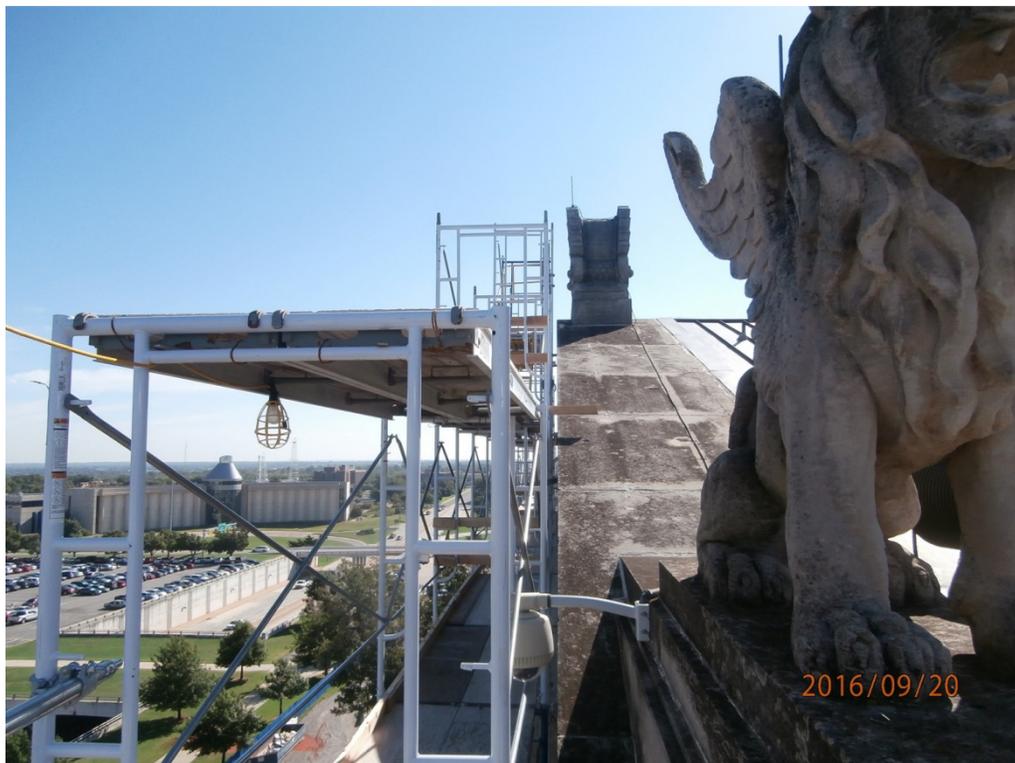
September Drone Footage > [Click Here](#)







Scaffold installation progressing on north elevation of north wing



Scaffold installation progressing on north elevation of north wing



Cover provided at emergency egress door on north elevation of north wing



Window removal progressing on west elevation of north wing



Raking of joints progressing on west elevation of north wing



Mechanical window penetration work progressing on west elevation of north wing



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### Mock-Ups

In construction, a mock-up is a scale or full-size model of a design used for: demonstration, design evaluation, constructability, and other purposes. A mock-up is very similar to a prototype if it provides at least part of the functionality of an assembly or system. The completion of mock-ups allows our team to be able to visualize what a completed installation will look like once the scope of work is completed on the actual project. The following report depicts a raking and repointing mock-up that was completed during the month of September to prepare for the completion of work.

#### Raking & Repointing of Limestone Mock-Up Example



# TREANORHL

Date: 09-22-2016

Project: Oklahoma Capitol Restoration – Exterior Rehabilitation  
CAP PROJECT 15039DB

Company: JE Dunn / Mark 1 Masonry  
Attention: Heath Glenn / Lukasz Lesniak

From: Julia Mathias Manglitz  
CC: M Maska, L. Boyce, T. Talerico, L. Heaton (JED)  
JC Witcher, P. Berninger (ADG)  
M. Thompson (ZFI)

Reference: 040343 – Joint raking and initial repointing

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*Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing. Where review is made at an intermediate stage, is partial or is one scope of work within a larger mock-up assembly, review comments are conditional based on the final full execution of the mock-up(s)*

Reviewed  
 Reviewed as Noted

Revise and Schedule Follow Up Review  
 Rejected

---

Mock Ups Reviewed: Reviewed joint raking at granite and limestone. Mock up performed on A206 at the north end of the façade. Initial repoint included filling open joints at the granite water table with setting mortar and with grout.

Some pointing mortar was applied in the limestone area to facilitate discussions about options for finishing with the striping remaining in place; two finishes were installed 1) flush and 2) concave. Granite is to be similarly pointed prior to review for color and finish in follow up visit.

Reviewed weather limitations and curing processes. Areas will be reviewed to look for bond line failure on future site visits – this was an issue with the trial repairs, particularly in the granite the previous year.

The following are specific comments that are key-noted on the mock up documentation:

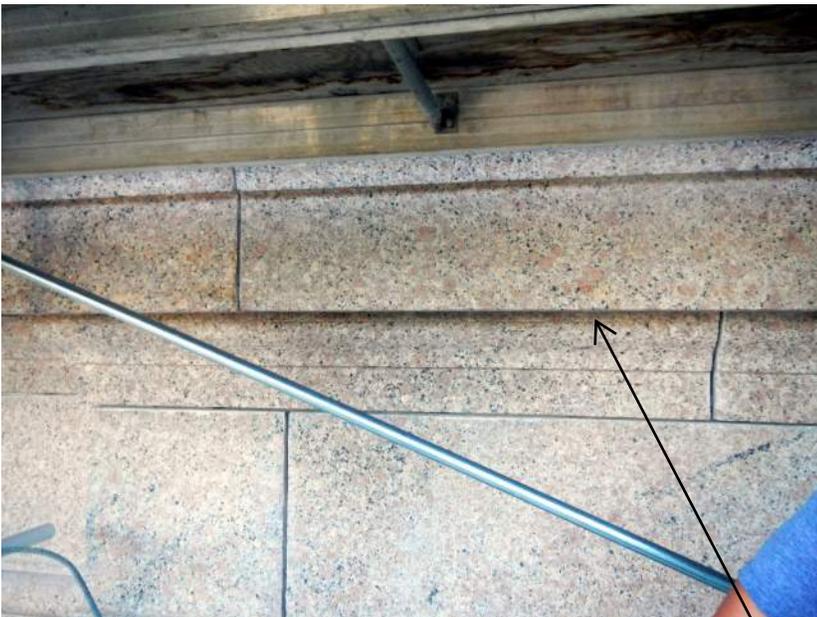
- 
1. Verify depth of raking.
  2. Verify depth of backer rod when using detail A2/A403 and A3/A403.
  3. Verify depth of initial repointing to allow ½" final pointing, minimum. Rake out excess mortar prior to setting.
  4. Verify mortar removal from entire height of joint under the granite water table and other joints that are difficult to access due to geometry.

The following are general comments regarding these mock ups:

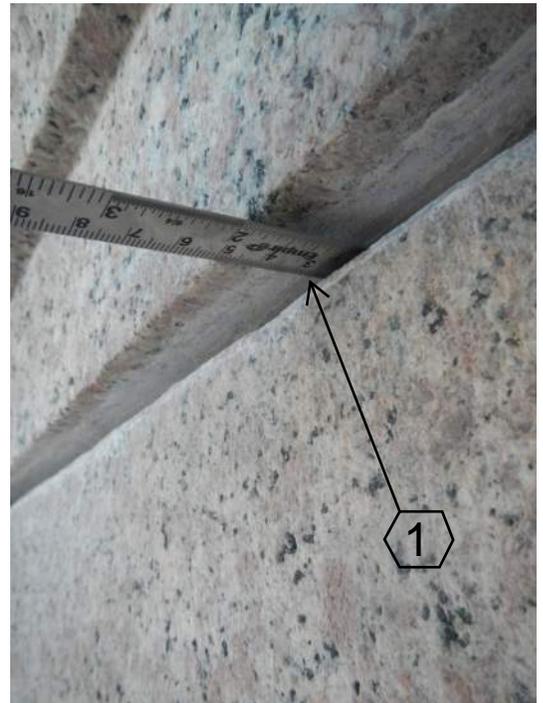
- 
1. Raking was very good overall, no overcutting of joints was observed and backs were nicely squared.
  2. Damage due to previous repointing has nicked stone, rounded over edges and cut into adjacent stones in some locations.
  3. Final pointing finish and review will be scheduled for a follow up visit.



4. Hand pump or gravity feed is acceptable to use for placing grout in joints.
5. Areas should be monitored for any sign of bond line failure. Quality assurance procedures for curing should be included in quality control program submittal.
6. Mortar should be mixed as dry as possible to limit staining and shrinkage cracking.



Partial view of raked area granite area



Verify raking has reached 1" minimum depth specified



Bed joint under the water table is challenging to reach due to geometry of overhanging stone - verify previous mortar has been removed entirely. Small area was not complete upon review





Partial overview of raked area of limestone. Head joints in limestone ashlar were open in this location.

— small void found in bed joint



Placing initial setting mortar to fill an open head joint in limestone with setting mortar per A2/A403.

2



Verifying depth of initial pointing (setting mortar used for initial pointing).

3





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### Challenges

Thus far, we have identified two (2) challenges on the exterior restoration project. While challenges are not ideal, our design-build delivery method allows us to work hand in hand with our architects and consultants to resolve these issues without delay. The following items are challenges that we have encountered to date:

**1** Type G Window Challenge: Hidden fasteners behind the building skin have prevented our team from being able to disassemble the windows as we had originally planned. Thus far, all windows were intended to disassemble to an extent that would allow us to restore varying pieces for restoration off-site. The discovery of this condition changed how we would proceed with restoring these type of windows. The subsequent photos show the hidden fasteners and describe how we will accomplish restoring these windows without having to physically remove them as originally planned.

**2** Windows 264, 265, 266 C (Alpha) Challenge: The configuration of these windows does not allow us to remove the side light spandrel glass as we had originally intended. The steel member present is approximately an 18" channel with 12" beams attached to it, with corrugated decking directly above it. The channel is tight to the frame with its top at the bottom of the horizontal window frame. Due to the impeding channel and configuration, we are no longer able to tilt the glass and remove it as planned. The following report describes this condition further and is used as an aide in our research to find an appropriate solution with our design-build team.



# Challenge No. 1

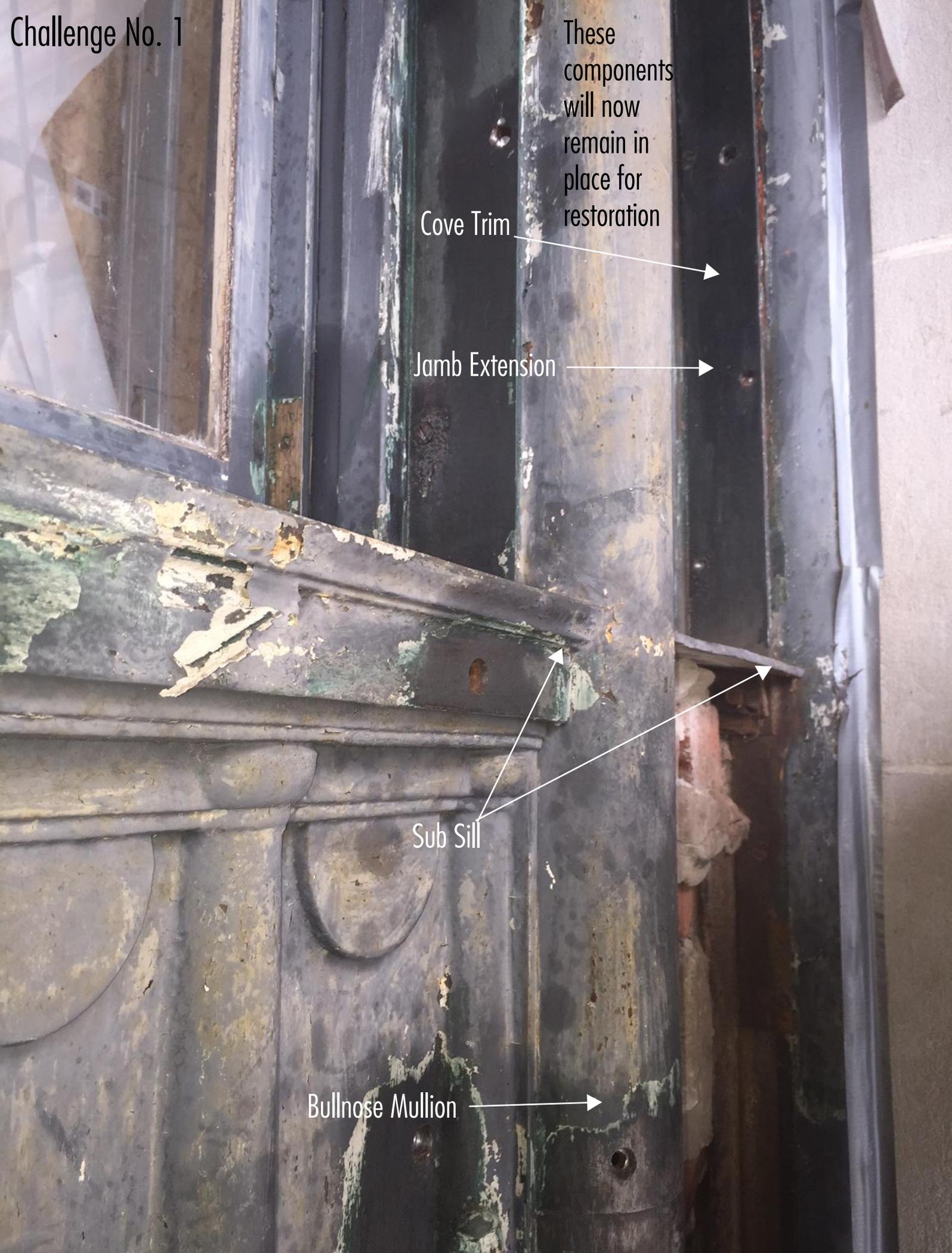
These components will now remain in place for restoration

Cove Trim

Jamb Extension

Sub Sill

Bullnose Mullion



These components are all attached by hidden fasteners

Connection bolt tying sub-sill, upper jamb extension and cove trim together

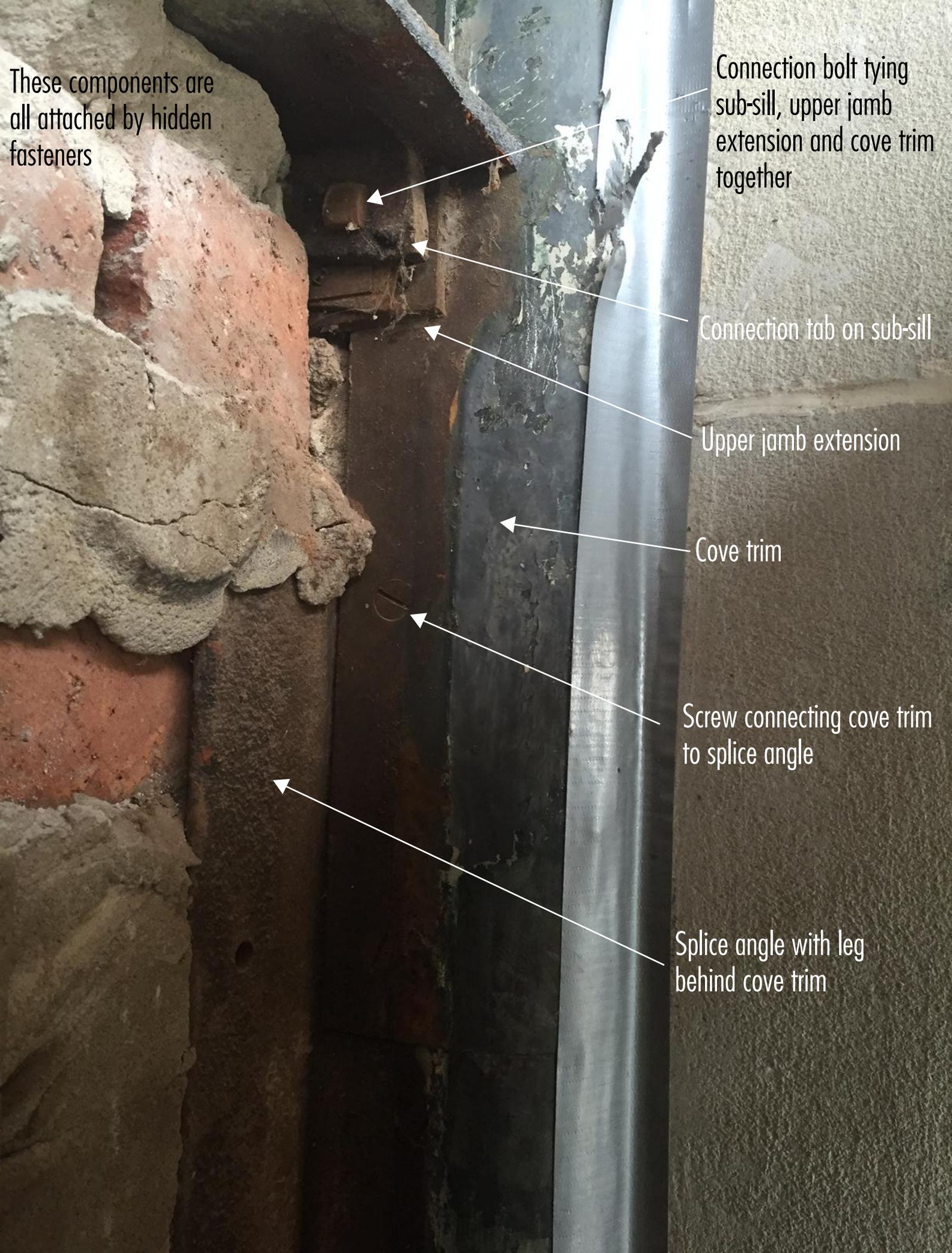
Connection tab on sub-sill

Upper jamb extension

Cove trim

Screw connecting cove trim to splice angle

Splice angle with leg behind cove trim





Connection screws  
for cove trim to  
splice angle

Splice angle behind  
sandrel panel.



Sub-sill vertical lip  
with connection hole  
to spandrel panel

Masonry back-up

## ENGINEER'S FIELD REPORT

**Project:** Oklahoma State Capitol Exterior Renovation  
**Project #:** 15071-01  
**Date / Time:** September 16, 2016 / ~10:30 a.m.  
**Temperature:** 75° F  
**Weather:** Cloudy, cool, intermittent rain

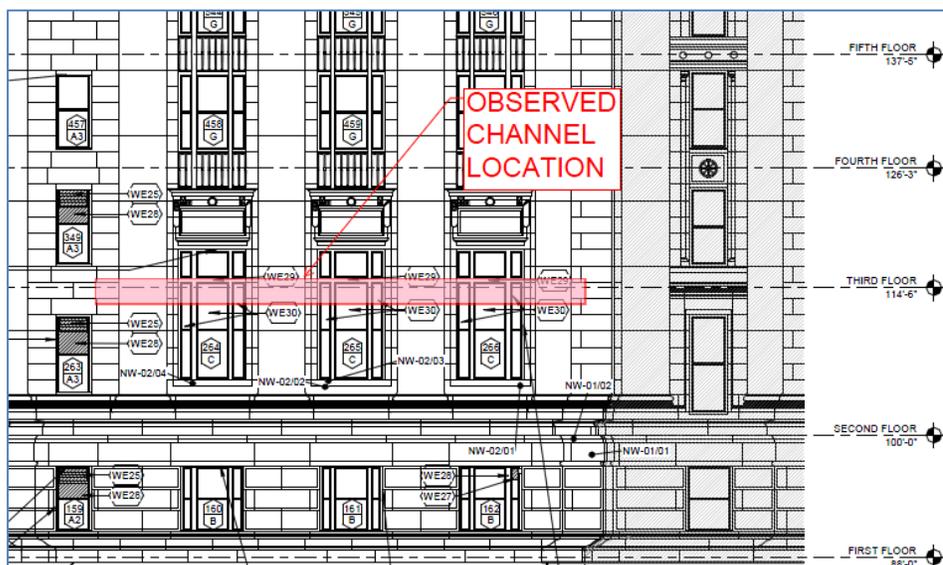
**Work in Progress:** Window Frame Removal on NWE

ZFI was asked by Heath Glenn of JE Dunn to visit the scaffolding on the North Wing – West Elevation in the vicinity of windows 264, 265, and 266 (that occur primarily below the 3<sup>rd</sup> floor). The reason for the visit was that undocumented steel framing was encountered crossing the upper third of the three windows and was interfering with the sidelight frame removal at those windows. Based on conversations he had with representatives of the building management office, Mr. Glenn was informed that a former two-story space on that side of the building was likely infilled sometime in the 1960's to create more office space. It is possible that the undocumented framing was part of this renovation.

After observing the framing and discussing the window conflict with Mr. Glenn, it was proposed that alternative window frame removal options be considered in lieu of attempting to modify the undocumented framing. It is our understanding that JE Dunn has begun to explore those options with the window designer and restoration subcontractor.

### Observations:

1. After removing the temporary opening covers, ZFI personnel observed an 18 inch steel channel framing across the top portion of the window opening (See Photo 1 below).



2. The channel is above the ceiling and the interior side was covered in spray-applied fireproofing. The channel was set flush against the window frame with the approximately 3 7/8 inch-wide flanges of the channel oriented toward the interior. The channel appeared to support a hot-rolled angle shape along its entire length (likely as a pour stop/deck support angle) and an additional vertical plate along the portion of its length in front of the windows (likely as additional protection for the window opening). This vertical plate extended above the floor deck and was observable from the 3<sup>rd</sup> floor above as it extended into the upper sidelight depth (Photo 2).
3. The channel appeared to span along the west wall of the north wing and possibly bear on vertically-oriented column elements (possibly channel or wide flange shapes) also flush to the wall (Photo 3). Due to the presence of the fireproofing, observation of any attachment method to the walls was not possible.
4. Various wide-flange beams also framed into the side of the channel from the east (Photo 4). The majority were similarly fireproofed indicating that they were likely installed at the same time as the channel. These nominally 18 inch deep beams appeared to be bolted into the channel web. The wide flange beam located in front of window 264 was approximately 10 feet from the masonry wall to the north where the concrete-on-deck floor appeared to bear on a rolled angle attached to the wall, the top of the wall, or a combination of the two. Similar beam spacing was observed at window 266. However, additional uncoated framing was observed in the vicinity of window 266 (Photos 5 and 6). These beams appeared to be of a later installation (due to lack of fireproofing) and may be supporting filing and storage uses above.
5. The beam and channel framing supports an approximately 3 inch concrete slab on a 2 inch deep metal deck floor with an approximate total thickness of between 5 inches and 5 1/2 inches (Photo 7).
6. Based on conversations with Heath Glenn, this channel was preventing the removal of the narrow, lower sidelights on each side of the aforementioned windows. The sidelight removal appeared to be contingent on removing a stay at the top of the window, tilting the sidelight frame into the interior, and then lifting it out of the larger window frame. The full 18 inch depth of the channel impaired the removal of the stay and prevents the tilting and lifting of the sidelight out of the frame (Photo 8).
7. After observing the framing and discussing the window conflict with Mr. Glenn, it was proposed that alternative window frame removal options be considered in lieu of attempting to modify the undocumented framing. It is our understanding that JE Dunn has begun to explore those options with the window designer and restoration subcontractor.

**Reported By:** Michel D. Thompson, PE  
ZFI Engineering Co.





prevents glass from  
being removed

Photo 1 - 18 inch Channel Framing Across Window 264



Photo 2 - Steel Plate Extending Above 3<sup>rd</sup> Floor





Photo 3 - Column Element Supporting Channel



Photo 4 - Wide Flange Beam Framing Into Channel





Photo 5 - Additional Framing at Window 266



Photo 6 - Additional Framing at Window 266





Photo 7 – Concrete on Corrugated Deck Portion of 3<sup>rd</sup> Floor



Photo 8 – Conflict at Top of Sidelight

-END-





## *Phasing & Schedule Attachments*

The following documents are included in the subsequent attachments:

- Site Phasing Plan
- Site Utilization Plan
- Window Abatement Tracking Plan
- Four (4) Week Look Ahead Schedule





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### *Site Phasing Plan:*

The site phasing plan is a broad representation of the work flow for the capitol exterior rehabilitation. Beginning with ALPHA (west elevation of the north face), scaffolding has been constructed continuing on to Beta and Charlie. We construct two phases of scaffolding at a time, which is followed by hazardous material removal, window restoration, and stone and lighting repair. As each phase is completed, the scaffolding will be disassembled and reassembled on the subsequent phases. This site phasing will occur for the duration of the rehabilitation until all work is complete, and the State Capitol is back to its original beauty and functionality.



JED Trailer Compound

BRAVO

A  
L  
P  
H  
A

C  
H  
A  
R  
L  
I  
E

LIMA

DELTA

K  
I  
L  
O

E  
C  
H  
O

JULIETTE

FOXTROT

TUNNEL (will continue across Lincoln)

I  
N  
D  
I  
A

G  
O  
L  
F

HOTEL





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### Site Utilization Plan:

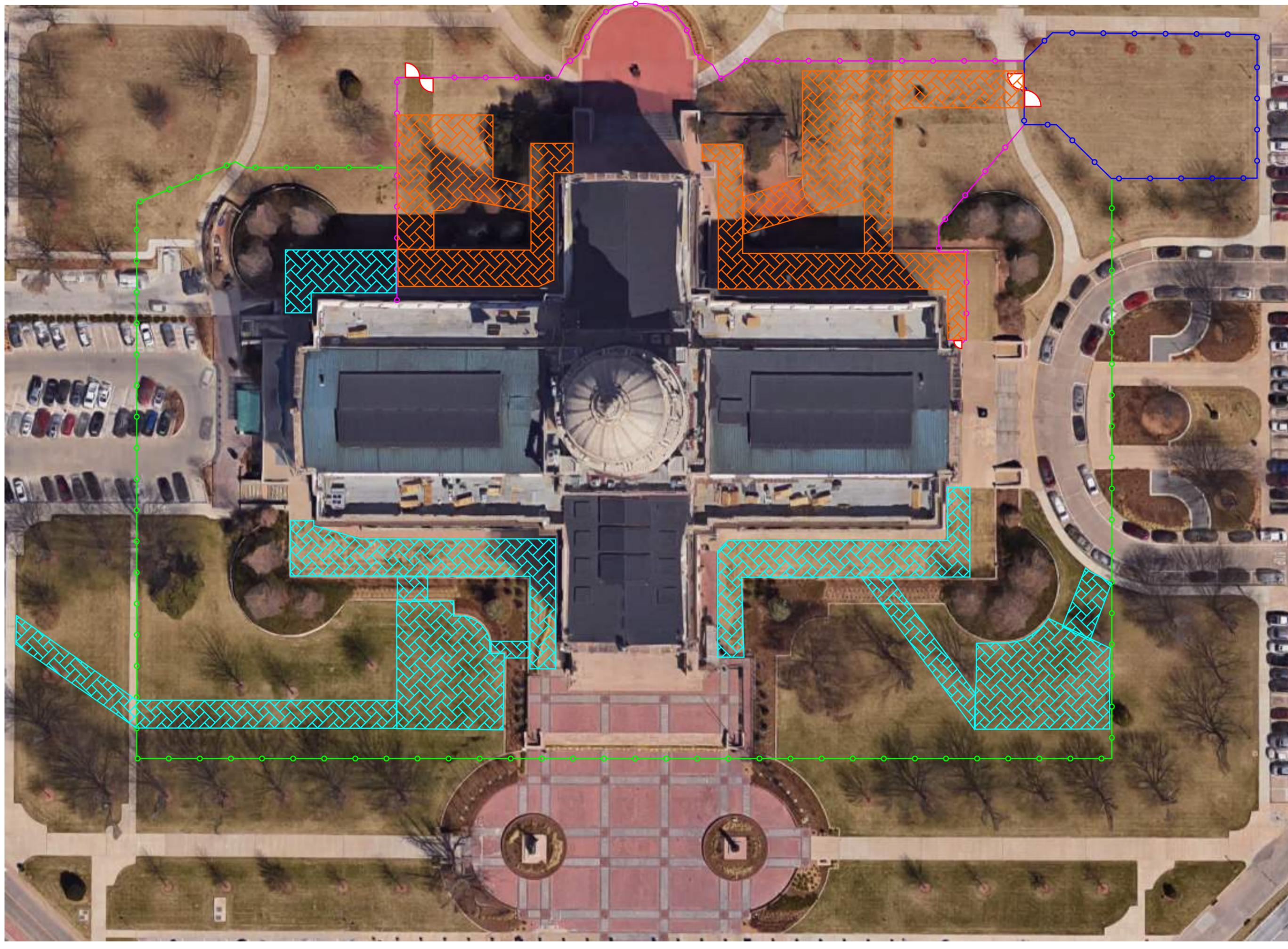
Per our site utilization plan, the JE Dunn trailer compound is the designated area for our staff members, trade partners, and material storage areas. It currently houses four field offices. 

Our site fencing is a revolving system that isolates our work area from the public as we move around the Capitol building, helping to ensure a safe work environment. 

The gravel lay-down areas are designated paths where machinery, supplies, and equipment are stored and provide a roadway for machinery to move supplies to and from the job site. The gravel will also serve as a protective barrier of the subsurface. 

Fence gates mark all areas where access can be gained to the job site for material and/or equipment deliveries, emergency access, or personnel access. These gates remain closed and are locked every night to ensure a safe work environment. 





**Legend:**

- JED Trailer Compound
- Phase 1 Site Fencing
- Gravel laydown
- Fence gate
- Future phases site fencing
- Future phases gravel laydown

**Project:**  
Oklahoma State Capitol Rehabilitation

**Date:**  
08.22.2016

**Drawing:**  
Site Utilization Plan



## *Exterior Rehabilitation*

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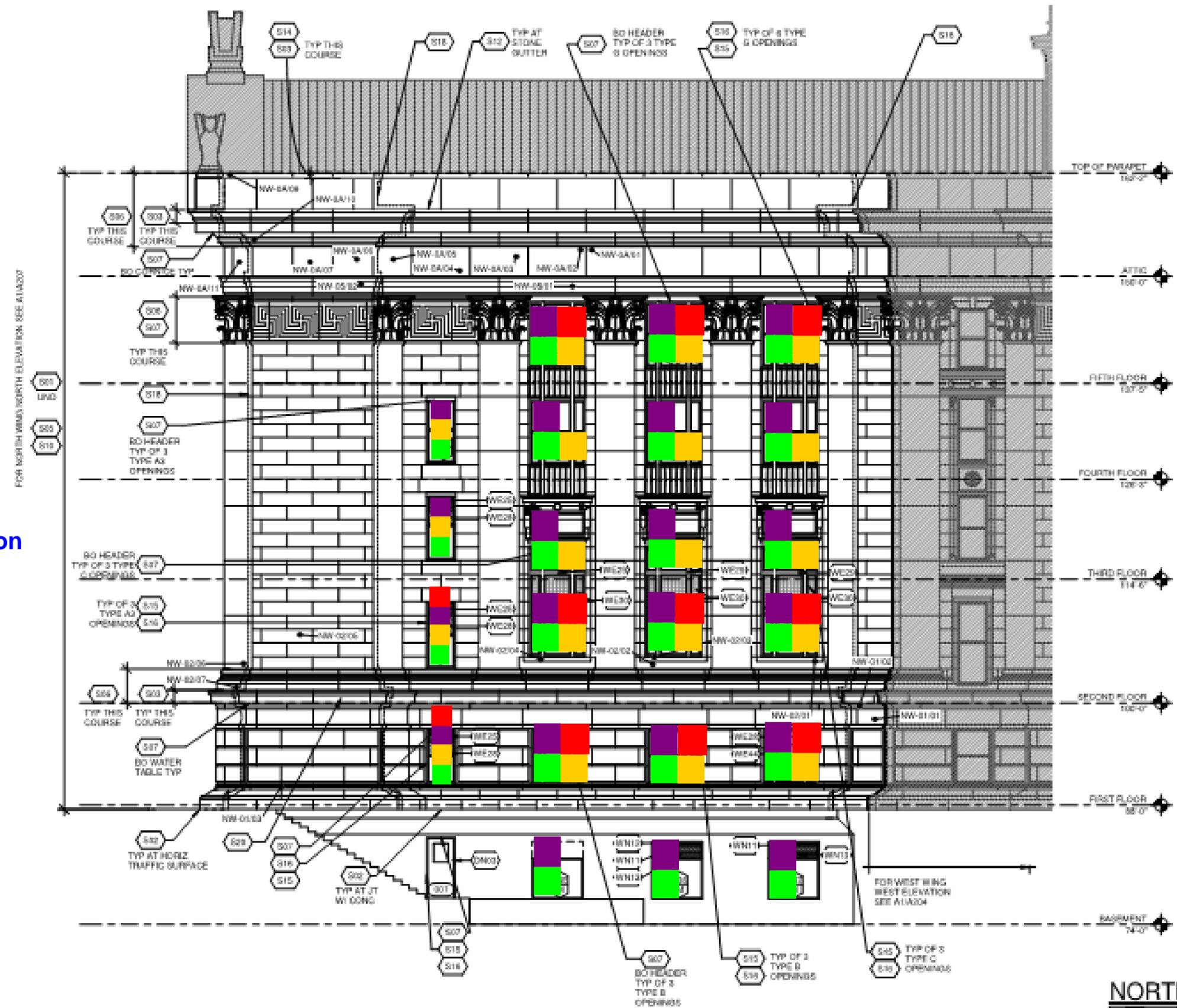
SEPTEMBER 2016

### *Window Abatement Tracking Plan:*

Aside from the erection of the scaffolding, the most significant progress made this month has been the historic window restoration process. Our team is currently performing hazardous material abatement, glass removal, and historic preservation and restoration. The following document shows the progress we have made thus far.

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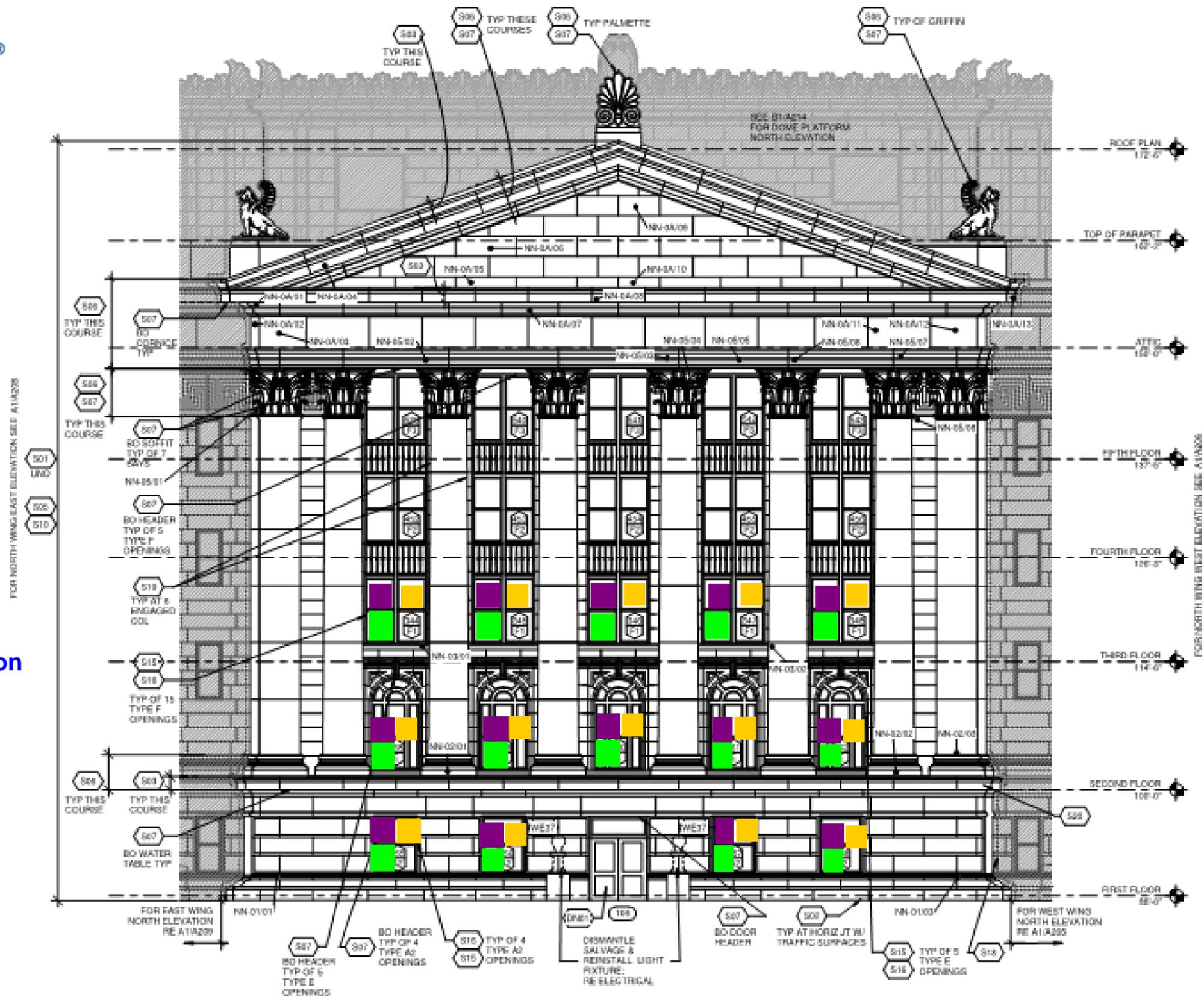
09/29/2016

### Historic Window Restoration Progress Legend

- Lead Paint Removed From Screw Heads
- Storm Window Removed
- Historic Glass Removed
- Lead Paint Removed From Window Frame

**NORTH WING WEST ELEVATION**  
 0 2 4 8 16  
 1/8" = 1'-0"

09/29/2016



**Historic Window Restoration Progress Legend**

- Lead Paint Removed From Screw Heads
  
- Storm Window Removed
  
- Historic Glass Removed
  
- Lead Paint Removed From Window Frame

**NORTH WING NORTH ELEVATION**



