

Exterior Envelope
Assessment

of the

**Brazos County
Administration
Building**

**200 South Texas Ave,
Bryan TX**

**FINAL REPORT
2.19.2024**

ZERO / SIX

Consulting

Envelope Architecture

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ABBREVIATIONS

ASCE	American Society Civil Eng.	MV	Masonry Veneer
ACM	Asbestos Containing Material	NRCA	National Roofing Contractors As.
AVB	Air Vapor Barrier	PW	Punched Windows
BUR	Built Up Roof	PVC	Polyvinyl Chloride
CFMF	Colf Formed Metal Framing	RCP	Reinforced Concrete Pipe
CIP	Cast In Place Concrete	ROM	Rough Order Magnitude
CW	Curtain Wall Glazing System	RTU	Roof Top Unit
IBC	International Building Code	SF	Storefront Glazing System
IECC	International Energy Conservation Code	SP	Single Ply
MB	Modified Bitumen	TDI	Texas Department of Insurance
MEP	Mechanical Electrical Plumbing	TPO	Thermoplastic Polyolefin
MP	Metal Panels	UV	Ultraviolet
		WRB	Weather Resistive Barrier
		ZSC	Zero/Six Consulting

REPORT DEFINITIONS

Stage One Facility Evaluation	Report based on review of construction documents and visual observations only.
Stage Two Facility Evaluation	Report based on review of construction documents, visual observations, and testing.
Stage Three Facility Evaluation	Report based on review of construction documents, visual observations, testing, and destructive investigations.
Service Life	The period during which a building material or system can perform as intended.
Poor Condition	Vulnerable to a common wind and/or rain event. Needs attention immediately.
Fair Condition	Service life should survive 5 years with yearly inspections and normal maintenance.
Good Condition	Service life should survive 5 years with no action. Re-inspections should occur within a minimum of 5 years.
Recovery Details	Architectural details prepared to correct a design or construction defect, or to enhance existing and/or outdated conditions.

PROJECT DATA

Project: Brazos County Admin Building
Address: 200 South Texas Ave.
Bryan, TX

Client: Plan North Architects
Contact: Ryan Key – PNA
Trevor Landsdown - BC



Construction Team:	Unknown	Design Code:	Unknown
Project Manager:	Unknown	Wind Speed:	Unknown
Architect:	Calhoun, Tungate & Jackson	Importance Factor:	Unknown
Contractor:	Unknown	Exposure Cat:	Unknown
Complete:	1970s	Levels:	3
Building Use:	Administrative	High Rise:	No
Storm Damage:	Damages appear from building age, not storm related	Approximate SF:	

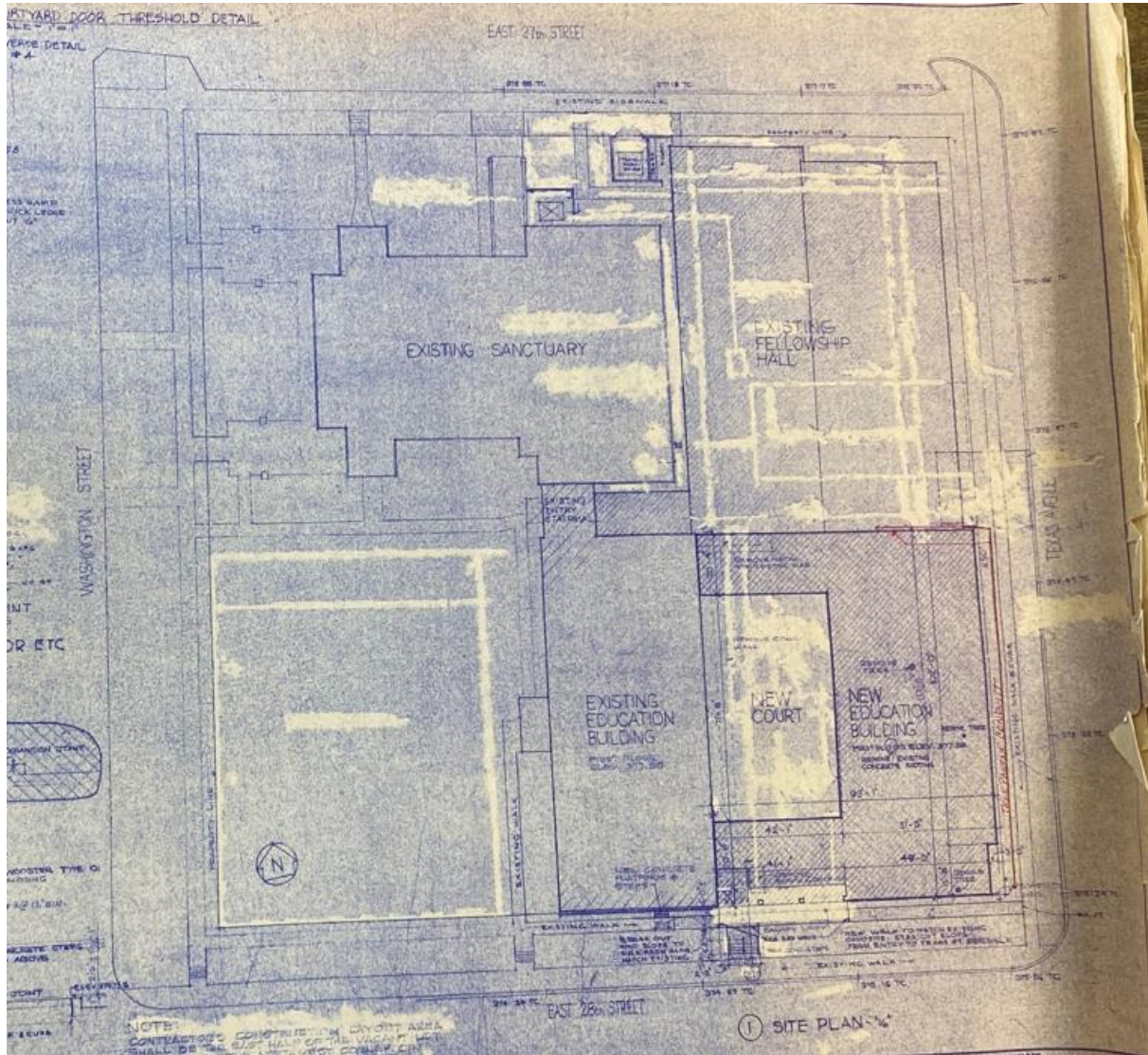
HISTORY

The Brazos County Administrative Building was originally constructed as the First Baptist Church of Bryan, Texas, some time before 1973. Original construction documents dated from October of 1973 show the addition of the Education Building and Fellowship Hall to the original Sanctuary. Construction documents dated November of 1979 show the addition of the Courtyard and New Education Building. In between the late 70s and 2007, the Church Sanctuary was demoed and rebuilt on the south-end of the structure, along with an addition to the older education building. Two portable buildings were placed where the original Sanctuary was once located. Construction documents titled “A New Administrative Office Facility for Brazos County” dated June 2007 show the removal of the portable buildings, improvements to the parking lot areas and sidewalk enhancements, a chiller and generator housing, in addition to interior remediations through-out.

Zero/Six Consulting, LLC (ZSC) was commissioned in January of 2024 to perform a stage three facility evaluation of the building envelope with emphasis on the north wing and sanctuary windows (as they are planning to be replaced in the near future) and provide a written narrative outlining findings of the assessment and recommendations of repairs. This report is that narrative, but it alone is not an adequate vehicle to direct future remedial services. All future construction remedial activities should be master planned and described via detailed construction documents.

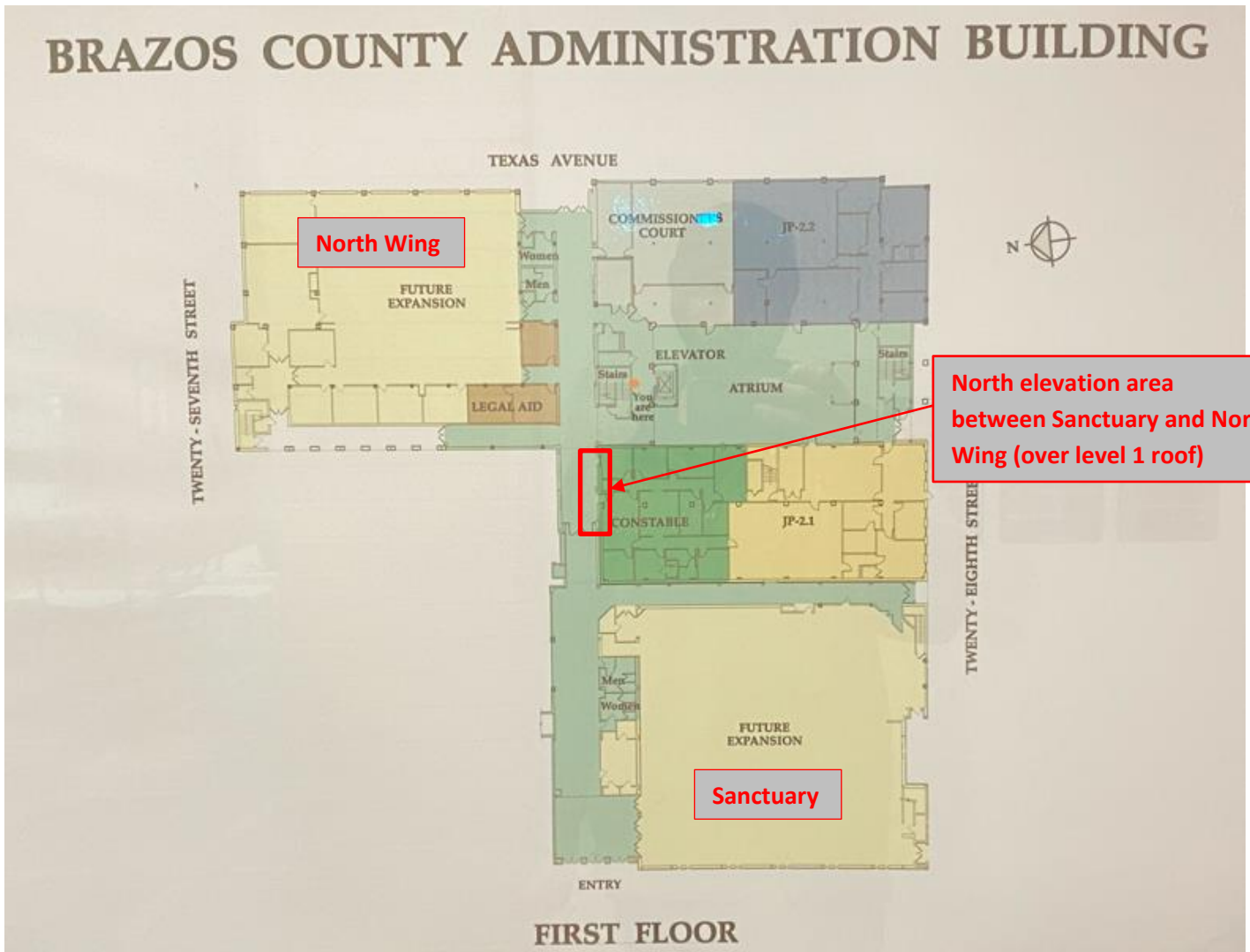


SITE PLAN



Site Plan from 1979

SITE PLAN



Current First Floor Plan

EXECUTIVE SUMMARY

This report is a Stage Three Facility Evaluation with medium investigative intensity that has identified sources of water infiltration into the Sanctuary and the area between the Sanctuary and North Wing (north elevation, over the level 1 roof adjacent to the enclosed chiller and generator area). ZSC utilized modified AAMA 501.2 (nozzle) testing to recreate water infiltration, which indicated failing window system sealants, and compromised perimeter sealant joints. United Restoration and Preservation (URP) was contracted under ZSC to remove and re-install masonry for observations in areas directed by ZSC.

Testing, in addition to observations at demoed areas, revealed that in most cases there is little-to-no sub-wall waterproofing behind the masonry veneer. Additionally, the window systems appear to be anchored directly to the masonry veneer. The sub-wall assembly appears to either be cold formed metal framed wall (CFMF) with ½" gypsum board (north wing and sanctuary), or a CMU substrate (area over low roof), all with masonry veneer. The north wing and the north elevation were noted to have an elastomeric coating applied over the masonry veneer, with wet glazed detailing at the level 2 storefronts along the north wing. No leaks were observed during testing in that area. Testing on the north elevation over the low roof resulted in failures regarding the windowsills and sill pans. At the Sanctuary, leaks were observed along the jambs.

ZSC was commissioned by Plan North Architects to perform this Stage Three Facility Evaluation, with emphasis on the North Wing and Sanctuary, which included reviews of available existing construction documents, observations from ground level and cursory locations where accessible via boom-lift, and removal of veneer in key locations chosen by ZSC (performed by United Restorations). This report serves to incorporate our opinion and subsequent recommendations based on the aforementioned data obtained.

OBSERVATIONS

ZSC conducted an envelope assessment, with emphasis on the Sanctuary, North Wing, and north elevation area over the level 1 roof (between Sanctuary and North Wing, *see site plan*). Randomized nozzle testing was performed on selected specimens at all three locations, with results outlined below. ZSC directed URP to demo select areas of the masonry walls in order to observe and document our findings to aid in a window replacement and remediation plan. These areas were patched back with the existing masonry units, mortar joints were color matched, and the coating was re-applied (where applicable).

Initial observations showed that a portion of the North Wing; west and north elevations has a masonry coating applied to the brick masonry walls. A bucket of the coating was stored on-site, and it was noted that Garland Tuff Coat was applied to these areas of the exterior. The west elevation masonry wall at the Sanctuary, along with the south and east elevations did not have a masonry coating applied to veneer. **See Photos 01-04**

Nozzle Testing at Sanctuary

Forensic nozzle testing at the Sanctuary's west elevation resulted in moisture infiltration when the jambs were directly sprayed. ZSC was granted permission to cut small "access" holes in the interior drywall (for the purpose of utilizing a borescope) to observe the moisture leaks from the interior side. Testing began at ground level and worked up to level 2. Six (6) out of the ten (10) multi-level window systems were tested, and water infiltration at the jambs at ground level was observed throughout the testing via litmus (water indication) paper and the borescope camera. It appears that water was able to bypass the perimeter joinery through the masonry mortar joints and/or voids in the perimeter sealant joinery and window systems. **See Photos 05-09 and Exhibit A**

Masonry Demo & Observations at Sanctuary

Two areas were opened for visual observations at the Sanctuary multi-floor window systems, at the west elevation. The first area was located adjacent to the jamb/sill interface with the window system, and the second one located adjacent to the head/jamb interface of the window systems. Masonry units were not removed directly next to the window systems, so as to not affect the perimeter sealant joinery.

The first area adjacent to the sill/jamb area of the window system revealed that there is no waterproofing (or damp-proofing) applied to the exterior sheathing. Typically, the vertical joinery of the sheathing boards would've been detailed with a *mastic* or *damp-proofing*, none of which was observed to be applied on the Sanctuary sub-wall. No sheet metal flashings were installed around the window system, with the exception of a sill flashing at the base of the windows. The sill framing member did not appear to be attached to any structure, but is cantilevered out of the interior and likely fastened to the brick masonry. A poly vapor retarder was observed extending up from the wall base, which is likely the extent of the base wall flashing.

OBSERVATIONS (cont.)

The second area adjacent to the head of the window system also revealed bare sheathing boards behind the masonry wall. The vertical sheathing joinery was verified to not be detailed with any sort of waterproofing. The head of the window system also sits proud of the interior framing, which may be the only non-component and cladding attachment point for the system (typical). On the exterior of the Sanctuary windows, the perimeter sealant joinery appears to be at the end of its service life. Voids in the window system sealant detailing were also observed throughout. Interior damage indicates that these issues have been ongoing, and leaks have been occurring at these windows for quite some time. **See Photos 10-21**

It is ZSCs understanding that the sheet metal fascia and flat roof area above the Sanctuary are planned for replacement in the near future, and therefore were not included in this assessment. No concerns were observed related to the exterior gutter system.

Nozzle Testing at North Wing

No water infiltration was observed during the nozzle testing performed along the west elevation level 2 punched windows at the North Wing. Four (4) of the thirteen (13) punched windows were tested per AAMA 501.2 standards, and all passed. The existing coating and wet seal detailing appear to be in good condition, however, ZSC noted gasketed fasteners were installed into the weep holes of the window system. **See Photos 22-24 and Exhibit B**

Masonry Demo & Observations at North Wing

Two areas were opened for visual observations at a single punched window along the west elevation of the north wing at level 2. Similar to the Sanctuary, one location was adjacent to the jamb/sill interface of the window system, and the other was located adjacent to the head/jamb interface. Masonry units were not removed directly next to the window systems, so as to not affect the perimeter sealant joinery.

At the area adjacent to the sill/jamb, ZSC also observed no waterproofing applied to the exterior sheathing boards. Similar observations were made at the head/jamb openings adjacent to the window system, however, it was noted that a mastic or damp-proofing type of material was applied to the shelf angle at the head of the window opening.

On the interior of the North Wing's west elevation, a portion of the interior wall was opened and ZSC was able to verify fasteners attaching the sill framing member directly to the masonry veneer. **See Photos 25-31**

Existing water damage appeared to originate from the roof level at the North Wing, however ZSC was informed that roof has recently been replaced, and therefore was not included in this assessment. No concerns were observed regarding the exterior gutter system.

OBSERVATIONS (cont.)

Nozzle Testing at North Elevation, over low roof (*between north wing and sanctuary*)

Forensic nozzle testing at the level 2 punch windows resulted in moisture intrusion via the sill portion of the operable window systems. Three (3) out of the four (4) punch windows were tested, and two (2) of the three (3) windows tested resulted in failures at the sill. Moisture was observed infiltrating the interior side by rolling over the backside of the sill pan. The existing wet seal detailing appears to have compromised the windows' ability to drain moisture that enters the system. **See Photos 32-34 and Exhibit C**

Masonry Demo & Observations at North Elevation, over low roof

Only one area of the masonry wall was opened up over the level 1 low roof, due to the roofing system interface with the masonry wall adjacent to the windowsills. This area was located adjacent to the head/jamb interface of the operable window. Masonry units were not removed directly next to the window systems, so as to not affect the perimeter sealant joinery.

ZSC observed the sub-wall to be comprised of CMU in lieu of CFMF and gypsum exterior sheathing. Additionally, a mastic or damp-proofing type material was observed to be applied to the CMU substrate. It was also observed that there was little to no air space between the masonry veneer and CMU sub-wall.

The existing masonry coating appeared to be in good condition, with the exception of the sloped masonry beneath the sill of the windows. These areas appear to be deteriorating at a faster rate than the vertical surfaces, potentially from cascading water during rain events. Additional cracking was observed in the coating that was applied over the mortar joinery along the head of the windows. The existing window sealants were observed to be in poor condition, with cracking and deterioration observed along the sills. **See Photos 35-42**

ZSC noted additional general concerns related to the buildings' exterior, some of which may be repeat items from above: **See Photos 43-63 & Exhibit D**

- Cracking mortar joinery, and voids in masonry and mortar joinery where building signage was once placed.
- Failing/deteriorating masonry control joints.
- Failing/deteriorating sealant joinery at window perimeters.
- Voids/holes in glazed-in panels and window systems.
- Hollow metal doors at North Wing (inside arched entrances) have a threshold that is recessed into the topping slab.
- Voided/deteriorated wall penetrations.
- Landscaping concealed slab edge in some areas, where weeps and/or curtain wall sill are potentially blocked.
- Exposed wood blocking along window heads at east elevation of North Wing.
- Staining at plaster eyebrow above soffit at east elevation entrance.
- Corroded window screens and window frames along south elevation (JP-21).
- Corroded shelf angles at south elevation (west facing) exit door (sanctuary area).
- Inadequate roof termination at north elevation low roof at north wing rise-wall

RECOMMENDATIONS

Based off of the existing conditions, and lack of a continuous weather resistive barrier (WRB) protecting the building, a window replacement project should not be the extent of the project if the goal of the project is to waterproof the building's exterior envelope.

Window replacement will merely provide a water tight square in a very leaky (with regard to air and water infiltration) existing building envelope. The air infiltration subject is something this report does not go in depth on, however, moisture laden air is traversing the exterior walls during hot, humid (and sometimes cold humid) months and likely causing condensation issues that we were not made aware of or are hidden by interior finishes.

While an elastomeric coating may provide some level of temporary protection with regard to bulk water infiltration, the masonry weeps would remain open and allow moisture laden air into the building through the compromised back up wall. This may be a temporary solution until recladding the building with proper environmental separation can be budgeted for but should under no circumstances be considered a primary solution to the existing problem.

In order to maintain the buildings service life, and mitigate the amount of future moisture intrusion, ZSC recommends the following.

Primary Action Plan:

1. Remove all masonry veneer over CFMF wall assemblies in sections to replace exterior sheathing, install continuous weather resistant barrier (WRB), and reinstall veneer. Updated building codes now require the use of C.I. (continuous insulation) which must be established in the cavity wall. This may require revisions to the lengths of relief angles/lintels to ensure proper cavity ratio, and proper masonry bearing surface is achieved.
2. Incorporate flashings into the aforementioned WRB system that will span between the new WRB and new window systems. Blocking or other attachment methods at the heads, jambs and sills should be incorporated in this phase to provide structural attachment points for the window system. Windows cannot be attached to components and cladding.
3. Replace window systems with systems that can perform per current wind loads (ASCE 7-16) and resist water penetration per 20% of the design loads. All systems are to be sealed to flashing extensions from the WRB and not components or cladding.
4. Reconfigure landscaping so there is a positive slope away from the building.
5. Implement a saw-cut sheet metal reglet-type counter flashing detailing at north elevation low roof rise-wall.

A secondary, or back-up plan is also provided. However, it should be noted that this is more of a way to phase out the primary action plan, with an initial focus on the window perimeters, until the budget can allow for adding sub-wall waterproofing to the remainder to the buildings' exterior. It should also be noted that this secondary option requires the removal of masonry twice.

RECOMMENDATIONS (cont.)

Secondary Action Plan – Phase A:

1. North Wing (at coated veneer)
 1. Remove existing windows and masonry veneer at window perimeters. Blocking or other attachment methods at the heads, jambs, and sills should be incorporated to provide structural attachment points for the window systems.
 2. Replace window systems with systems that can perform per current wind-loads (ASCE 7-16) and resist water penetration per 20% of design load. Re-install adjacent masonry veneer. Seal perimeter joints to masonry returns, and re-coat masonry up to perimeter joint.
2. North elevation between North Wing and Sanctuary (same as above)
 1. Remove existing windows and masonry veneer at window perimeters. Blocking or other attachment methods at the heads, jambs, and sills should be incorporated to provide structural attachment points for the window systems.
 2. Replace window systems with systems that can perform per current wind-loads (ASCE 7-16) and resist water penetration per 20% of design load. Re-install adjacent masonry veneer. Seal perimeter joints to masonry returns, and re-coat masonry up to perimeter joint.
3. Sanctuary
 1. Remove existing windows and masonry veneer at window perimeters. Blocking or other attachment methods at heads, jambs, and sills should be incorporated to provide structural attachment points for the window systems.
 2. Install a stainless-steel sheet metal out-bound rigid flashing at jambs (tabbed onto head lintel) and sills (w/ vertical tabs turned inside of jamb flashing). SS sheet metal flashing should be set in a full bed of sealant at existing sheathing adjacent of rough opening (to be stripped in during Phase B)
 3. Replace window systems with systems that can perform per current wind-loads (ASCE 7-16) and resist water penetration per 20% of design load. Re-install adjacent masonry veneer. Seal perimeter joints to masonry returns, and re-coat masonry up to perimeter joint.
4. Reconfigure landscaping so there is positive slope away from the building.
5. Implement a saw-cut sheet metal reglet-type counter flashing detailing at the north elevation low roof rise-wall.

RECOMMENDATIONS (cont.)

Secondary Action Plan – Phase B

1. North Wing
 1. Remove masonry veneer in sections, including window perimeter joints. Replace exterior sheathing as needed and install a weather resistant barrier (WRB).

Updated building codes require continuous insulation in the cavity wall space, which may require revisions to relief angle lengths and masonry ties, ensuring that the proper air space is maintained along with adequate masonry bearing surface.
 2. Install rigid stainless-steel sheet metal flashings into the WRB system, that will span between the WRB and the window systems.
 3. Re-install masonry veneer and install perimeter joints at window systems between window frames and flashings.

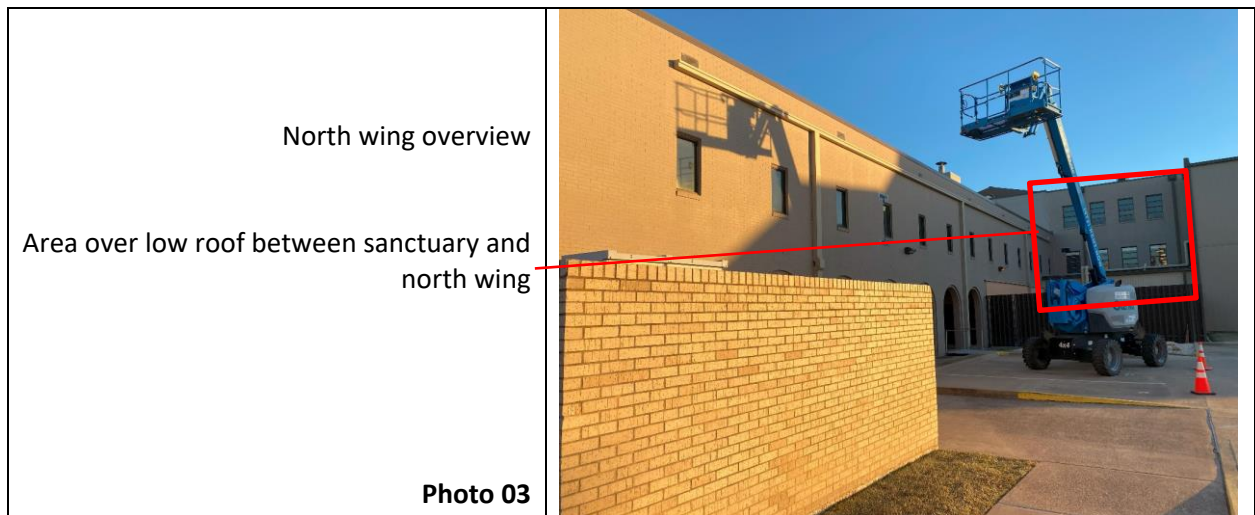
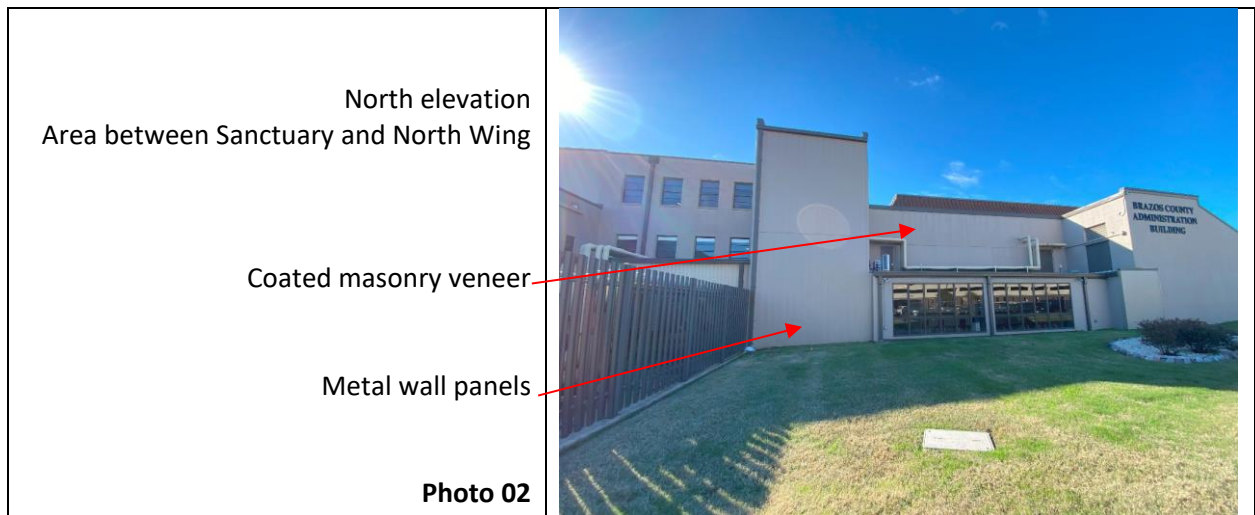
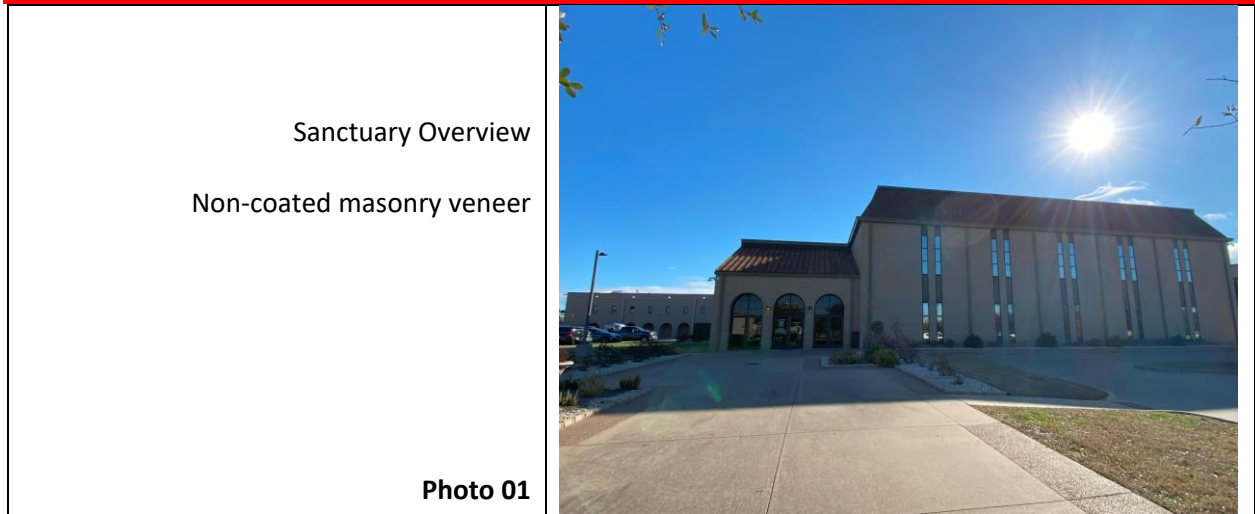
2. North elevation between North Wing and Sanctuary (same as above)
 1. Remove masonry veneer in sections, including window perimeter joints. Replace exterior sheathing as needed and install a WRB.

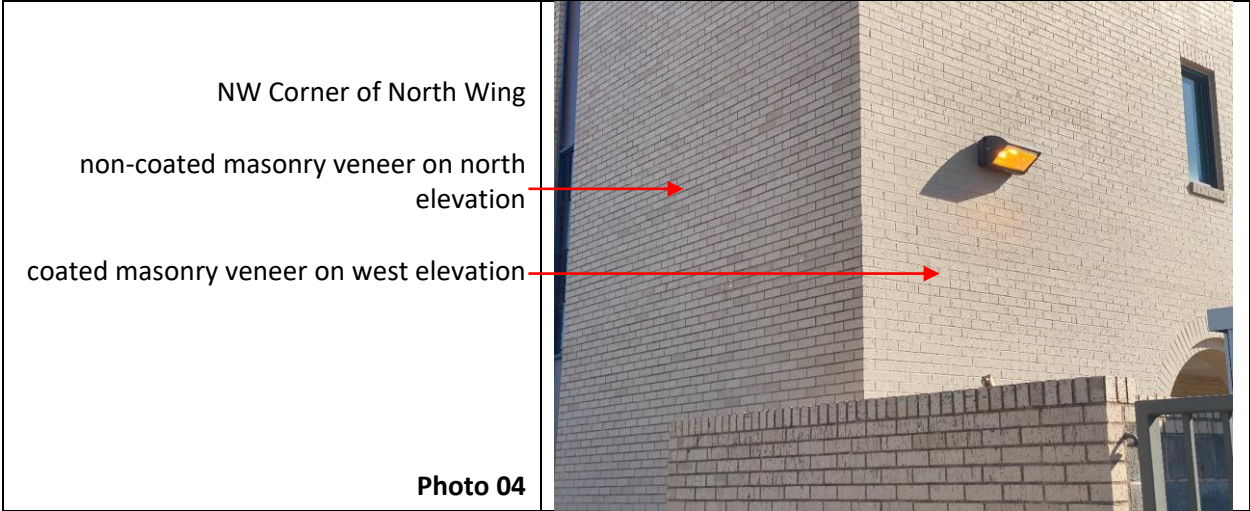
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 2. Install rigid stainless-steel sheet metal flashings into the WRB system, that will span between the WRB and the window systems.
 3. Re-install masonry veneer and install perimeter joints at window systems between window frames and flashings.

3. Sanctuary
 1. Remove masonry veneer in sections. Replace exterior sheathing as needed and install a WRB, stripping in the sheet metal flashings at the existing sheathing.
 2. Re-install masonry veneer.

End of Recommendations

PHOTOS





Water activation paper activating during nozzle testing at jambs



Photo 07

Borescope image of water running down backside of masonry during nozzle testing



Photo 08

Borescope image of additional masonry saturation during nozzle testing



Photo 09

Masonry demo area at Sanctuary

Photo 10



No waterproofing observed at sub-wall

Potentially poly vapor barrier extending up from wall base

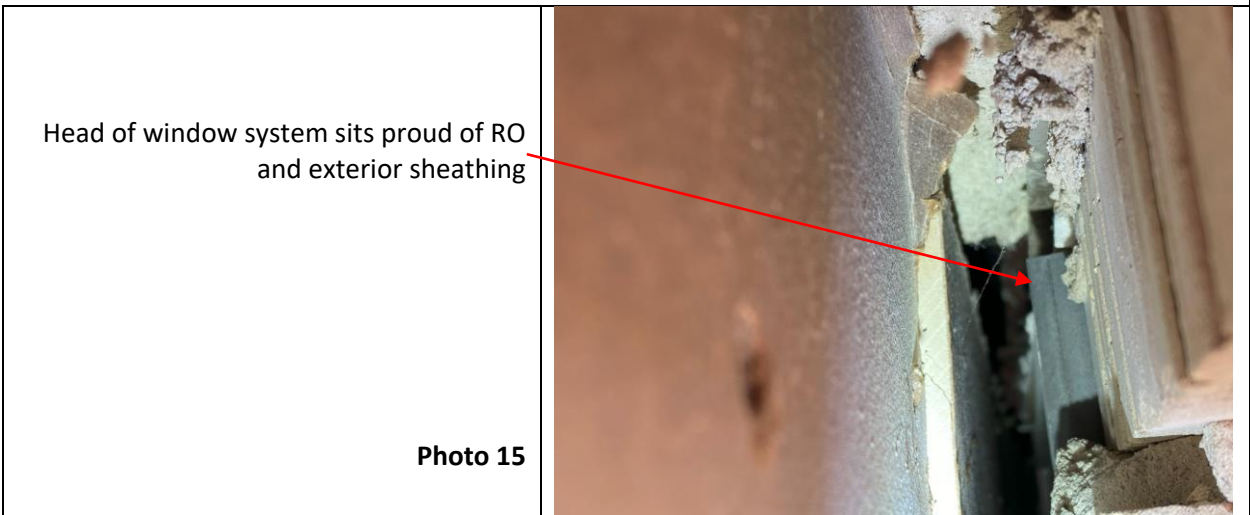
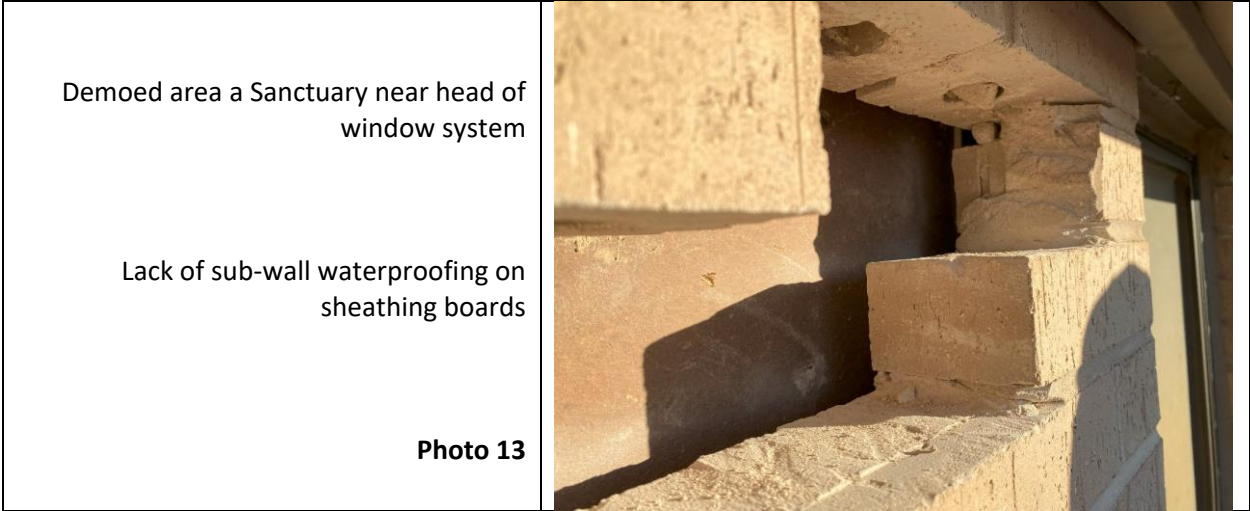
Photo 11



Sill flashing member appears "floating" thru sub-wall

Photo 12





Typical windowsill condition at Sanctuary



Photo 16

Wet seal detailing with deteriorated sealant joints observed



Photo 17

Voids in masonry observed adjacent to window systems

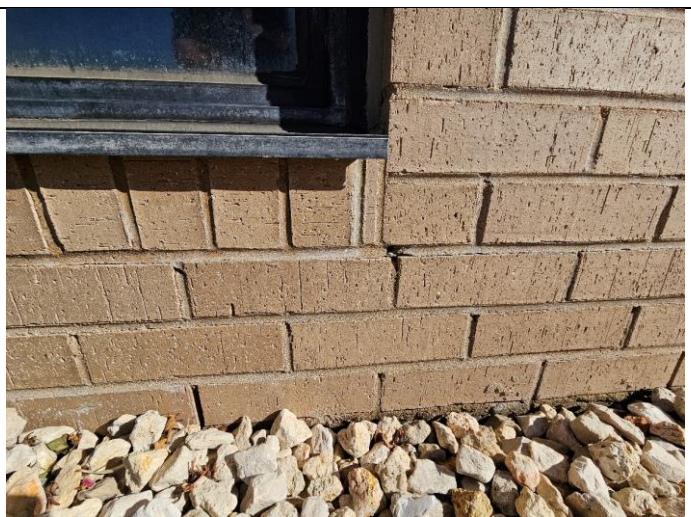


Photo 18

Failing/deteriorating sealant joinery along
jamb at Sanctuary

Photo 19



Failing sealant joinery observed at heads
of window system

Photo 20



Failing sealant joinery at window head

Photo 21



Nozzle testing ongoing at North Wing,
west elevation



Photo 22

Borescope utilized to check for any leaks,
none observed



Photo 23

Interior access holes opened by ZSC
revealed a large amount of organic growth
in wall insulation



Photo 24

Windowsill observed anchored directly into masonry beneath window system



Photo 25

Removed masonry unit at North Wing adjacent to jamb/sill

Note the lack of waterproofing at the sheathing



Photo 26

ZSC utilizing a borescope into the sub-wall cavity



Photo 27

Damp-proofing type material observed running down sub-wall from head detailing

Photo 28



Shelf angle at head of window appear to be stripped in with a mastic or damp-proofing

Photo 29



Existing material appear to minimally capture the lintel detailing

Photo 30



Existing material appears to stop 8-10"
above shelf angle at head of window



Photo 31

Nozzle testing ongoing at area between
North Wing and Sanctuary (over low roof)



Photo 32

Moisture intrusion observed via sill pans



Photo 33

It appears the wet seal detailing is preventing the sill pan from draining, as intended

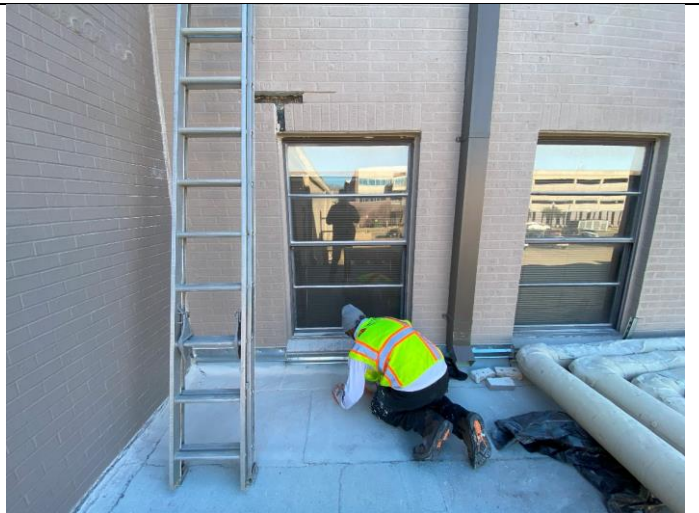
Photo 34



Masonry demo over low roof area

ZSC did not remove brick at roof level

Photo 35



Existing damp-proofing type material applied over sub-wall substrate

Photo 36



Suball substrate appears to be CMU block wall

Photo 37



Perimeter and window system sealants observed in poor condition

Photo 38



Cracking and signs of failing at head window perimeter joinery

Photo 39



Wet seal detailing appears at the end of its service life

Photo 40



Numerous cracks and chips observed in operable window frames. Screws were utilized to make the windows in-operable

Photo 41



Deteriorated perimeter sealant joinery at sill of windows

Photo 42



Typical view of cracking along mortar joints

Photo 43



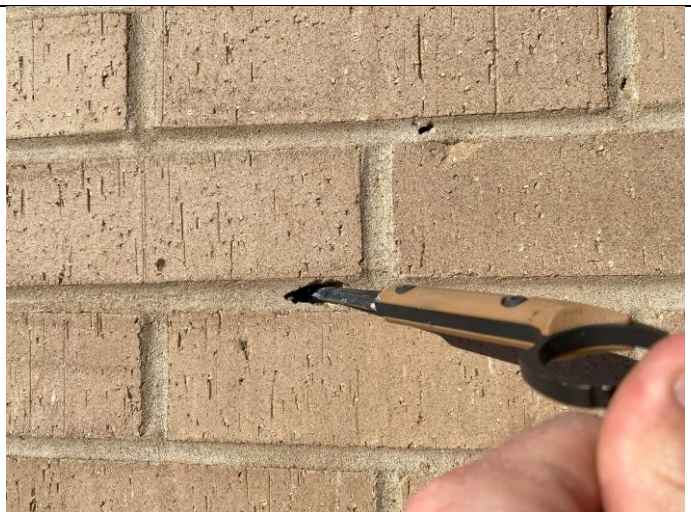
Close-up of masonry and mortar joinery cracking

Photo 44



Void in mortar joint

Photo 45



Deteriorating/Failing sealant control
joinery in masonry walls

Photo 46



Deteriorating sealant joinery at window
systems

Photo 47



Deteriorating sealant joinery at window
perimeters

Photo 48



Window perimeter sealant joinery in poor condition

Photo 49



Hole in glazed in panel in window system, located at north wing north stair tower

Photo 50



Hole/penetration thru glazed in panels

Photo 51



Sanctuary entry doors, threshold recessed in topping slab

Photo 52



Missing sealant detailing between sleeve and piping at penetration

Photo 53



Inadequately detailed wall penetration

Photo 54



Masonry weeps potentially obstructed by landscaping

Photo 55



Window system sill potentially obstructed by landscaping

Photo 56



Exposed wood blocking at window head along east elevation

Photo 57



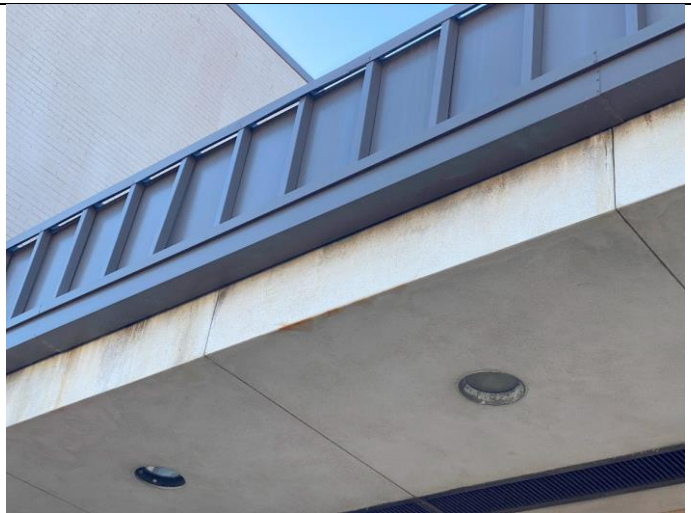
Exposed wood blocking at window head
along east elevation

Photo 58



Staining plaster beneath sheet metal
fascia at east elevation

Photo 59



Corroded window systems along south
elevation

Photo 60



Corroded shelf angle



Photo 61

Corroded shelf angle at south elevation
(west facing) exit door



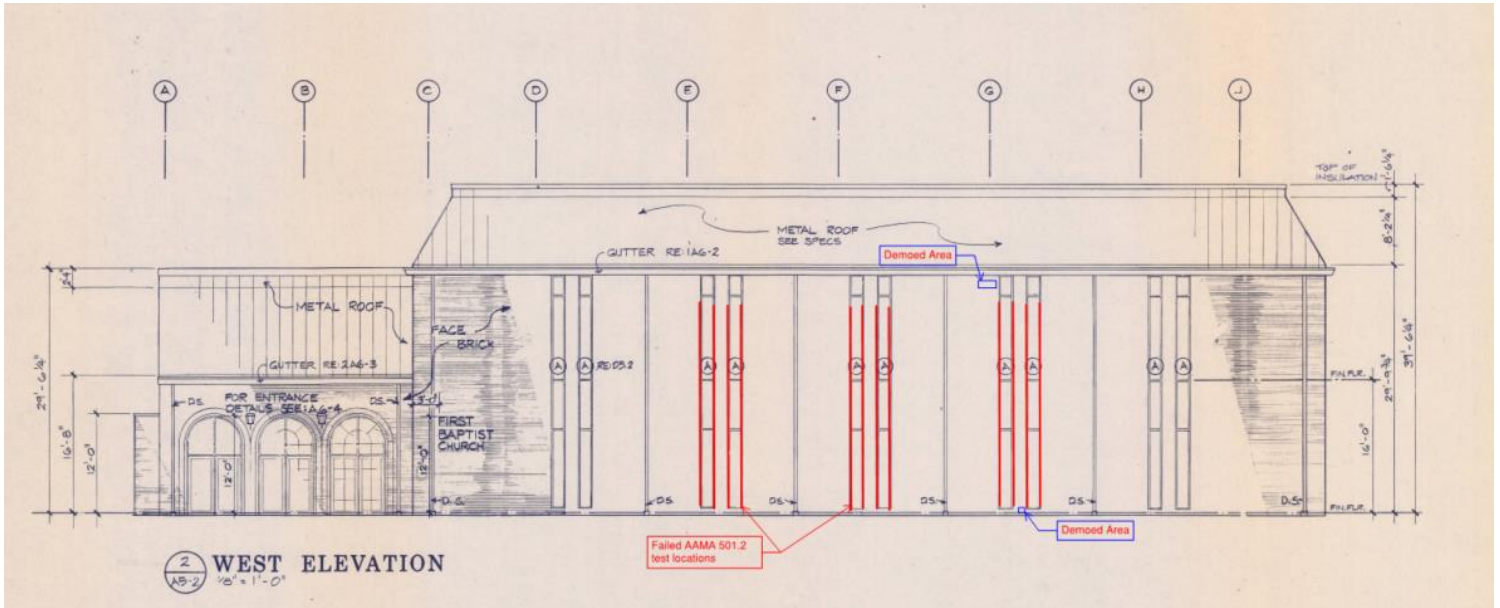
Photo 62

Inadequate roof termination at north
elevation low roof (north wing rise-wall)



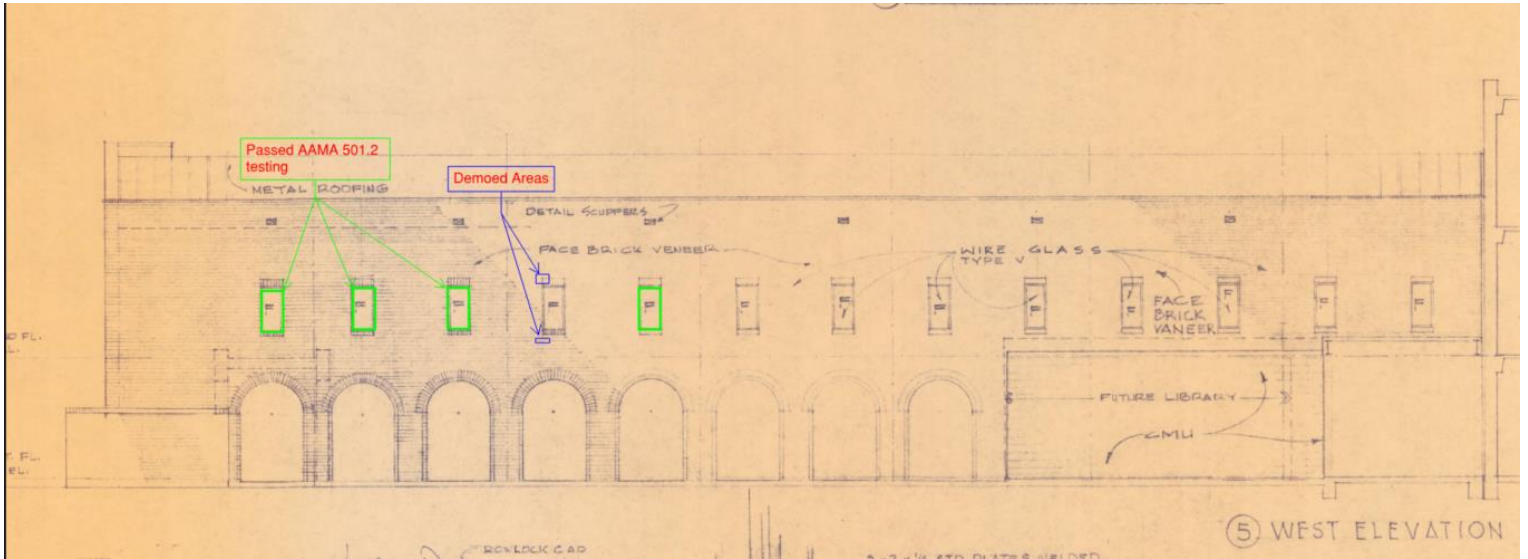
Photo 63

EXHIBIT A



Sanctuary West Elevation Testing and Demo Mark-Up

EXHIBIT B



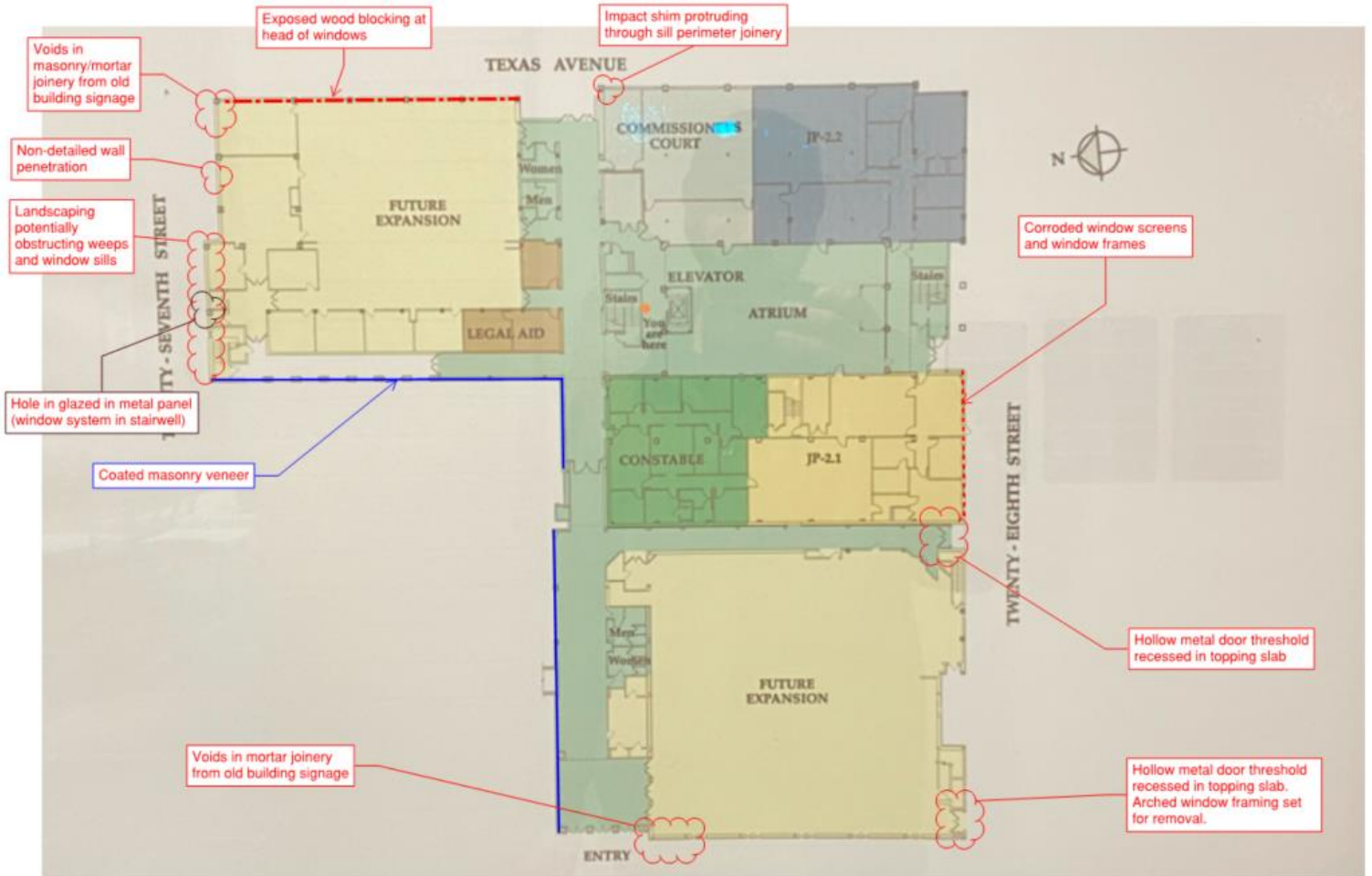
North Wing West Elevation Testing and Demo Mark-Up

EXHIBIT C



North Elevation Area Between Sanctuary and North Wing Testing and Demo Mark-Up

EXHIBIT D



Current Site Plan Mark-Up

End of Report