MCC 1200
ARCHITECTURAL ENGINEERS PLLC

Bank of Alexandria

Façade Assessment

1200AE PROJECT NO. 19-029

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Prepared For:

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Introduction

1200 Architectural Engineers (1200AE) was contracted to perform a structural investigation and façade assessment of the historic Bank of Alexandria building (Figure 1) at 133 North Fairfax Street in Alexandria, Virginia. The structure consists of the original three-story building with a full-height basement space sited on the corner of North Fairfax and Cameron Streets (Figure 1 and Figure 2) and contemporary three-story rear (east) ell with walkout basement extending along the Cameron Street elevation (Figure 3). A modern one-story basement-level walkout space exists against the east elevation of the original structure and the south elevation of the rear ell (Figure 4). The original structure and rear ell primarily consist of wood framed floor and roof systems spanning to perimeter brick masonry bearing walls. Large areas of reconstructed or replacement brick masonry are visible, particularly at the south and east elevations of the original structure and its rear ell addition, where a former hotel structure once extended across the width of the existing lot.

Figure 1: West elevation of the Bank of Alexandria during lift survey, photos by 1200AE, unless noted.

Figure 2: North and west elevations of original structure, showing main bank block.

The structural investigation which 1200AE has been asked to perform is focused on the condition of the exterior façade, particularly the Aquia Creek sandstone and cast concrete elements which primarily characterize the north and west elevations but are also integrated into the east and south elevations. Additionally, the investigation includes consideration of the condition of the brick masonry construction and associated façade elements. As a point of comparison, observations of these elements are compared to the John Milner Associates report completed in 1996, which focused on the condition of the stone features of the façade. Discussion of the structure and various existing conditions noted on site follows, with recommendations for future work and investigation given relative to each section and a full list with recommendations following the main body of the report.

Figure 3: North elevation of rear ell of original structure.

Historic Description

Based on existing records, the original building, consisting of the main structure and rear ell was constructed circa 1804-1806 as the dedicated headquarters of the Bank of Alexandria. By the 1850s, following the closure of the Bank of Alexandria, the structure became an integral part of the Mansion House Hotel complex and the structure was modified and added onto as part of this use. 1970s era restoration efforts removed much of these later additions and evidence of these past alterations are visible on the east and south façades, which were heavily altered as part of the nineteenth century expansion.

Figure 4: East elevation of modern basement level addition.

Aquia Creek Sandstone

Aquia Creek sandstone is a regional sandstone quarried from the Aquia Creek region of Virginia. The stone was used to build several prominent buildings in the region, including the United States Capitol Building, the White House, Monumental Church in Richmond, Christ Church in Alexandria, Gunston Hall, and the Old Patent Office Building. The sandstone is known to have high inclusions of iron and feldspar-based clays. The iron gives it the sometimes red or pinkish coloring. The clay inclusions will often alter over time, resulting in softer areas or pockets of the stone which can be washed out, a result which is sometimes referred to as clay holes. The stone generally is highly porous and susceptible to weathering. There is a wide range of performance characteristics of the stone ranging from poor quality to good quality building stone. Most existing structures with this material have a variation in the quality of stones used in the original construction.

General Façade Description

The façade of the Bank of Alexandria building consists of brick masonry laid in a Flemish bond on the north and west elevations, extending above a band of cut Aquia sandstone laid in an ashlar pattern at the base of each wall (Figure 5). At the north elevation, this transitions at lower levels to a rough bluestone or granite laid in a rubble coursing (Figure 6). The north and west elevations of the original structure are capped by a cast concrete or cast stone balustrade (Figure 7) which bears directly on the perimeter wall construction (Figure 8). A carved Aquia sandstone cornice with decorative frieze panel sits below the balustrade, bearing on the brick masonry construction at the north and west elevations (Figure 9). The frieze portion is comprised of decorative bracket elements separating fluted panels.

In its current (and historic) configuration, the main elements of the balustrade work with the bracket to balance the eccentric loading of the cornice on the brick masonry bearing wall (Figure 10). The cornice cantilevers out beyond the face of the brick masonry wall, creating this eccentric (out of plane) loading condition. The balustrade assembly, including the solid piers, rail, and base

Figure 5: Sandstone band at base of wall on north elevation.

Figure 6: Sandstone band transitioning to bluestone.

Figure 7: Cast concrete balustrade on west elevation.

serves as a counterweight to the cantilevered cornice stone. The individual bracket elements provide additional support for the cantilevered portion of the cornice. Additional support is assumed to be provided with iron ties connecting the bracket elements to the brick masonry back-up construction. All of these loads are transferred into the load bearing brick masonry bearing wall below.

Window penetrations at the north and west elevations are primarily characterized by carved Aquia sandstone lintels and sills, with later cementitious patches and replacement elements. Decorative carved Aquia sandstone moldings surround the main entry on both the north and west facades, each accessed by a stone staircase.

At the east and south elevations, the brick masonry construction is primarily laid in running bond. A cast concrete coping caps the exterior brick masonry wall construction on these two facades. Window and door penetrations are characterized by steel lintels supporting brick masonry and cast stone elements. Sills at window openings are a mixture of stone and cast concrete elements.

Brick masonry on the rear (east) ell is similarly laid in running bond on the north elevation, transitioning to running bond on the east and south elevations. At lower levels, this transitions to rubble stone elements at its base on all elevations. The north elevation is finished with a cast concrete coping and low cornice which wraps around the east and south

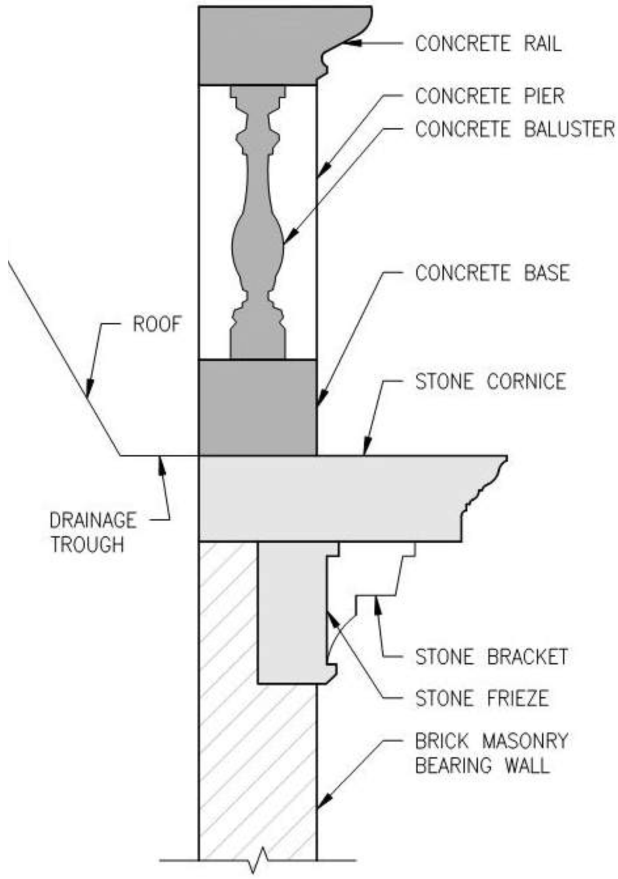


Figure 8: Section showing relationship of balustrade and cornice assemblies

Figure 9: Cornice and frieze detailing, viewed from below.

façades. Window penetrations at the west elevations are primarily characterized by carved Aquia sandstone lintels and sills, with later cementitious patches and replacement elements. At the south elevation, sills at window openings are a mixture of stone and cast concrete elements.

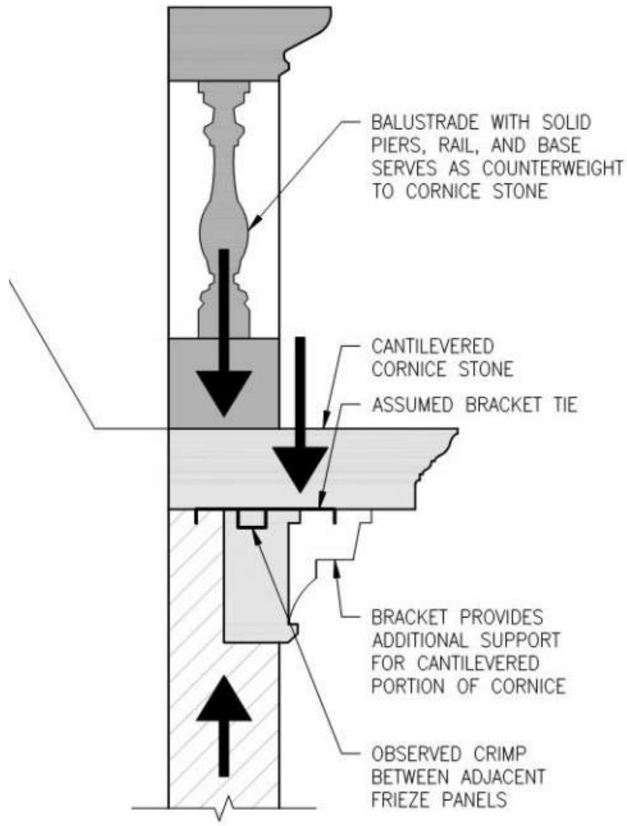


Figure 10: Loading relationship of balustrade, cornice, and brackets.

Balustrade and Coping

As noted above, the cast concrete balustrade characterizes the upper portion of the north and west elevations, with balusters extending between a cast concrete base and a cast concrete railing (Figure 7). The balustrade extends beyond the roof to create a parapet detail on these elevations. Runs of balusters are separated by large cast concrete piers with brick masonry back up. Railing elements are cramped into place at joints and at piers locations (Figure 11). Balusters are a pair of matched cast concrete pieces each with an embedded metal rod joined at their halves with a thin mortar seam. In addition to the rod embedment, the individual balusters appear to be connected through grout pads at each end (Figure 12), although the base connection is not able to be observed due to the existing flashing details. The balustrade assembly bears directly on the stone cornice detailing and brick masonry wall construction below. This balustrade is a replacement element from the 1970s era restoration.

Currently, the concrete rail has large areas of staining and biological growth. At the southern end of the west façade balustrade, two railing stones have shifted inward, away from the wall face, with 1-1/4” movement noted at the southern end (Figure 13). Based on observations, the cramp detail has failed, likely due to corrosion (Figure 14). In this area, visible separation exists between individual balusters and rail elements.

Figure 11: Top side of balustrade assembly, with cramps visible.

Figure 12: Top of baluster grout pad connection to concrete railing, with crimps at balusters.

Figure 13: Rotation of concrete coping away from west elevation.

Several of the balusters are loose and can be easily moved by hand (Figure 15). The paired elements forming the individual balusters are generally held in place via a metal crimp attached to the upper and lower portions of the baluster (Figure 12, above), which was likely added as part of the original installation of this concrete assembly, once deterioration caused separation between baluster faces. These crimps generally exhibit superficial corrosion, and some are loose. More than thirty of the balusters show signs of cracking and separation of the paired elements. Most of the observed cracking in the balusters would be considered significant – with more than half those observed exhibiting deep cracking and separation or spalled concrete (Figure 16 and Figure 17). Generally, where able to be observed, the existing interior metal rods are corroded with significant section loss.

It is likely that the observed cracking in the individual balusters are the result of two main mechanisms occurring in this area. As noted above, a thin joint joins the two halves of the baluster together. This seam appears only partially grouted, allowing water infiltration into the baluster assembly. Additionally, based on observations, the embedded rods in the baluster halves have a very small amount of cover protecting them at both areas of necking (thinning of the baluster) and at the interior joint (Figure 19). The lack of sufficient cover allows for increased opportunity for cracking and spalls, particularly under freeze thaw cycles.

Figure 14: Failed cramp and separation between rail stones at west elevation.

Figure 15: Separation of loose half baluster.

Figure 16: Typical cracking in baluster.

Generally, the concrete piers appear to be in good condition. Due to the existing flashing detail, conditions at the base of the balustrade assembly were unable to be reviewed (Figure 18). Specific conditions of the balustrade assembly observed on site are documented on S301 in the attached Appendix A.

At remaining areas of the roof, the brick masonry is capped by a cast concrete coping stone. Generally, the concrete appears to be in fair condition, with surface staining, biological growth, and loss of mortar at joints (Figure 20).

Recommendations

Loose baluster elements should be removed or stabilized in place in order to minimize falling hazards to the street level.

The balusters and associated connecting elements should be individually repaired or replaced, as required based on the existing condition. Replacement balusters should be detailed with a mechanical attachment to the base of the balustrade assembly. It should be assumed that baluster elements require replacement, in order to remove existing deteriorated and corroded portions of the existing balustrade assembly. This will require removal and replacement of the existing flashing details at the balustrade.

Lost connections at coping stones should be reestablished. The rotated stones should be reset in order to reestablish an appropriate connection and to allow for installation of new crimping elements.

Open joints should be repointed with an appropriate mortar.

Figure 17: Spall at baluster exposing interior metal rod.

Figure 18: Flashing detail at base of balustrade assembly and at base of individual balusters.

Due to the extent of existing deterioration, cracking, and disrepair, consideration should be given to reconstructing the entire balustrade system (and cornice assembly, see discussion below) using new materials.

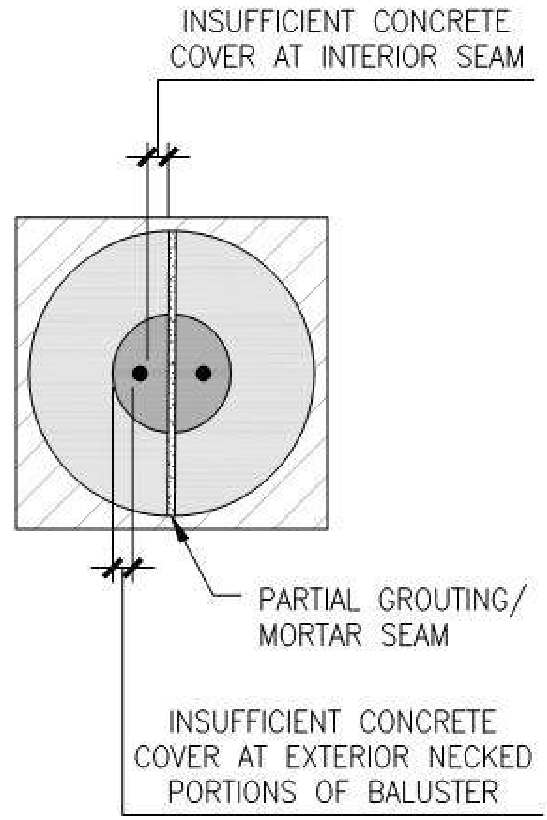


Figure 20: Section at baluster showing relationship to embedded reinforcing.

Figure 19: Loose, missing mortar, in existing coping joint.

Cornice

As discussed above, the stone cornice and frieze create the architectural detail below the existing balustrade assembly. The cornice extends beyond the face of the existing masonry wall construction, transitioning to the frieze, which consists of decorative bracket elements and fluted panels. At the base of the frieze detail, the stone bears on the existing brick masonry wall. Based on observations, the cantilevered stone cornice elements obtain stability from the counterweight of the balustrade above (Figure 10, above). An embedded metal strap or cramp was uncovered at two locations. The cramp appears to connect adjacent frieze and embedded bracket stones within the bed joint below the cornice stones (Figure 21). At the ends of the cornice and frieze detail, the frieze stone turns the corner onto the east and south elevations of the main bank block with a quoin detail. There is evidence of past limewash around the bracket elements of the stonework (Figure 22).

Generally, the stone is in poor condition, with large areas of section loss, stone exfoliation, staining, weathering, and stone spalling (Figure 23 and Figure 24). Areas of the stonework exhibit signs of efflorescence, salt deposits left behind on the surface of the stone from water. Large portions of the frieze and cornice have lost architectural detailing due to these sources of deterioration. When sounded, portions of the cornice and frieze detail are hollow or unsound, which indicates that there is section loss behind the exterior face of the stone. Some areas of

Figure 21: Remnants of iron tie at removed stone.

Figure 22: Remnants of historic limewash on face of bracket.

Figure 23: Loss of bracket, signs of exfoliation, and past patching efforts at bracket location.

the west cornice detail have signs of previous patching efforts on the stone masonry. At the west elevation, several of the stone brackets were replaced with a replacement stone or cast concrete bracket which were set by cutting out the stonework, placing the concrete bracket, and placing mortar between the joints (Figure 25). It is unknown if any pinning was used to anchor the replacement brackets into the substrate. Areas of the cornice, particularly along the west elevation, have signs of significant cracking in the stone masonry (Figure 26). Some of these cracks appear to have been previously repointed, while others appear to have opened following past repair campaigns. Specific locations of conditions noted on site are documented on S301 of the attached Appendix A.

At the north elevation, discrete areas of the stone cornice and frieze were noted to be loose (Figure 27). In three areas of the north elevation, loose stone was removed from the building in order to limit falling hazards (Figure 21 and Figure 28). These locations are noted in S301 in Appendix A. Where material was removed from the stone detailing, the historic metal anchors were observed to be corroded, with significant cross-sectional loss (Figure 21, above). The remaining stone in areas of removal had damp feeling surfaces, indicating that water infiltrates the stone detailing, either through gaps in the existing flashing or by infiltrating through the stone, roof, or wall surfaces. Remnants of stone removed from the structure were given to the Owner.

Figure 24: Stone flaking and past patching efforts at southwest cornice detail.

Figure 25: Replaced bracket detail at west elevation.

Figure 26: Stone with open cracks and cracks with some evidence of past repointing.

Recommendations

Existing open cracks should be repaired and repointed with an appropriate mortar.

Loose material and spalls should be removed from the surface of the stone, including surface contaminates such as salts, or stabilized in place. The removal process should include comprehensive sounding to assure delaminating stone material is not left in place. Remaining stone should be dressed to allow water to shed from the surface. Dressing refers to the process of working or shaping stone into a desired shape.

Figure 27: Loose stone at north frieze detail noted prior to removal.

Figure 28: Area of removed stone at north elevation frieze detail.

Consideration should be given to coating the existing stone with an appropriate breathable coating, such as limewash. Such a coating would have been typical for this stone historically and would help protect the surface of the material. It is important that any coating on this type of stone be breathable to allow for appropriate movement of water through the material. In addition, given the combined ongoing mechanisms of deterioration in both the stone itself and with embedded metal straps, a long-term solution of doing a full reconstruction of the cornice should be considered. The need to deconstruct and repair or rebuild the balustrade and its integral flashing may be another impetus to address the cornice and balustrade as a combined project.

Lintels and Sills

As noted above, the north and west elevations primarily are characterized by original stone lintel and sill elements, with some later patching and cast concrete replacement. The south and east elevations, in contrast, are characterized by replacement steel lintels with brick and stone detailing and cast concrete sill construction.

Stone and Concrete Lintels and Sills at North and West Elevations

The stone lintels and sills on the west elevation generally appear to be in fair condition, although isolated areas of deterioration were noted, particularly at the existing third floor lintels. More significant signs of deterioration were noted on the north elevation. A majority of the original stone lintels and sills have been previously patched to recreate some amount of surface detailing at the stone lintels (Figure 29). Where stone elements have been replaced with concrete, it is generally cast concrete with an exposed aggregate finish (Figure 30). In some areas, replacement concrete elements were observed to have a parge coat or similar applied surface finish, generally to aid in water runoff. Observed conditions are summarized on S201 and S202 of Appendix A.

When sounded, most of the stone and surrounding patch appears hollow or unsound (Figure 31). On observation, many of the patches on existing lintels appear to be failing. There is evidence of cracking, generally on the underside of lintels (Figure 32), but also on the face of

Figure 29: Typical stone lintel with patching.

Figure 30: Typical replacement concrete sill with cementitious parging at topside.

Figure 31: Sounding stone and patches at existing sill. Cracking in sill at edge of patching material.

some lintels (Figure 33). It is possible that these cracks are opening at previous areas of disrepair which the patching material covered over. Some spalling of the patching material, stone, and concrete was observed, particularly on the north elevation. Several sills and some lintels at the north elevation were observed to have surface staining or biological growth (Figure 34).

At multiple locations, the keystone of the original stone lintel was observed to have slipped downward (Figure 35). This likely did not occur recently as a caulk patch material was observed in brickwork above the stone lintel. This observed movement minimizes the ability of the stone elements to properly support the load above over the existing opening by altering how the individual stones work together as a lintel element. Over time, this can affect the existing window or door frame by transferring loads directly into the frame where the lintel is unable to carry loads to adjacent masonry construction. Some evidence of this was observed, with localized crushing of wood window frame elements.

Recommendations

Existing open cracks should be repaired and repointed with an appropriate mortar.

Loose material and spalls should be removed from the surface of the stone, including surface contaminates such as salts or stabilized in place.

Hollow sounding stone and patches should be resounded and removed if deemed likely to fail again in the near future.

Figure 32: Cracking at underside of patched stone lintel.

Figure 33: Cracking at face of patched stone lintel.

Figure 34: Surface staining and failing patching at stone lintel.

Timeframes for repair durations versus likelihood of reemerging failures should inform ultimate repair approach.

Once loose material is removed, consideration should be given to coating the existing stone with an appropriate breathable coating, such as limewash. Such a coating would have been typical for this stone historically and would help protect the surface of the material. It is important that any coating on this type of stone be breathable, to allow for appropriate movement of water through the material. Alternatively, and for the best long-term repair, consideration should be given to full replacement of the stone lintels with new stone or cast stone that is selected for aesthetic compatibility and greatest durability.

Where keystones have slipped from their original bearing location, stone lintel elements should be carefully disassembled and reset to reestablish and appropriate load path.

Steel Lintels at South and East Elevations

At the east and south elevations, where most openings were created or restored as part of the 1970s era work, existing lintels were observed to be steel with brick and stone elements to create the appearance of a traditional arched brick opening (Figure 36). The lintels were observed to generally appear in good condition, with few signs of surface staining or other deterioration. Observed conditions are summarized on S202 and S203 in Appendix A.

Figure 35: Slipped keystone in stone lintel on north elevation.

Figure 36: Typical modern lintel configuration at south and east elevations.

Figure 37: Recent repointing at steel lintel bearing, indicating rust jacking.

At the basement level opening to the southeast addition at the east elevation, the existing steel lintel shows signs of rust jacking and previous masonry repair (Figure 37). Rust jacking occurs when steel lintels expand as a result of corrosion, which results in uplifting or jacking the surrounding masonry. This is typically most evident at bearing ends of the steel lintel, which would have cracking and other signs of distress in the masonry construction.

Figure 38: Typical modern cast concrete sill on south and east elevations.

Recommendations

The existing steel lintel at the basement entry should be cleaned and repainted with a rust inhibiting paint.

Concrete Sills at South and East Elevations

At the east and south elevations, where most openings were created or restored as part of the 1970s era work, existing sills were observed to be cast concrete (Figure 38). The sills were observed to generally appear in good condition, with few signs of surface staining or other deterioration.

Recommendations

No specific conditions which require repair were noted at this time.

Brick Masonry

The existing brick masonry construction, as noted above, is laid in a Flemish bond on the north and west elevations and in running bond on the south and east elevations. There are large areas of the masonry construction, particularly on the south and east elevations, where brick infill exists as a result of the removal of the former hotel structure in the 1970s. As a result, large sections of the masonry on those two elevations are replacement brick, particularly at existing window openings. Generally, the historic masonry on the north and west elevations remains intact, with some localized areas of replacement brick observed, particularly on the west elevation. Observed conditions in the brick masonry are shown in S200 through S203 of Appendix A.

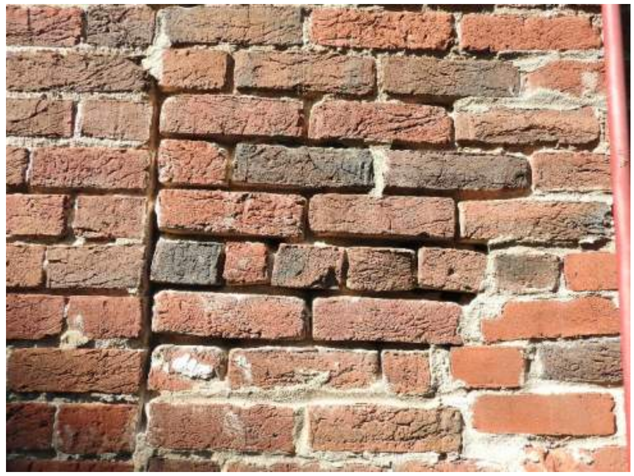


Figure 39: Area of masonry construction with open mortar joints.

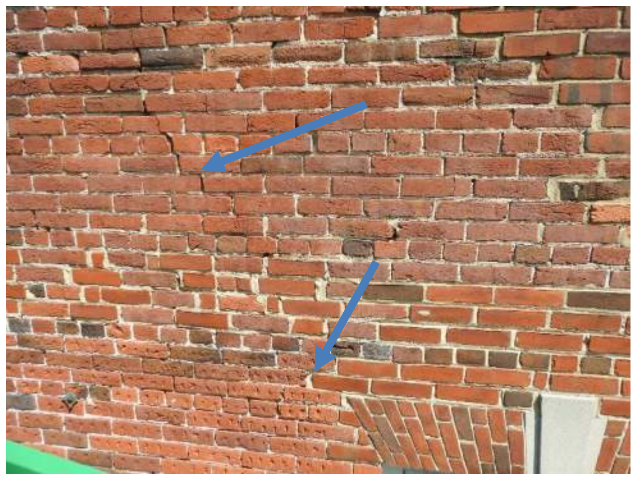


Figure 40: Existing cracking above window opening at south elevation.

Figure 41: Spalled, missing bricks, and active biological growth.

Where able to be observed in detail, the brick appears to be in relatively good repair, although localized areas of deterioration were noted. Observed deterioration is primarily in the form of open mortar joints, with large zones of mortar loss observed on the north elevation and more concentrated areas observed on the remaining elevations (Figure 39). Localized cracking was observed in the brick masonry at all elevations (Figure 40) and at the backside of the existing chimney construction, as observed from the roof. Some of this cracking appears to correlate with the perimeter of reconstructed brick at the south and east elevations. Locally, some bricks were spalled, loose, or missing, and some areas of active biological growth were noted (Figure 41). At one area of the south east addition, there is a visible separation between planes of brick (Figure 42). It is unclear whether this occurred during the construction of this area or due to past movement, but it does not appear to be an active source of distress.


Figure 42: Separation in existing brick construction.

Recommendations

Existing masonry should be cleaned and repointed with an appropriate mortar, compatible with the historic brick units. Existing cracks should be cleaned and pointed. Once repaired, cracks should be visually monitored for signs of recurring movement.

Spalled and missing bricks should be removed and replaced with appropriate replacement bricks or stabilized in place.

Stone Base

The brick masonry transitions to a stone base at the north and west elevations (Figure 43), as noted above, with areas of stonework also visible on the south and east elevations. At the north and west elevations, the stone consists of an Aquia sandstone band which transitions to bluestone near grade. It appears that some stones may have been replaced with a new stone where particularly deteriorated. These stones are likely a Briar Hill Sandstone, an accepted replacement material, as the historic Aquia sandstone is no longer quarried. At the south and east elevations, only areas of bluestone or granite were observed (Figure 44).

At the north and west elevations, the sandstone shows signs of significant deterioration. Observed conditions are summarized in sheets S100 through S104 and S 201 and 1/S201 in Appendix A. It appears large portions of the stone face have been lost, either through spalls or flaking of the dressed stone face (Figure 45 and Figure 46). There are areas of voids in the stone construction, with some voids greater than 1” deep. Several areas where there has been section loss correspond with the locations of embedded iron ties, lintels, and grates. It appears that with long-term moisture infiltration into the stonework, the iron ties have corroded, causing cracking and spalls in the sandstone (Figure 47). When sounded, many areas of the sandstone appear to be hollow or unsound. Of additional concern, multiple stones were noted to have been originally placed

Figure 43: Typical sandstone band transitioning to bluestone on north elevation.

Figure 44: Granite at base of brick on south elevation.

Figure 45: Existing spall at north face.

with their bedding planes oriented such that when the stones are loaded entire planes of the stone can shear off or similar damage can occur.

Generally, the existing mortar joints appear to be open. There are many areas of existing cracks in the stonework (Figure 48). Some of the cracks and joints have been infilled with a caulking or sealant. Cracking allows for water penetration into the stone. This, in conjunction with freeze-thaw cycles and the corrosion of embedded anchors noted above, causes the observed spalling in the stone. An additional contributing factor to the deterioration is the salt deposits on the masonry construction – such deposits were observed up to seven feet from grade, which is generally above the stone coursing. Large areas of stonework were observed to have surface staining from biological growth or other deposits (Figure 49).

Generally, the bluestone and granite construction appears in good condition on all elevations with the exception of open mortar joints noted on all elevations with bluestone or granite.

Recommendations

Existing masonry should be cleaned and repointed with an appropriate mortar. Existing cracks should be cleaned and pointed.

Loose material and spalls should be removed from the surface of the stone, including surface contaminates such as

Figure 46: Flaking face of stonework.

Figure 47: Spall at embedded iron tie.

Figure 48: Cracking in stonework.

salts, or stabilized in place. Remaining stone should be dressed to allow water to shed from the surface.

Consideration should be given to coating the existing sandstone with an appropriate breathable coating, such as limewash. Such a coating would have been typical for this stone historically and would help protect the surface of the material. It is important that any coating on this type of stone be breathable, to allow for appropriate movement of water through the material.

The use of deicing salts should be limited around the existing stonework. An alternative method of snow and ice removal should be considered.

Figure 49: Surface staining from biological growth and previously caulked joints.

Stone Stairs and Entries

The two main entries on the north and west elevations are accessed via decorative stone staircases (Figure 50) and a decorative stone surround at each doorway (Figure 51). The outside stone face of each of these staircases has been covered with a stucco or similar cementitious coating. Some past patching exists at the entry surrounds. Based on historic photographs, the patching and stair stucco finish was added as part of the 1970s work over the historic stonework.

Figure 50: North stair construction with stucco coating.

Cracking is present in the face of the stucco parging and throughout the exposed stone surrounds. It is possible that cracking observed in the stucco parging (Figure 52) mimics preexisting or new cracks in the stonework beneath. Biological growth and staining exist at both the stair construction and the stone surrounds (Figure 53). The stone at the door surrounds, particularly at the north entry, is significantly deteriorated, with large areas exhibiting section loss in the form of spalls and flaking (Figure 54).

Figure 51: Stone surround at north entry.

Recommendations

Existing masonry should be cleaned and repointed with an appropriate mortar. Existing cracks should be cleaned and pointed.

Loose material and spalls should be removed from the surface of the stone, including surface contaminates such as salts, or stabilized in place. Remaining stone should be dressed to allow water to shed from the surface.

Consideration should be given to coating the existing stone with an appropriate breathable coating, such as limewash. Such a coating would have been typical for this stone historically and would help protect the surface of the material. It is important that any coating on this type of stone be breathable, to allow for appropriate movement of water through the material.

The use of deicing salts should be limited around the existing stonework. An alternative method of snow and ice removal should be considered.

Figure 52: Cracking and loss of finish coat in stucco.

Figure 53: Typical surface staining at stair.

Figure 54: Stone deterioration at north stone surround.

Other Architectural Elements

While the focus of this survey was on the existing stone and brick masonry elements, 1200AE did observe some other areas of deterioration, noted as follows.

Windows and Window Frames

The existing windows at the original structure generally consist of a 6-pane over 6-pane double-hung wood framed window. Typically, window muntins were observed to have evidence of past epoxy repair, surface staining, and mold growth, particularly at the north and west elevations (Figure 55). Wood window frame elements were observed to have section loss, rot, and other signs of wood deterioration which has been largely obscured by existing paint. Individual panes of glass were observed to be loose or cracked, with some removed for installation of exterior mounted cooling systems.

Recommendations

A detailed survey of the existing windows and window frames should be completed by an architect or architectural conservator, in order to better document and understand the extent of deterioration to these elements and to recommend specific repair or replacement methods.

Cast Iron Railings

Attached to the two historic exterior stairs are cast iron railing elements embedded into the stonework (Figure 56), providing a guard at the edge of the stair construction. Localized areas of section loss near embedment points in the stone

Figure 55: Loose windowpane, muntins with mold growth.

Figure 56: Typical railing embedment at stone treads.

Figure 57: Observed gap at roof terrace gutter system.

masonry due to corrosion of the railing elements was observed.

Recommendations

While some section loss in the railings was observed, it is minimal. It appears that the railings have been recently repainted, and no specific repairs are recommended at this time.

Drainage and Gutter Systems

At the main bank block, the primary roof drainage is through a rooftop drainage system which slopes to the rear (east) end of the block. Water is removed from the roof level by two downspouts, placed at the northeast and east ends of the structure. The east downspout extends to below the terrace at the southeast addition; it is not clear where the terrace drains away from the structure. At the rear ell to the east of the main bank block, the rooftop terrace drains to the south end of the structure and is serviced by a single downspout.

Based on discussion with current tenants, both the rooftop terrace and the grade level terrace have issues with water penetrating into interior spaces. The existing gutter from the rear ell rooftop terrace has visible gaps and separation from the structure (Figure 57), which allows for water runoff from the intended drainage system.

Recommendations

Positive drainage away from the structure should be maintained, in order to limit stone and brick masonry deterioration and sources for biological growth and staining.

Existing waterproofing membranes at the rooftop terrace and grade level terrace should be examined to ensure that there are no existing openings or other opportunity for leaks which allow water infiltration to interior spaces. 1200AE recommends this be reviewed by an architect or exterior envelope specialist, perhaps in coordination with the recommended window assessment.

Conclusions and Recommendations

As a result of the observed conditions at the façade of the Bank of Alexandria building, focusing on the Aquia sandstone and brick masonry elements of the structure, 1200AE offers the following prioritized repair recommendations, summarizing the repair recommendations made above relative to each portion of the façade.

Immediate Life Safety

Balustrade

The balustrade, in particular the individual balusters that support the rail units, were found to be in poor condition in general and many had significant cracks and loose materials. The embedded steel and detailing in the balusters create an ongoing mechanism of deterioration. The present conditions warrant stabilization within the next few months, prior to winter.

Stabilization may take the form of localized confinement of loose material or selective removals. Baluster removals should be done in accordance with recommendations from a structural engineer to assure the rail is not destabilized.

Façade

The lift survey performed on April 23 through April 26 included an active removal of apparent loose materials. Given the nature of ongoing material deterioration mechanisms, no guarantee can be made that new, loosened conditions will not emerge in the short term. However, within this inherent limitation to discern all incipient failures that may develop over time on the masonry façade, we feel the recent stabilization efforts offer a sufficient reduction in risk to allow time to develop designs and begin implementation of repairs as noted below.

Design of Repairs

The condition of the façade, particularly the stone elements and balustrade components, was found to be fair to poor overall. The current survey and some recommended short-term stabilization of the balustrade will buy some time where risks can be reduced to an acceptable level, however the presence of multiple, interrelated deterioration mechanisms will quickly result in a resumed increase in risk of masonry falling from the façade. The observed ongoing mechanisms include the following:

Balustrade

- Rusting of embedded steel in balusters with cracking and delamination of surrounding concrete.
- Water penetration through the rail and balusters into the masonry cornice and wall below.

Cornice

- Deterioration of Aquia Sandstone due to nature of stone and water penetration with incipient delamination over time
- Rusting of embedded iron cramps within the masonry construction and the resultant damage due to expansive forces.

Stone Lintels

- Deterioration of Aquia Sandstone due to nature of stone and water penetration with incipient delamination over time

Stone Base

- Deterioration of Aquia Sandstone due to nature of stone and water penetration with incipient delamination over time
- Rusting of embedded iron cramps, lintel embedments, and iron security grating anchorages within the masonry construction and the resultant damage due to expansive forces.

Stabilization measures may be performed to limit risks and perhaps slow the mechanisms of deterioration, however, the duration of these repairs will be unpredictable. At some point a more comprehensive preservation project that considers significant stone replacement should be performed. Addressing the conditions comprehensively at one time is the most economical approach to the repairs in the long term, however immediate budget limitations may preclude that approach. Performing short-term stabilization measures of isolated components may lead to larger and sustained costs and may even result in having to redo work because of the interrelated nature with other components. Stringing together stabilizing preservation efforts has been the approach to date – a reasonable and good-faith approach when working with limited budgets. However, each iteration inevitably results in more and more loss of original building material.

A comprehensive repair design will require input from a full breadth of preservation and design expertise. The mechanisms noted above inevitably relate to water intrusion into the masonry façade, which is apparently coming both from above and from the exterior elevations. Working from top down, the deterioration of the balustrade stems from water intrusion and the replacement and repair of balusters will involve the waterproofing and highly detailed flashing work. The balustrade itself serves as the counterweight for the cornice, so temporary disassembly of the balustrade will require careful review of its role in the stability of the cornice. And, likewise, significant repairs to the cornice, particularly at the depth of embedded iron found in this investigation, will require disturbance to the balustrade. The presence of the cornice serves to limit moisture directly hitting the façade, so maintaining this significant component is both of aesthetic and technical importance. The presence of moisture on the facade, even though reduced by the presence of the cornice, has resulted in continued deterioration of the stone components below.

We feel that a design team including an architect, a structural engineer and a conservator will serve the building and the owners best for the long term. A comprehensive approach by a full design team can address the following:

- Establish project goals with the owner.
- Assess exterior envelope issues, including windows and roofing, and their relationship to the façade conditions.
- Evaluate pros and cons of short-term stabilization with comprehensive repair with a cost analysis.
- Establish preservation priorities, perhaps through an initial historic structures report. Work in this phase could include documentation by laser scanning and direct measurement of the small portions of fully intact cornice.

Recommended repair and restoration efforts for the exterior façade include the following, relative to each area of the structure:

Balustrade

- Loose baluster elements should be removed or stabilized in place in order to minimize falling hazards to the street level.
- The balusters and associated connecting elements should be individually repaired or replaced, as required based on the existing condition. Replacement balusters should be detailed with a mechanical attachment to the base of the balustrade assembly. It should be assumed that baluster elements require replacement, in order to remove existing deteriorated and corroded portions of the existing balustrade assembly. This will require removal and replacement of the existing flashing details at the balustrade.
- Lost connections at coping stones should be reestablished. The rotated stones should be reset in order to reestablish an appropriate connection and to allow for installation of new crimping elements.
- Open joints should be repointed with an appropriate mortar.
- Due to the extent of existing deterioration, cracking, and disrepair, consideration should be given to reconstructing the entire balustrade system (and cornice assembly, see discussion below) using new materials.

Cornice

- Existing open cracks should be repaired and repointed with an appropriate mortar.
- Loose material and spalls should be removed from the surface of the stone, including surface contaminates such as salts, or stabilized in place. The removal process should include comprehensive sounding to assure delaminating stone

material is not left in place. Remaining stone should be dressed to allow water to shed from the surface. Dressing refers to the process of working or shaping stone into a desired shape.

- Consideration should be given to coating the existing stone with an appropriate breathable coating, such as limewash. Such a coating would have been typical for this stone historically and would help protect the surface of the material. It is important that any coating on this type of stone be breathable to allow for appropriate movement of water through the material. In addition, given the combined ongoing mechanisms of deterioration in both the stone itself and with embedded iron straps, a long-term solution of doing a full reconstruction of the cornice should be considered. The need to deconstruct and repair or rebuild the balustrade and its integral flashing may be another impetus to address the cornice and balustrade as a combined project.

Lintels and Sills

- Existing open cracks should be repaired and repointed with an appropriate mortar.
- Loose material and spalls should be removed from the surface of the stone, including surface contaminates such as salts or stabilized in place.
- Hollow sounding stone and patches should be resounded and removed if deemed likely to fail again in the near future. Timeframes for repair durations versus likelihood of reemerging failures should inform ultimate repair approach.
- Once loose material is removed, consideration should be given to coating the existing stone with an appropriate breathable coating, such as limewash. Such a coating would have been typical for this stone historically and would help protect the surface of the material. It is important that any coating on this type of stone be breathable, to allow for appropriate movement of water through the material. Alternatively, and for the best long-term repair, consideration should be given to full replacement of the stone lintels with new stone or cast stone that is selected for aesthetic compatibility and greatest durability.
- Where keystones have slipped from their original bearing location, stone lintel elements should be carefully disassembled and reset to reestablish and appropriate load path.
- The existing steel lintel at the basement entry should be cleaned and repainted with a rust inhibiting paint.

Brick Masonry

- Existing masonry should be cleaned and repointed with an appropriate mortar, compatible with the historic brick units. Existing cracks should be cleaned and pointed. Once repaired, cracks should be visually monitored for signs of recurring movement.

- Spalled and missing bricks should be removed and replaced with appropriate replacement bricks or stabilized in place.

Stone Base

- Existing masonry should be cleaned and repointed with an appropriate mortar. Existing cracks should be cleaned and pointed.
- Loose material and spalls should be removed from the surface of the stone, including surface contaminates such as salts, or stabilized in place. Remaining stone should be dressed to allow water to shed from the surface.
- Consideration should be given to coating the existing sandstone with an appropriate breathable coating, such as limewash. Such a coating would have been typical for this stone historically and would help protect the surface of the material. It is important that any coating on this type of stone be breathable, to allow for appropriate movement of water through the material.
- The use of deicing salts should be limited around the existing stonework. An alternative method of snow and ice removal should be considered.

Stone Stairs and Entries

- Existing masonry should be cleaned and repointed with an appropriate mortar. Existing cracks should be cleaned and pointed.
- Loose material and spalls should be removed from the surface of the stone, including surface contaminates such as salts, or stabilized in place. Remaining stone should be dressed to allow water to shed from the surface.
- Consideration should be given to coating the existing stone with an appropriate breathable coating, such as limewash. Such a coating would have been typical for this stone historically and would help protect the surface of the material. It is important that any coating on this type of stone be breathable, to allow for appropriate movement of water through the material.
- The use of deicing salts should be limited around the existing stonework. An alternative method of snow and ice removal should be considered.

Windows and Window Frames

- A detailed survey of the existing windows and window frames should be completed by an architect or architectural conservator, in order to better document and understand the extent of deterioration to these elements and to recommend specific repair or replacement methods.

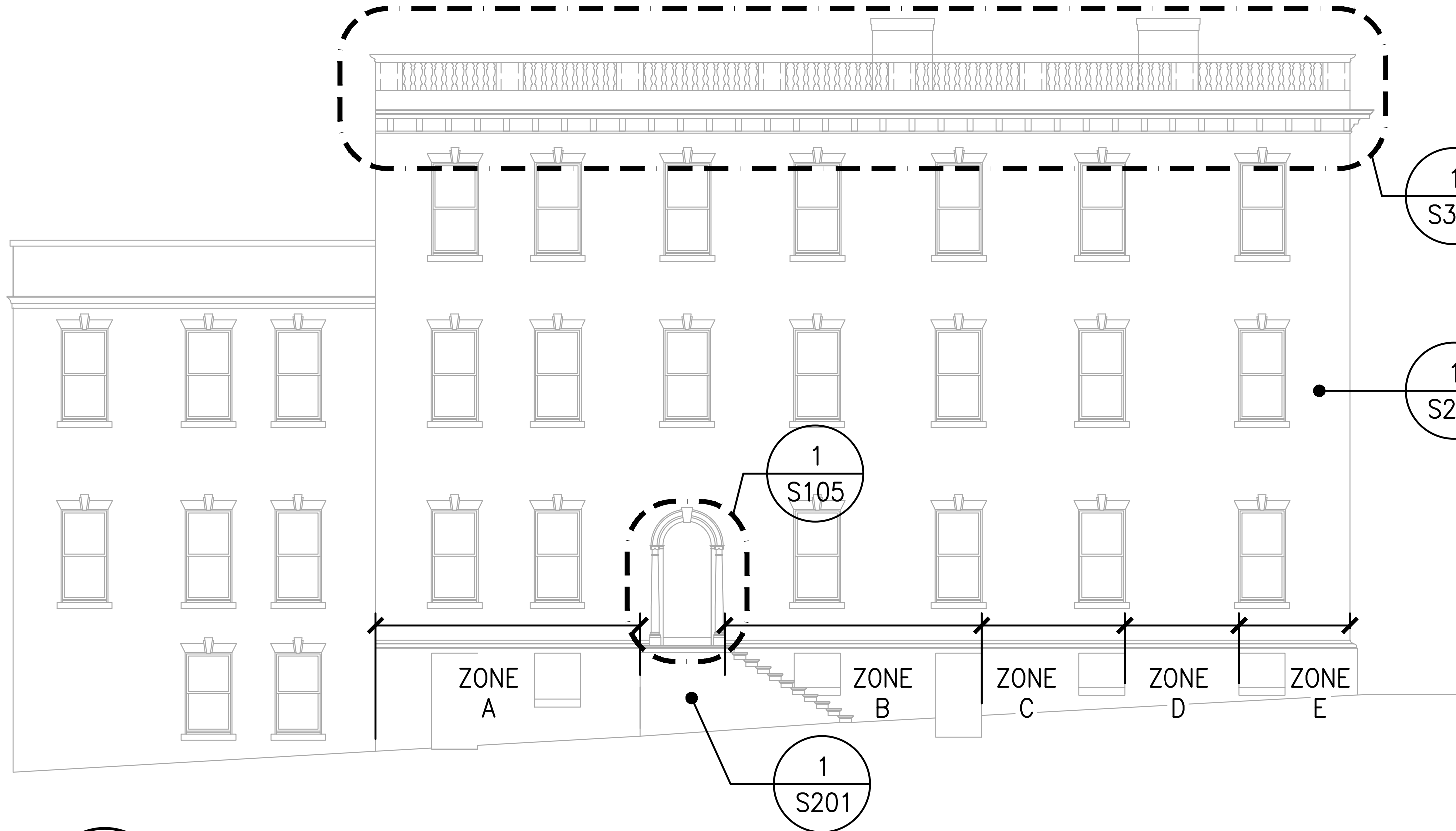
Drainage and Gutter Systems

- Positive drainage away from the structure should be maintained, in order to limit stone and brick masonry deterioration and sources for biological growth and staining.
- Existing waterproofing membranes at the rooftop terrace and grade level terrace should be examined to ensure that there are no existing openings or

other opportunity for leaks which allow water infiltration to interior spaces. 1200AE recommends this be reviewed by an architect or exterior envelope specialist, perhaps in coordination with the recommended window assessment.

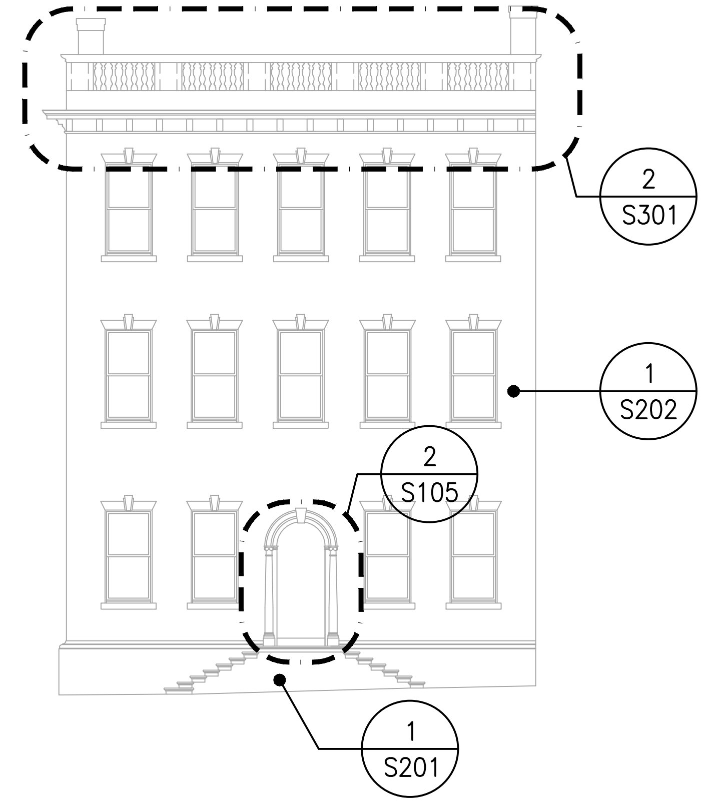
Appendix A: Existing Conditions Drawings

Drawings summarizing observations of existing conditions made during the site investigation of the exterior façade.



1 / S000 **KEY - NORTH ELEVATION**

SCALE: N.T.S.

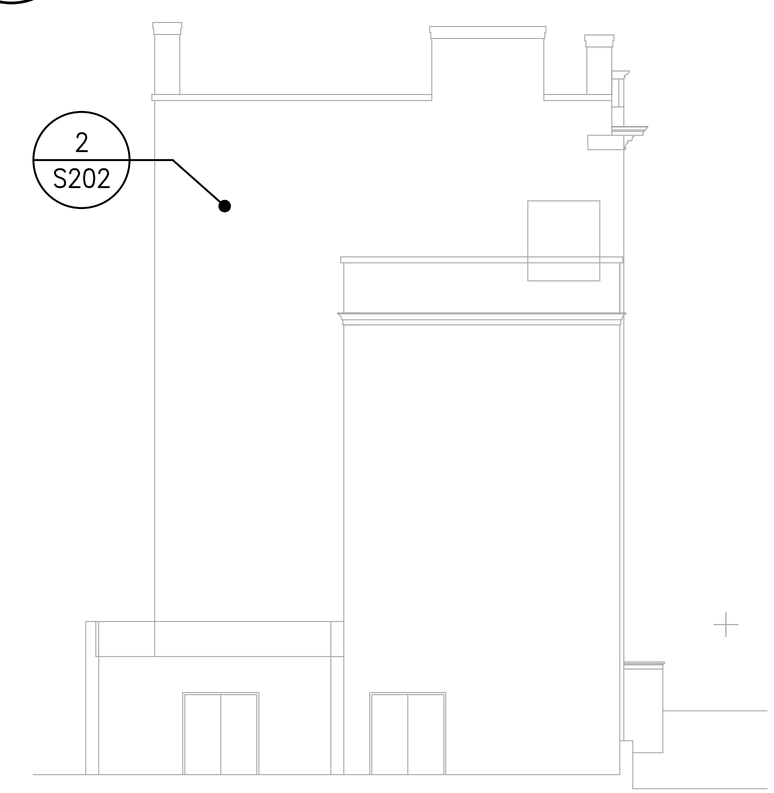


2 / S000 **KEY - WEST ELEVATION**

SCALE: N.T.S.

3 / S000 **KEY - NORTH ELEVATION**

SCALE: N.T.S.



4 / S000 **KEY - WEST ELEVATION**

SCALE: N.T.S.

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S000

EXISTING CONDITIONS – STONEWORK AT BASE OF NORTH ELEVATION

		APPROXIMATE AREA (SF) / LENGTH (LF)								
KEY	DESCRIPTION OF DETERIORATION	ZONE A	ZONE B	ZONE C	ZONE D	ZONE E	1/S105	2/S105	TOTAL	RECOMMENDATIONS
	AREA OF LOSS/SPALLED STONE FACE (DEPTH BETWEEN 1/2" AND 3/4")	25.30	0	4.3	6.3	12.4	4.6	0	52.9	DRESS STONE TO ALLOW FOR POSITIVE WATER DRAINAGE.
	AREA OF FLAKING STONE FACE	0.8	2.1	0.8	2.1	1.4	0	0	7.2	REMOVE EXISTING LOOSE MATERIAL
	AREA OF VOID IN STONE FACE (DEPTH GREATER THAN 1")	2.2	0.7	4.9	0.4	0.3	0.3	0.6	9.4	DRESS STONE TO ALLOW FOR POSITIVE WATER DRAINAGE.
	AREA OF WEAK/HOLLOW SOUNDING STONE FACE	12.1	4.2	2.7	1.4	0	0	0	20.4	MONITOR FOR NEW SPALLS OR SECTION LOSS.
	AREA OF PREVIOUS FAILING CONC. INFILL OR PARGING	2.7	1.0	2.3	0	3.4	0.3	0	9.7	REMOVE EXISTING LOOSE MATERIAL
	EXCESSIVE FLAKING, DETERIORATION	0	2.3	4.0	0	0	0	0	6.3	REMOVE EXISTING LOOSE MATERIAL
	CRACK	46.0	2.5	24.5	22.5	26.5	21.0	3	146.0	REPAIR AND REPOINT EXISTING OPEN CRACKS
	CRACK W/ FAILING CAULKING	6.0	10.5	5.0	2.0	6.0	0	0	29.5	REMOVE CAULKING. REPAIR AND REPOINT EXISTING OPEN CRACKS.
	STONE JOINT W/ FAILING CAULKING	39.0	35.5	10.0	17.5	10.0	6.5	14.0	132.5	REMOVE CAULKING. REPOINT EXISTING OPEN JOINTS.

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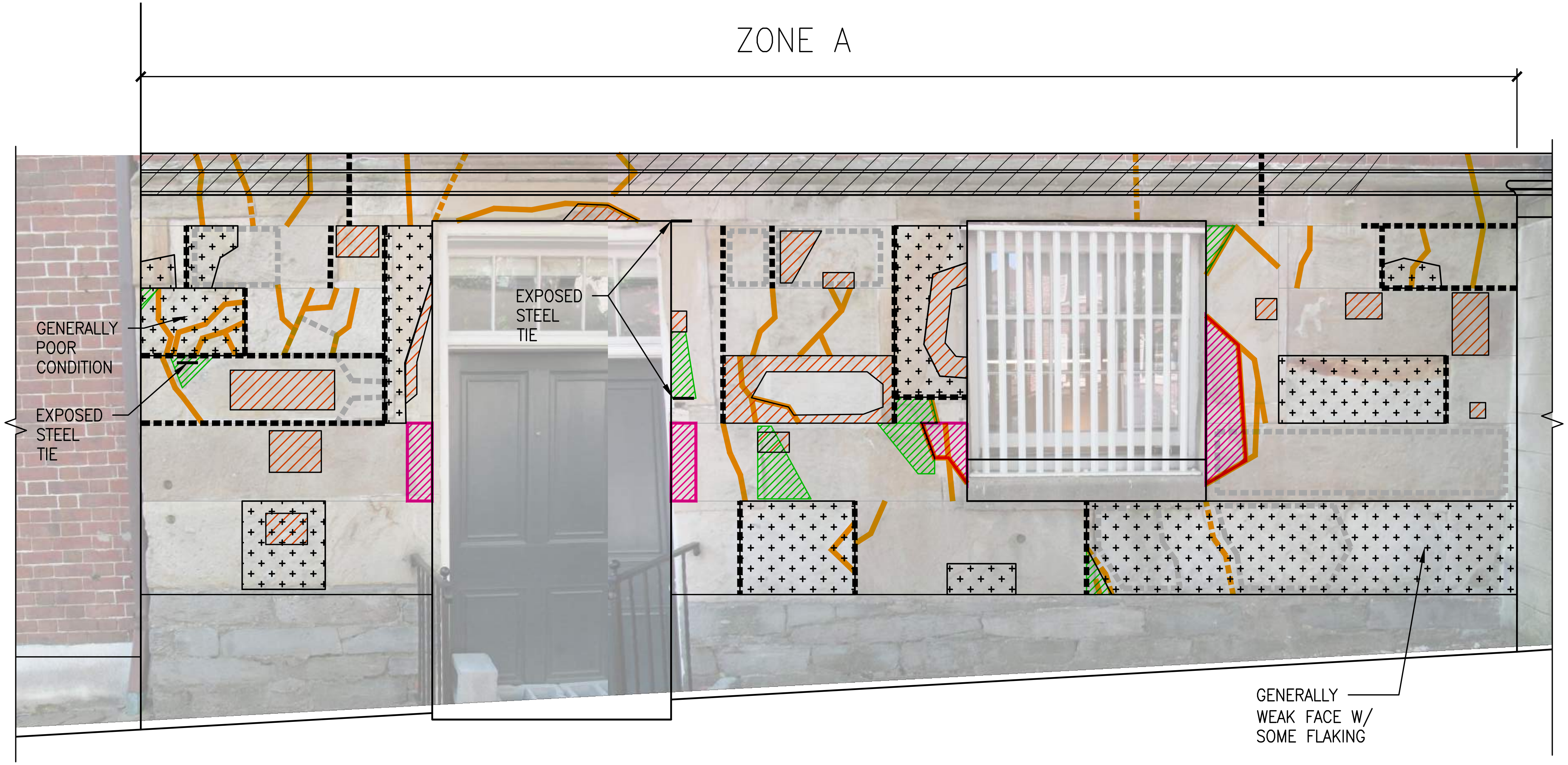

1
S101
STONE CONDITIONS – NORTH ELEVATION, ZONE A
SCALE: 1/2"=1'–0"

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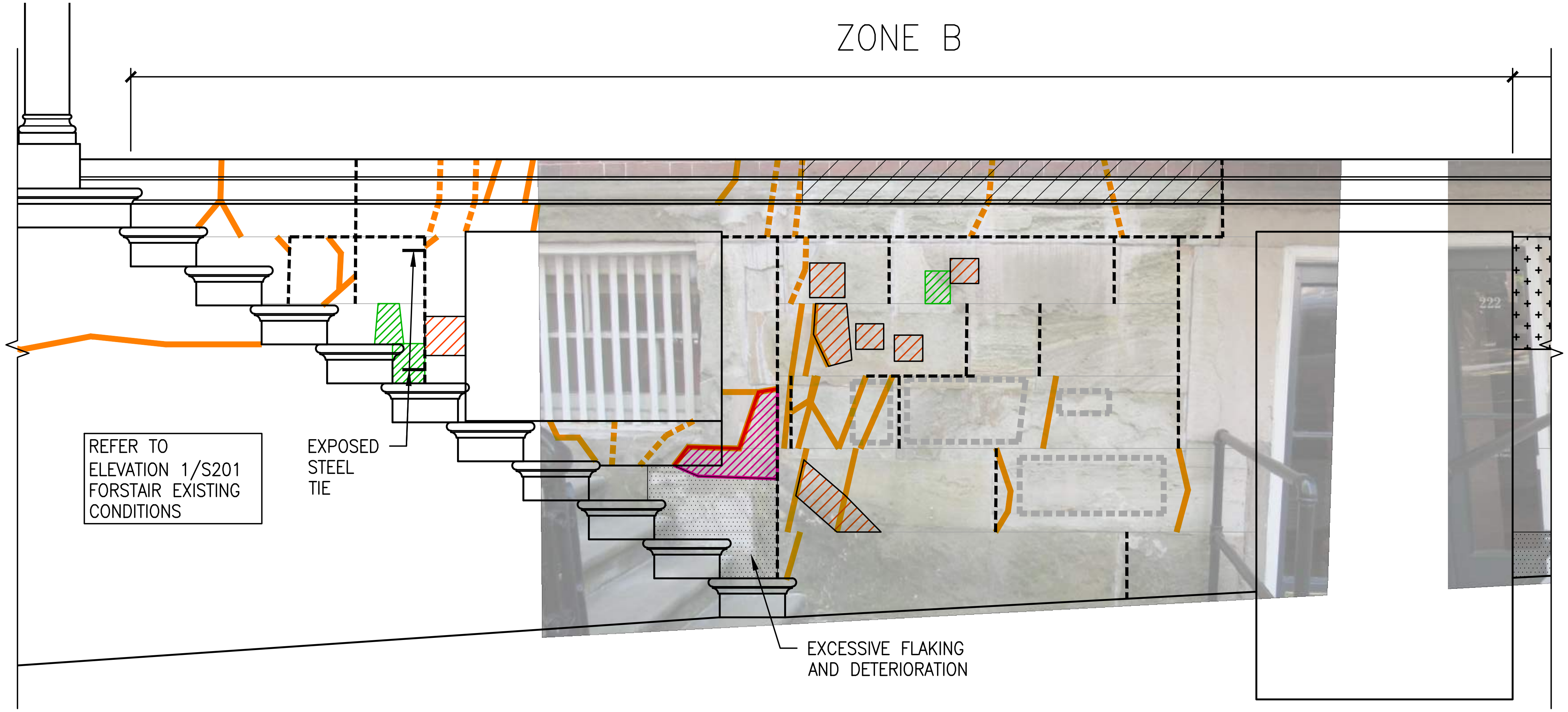

1
S102
STONE CONDITIONS – NORTH ELEVATION, ZONE B
SCALE: 1/2"=1'–0"

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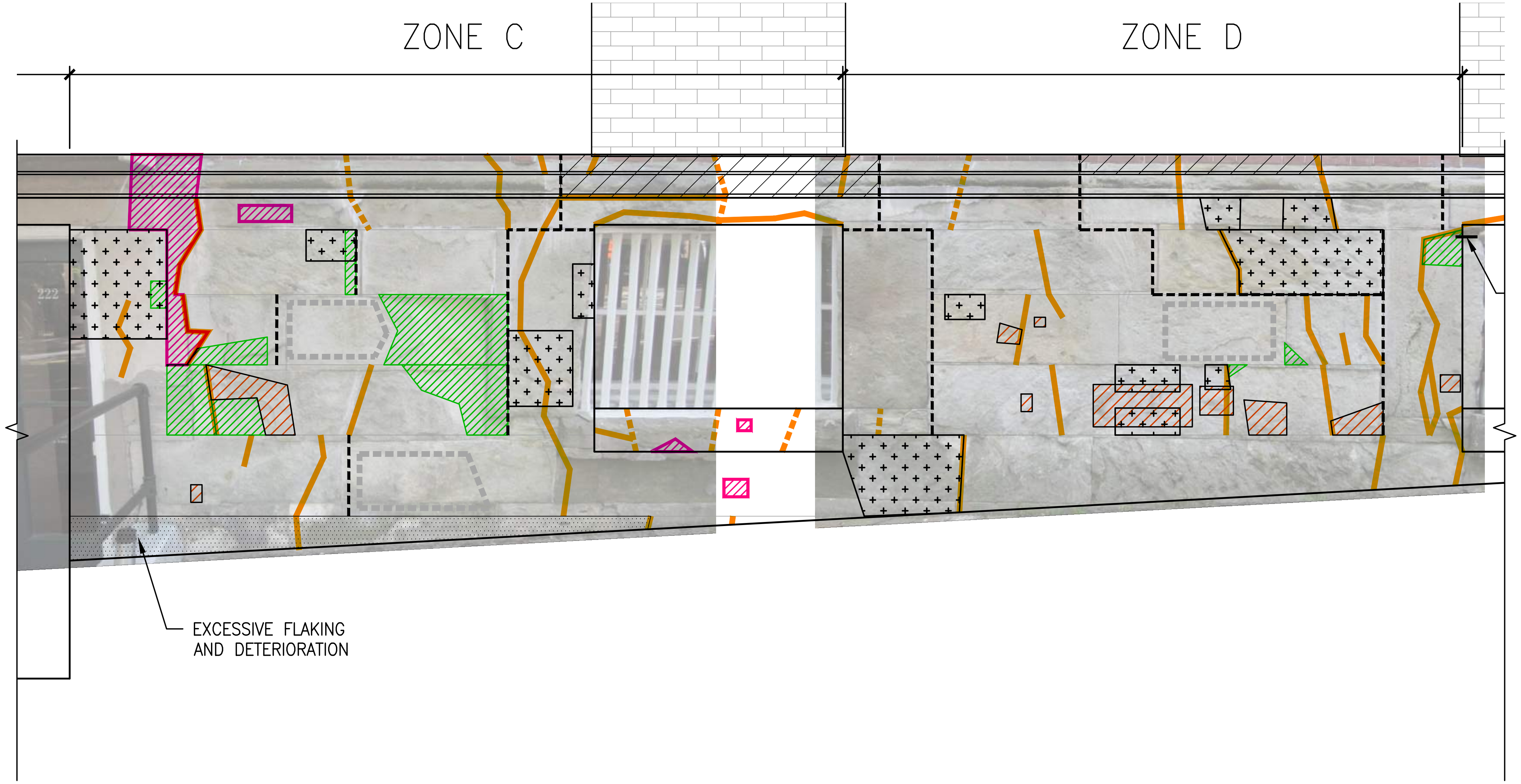
S102



1
S103

STONE CONDITIONS – NORTH ELEVATION, ZONE C & D

SCALE: 1/2"=1'–0"

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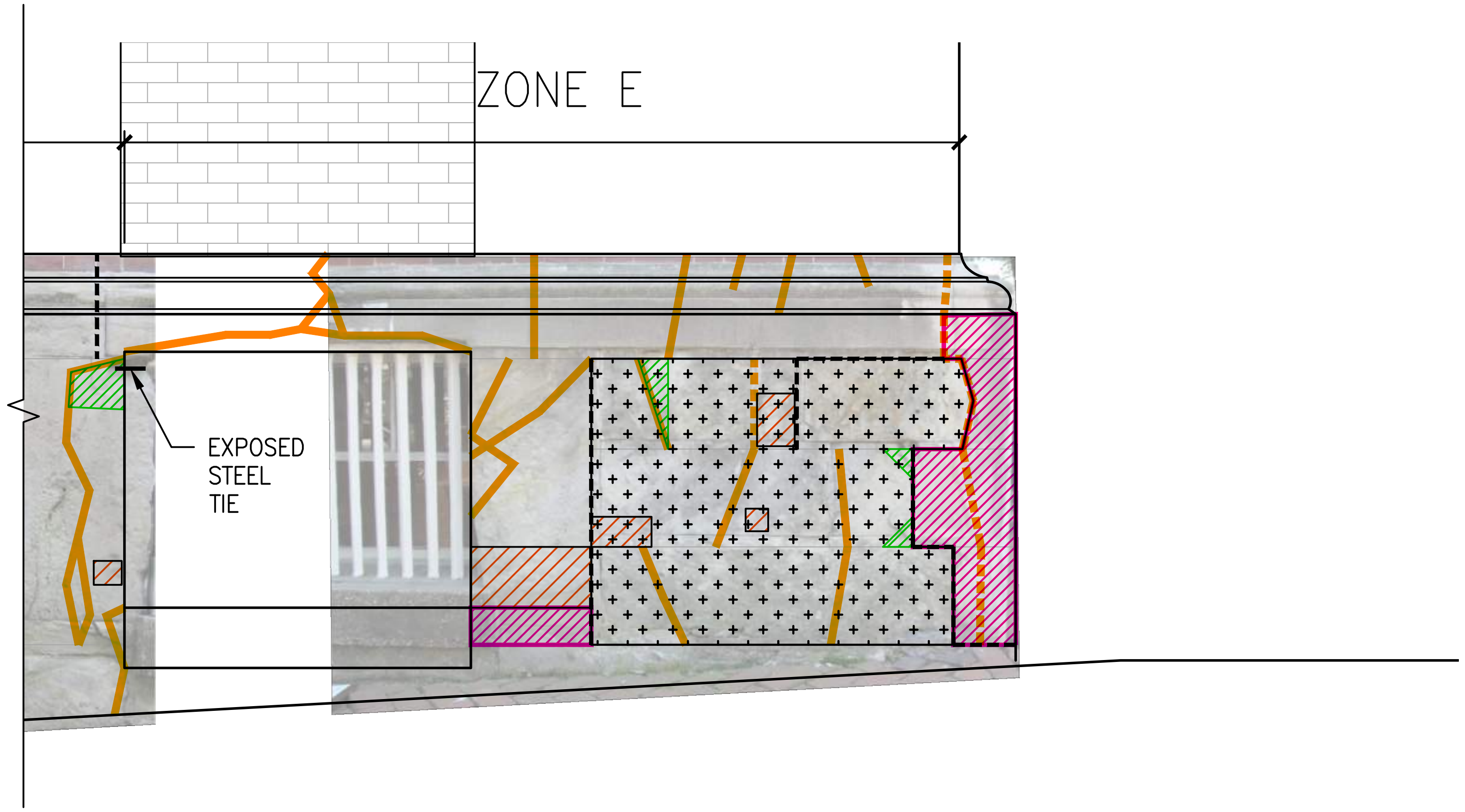
S103



1
S104

STONE CONDITIONS – NORTH ELEVATION, ZONE E

SCALE: 1/2"=1'–0"

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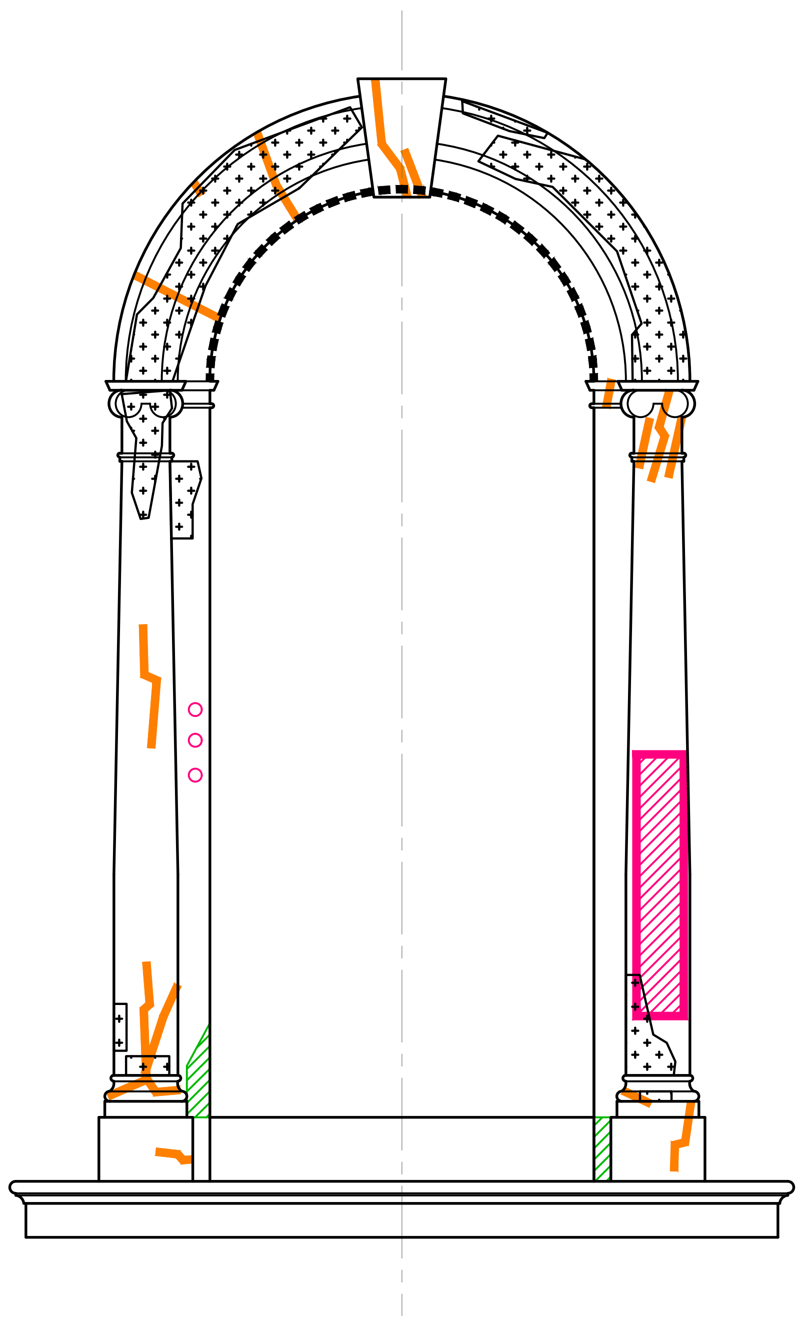
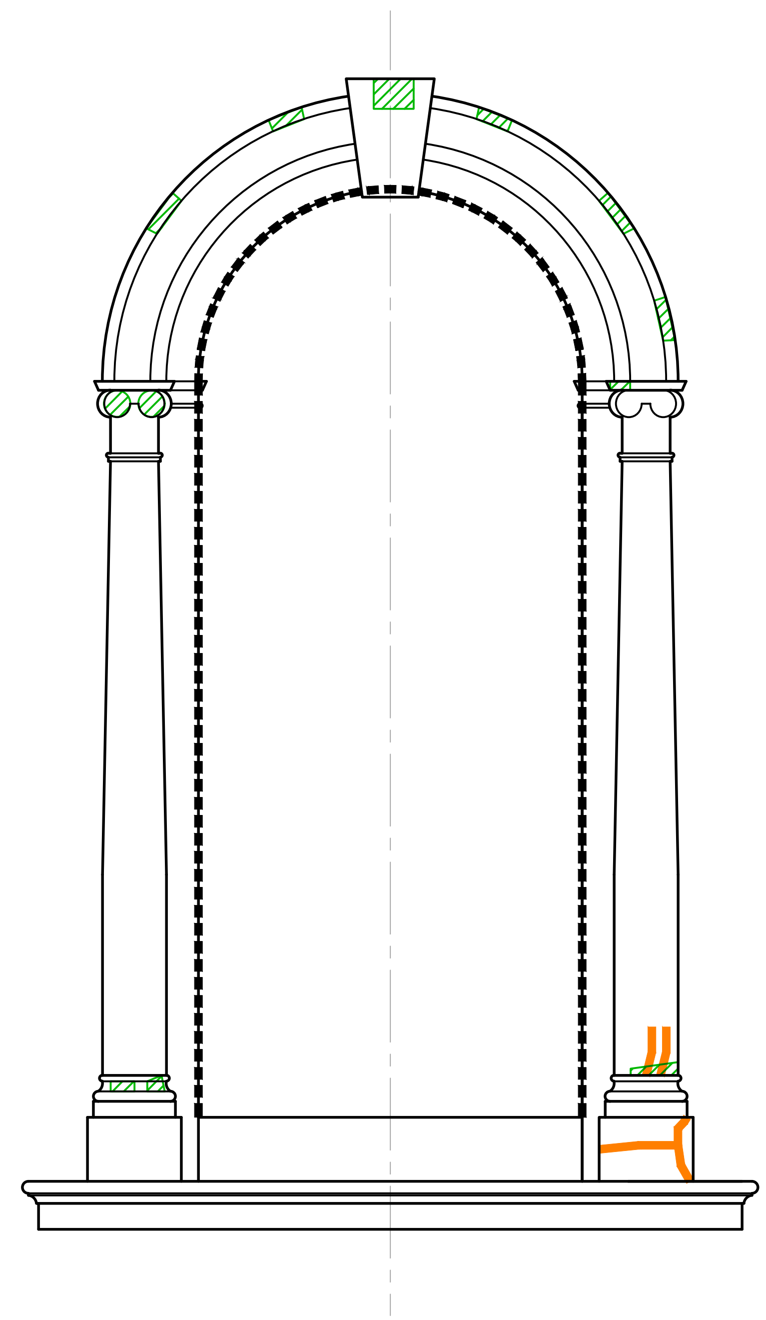
S104



STONE CONDITIONS
NORTH ENTRY SURROUND

1
S105
SCALE: 1/2"=1'-0"



STONE CONDITIONS
WEST ENTRY SURROUND

2
S105
SCALE: 1/2"=1'-0"

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EXISTING CONDITIONS – LINTELS AND SILLS

HATCH	KEY	DESCRIPTION OF DETERIORATION	RECOMMENDATIONS
	A	CRACK	REPAIR AND REPOINT EXISTING OPEN CRACKS
	B	HORIZONTAL CRACK AT SILL/LINTEL	REPAIR AND REPOINT EXISTING OPEN CRACKS
	C	SPALLING AT FAILED PATCH/NEW CONC.	REMOVE EXISTING LOOSE MATERIAL
	D	SPALLING AT ORIGINAL STONE SILL/LINTEL	REMOVE EXISTING LOOSE MATERIAL
	E	PATCH	---
	F	KEYSTONE SLIPPING/LOOSE	REMOVE AND RESET EXISTING KEYSTONE
	G	REPLACEMENT SILL/HEADER	---
	H	ORIGINAL STONE SILL/HEADER	---
	J	PARGED ORIGINAL STONE	---
	K	BIOLOGICAL GROWTH/SURFACE STAINING	CLEAN EXISTING SURFACE WITH AN APPROPRIATE MATERIAL
	L	EXPOSED PATCH	---

EXISTING CONDITIONS – BRICK MASONRY

HATCH	KEY	DESCRIPTION OF DETERIORATION	RECOMMENDATIONS
	A	OPEN JOINTS	REPAIR AND REPOINT EXISTING OPEN JOINTS
	B	EXISTING BRICK REPOINTING/RECONSTRUCTION	---
	C	EXISTING BRICK REPOINTING/RECONSTRUCTION W/ OPEN JOINTS	REPAIR AND REPOINT EXISTING OPEN JOINTS
	D	BIOLOGICAL GROWTH/SURFACE STAINING	CLEAN EXISTING SURFACE WITH AN APPROPRIATE MATERIAL
	E	REPLACEMENT BRICK	---
	F	CRACK	REPAIR AND REPOINT EXISTING OPEN CRACKS
	G	SPALL/SURFACE LOSS	REMOVE EXISTING LOOSE MATERIAL

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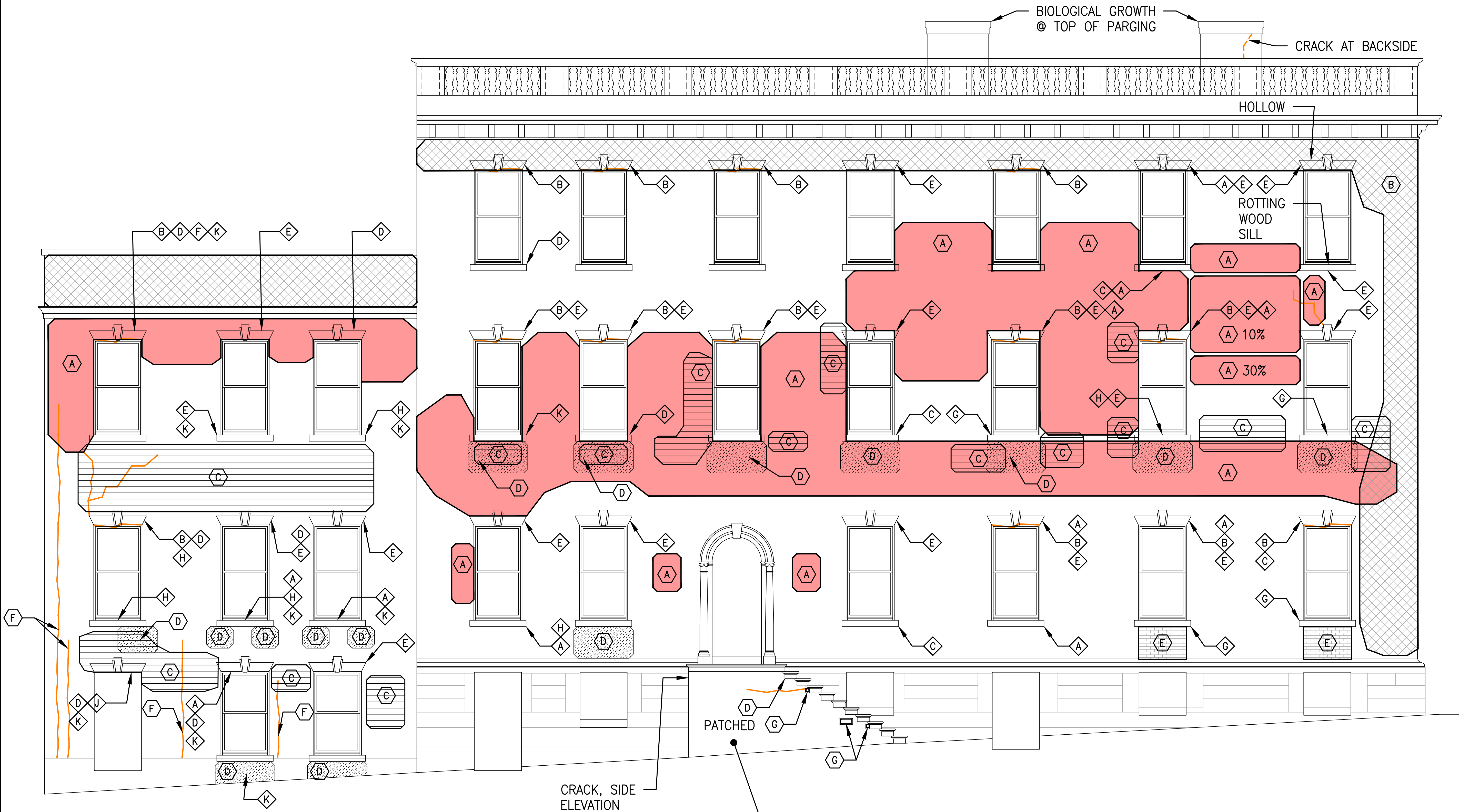

NOTE: STAIR BASE AT NORTH ELEVATION IS PARGED/STUCCO SURFACE AND BUILT OUT FROM ORIGINAL STONE. BIOLOGICAL GROWTH/STAINING, TYP.

1
S201

BRICK CONDITIONS – NORTH ELEVATION

SCALE: 1/8"=1'-0"

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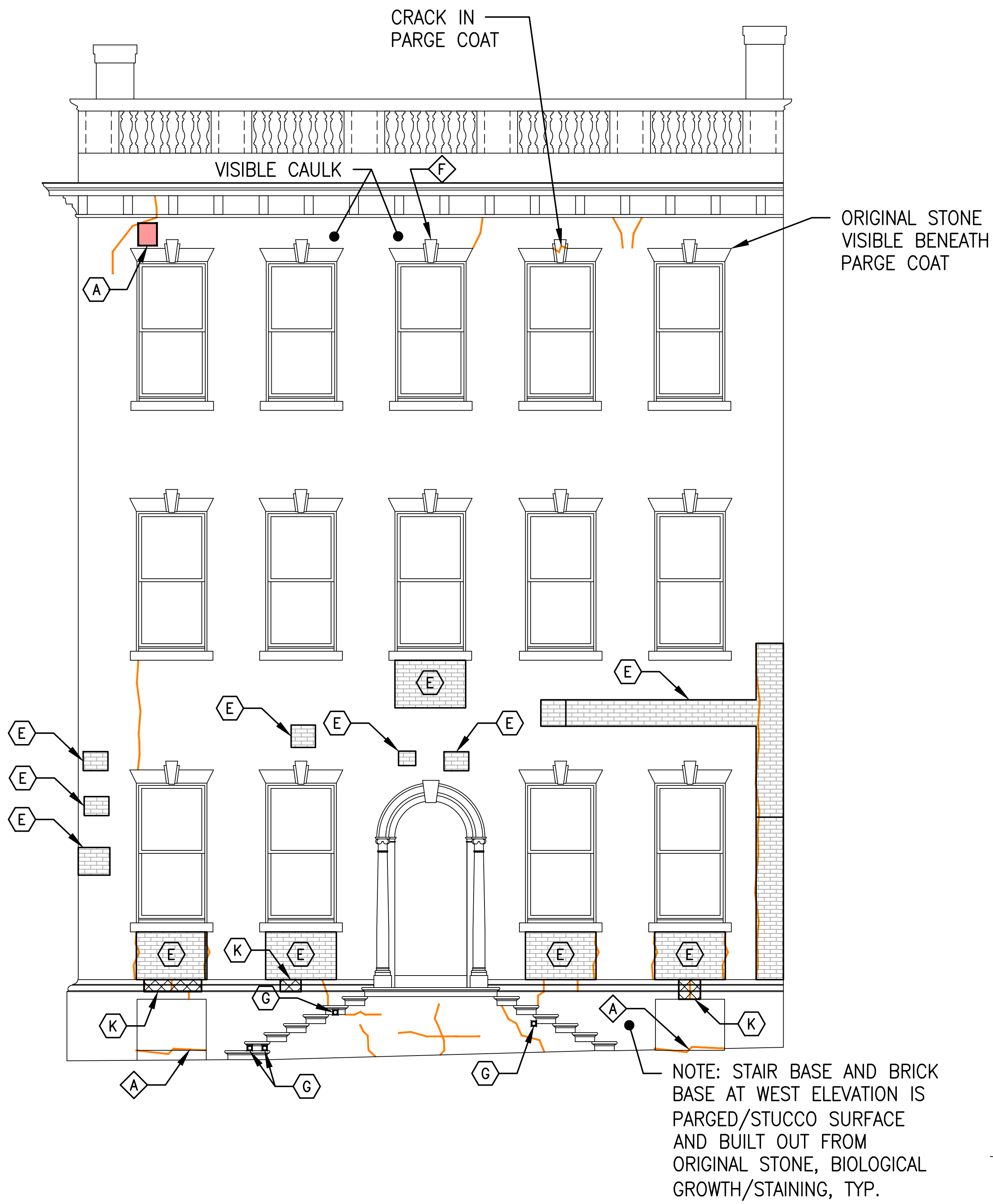
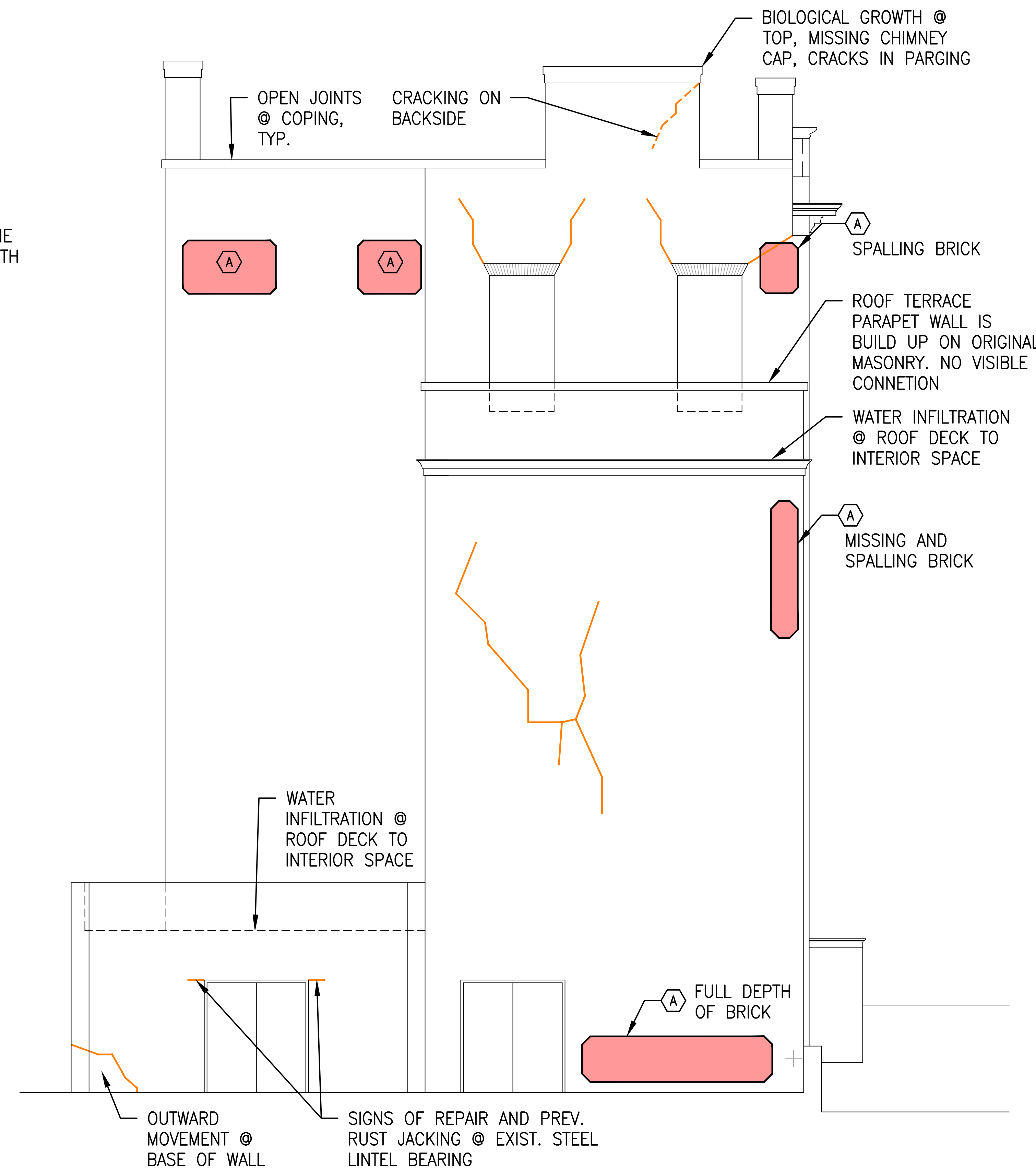
S201



1 S202 BRICK CONDITIONS – WEST ELEVATION
SCALE: 1/2"=1'-0"



2 S202 BRICK CONDITIONS – EAST ELEVATION
SCALE: 1/2"=1'-0"

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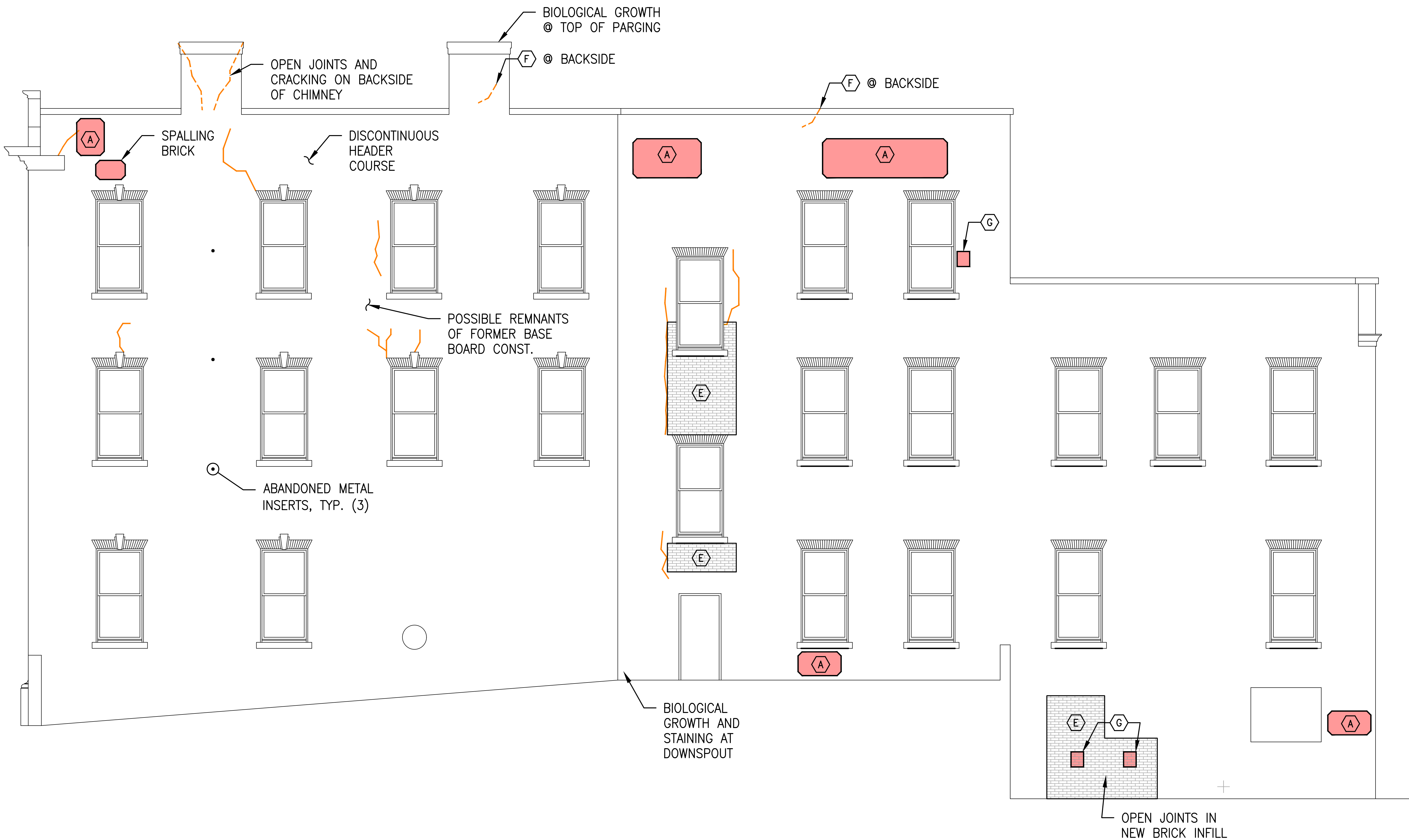
S202



1
S203
BRICK CONDITIONS – SOUTH ELEVATION
SCALE: 1/2"=1'-0"

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EXISTING CONDITIONS - BALUSTRADE, STONE CORNICE AND FRIEZE

HATCH	KEY	DESCRIPTION OF DETERIORATION	RECOMMENDATIONS
	A	HAIRLINE CRACK	REPAIR AND REPOINT EXISTING OPEN CRACKS
	B	VERTICAL CRACK	REPAIR AND REPOINT EXISTING OPEN CRACKS
	C	CRACK	REPAIR AND REPOINT EXISTING OPEN CRACKS
	D	LOOSE BALUSTRADE	REMOVE AND REPLACE LOOSE MATERIAL
	E	SPALL	REMOVE LOOSE MATERIAL
	F	VISIBLE PIN / STRAPPING	---
	G	SECTIONAL LOSS	---
	J	STONE OUT OF PLANE	---
	K	OPEN JOINT / SEPARATION	REPAIR AND REPOINT EXISTING OPEN JOINTS

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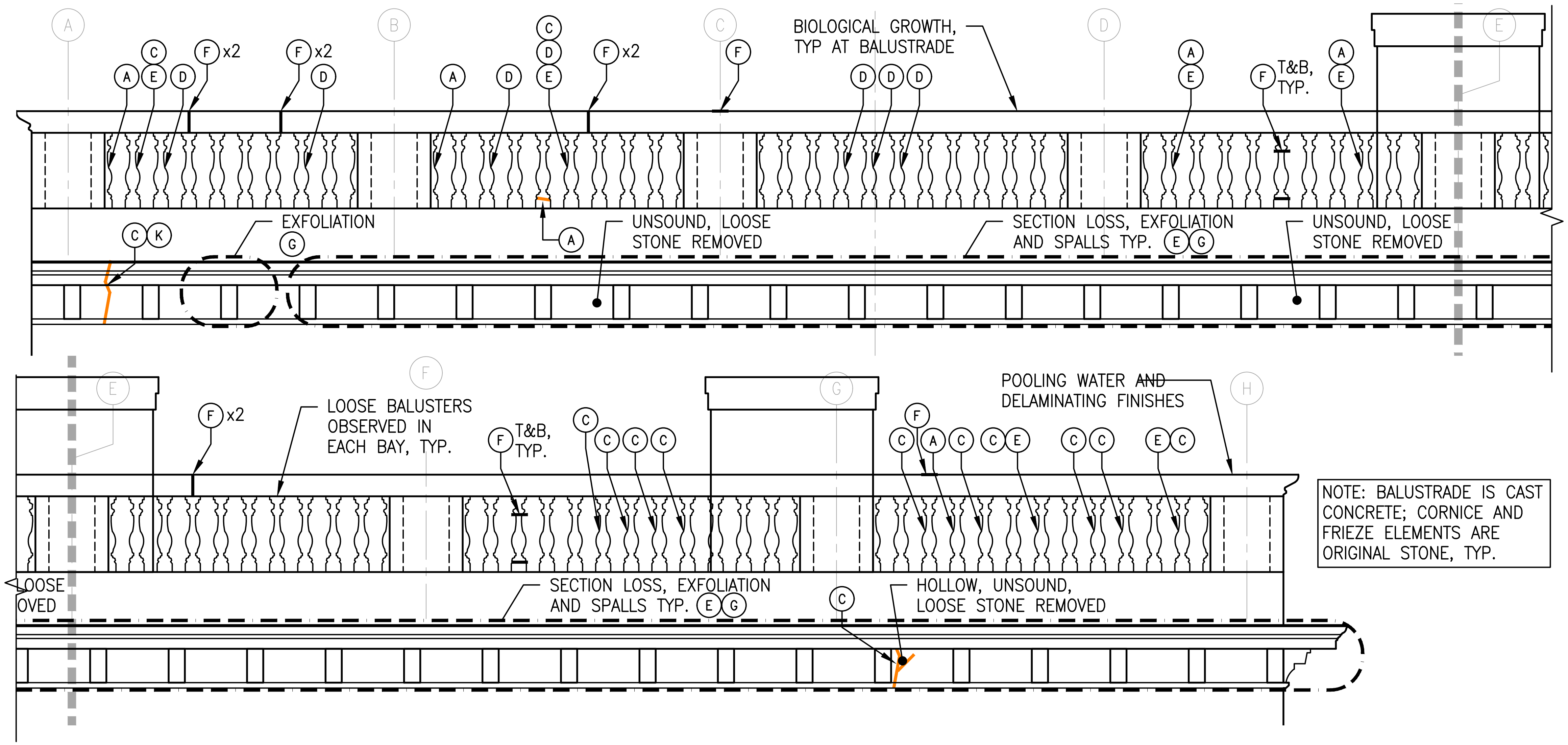
Project Number: 19-029

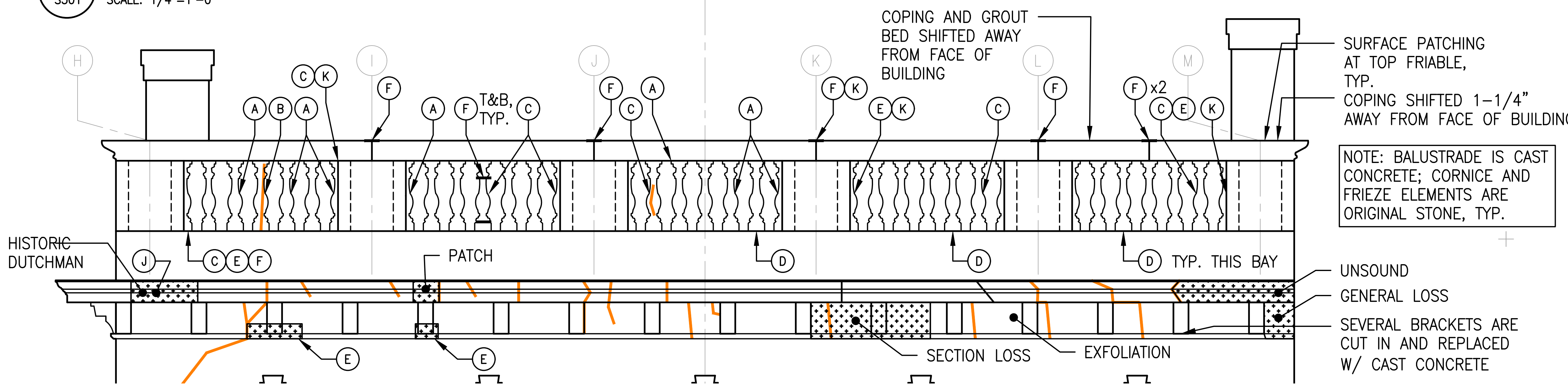
S300



NOTE: BALUSTRADE IS CAST CONCRETE; CORNICE AND FRIEZE ELEMENTS ARE ORIGINAL STONE, TYP.

1 S301 BALUSTRADE, CORNICE, AND FRIEZE EXISTING CONDITIONS – NORTH ELEVATION

SCALE: 1/4"=1'-0"



NOTE: BALUSTRADE IS CAST CONCRETE; CORNICE AND FRIEZE ELEMENTS ARE ORIGINAL STONE, TYP.

2 S301 BALUSTRADE, CORNICE, AND FRIEZE EXISTING CONDITIONS – WEST ELEVATION

SCALE: 1/4"=1'-0"

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S301