V. OPTION 2: NEW MASONRY VENEER OVER CONCRETE WALLS

1. GENERAL INTRODUCTION

1.0. General

This section addresses issues of general applicability to Part V: Option 2: New Brick Veneer Over Concrete Walls.

Subsection 1.1 includes General Format Notes, which describe the general formatting.

Subsection 1.2, Introductory Notes, outlines some general considerations.

Finally, subsection 1.3, Overall Description of the Option 2 Reconstruction Approach, provides a summary description of the overall approach.

1.1. General Format Notes

Please see section IV-1.1, which applies fully to this Option 2 approach as well.

1.2. Introductory Notes

Please see section IV-1.2, which applies fully to this Option 2 approach as well.

1.3. Overall Description of the Option 2 Reconstruction Approach

The recommendations are divided into numerous subsections, each of which addresses a particular element. While this approach provides specific information in a highly retrievable format, the resulting fragmentation may obscure the overall context from which the individual recommendations spring. This section attempts to provide the more holistic explanation.

This approach recognizes the inherent limitations of the Option 1 approach, and rather than recommending that millions of dollars be spent to still produce a flawed building whose masonry continued to erode away, it is technically much preferable to reconstruct its outer cladding system as a masonry veneer. As it appeared plausible that such an approach may not actually be much more costly than Option 1, PL:BECS recommended that this Option 2 approach be evaluated for cost as a first step.

This approach also strives to retain the existing appearance to the greatest reasonable degree. However, it does so by removing essentially all exterior masonry, beefing up the existing concrete structure, casting new concrete back-up exterior walls, and re-cladding the building with a masonry veneer resembling the existing building, as originally designed.

Please note that this “Reconstruction” Option 2 represents the technically ideal approach, and is most recommended by PL:BECS if its costs prove anywhere near comparable. This approach provides concrete back-up walls with a new brick veneer, which is likely to perform best in Juneau’s climate. It accommodates substantial added insulation to the exterior walls, and should appreciably enhance energy efficiency, yielding cost savings and greater comfort. Compared to the restoration approach of Option 1, it also results in a somewhat lighter structure with a thinner exterior wall profile, yielding added interior space, which is roughly in the range of 2,000 SF for the entire building. As it produces a lighter structure, it also reduces possible seismic forces, and yields a seismically safer building. Properly executed, this approach should yield a low-maintenance cladding with a likely lifespan exceeding 120 years even in Juneau’s masonry-challenging climate.

In short, this Option 2 is the technically optimal approach, which is well worth paying extra for. As the cost estimate for this option is only about 21% higher than for Option 1, PL:BECS considers Option 2 as the only truly viable approach, as it yields at least 3 times the likely projected cladding lifespan, lower energy and maintenance costs, larger interior space, among many other benefits, for only a small cost premium.

In general, the work consists of the removal of all existing interior finishes, the hollow clay tile, and all exterior masonry to expose the existing concrete building frame.

New concrete walls, piers, and headers are cast between existing columns per subsection IV-2.1.1. The exterior concrete faces are then coated with an asphaltic damp-proofing.

Galvanized steel ledgers are secured along all floor lines where needed to support the new brick veneer along each floor level.

The ledgers and the existing protruding concrete lugs are flashed with a double-layer flashing assembly of self-adhered flashing membrane capped with 26-gage stainless steel flashings where fully concealed, and with 16 oz. copper flashings where these become exposed to view.

New stainless steel veneer anchor channels, such as Dur-O-Wal DA904, are fastened to the concrete walls, spaced 16” apart horizontally, and vertically continuous.

A thin vent mat, such as Enka-Drain 9714, is placed against the damp-proofed concrete walls, with 4” thick extruded polystyrene insulation, such as Dow Board, placed against this. Stainless steel veneer anchors, such as Dur-O-Wal DA931, are clipped into the channel slots, spaced 18” apart vertically. A thicker drain mat, such as Enka-Drain 9120, is placed over the insulation, fabric-side facing outward, to limit mortar clogging.

A new masonry veneer, consisting of ASTM C-216 face brick, Grade SW, at brick areas, or pre-cast concrete cladding at stone locations, is installed over this, largely to match the existing appearance, but with greatly reduced offsets and with concave-tooled mortar joints to limit water infiltration into the masonry. Horizontal 9-gage stainless steel wire seismic joint reinforcing is embedded within the horizontal joints spaced 18” apart vertically.

The new masonry should be cleaned and sealed with a penetrating water repellent, such as ProSoCo Weather-Seal Siloxane.

Figure V-1.3(1) shows a typical exterior detail where it occurs over the existing embedded concrete columns.

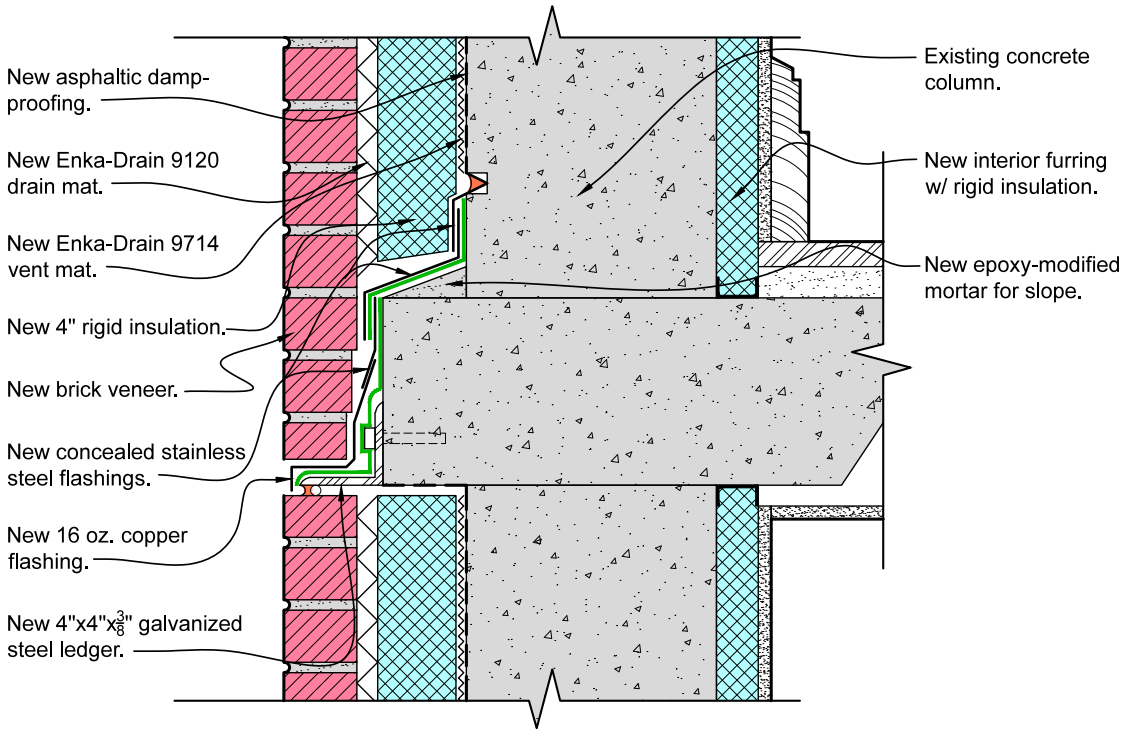

Figure V-1.3(1): Typical New Brick Veneer Over Existing Concrete Column

2. STRUCTURE

2.0. General

This section addresses larger-scale structural considerations. It is divided into nine subsections, each of which pertains to a specific sub-element of the structure.

2.1. Basic Structure of Building

2.1.0 General

This subsection pertains to the building's basic structural design in the most general terms.

2.1.1 Basis of Recommendations

Please see subsection IV-2.1.1, which applies fully to this Option 2 approach as well.

2.1.2 Recommended Corrective Actions

With regard to the building's overall structural frame, recommended corrective work is similar to Option 1, and is not described here in detail. Please refer to subsection IV-2.1.2 and the floor plans therein for the work description.

In brief, this work consists of adding concrete shear walls, headers, piers, and grade beams with thicknesses and reinforcing remaining mostly same as for Option 1.

The structural work in this approach diverges from the corresponding Option 1 work in two aspects.

First, where 4" thick walls are shown in Option 1, those should be changed to 5" thick walls. Further, while Option 1 places those walls against the inner face of the existing brickwork, these would be stand-alone cast-in-place concrete walls. Steel reinforcing in all walls remains the same as shown for Option 1.

The second modification is that in contrast to the Option 1 approach, Option 2 replaces the exterior walls of the north stair tower with a brick veneer placed over 8" thick concrete walls reinforced with #5 bars spaced 12" O, C. each way.

2.2. Foundations

2.2.0 General

This subsection pertains to the building's basic foundation system in general terms. See also section V-3.1: Lowest-Level Crawl Space for related information.

2.2.1 Basis of Recommendations

Please see subsection IV-2.2.1, which applies fully to this Option 2 approach as well.

2.2.2 Recommended Corrective Actions

Please see subsection IV-2.2.2, which applies fully to this Option 2 approach as well. In brief, this work consists of adding new grade beams per subsection IV-2.2.2 and Figure IV-2.2(1).

In addition, the existing foundations should be restored as outlined in subsection IV-2.2.2. An experimental, corrosion-retarding treatment is also suggested in that subsection.

2.3. Lowest-Level Concrete Floor Framing

2.3.0 General

This subsection pertains to the concrete-framed floor directly above the crawl space.

2.3.1 Basis of Recommendations

Please see subsection IV-2.3.1, which applies fully to this Option 2 approach as well.

2.3.2 Recommended Corrective Actions

Please see subsection IV-2.3.2, which applies fully to this Option 2 approach as well. In brief, this work consists of repairing existing damaged concrete floor joists per subsection IV-2.3.2.

2.4. Level 1 Concrete Floor Slab

2.4.0 General

This subsection pertains to the raised, concrete-framed floor directly above the ground floor level.

2.4.1 Basis of Recommendations

Please see subsection IV-2.4.1, which applies fully to this Option 2 approach as well.

2.4.2 Recommended Corrective Actions

Please see subsection IV-2.4.2, which applies fully to this Option 2 approach as well. In brief, this work consists of injecting existing floor slabs with epoxy per subsection IV-2.4.2.

2.5. Brick Chimney

2.5.0 General

This subsection pertains to the relatively tall brick chimney above the main roof, near the inside corner where the west wing joins the main portion of the building.

2.5.1 Basis of Recommendations

Please see subsection IV-2.5.1, which applies fully to this Option 2 approach as well.

2.5.2 Recommended Corrective Actions

Please see subsection IV-2.5.2, which applies fully to this Option 2 approach as well. In brief, this work consists of shortening the chimney, casting a new concrete cap atop it, installing new flashings, and over-cladding the chimney with a new metal cladding, per subsection IV-2.5.2.

2.6. Securement of Large Masonry Cladding Elements

2.6.0 General

This subsection pertains to the securement of the various masonry elements to the primary structure. These are also discussed in subsequent subsections in greater detail.

2.6.1 Basis of Recommendations

Please see subsection IV-2.6.1, which applies fully to this Option 2 approach as well.

2.6.2 Recommended Corrective Actions

In general, this Option 2 approach involves construction of a new masonry veneer, so essentially all exterior elements will be new, and will be anchored as outlined in other subsections of this part. No specific work is included in this subsection for this Option 2 approach.

2.7. Interior Hollow Clay Tile Walls

2.7.0 General

This subsection pertains to the interior partition walls comprised of hollow clay tile.

2.7.1 Basis of Recommendations

Please see subsection IV-2.7.1, which applies fully to this Option 2 approach as well.

2.7.2 Recommended Corrective Actions

Please see subsection IV-2.7.2, which applies fully to this Option 2 approach as well. In brief, this work consists of bracing the existing walls per subsection IV-2.7.2 and Figures IV-2.7(1-7).

2.8. Large Mechanical Equipment

2.8.0 General

This subsection pertains to various pieces of large mechanical equipment, such as the boiler.

2.8.1 Basis of Recommendations

Please see subsection IV-2.8.1, which applies fully to this Option 2 approach as well.

2.8.2 Recommended Corrective Actions

Please see subsection IV-2.8.2, which applies fully to this Option 2 approach as well. In brief, this work consists of bolting floor-mounted equipment to the floor slabs and bracing large suspended plumbing lines, per subsection IV-2.8.2.

3. PRIMARY EXTERIOR ENCLOSURE ASSEMBLIES & ELEMENTS

3.0. General

This section of the report addresses issues related to the building's primary exterior elements, such as wall assemblies, ground-level floor slabs, windows, roofs, and similar major components. It is divided into 14 subsections, each of which pertains to a specific primary element. Where appropriate, each subsection contains preliminary drawings depicting the described work. In addition, Figures V-3.0(1-7) show the exterior elevations which reference the locations of specific details in the various subsections.

Fig. V-3.0(1): South Elevation

Fig. V-3.0(2): West Elevation

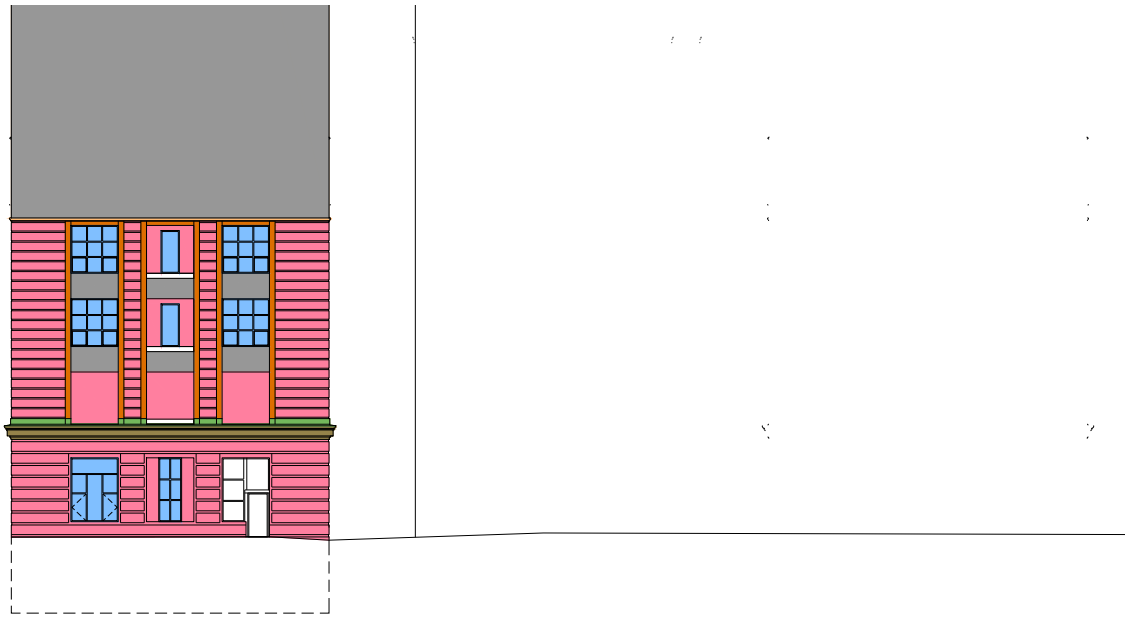

Fig. V-3.0(3): North Elevation

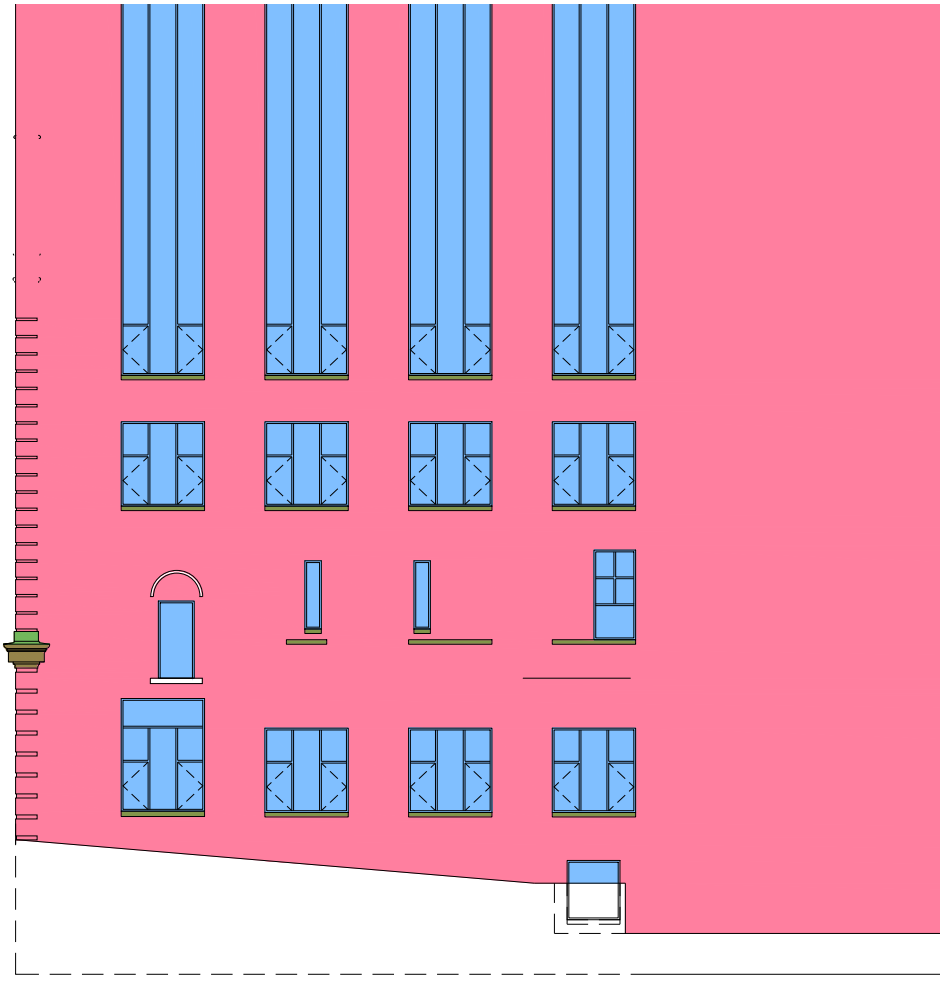

Fig. V-3.0(4): North Courtyard: West-Facing Wall

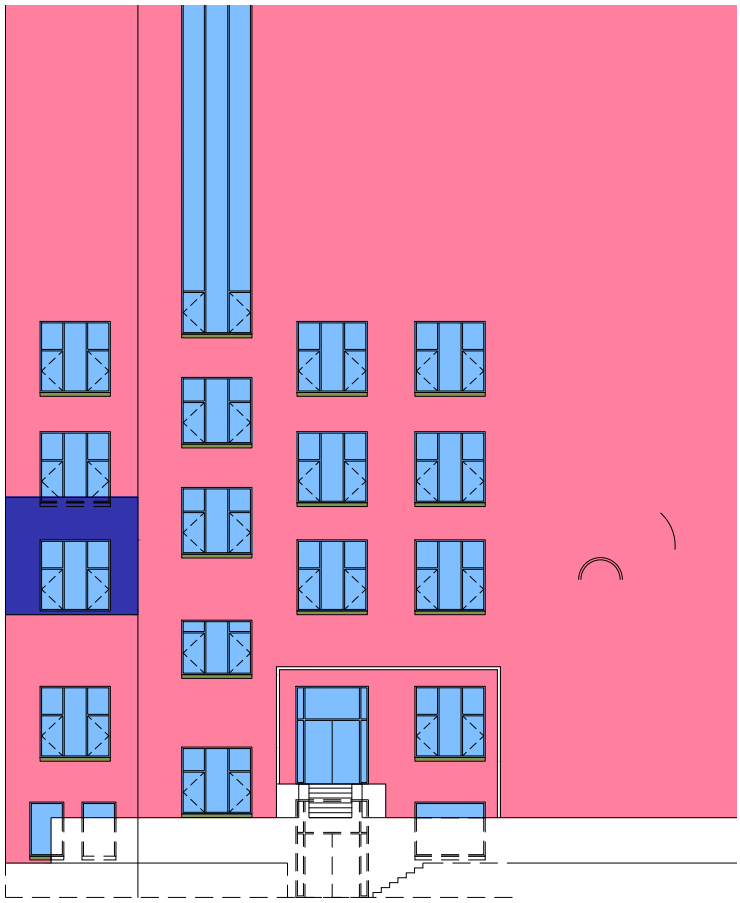

Fig. V-3.0(5): North Courtyard: North-Facing Wall

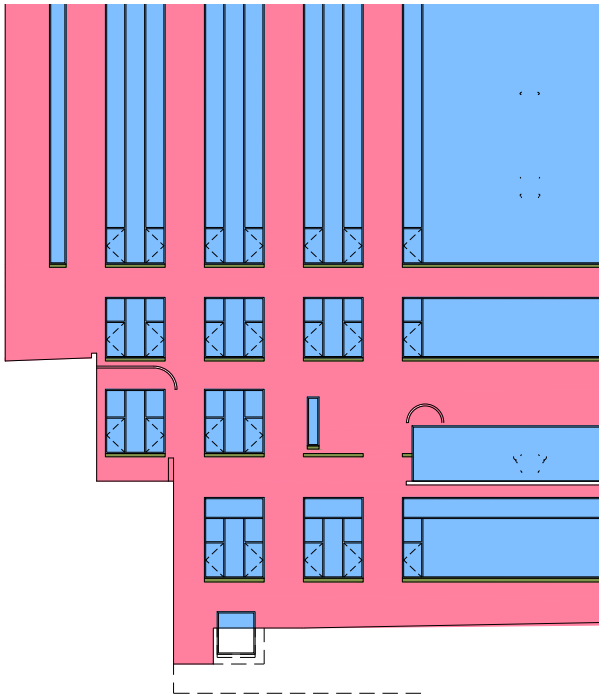

Fig. V-3.0(6): North Courtyard: East-Facing Wall

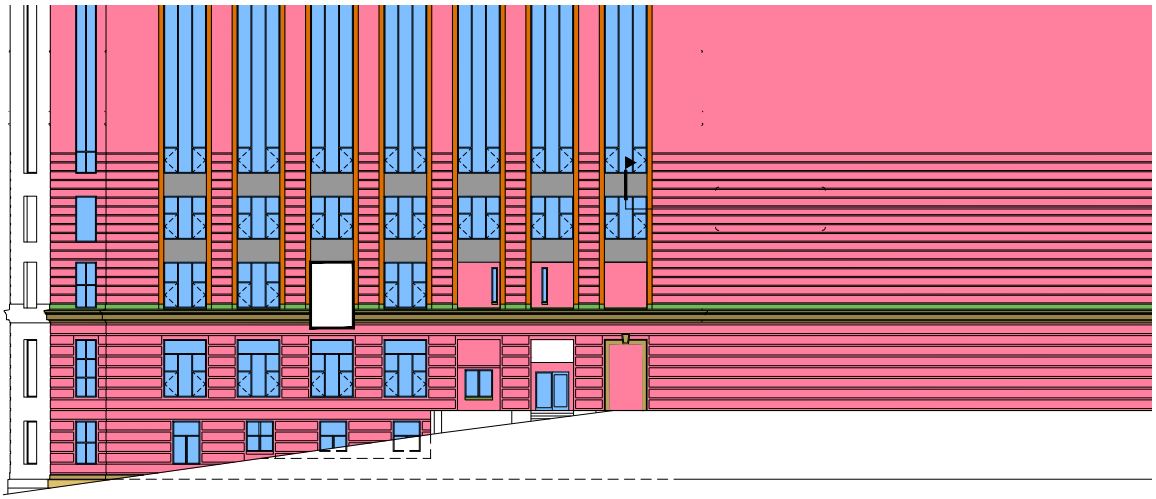

Fig. V-3.0(7): East Elevation

3.1. Lowest-Level Crawl Space

3.1.0 General

This subsection pertains to the crawl space located under the building's main body and under the southerly portions of both north-extending wings, in general terms.

3.1.1 Basis of Recommendations

Please see subsection IV-3.1.1, which applies fully to this Option 2 approach as well.

3.1.2 Recommended Corrective Actions

Please see subsection IV-3.1.2, which applies fully to this Option 2 approach as well. Please see also subsections IV-2.2 and IV-2.3 for related corrective measures not described here.

In brief, this work consists of the installation of a gravity-fed drainage system and soil-capping with a cross-laminated vapor-barrier, as well as optional capping with a 2" thick, fiber-reinforced shot-crete "slab" to help protect the vapor barrier and further reduce humidity. See Figures IV-3.1(1 & 2).

3.2. Concrete On-Grade Floor Slabs

3.2.0 General

This subsection pertains to the on-grade concrete floor slabs that occur at the base of the northern portions of both north-extending wings.

3.2.1 Basis of Recommendations

Please see subsection IV-3.2.1, which applies fully to this Option 2 approach as well.

3.2.2 Recommended Corrective Actions

Please see subsection IV-3.2.2, which applies fully to this Option 2 approach as well.

In brief, this work consists of injecting all accessible floor cracks and the perimeter of the shop slab where it joins the basement walls with epoxy.

3.3. Concrete Sub-Grade Walls

3.3.0 General

This subsection pertains to several sub-grade concrete walls that occur primarily at the base of the northern portions of both north-extending wings.

3.3.1 Basis of Recommendations

Please see subsection IV-3.3.1, which applies fully to this Option 2 approach as well.

3.3.2 Recommended Corrective Actions

Please see subsection IV-3.3.2, which applies fully to this Option 2 approach as well.

In brief, no work related to these walls is recommended at the west wing's sub-grade walls.

At the east wing's sub-grade walls, this work consists of selective removal of interior finishes at locations of apparent leakage, injecting all wall cracks and cold joints with epoxy, treatment of rock pockets and similar flaws with crystalline waterproofing, and replacement of finishes.

3.4. Stone-Clad Exterior Wall Base

3.4.0 General

This subsection pertains to the lowest-level stone base along the south elevation, which extends from grade up to a projecting stone water table, which separates it from the cladding above.

3.4.1 Basis of Recommendations

Please see subsection IV-3.4.1, which applies fully to this Option 2 approach as well.

3.4.2 Recommended Corrective Actions

Please see subsection IV-3.4.2, which applies fully to this Option 2 approach, except that the stone cladding above the base will be removed in Option 2, rather than stabilized as in Option 1.

In brief, the work consists of replacement of this band with a pre-cast concrete cladding per subsection IV-3.4.2. As subsection IV-3.4.2 described the stabilization of the stone cladding above this, rather than its removal, Figure V-3.4(1) depicts the Option 2 work.

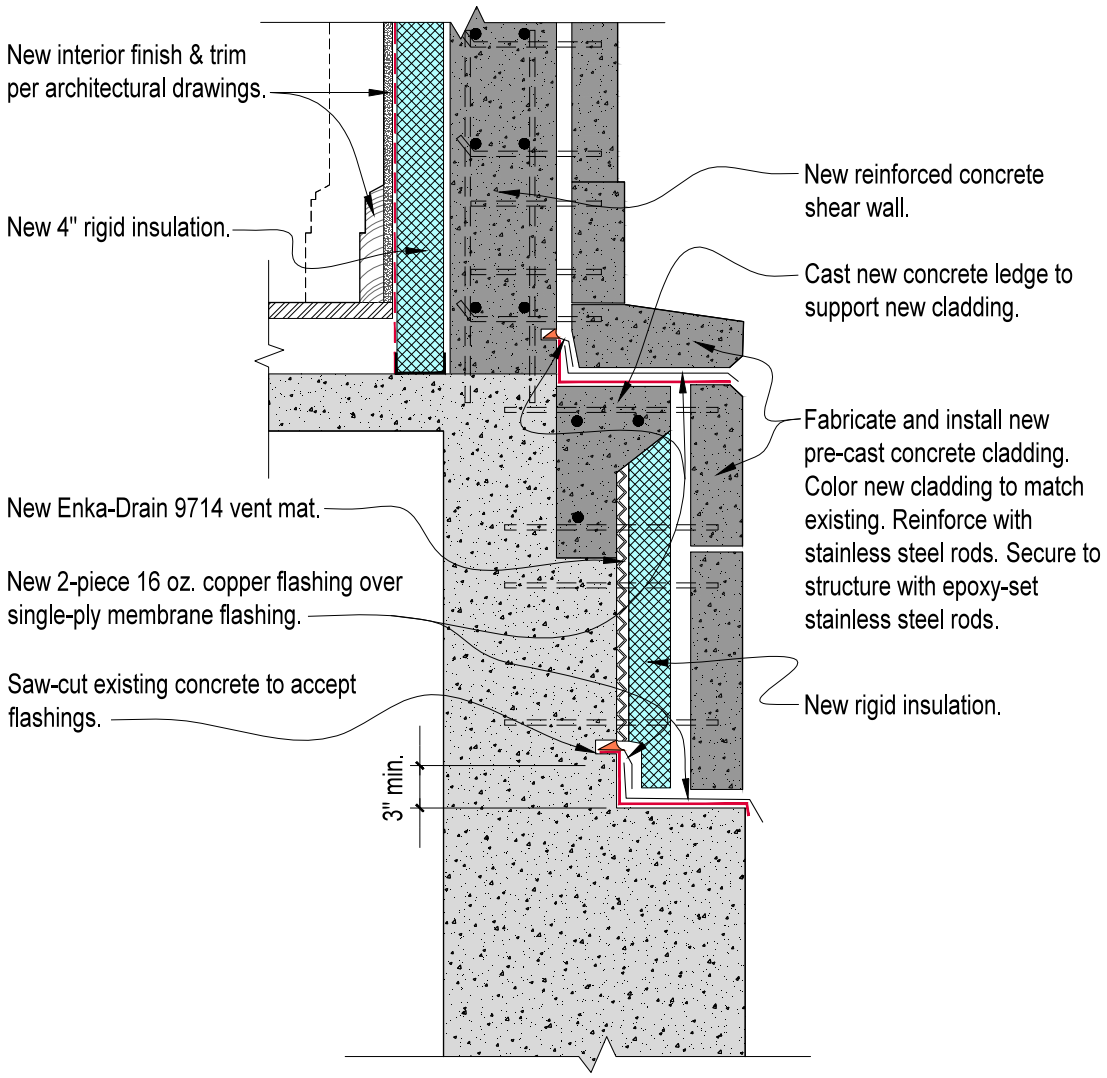

Fig. V-3.4(1): Stone Base Replacement with Replacement of Cladding Above

3.5. Stone-Clad Exterior Walls Along Bottom 2 Levels

3.5.0 General

This subsection pertains to the stone-clad walls directly above the stone base addressed in subsection V-3.4. While this cladding is contiguous with and similar to the cladding below the portico, the portico-related cladding is addressed separately in subsection V-5.3.

3.5.1 Basis of Recommendations

Please see subsection IV-3.5.1, which applies fully to this Option 2 approach as well.

3.5.2 Recommended Corrective Actions

In general terms, the Cladding Replacement approach is depicted in Figure IV-3.5(1), and the verbal description of the work follows the drawing.

The new cladding should be integrally colored and textured to match the existing stone cladding's appearance, and it should be reinforced only with stainless steel reinforcing to avoid future corrosion spalling. For cost estimating purposes, the cladding should be assumed 4" thick.

It can be anchored to the structure with epoxy-set stainless steel threaded rods, or with stainless steel embedded clips, etc.

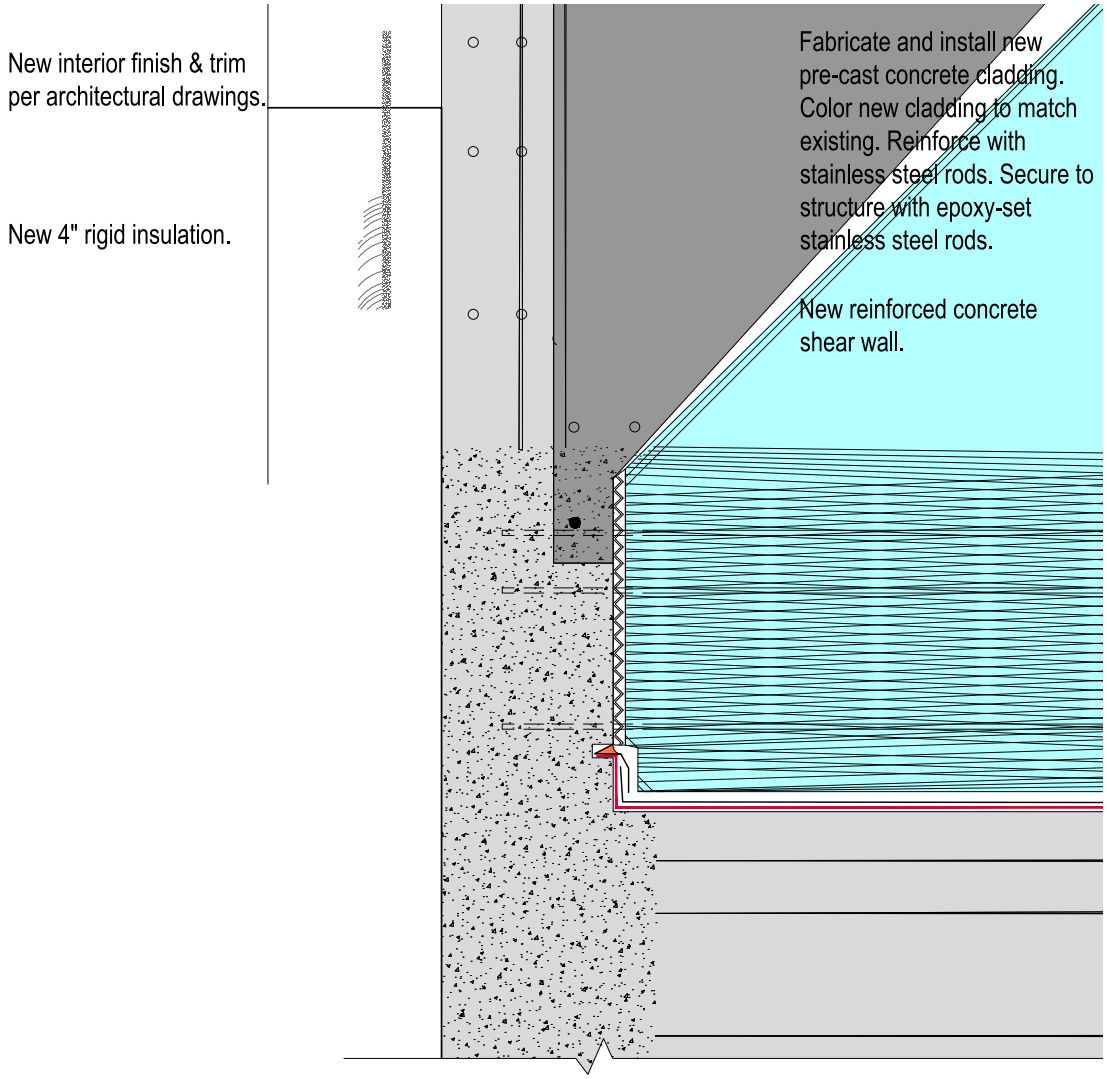

Fig. V-3.5(1): Stone Cladding Replacement

The Cladding Replacement approach consists of the following general steps:

1. Remove Interior Hollow Clay Tile and Install New Interior Concrete Walls and Pins at Level 2

   This work is described in greater detail in subsection IV-2.1.2. It can be executed at level 2 near the top of this cladding as part of helping secure the stone water table, which is partly supported by this cladding.

2. Remove Existing Stone Cladding Above Stone Base

   As the stone cladding helps support the stone water table above it, the water table would first need to be supported, as generally described in subsection IV-4.1.2. Once this element has been secured, the stone base can be removed.

3. Replace Stone Base Below Stone Cladding

   This work is described in greater detail in subsection IV-3.4.2.

4. Remove Int. Hollow Clay Tile and Install New Int. Concrete Walls and Pins at Levels 0 & 1.

   This work is described in greater detail in subsection IV-2.1.2. It can be executed after the outer cladding is removed to allow new anchor pins to be installed.

5. Install Anchors For New Cladding

   Please see item 4 in subsection IV-3.4.2 for a more detailed explanation of possible anchor methods. For cost-estimating purposes only, the “rod method” is described.

   Regardless of specific anchoring method, all anchors should be type 304 stainless steel to avoid corrosion. The number of anchors per cladding piece will vary, depending on size of cladding piece being secured, but no fewer than two anchors should secure each piece, and at least one anchor should occur for every 2 SF.

   Where the cladding occurs over brick walls, the rods would be drilled through the brick from the interior. Stainless steel, ½” ø rods would be drilled through the brick to penetrate the cladding to within 1 ½” of its outer surface.

   However, most of the cladding occurs over existing concrete columns, which would be drilled from the exterior. The existing concrete walls should be drilled at least 4” deep, and roughly ½” ø stainless steel threaded rods should be epoxy-set into these holes. The rods should be of sufficient length to penetrate into the cladding to within 1 ½” of its outer surface.

6. Install New Color-Matched Pre-Cast Concrete Cladding

   Drill or cast-in oversized holes into back side of pre-cast concrete cladding pieces to accept stainless steel rods. Drill holes to within about 1 ½” of outer cladding surface. Inject holes with epoxy, set over anchor rods, and brace in place till epoxy sets.

3.6. Brick-Clad Exterior Public Façade Walls, All Levels

3.6.0 General

This subsection pertains to the brick-clad exterior walls at all floor levels and at all of the building's "public" façades, including its south, east, and west elevations, and the north elevations of its east and west wings. Some elements integral to these walls are also addressed here.

3.6.1 Basis of Recommendations

Please see subsection IV-3.6.1, which applies fully to this Option 2 approach as well.

3.6.2 Recommended Corrective Actions

In general, the work consists of the removal of all existing interior finishes, the hollow clay tile, and all exterior masonry to expose the existing concrete building frame.

New concrete walls, piers, and headers are cast between existing concrete columns per subsection IV-2.1.1. The exterior concrete faces are then coated with an asphaltic damp-proofing.

Galvanized ledgers are secured at all floor lines to support the new brick veneer at each level.

The ledgers and the existing protruding concrete lugs are flashed with a double-layer flashing assembly of self-adhered flashing membrane capped with 26-gage stainless steel flashings where fully concealed, and with 16 oz. copper flashings where these become exposed to view.

New stainless steel veneer anchor channels, such as Dur-O-Wal DA904, are fastened to the concrete walls, spaced 16" apart horizontally, and vertically continuous.

A thin vent mat, such as Enka-Drain 9714, is placed against the damp-proofed concrete walls, and 4" thick extruded polystyrene insulation, such as Dow Board, is placed against this. Stainless steel veneer anchors, such as Dur-O-Wal DA931, are clipped into the channel slots, spaced 18" apart vertically. A thicker drain mat, such as Enka-Drain 9120, is placed over the insulation, fabric-side facing outward, to limit mortar clogging.

A new brick veneer is installed over this, largely to match the existing appearance, but with greatly reduced offsets and with concave-tooled mortar joints to limit water infiltration into the masonry. Horizontal 9-gage stainless steel wire seismic joint reinforcing is embedded within the horizontal joints spaced 18" apart vertically.

The new masonry should be cleaned and sealed with a penetrating water repellent, such as ProSoCo Weather-Seal Siloxane.

With respect to configuration, the existing brickwork contains many recessed header courses and deeply raked joints, which are recessed about 1" from the brick face. These help create visual interest, but are technically counter-productive, as both greatly increase exposed surface area and moisture absorption, contributing to the severe degradation affecting the existing brickwork. It would be best to avoid these aspects, while still maintaining the desired visual appearance. I believe that the recessed header coursing can be successfully mimicked by using somewhat darker brick in the header courses. Similarly, I believe the recessed mortar joints can also be simulated by using integral pigments to darken the mortar. Therefore, my specific recommendations are to use a darker brick type along the header courses, and recess these only about ¼" and to use a darker mortar and recess it also only ¼", with a concave-tooled profile.

Concerning specific brick types to use, given Juneau's masonry-challenging climate, in addition to complying with ASTM C-216, Grade SW requirements, I also recommend that, to the greatest feasible extent, technically optimal brick types should comply with having maximum 5-hour boiling absorption of 13%, maximum 24-hour cold absorption of 9%, Initial Rate of Absorption (IRA) values near the range of 10-20 grams/30 sq. in./minute, and minimum compressive strength of 4,000 psi. These requirements may limit color selection to the darker range.

Figure V-3.6(1) shows a typical exterior detail where it occurs over the existing embedded concrete columns. Figure V-3.6(2) shows a comparable detail at the windows. Figures V-3.6(3 & 4) show a very similar in-progress stone veneer assembly.

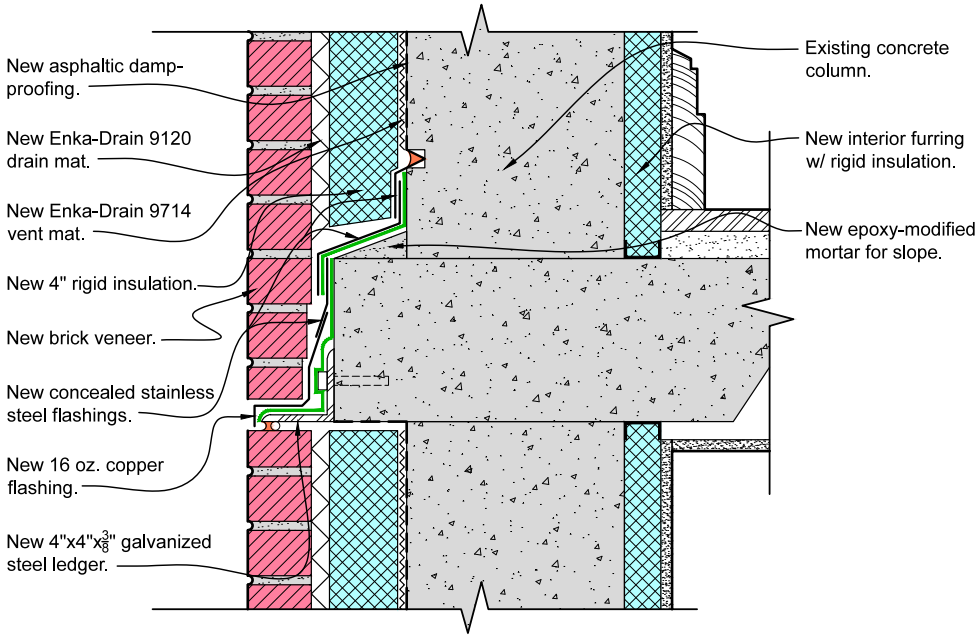

Figure V-3.6(1): Typical New Brick Veneer Over Existing Concrete Column

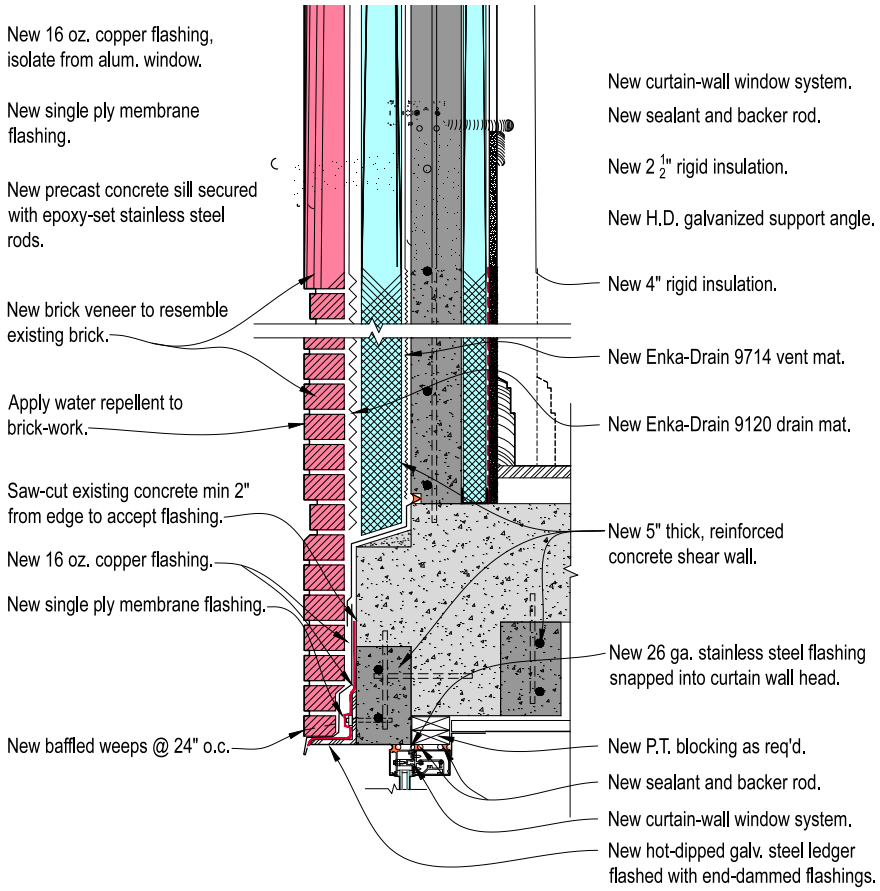

Figure V-3.6(2): Typical New Brick Veneer at Windows

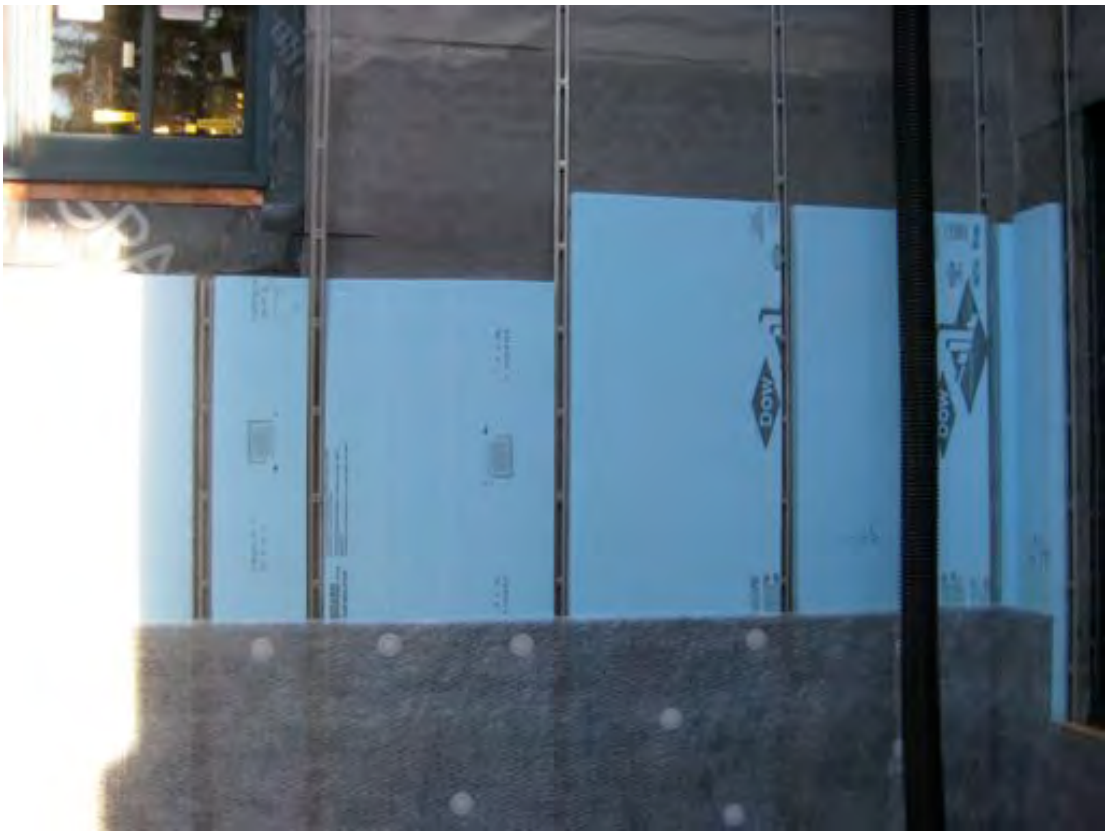

Figure V-3.6(3): Similar In-Progress Work

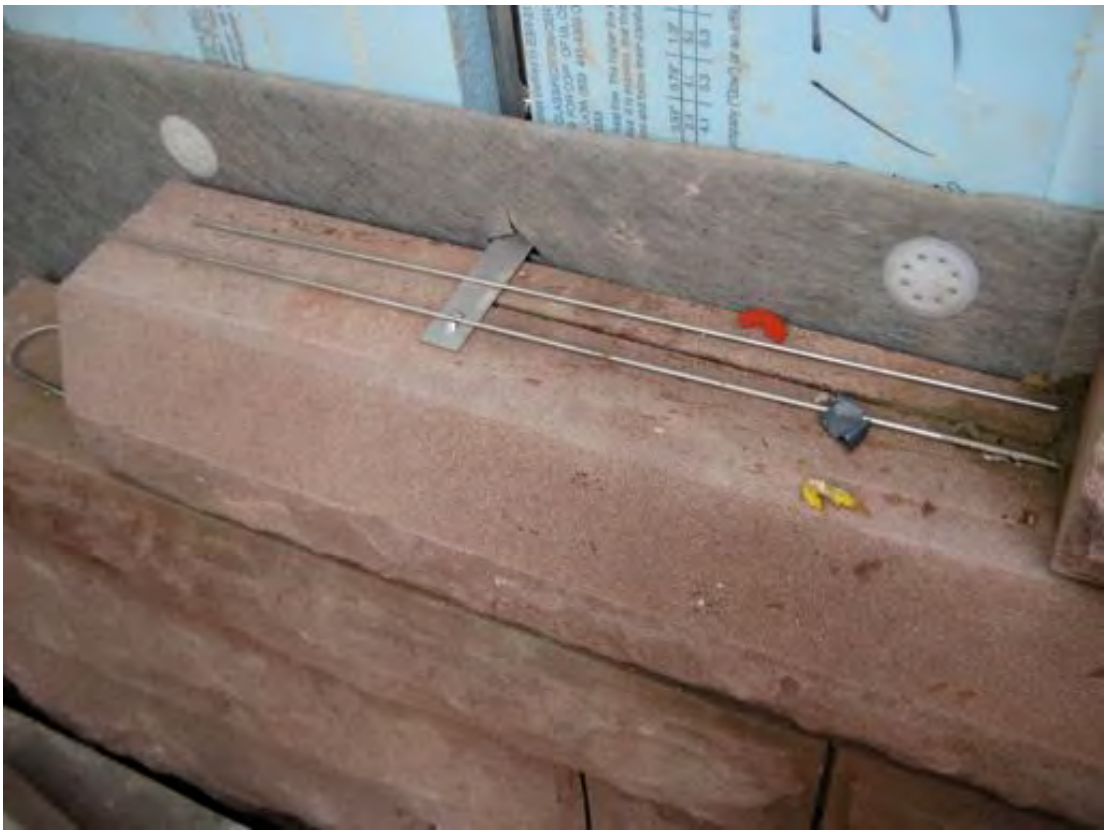

Figure V-3.6(4): Similar In-Progress Work

3.7. Terra-Cotta-Clad Exterior Walls at Levels 2-4

3.7.0 General

This subsection pertains to the terra-cotta exterior wall panels that occur between windows at floor levels 2-4 at the building's south, east, west, and north "public" façades.

3.7.1 Basis of Recommendations

Please see subsection IV-3.7.1, which applies fully to this Option 2 approach as well.

3.7.2 Recommended Corrective Actions

The work includes wholesale replacement of these panels, either with pre-cast concrete, or Glass-Fiber-Reinforced-Concrete, (GFRC). Terra-cotta would obviously be closest in appearance, but would likely be more costly. Also, as these panels are one color, pre-cast concrete or GFRC can be integrally colored to match the existing terra-cotta. The panels can be secured with embedded stainless steel clips, epoxy-set threaded rods, or similar methods.

To slow degradation, I recommend that these replacement panels consist of two pieces, one consisting of a sill piece directly below the windows, and the other below this, with a double-layer flashing of adhered single-ply membrane capped with 16 oz. copper installed between these two as well as atop the sill. The upper sill flashing should integrate with the new curtain-wall windows recommended in subsection V-3.12.2. The single-ply membrane flashing should wrap over the top of the copper flashing to avoid contact between the aluminum window frame and the copper flashing. Figure V-3.7(1) shows a generic detail for this work.

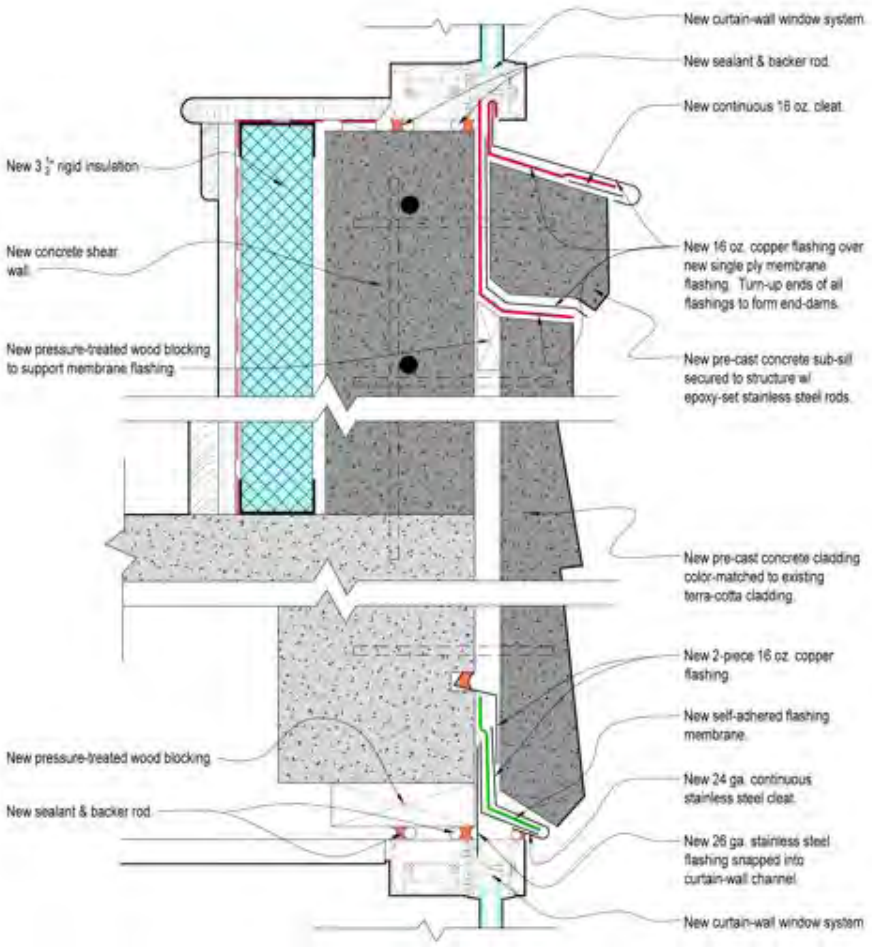

Fig. V-3.7(1): Replacement of Terra-Cotta Panels With Pre-Cast Concrete Panels

3.8. North Courtyard Walls, Brick-Clad

3.8.0 General

This subsection pertains to the brick-clad exterior walls wrapping the north courtyard, but excludes the stairwell walls. Elements integral to these walls, such as steel lintels above the windows, are also addressed here.

3.8.1 Basis of Recommendations

Please see subsection IV-3.8.1, which applies fully to this Option 2 approach as well.

3.8.2 Recommended Corrective Actions

Recommended work at these walls is in most ways quite similar to the recommended work for the more public brick walls addressed in subsection V-3.6.2, and is thus described in a more cursory fashion. Please see subsection V-3.6.2 for more detailed information.

However, there is one significant difference between these courtyard walls and the more public ones, in that the courtyard walls only have a single brick wythe outward of the concrete columns, and the windows are presently recessed farther inward to maintain a similar sill depth to the other walls. To maintain a similar appearance, the new interior concrete shear walls above and below windows would be cast about 4” inward of the outer concrete column faces. However, in other regards, the work is very similar to that described in subsection V-3.6.2, and is repeated here only skeletally. Please see subsection V-3.6.2 for additional information.

This work also begins with the removal of all existing interior finishes, the hollow clay tile, and all exterior masonry to expose the existing concrete building frame.

New concrete walls, piers, and headers are cast between existing concrete columns per subsection IV-2.1.1, but about 4” inward of the outer concrete column faces. All exterior concrete faces are then coated with an asphaltic damp-proofing.

Galvanized steel ledgers are secured along all floor lines where needed to support the new brick veneer along each floor level.

The ledgers are flashed with a double-layer flashing assembly of self-adhered flashing membrane capped with 26-gage stainless steel flashings where fully concealed, and with 16 oz. copper flashings where these become exposed to view.

New stainless steel veneer anchor channels, such as Dur-O-Wal DA904, are fastened to the concrete walls, spaced 16” apart horizontally, and vertically continuous.

A thin vent mat, such as Enka-Drain 9714, is placed against the damp-proofed concrete walls, and 4” thick extruded polystyrene insulation, such as Dow Board, is placed against this. Stainless steel veneer anchors, such as Dur-O-Wal DA931, are clipped into the channel slots, spaced 18” apart vertically. A thicker drain mat, such as Enka-Drain 9120, is placed over the insulation, fabric-side facing outward, to limit mortar clogging.

A new masonry veneer, consisting of ASTM C-216 face brick, Grade SW, is installed over this, largely to match the existing appearance. Horizontal 9-gage stainless steel wire seismic joint reinforcing is embedded within the horizontal joints spaced 18” apart vertically.

The new masonry should be cleaned and sealed with a penetrating water repellent, such as ProSoCo Weather-Seal Siloxane.

Figure V-3.8(1) shows a similar exterior detail where it occurs at the windows. This detail pertains specifically to the more public walls addressed in subsection V-3.6.2, and does not represent the condition at the courtyard walls with complete accuracy. However, it should be close enough for cost-estimating purposes.

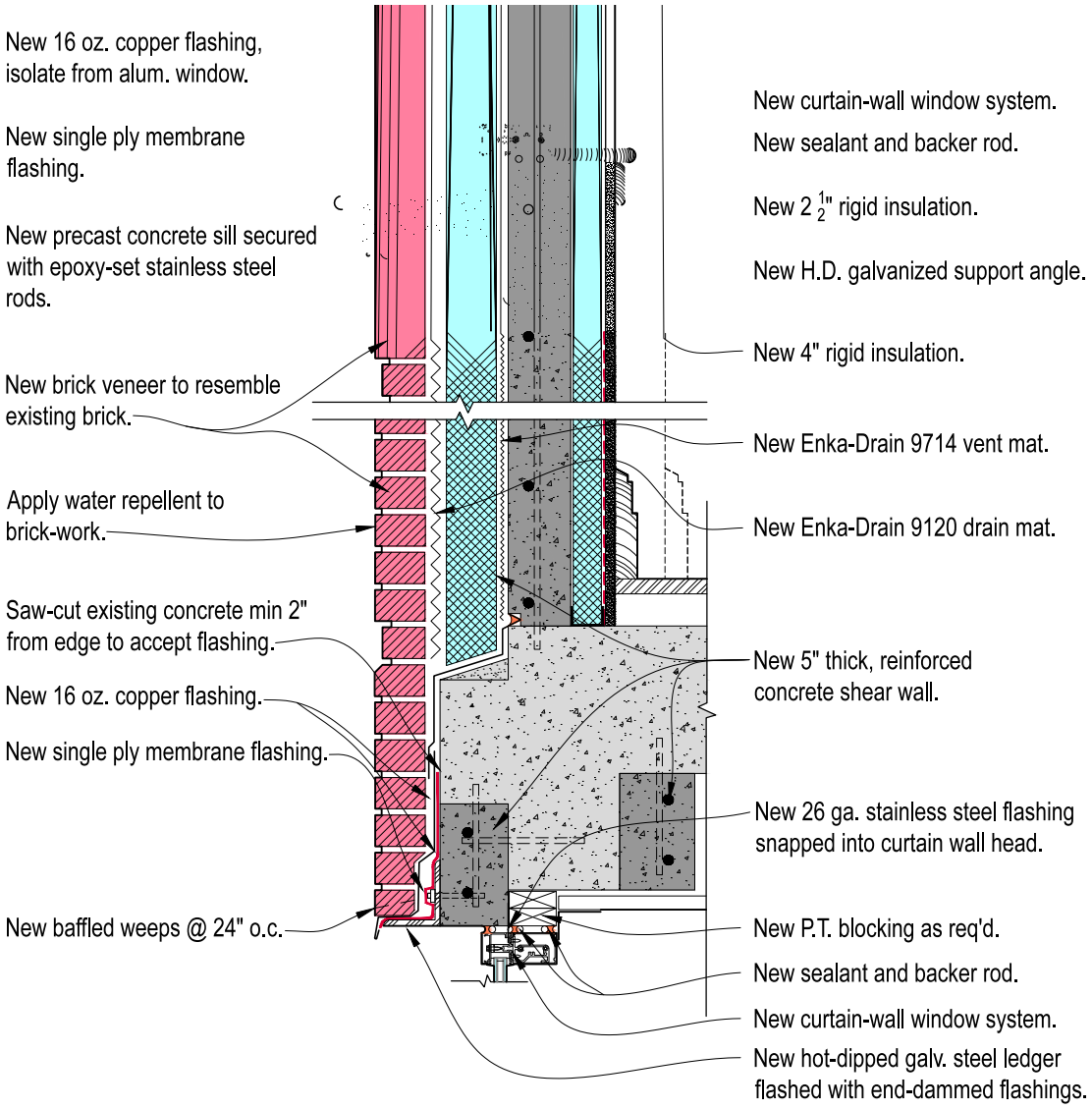

Figure V-3.8(1): Typical New Brick Veneer at Windows

3.9. North Stairwell Walls, Brick & Stucco-Clad

3.9.0 General

This subsection pertains to the brick-clad exterior walls wrapping the stairwell in the courtyard.

3.9.1 Basis of Recommendations

Please see subsection IV-3.9.1, which applies fully to this Option 2 approach as well.

3.9.2 Recommended Corrective Actions

In most respects, recommended work at these walls is identical to the work recommended for the other Courtyard walls, as described in subsection V-3.8.2, and is not repeated here in detail.

This work also begins with the removal of all existing interior finishes, the hollow clay tile, and all exterior masonry to expose the existing concrete building frame.

New concrete walls, piers, and headers are cast between existing concrete columns per subsection IV-2.1.1, flush with the outer concrete column faces. All exterior concrete faces are then coated with an asphaltic damp-proofing. For cost-estimating purposes, 8" thick concrete walls reinforced with #5 bars at 12" O. C. Each Way should be assumed.

Galvanized steel ledgers are secured along all floor lines where needed to support the new brick veneer along each floor level.

The ledgers are flashed with a double-layer flashing assembly of self-adhered flashing membrane capped with 26-gage stainless steel flashings where fully concealed, and with 16 oz. copper flashings where these become exposed to view.

New stainless steel veneer anchor channels, such as Dur-O-Wal DA904, are fastened to the concrete walls, spaced 16" apart horizontally, and vertically continuous.

A thin vent mat, such as Enka-Drain 9714, is placed against the damp-proofed concrete walls, and 4" thick extruded polystyrene insulation, such as Dow Board, is placed against this. Stainless steel veneer anchors, such as Dur-O-Wal DA931, are clipped into the channel slots, spaced 18" apart vertically. A thicker drain mat, such as Enka-Drain 9120, is placed over the insulation, fabric-side facing outward, to limit mortar clogging.

A new masonry veneer, consisting of ASTM C-216 face brick, Grade SW, is installed over this, largely to match the existing appearance. Horizontal 9-gage stainless steel wire seismic joint reinforcing is embedded within the horizontal joints spaced 18" apart vertically.

The new masonry should be cleaned and sealed with a penetrating water repellent, such as ProSoCo Weather-Seal Siloxane.

In contrast to the Option 1 approach, the uppermost, stucco-clad wall band would also be replaced with this new brick veneer, rather than a metal cladding.

This approach would also require new galvanized-steel ledgers directly above the abutting low roofs, with through-wall flashings, to drain water from behind the brick veneer over these roofs.

Similarly, new galvanized-steel ledgers would be needed to support the brick veneer above the newly retrofitted cornice. These ledgers would also be flashed with a double-layer through-wall flashing to drain water from behind the brick veneer over the cornice cap.

Finally, this work would also require new sheet metal copings at the stairwell roof parapets. The existing EPDM membrane would be extended over the new parapet tops over continuous 24-gage stainless steel cleats, and new 16 oz. copper copings would secure over this.

Detailing around windows would be similar to Figure V-3.8(1).

3.10. Brick Chimney

3.10.0 General

This subsection pertains to the relatively tall brick chimney above the main roof, near the inside corner where the west wing joins the main portion of the building. As the “structural” and “weather-integrity” issues affecting this chimney are intricately related and inseparable, all recommendations related to this chimney are addressed holistically in section V-2.5. The sole purpose of section V-3.10 is to refer the reader to section V-2.5 for both “structural” and “weathering” information.

3.11. North Courtyard Walls, Metal-Clad

3.11.0 General

This subsection pertains to two small wall portions on the building’s north side, one to each side of the stair tower, at floor level 2. These walls were not part of the building’s original construction.

3.11.1 Basis of Recommendations

Please see subsection IV-3.11.1, which applies fully to this Option 2 approach as well.

3.11.2 Recommended Corrective Actions

Please follow recommendations of subsection IV-3.11.2, which apply fully to this Option 2 approach as well.

3.12. Windows

3.12.0 General

This subsection pertains to all exterior windows.

3.12.1 Basis of Recommendations

Please see subsection IV-3.12.1, which applies fully to this Option 2 approach as well.

3.12.2 Recommended Corrective Actions

Please follow recommendations of subsection IV-3.12.2, which apply to this Option 2 approach as well.

In brief, the work consists of complete replacement of all windows with a new curtain-wall system with operable sashes integrated as needed to match the current window configurations.

Figures V-3.12(1 & 2) depict typical window installation details for most conditions on this building.

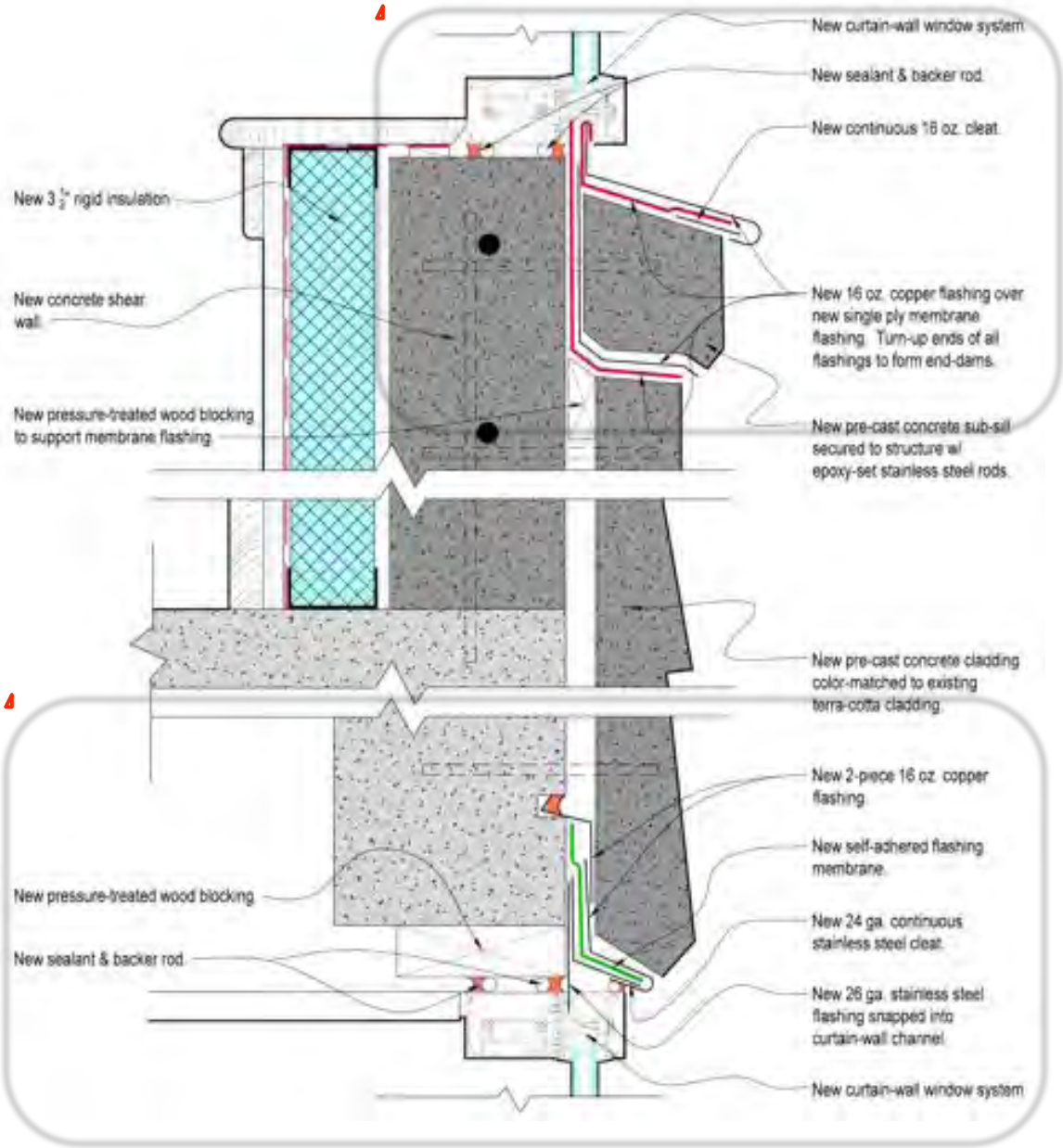

Fig. V-3.12(1): Window Head & Sill Installation at Typical Cladding Panel Loc.

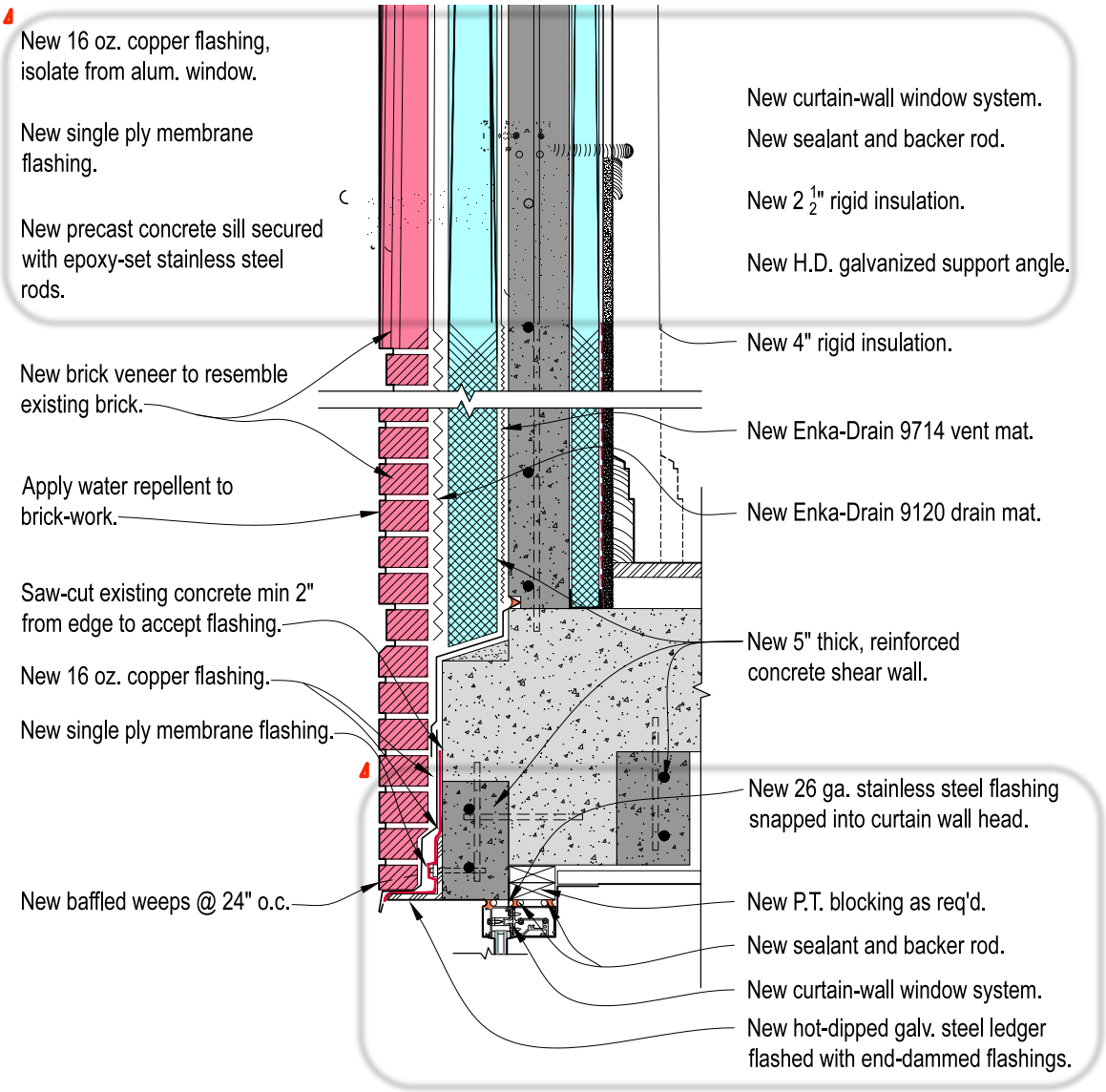

Fig. V-3.12(2): Window Head & Sill Installation at Typical Brick Wall Loc.

3.13. Roofs

3.13.0 General

This subsection pertains to four roof areas, including the large main roof, a small roof atop the stair-tower, and two small roof areas atop the metal-clad additions on the building's north side. The portico roof is addressed separately with the portico in subsection V-5.6.

3.13.1 Basis of Recommendations

Please see subsection IV-3.13.1, which applies fully to this Option 2 approach as well.

3.13.2 Recommended Corrective Actions

Please follow recommendations of subsection IV-3.13.2, which apply to this Option 2 approach as well.

4. EXTERIOR MASONRY SUB-ELEMENTS

4.0. General

This section of the report addresses issues related to the various exterior masonry sub-elements, such as the stone and terra-cotta water tables, stone window sills, marble panels, etc. It is divided into 8 subsections, each of which pertains to a specific primary element. Where appropriate, each subsection contains preliminary drawings depicting the described work. In addition, Figures V-4.0(1-7) show the exterior elevations which reference the locations of specific details in the various subsections.

Fig. V-4.0(1): South Elevation

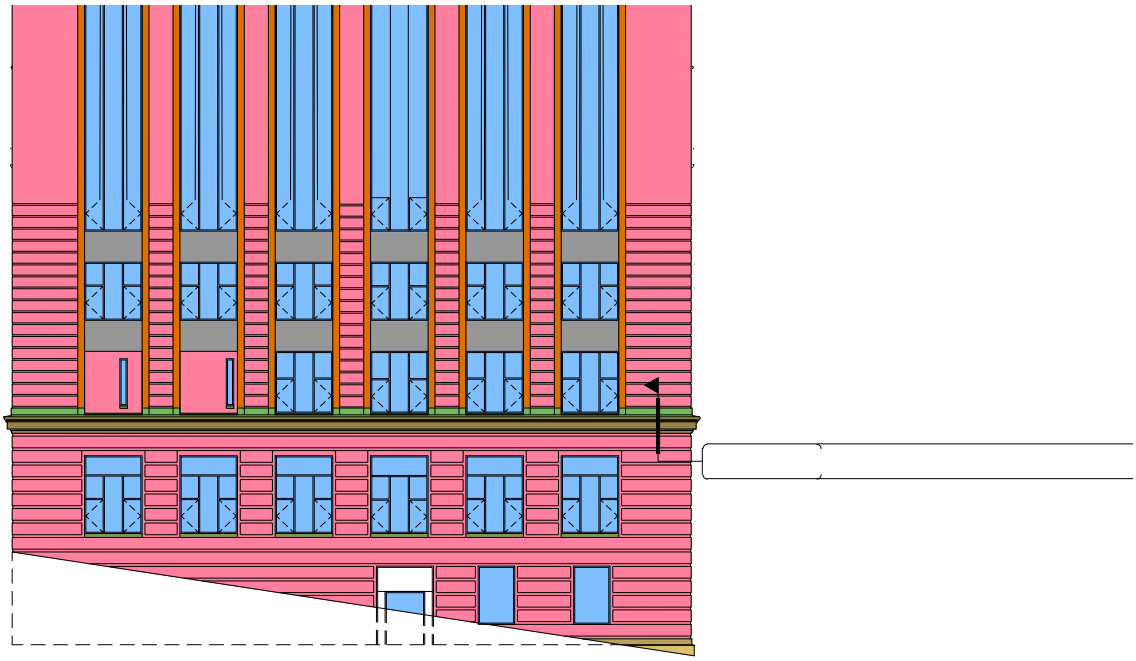

Fig. V-4.0(2): West Elevation

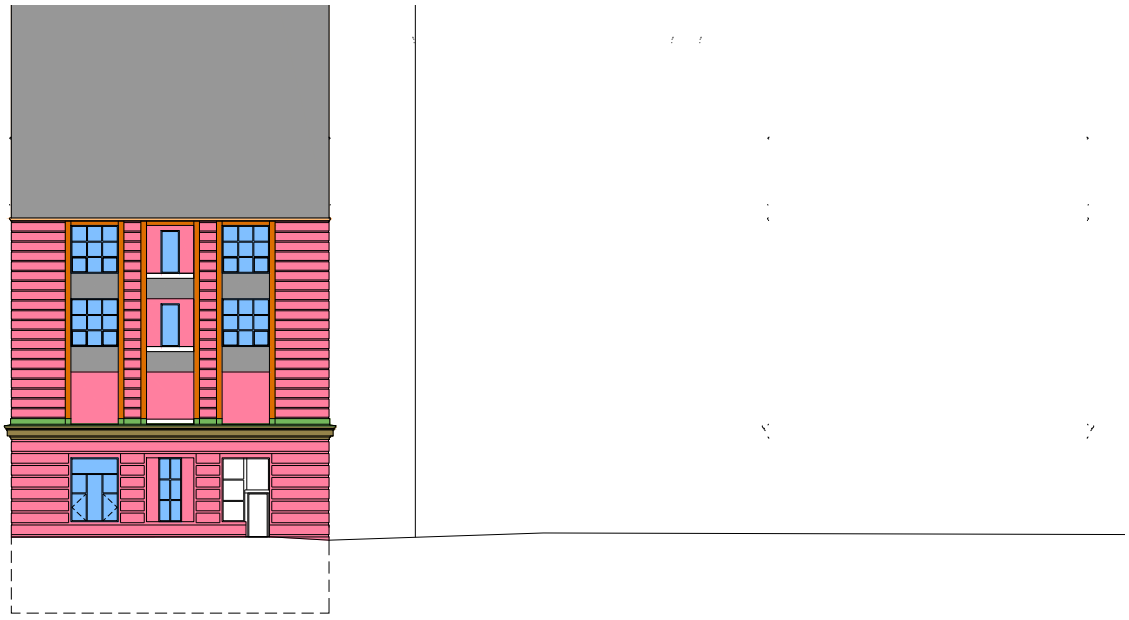

Fig. V-4.0(3): North Elevation

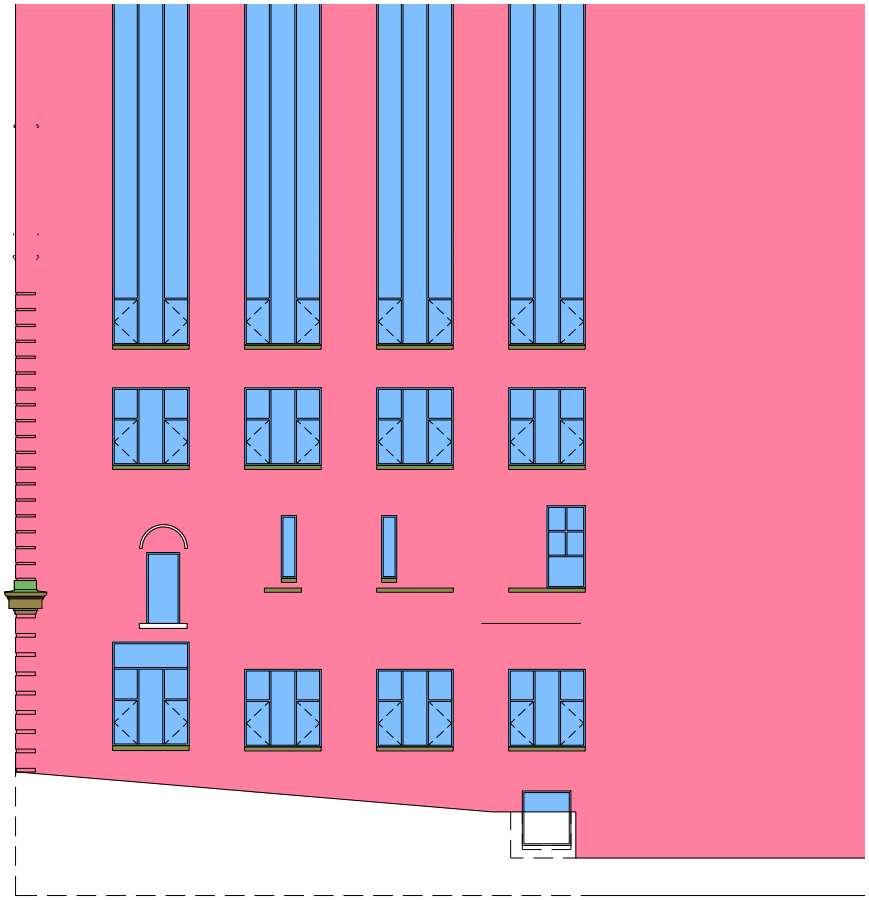

Fig. V-4.0(4): North Courtyard: West-Facing Wall

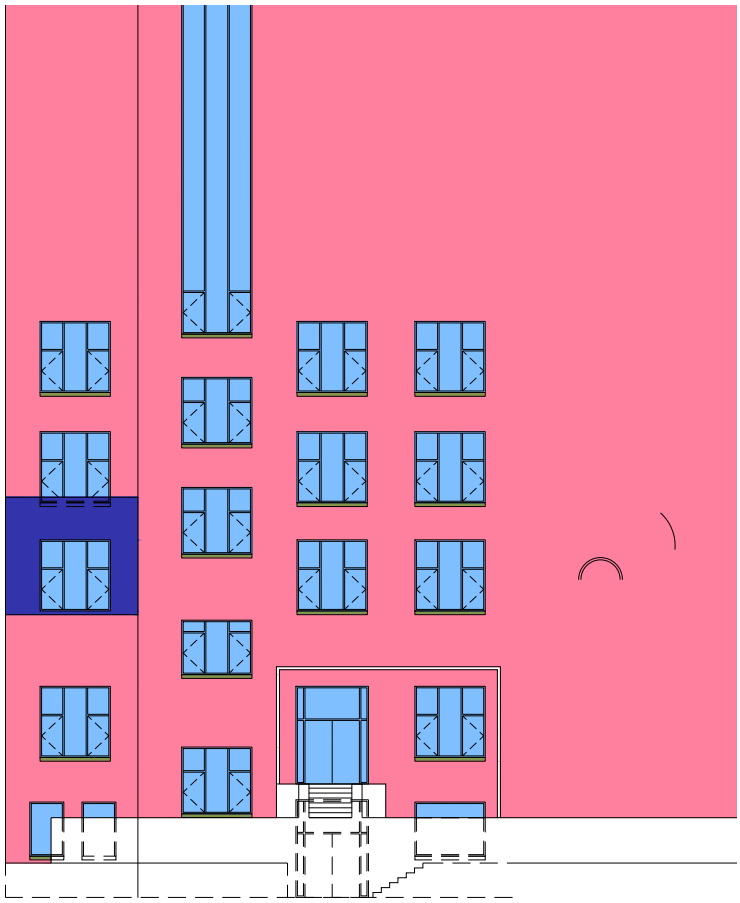

Fig. V-4.0(5): North Courtyard: North-Facing Wall

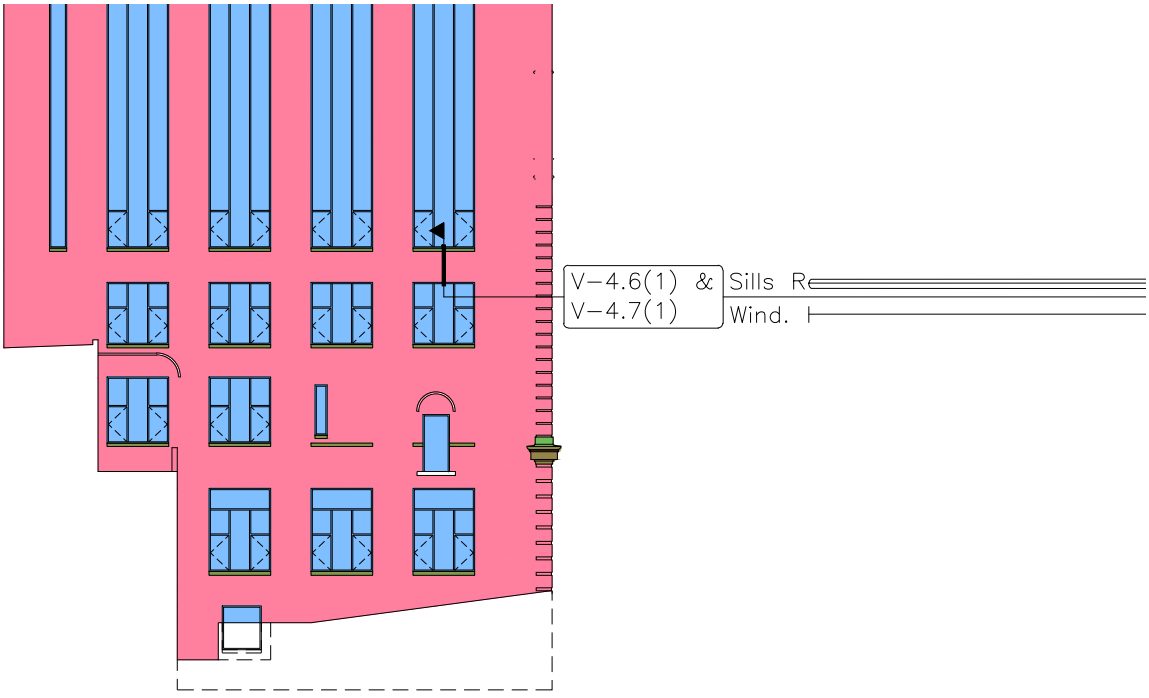

Fig. V-4.0(6): North Courtyard: East-Facing Wall

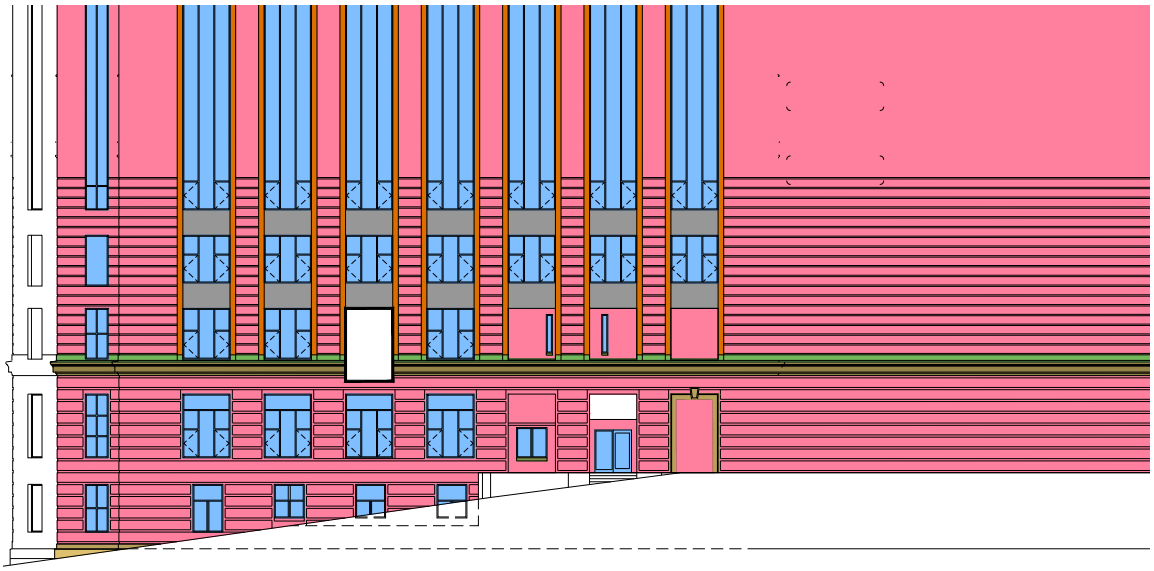

Fig. V-4.0(7): East Elevation

4.1. Lower Stone Water Table at Level 2

4.1.0 General

This subsection pertains to the stone water table that extends at level 2 around the building's more public façades on the west, south, east, and north sides, but not in the north courtyard.

4.1.1 Basis of Recommendations

Please see subsection IV-4.1.1, which applies fully to this Option 2 approach as well.

In addition, please note that although the existing water table could be restored and reused in this approach, it would need to be removed to allow other work to proceed, and it would probably be less costly, as well as technically preferable, to replace this water table with a new, pre-cast concrete one, generally similar to the proposed new cornice.

4.1.2 Recommended Corrective Actions

Replacement of this water table with a pre-cast concrete one is recommended. Figure V-4.1(1) depicts the general scope of this work.

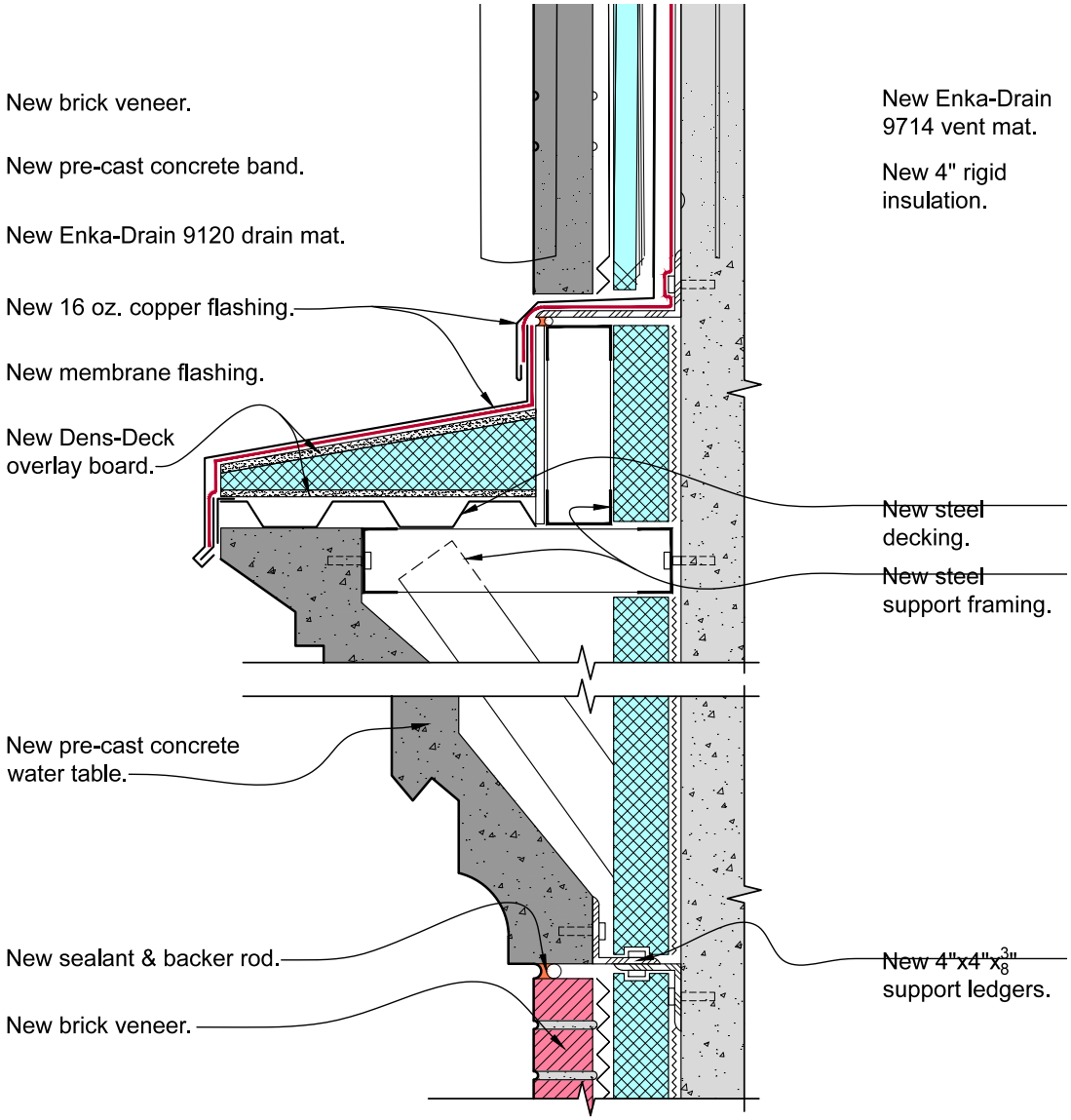

Fig. V-4.1(1): Water Table Reconstruction

4.2. Terra-Cotta Window Bay Surrounds

4.2.0 General

This subsection pertains to the multi-colored terra-cotta border elements that surround all vertical window bays at levels 2-5 around the building's public façades on the west, south, east, and north sides, but not in the north courtyard.

4.2.1 Basis of Recommendations

Please see subsection IV-4.2.1, which applies fully to this Option 2 approach as well.

4.2.2 Recommended Corrective Actions

Please see subsection IV-4.2.2, which applies fully to this Option 2 approach as well.

In brief, this work consists of replacing all existing terra-cotta window bay surrounds with new terra-cotta pieces.

4.3. Upper Terra-Cotta Water Table at Level 5

4.3.0 General

This subsection pertains to the wide horizontal band that separates the 4^{th} and 5^{th} level windows.

4.3.1 Basis of Recommendations

Please see subsection IV-4.3.1, which applies fully to this Option 2 approach as well.

4.3.2 Recommended Corrective Actions

Recommended work of this section is similar to the corresponding work in the Option 1 Restoration approach, as described in subsection IV-4.3.2.

In brief, the work consists of replacing the entire band with new pre-cast concrete and terra-cotta pieces, along with installation of new, continuous steel support ledgers above the level 4 windows and above the adjacent brick, and below the new pre-cast concrete water table, as well as installation of new flashing caps and through-wall flashings. Figure V-4.3(1) depicts this work.

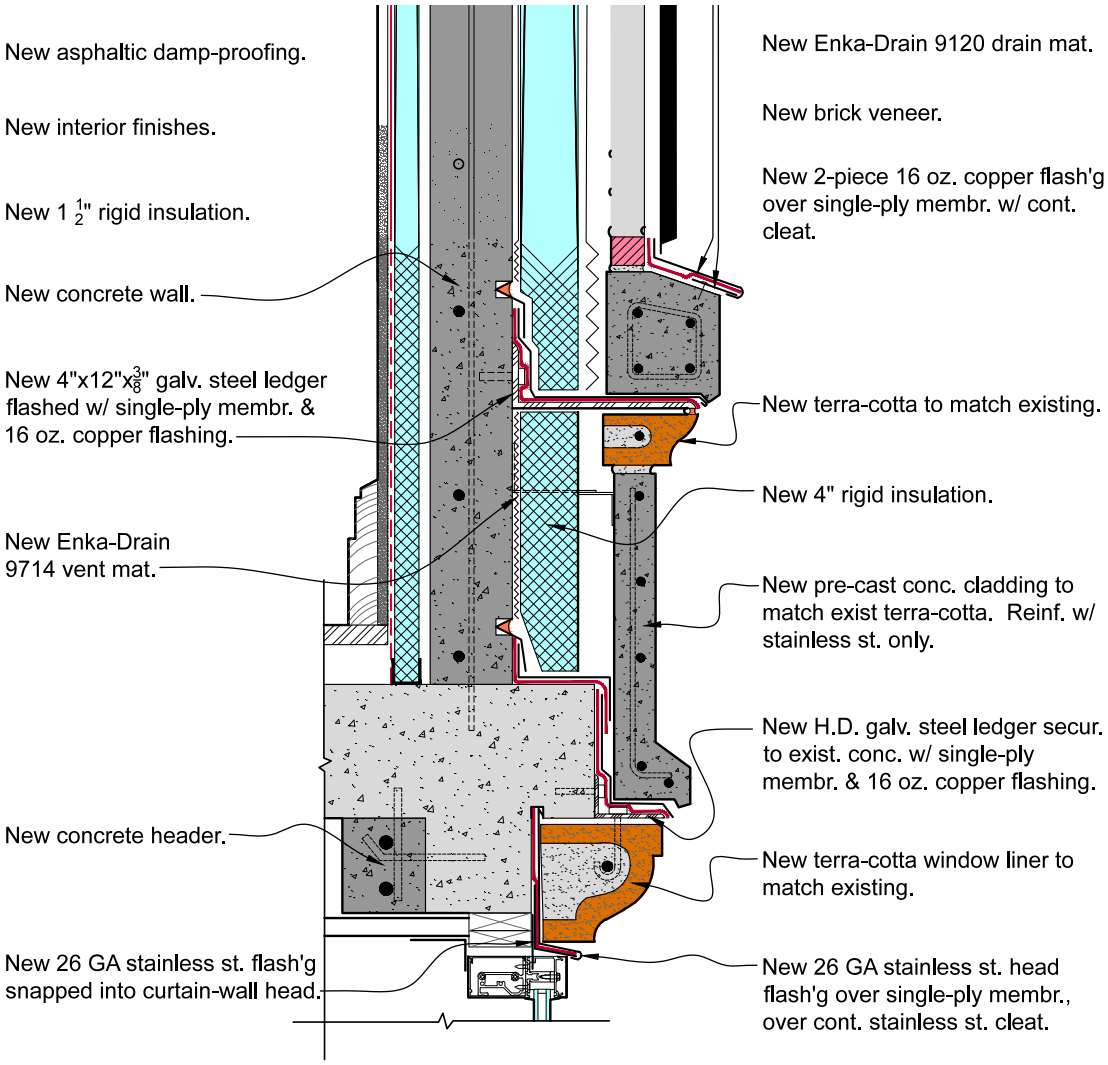

Fig. V-4.3(1): Terra-Cotta Water Table Band Replacement Abv. Level 4 Windows

4.4. Marble Panels at Level 5

4.4.0 General

This subsection pertains to four flat marble panels embedded within the level 5 brickwork.

4.4.1 Basis of Recommendations

Please see subsection IV-4.4.1, which applies fully to this Option 2 approach as well.

4.4.2 Recommended Corrective Actions

In contrast to the Option 1 approach, these marble panels will not be backed-up with another wythe of brick, and will need to be fitted within the thickness of the brick veneer. As these panels are 2 ½" thick, they should not support any brick above them, though they can rest upon the brick below them.

In view of this consideration, the existing panels should be restored and anchored in place, but the steel ledgers above the adjacent windows should run continuously to support the brick above the panels. These ledgers should be flashed with a membrane flashing capped with 16 oz. copper as recommended for all ledgers. The gaps separating the tops of the marble panels from the ledgers should be filled with closed-cell backer rods and sealant.

The panels can be anchored by drilling epoxy-set threaded rods into the existing concrete walls behind them. Only stainless steel anchors should be used, and should be set into the back-up concrete walls at least 4". The back side of the panels should be drilled with slightly over-sized holes which stop about ¾" short of the outer panel faces. These drilled holes should be filled with epoxy, then set over the threaded rods. The two larger panels should be anchored with 9 anchors, consisting of 3 rows of 3 anchors each, while the two smaller panels can be secured with 3 anchors.

The apparent cracks in the panels can be injected with a low viscosity epoxy, such as Sika Sikadur 35 Hi-Mod LV to re-glue the panels. However, this method should first be tested to assure that the epoxy does not stain the stone.

Although the surface erosion could be addressed by re-polishing, this would be costly and would provide very little benefit, as it cannot be seen from the street level. Therefore, no polishing is recommended.

However, the panels should be cleaned and sealed to limit infiltration and slow-down further degradation. Cleaning can be achieved with products such as ProSoCo Limestone Restorer or 766 Limestone & Masonry Pre-Wash and Limestone After-Wash. Sealing can be achieved with ProSoCo NST 400, NST-600, or Weather-Seal H40, which will also help consolidate the stone surface.

4.5. Cornice-Parapet Band at Roof Level

4.5.0 General

This subsection pertains to the entire height of the multi-part band above the level 5 windows and brickwork.

4.5.1 Basis of Recommendations

Please see subsection IV-4.5.1, which applies fully to this Option 2 approach as well.

4.5.2 Recommended Corrective Actions

The recommended work for this band in this approach is very similar to the work recommended for the Option 1 approach, and also includes complete replacement of this band with a new pre-cast concrete cornice and cladding supported with new steel framing. It differs from the option 1 approach only in the specifics of its construction to reflect the different cladding approach. Figure V-4.5(1) depicts the general nature of the recommended replacement cornice.

In brief, the recommended work in this approach also begins by removing all remnants of this cornice band. The bottom projecting terra-cotta band and the flat terra-cotta panels above would then be replaced with a single band of pre-cast concrete, which can be secured to the structure with stainless steel clips, with a minimum of 4 anchors per panel piece.

Above this, a new structural support framework of hot-dipped galvanized steel would be constructed, capped with galvanized steel decking. Pre-cast concrete soffit panels, fabricated to mimic the original cornice and reinforced with stainless steel, would then be secured to this steel support structure.

New 5/8” gypsum overlay board, such as Georgia Pacific Dens-Deck, would be secured over the decking, and would be capped with tapered rigid insulation, sloped at 1” per foot as a minimum, to provide slope. Another layer of 1/2” gypsum overlay board would be secured over this.

A continuous 24-gage stainless steel cleat would be secured along the outer edge. A single-ply membrane, such as the existing EPDM roof membrane, Cetco Core-Flash 60, TPO roofing membrane, or a similar membrane, would cap over this cleat and extend over the cornice top and up the parapet wall to its top.

Finally, a 16 oz. copper cap flashing would be secured over this, and would be counter-flashed along the parapet face with another 16 oz. copper flashing. This counter-flashing could be fabricated to interlock with a new 16 oz. copper parapet coping, though this could also be secured with a separate cleat.

Figure V-4.5(1) illustrates the general construction of the recommended cornice.

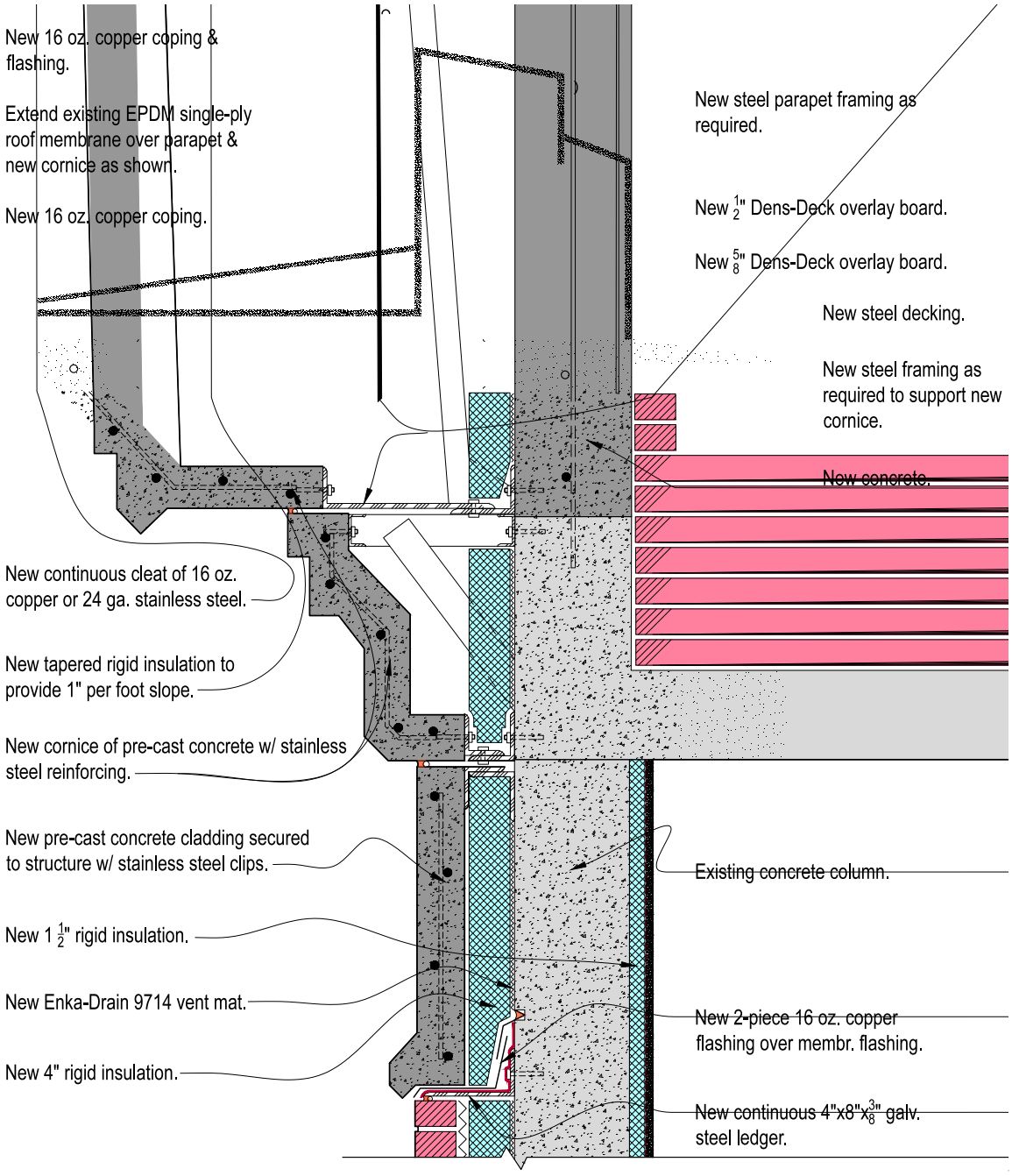

Fig. V-4.5(1): General Configuration of New Cornice

4.6. Stone Window Sills

4.6.0 General

This subsection pertains to the stone sills which occur along the full height of three vertical window bands at the building's SE corner, along levels 0 and 1 on the east and west elevations, at level 1 of the north ends of both wings, and at nearly all windows facing the courtyard.

4.6.1 Basis of Recommendations

Please see subsection IV-4.6.1, which applies fully to this Option 2 approach as well. In addition, this Option 2 approach envisions removing all existing exterior cladding. Consequently, it would probably be less costly to fabricate new pre-cast concrete sills, rather than trying to save the existing stone sills.

4.6.2 Recommended Corrective Actions

The recommended work consists of replacing these sills with new pre-cast concrete sills with membrane and copper flashings atop and below these as shown in Figure V-4.6(1).

The new pre-cast concrete sills should be supported on new 4" x 10" x 3/8" hot-dipped galvanized steel ledgers secured to the new concrete walls, and should also be anchored to the new interior concrete walls with either stainless steel helical Helifix anchors, or epoxy-set threaded rods. Each sill should be anchored with at least two rods.

The new sills should be underlain as well as capped with a single-ply membrane flashing and 16 oz. copper flashings. Prior to installing the sills, new single-ply membrane flashings, such as Cetco Core-Flash 60, should be adhered over the supporting steel ledger and extended up the vertical concrete face under the windows, and new 16 oz. copper flashings with up-turned end-dams should secure over this. The new sills should then be mortar-set over this, with gaps left in the mortar to allow drainage.

New flashing caps should be installed over these sills. This work consists of securing continuous cleats of 16 oz. copper or 24-gage stainless steel along the outer edges, adhering a single-ply membrane over the cleats and sills, and integrating this membrane into the curtain-wall channels. Finally, 16 oz. copper flashing caps with up-turned ends should clip over these cleats and into the curtain-wall window channels. The up-turned ends should be counter-flashed with copper flashings cut into the jamb brick joints.

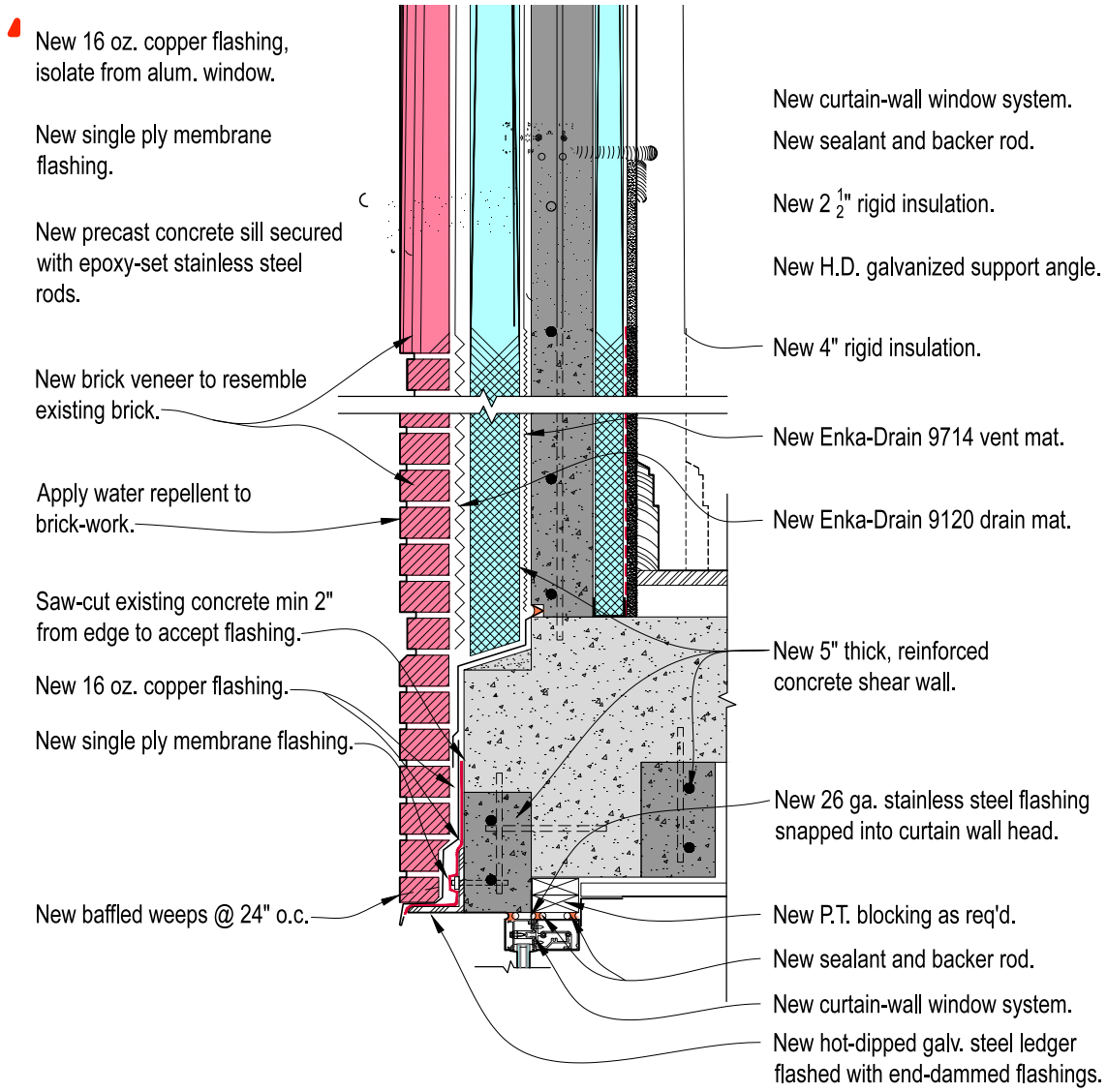

Fig. V-4.6(1): Sill Replacement With Pre-Cast Concrete

4.7. Steel Window-Head Lintels

4.7.0 General

This subsection pertains to the steel lintels above windows that do not have terra-cotta panels above them. These occur along the full height of three vertical window bands at the SE corner, at levels 0 and 1 on the east and west elevations, at level 1 of the north ends of both wings, and at all windows facing the courtyard.

4.7.1 Basis of Recommendations

Please see subsection IV-4.7.1, which applies fully to this Option 2 approach as well. In addition, this Option 2 approach envisions removing all existing exterior cladding. Consequently, the window-head lintels would be replaced with galvanized steel ledgers.

4.7.2 Recommended Corrective Actions

Although many of the existing lintels are still in decent condition and could provide several decades of additional life, their current un-flashed configuration contributes to scattered interior leakage, and the scope of this retrofit project warrants replacement of the outer, accessible lintels as part of this approach. This work is depicted in Figure IV-4.7(1).

In brief, this work consists of replacing these lintels with new, hot-dipped galvanized steel ledgers. These should be flashed with 2-layer flashings consisting of membrane flashings, such as Cetco Core-Flash 60, capped with 3-piece copper flashings, as shown in Figure V-4.7(1). Baffled weeps spaced 24” apart should be included for drainage.

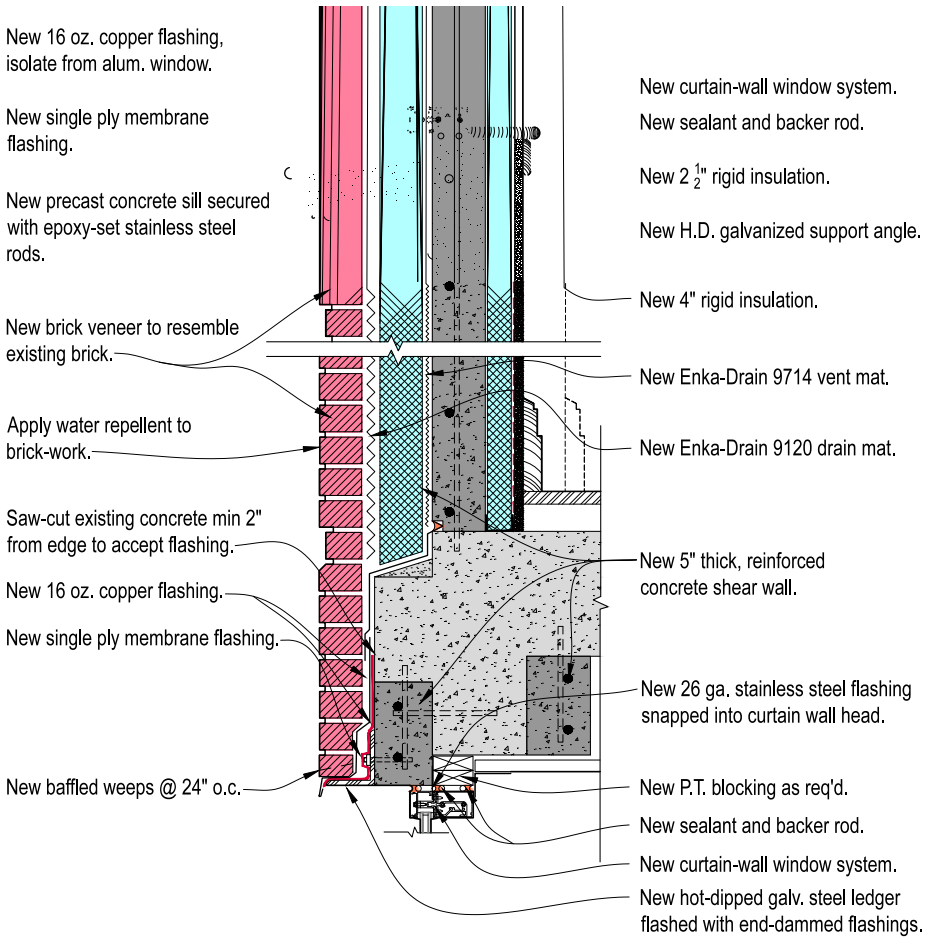

Fig. V-4.7(1): Window-Head Lintel Replacement and Flashing

5. ENTRY PORTICO

5.0. General

This section pertains to all elements that comprise the entry portico. It is subdivided into 7 subsections, each of which addresses the portico's various components, such as its support base, stairs, columns, etc. As the Option 2 work at the portico is essentially identical in nearly all regards to the Option 1 portico work, no new details are needed, and Figure V-5.0(1) references specific details from the Option 1 approach without repeating them in this section.

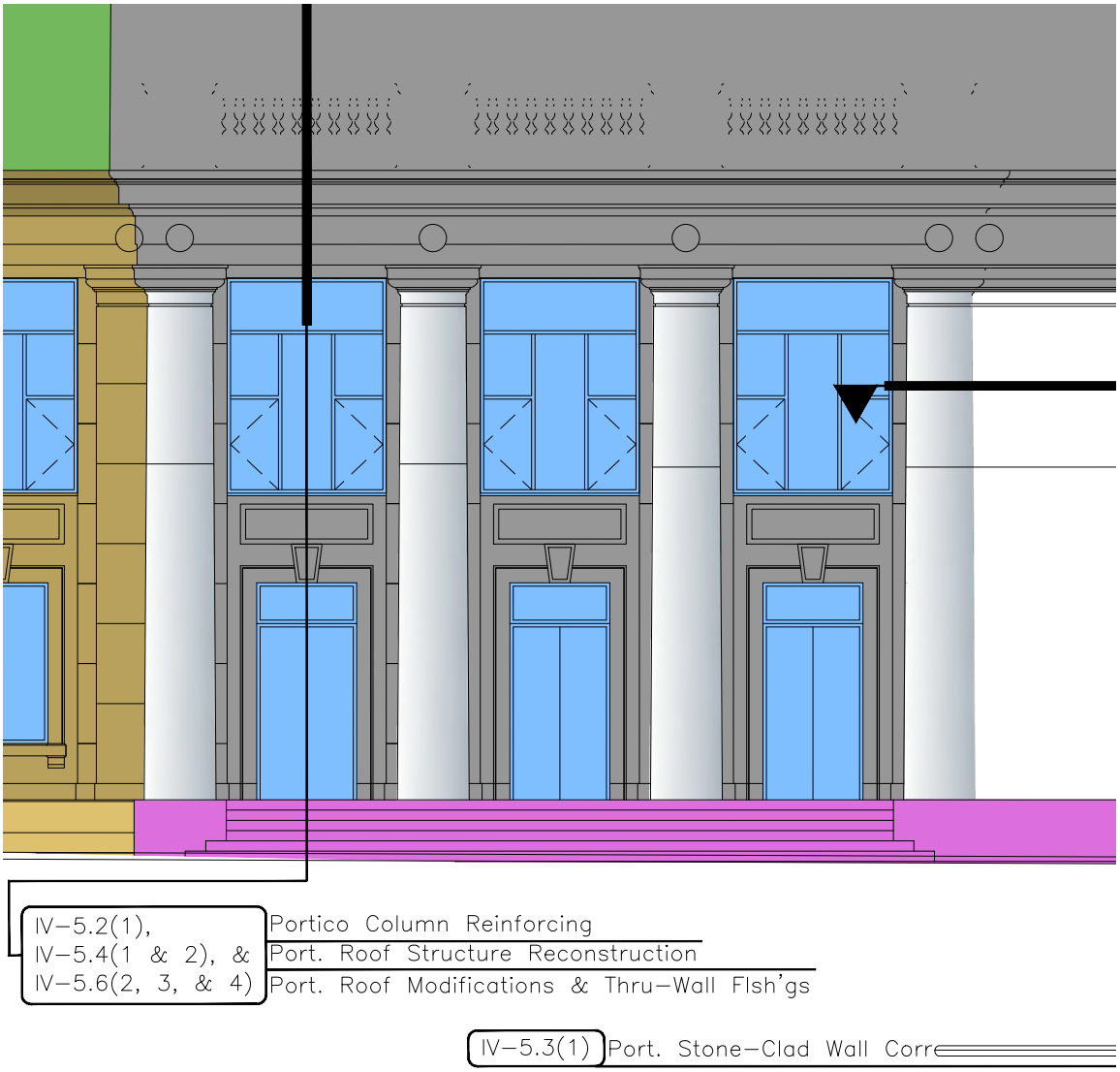

Figure V-5.0(1): Portico South Elevation

5.1. Support Base for Portico Entry and Stairs

5.1.0 General

This subsection pertains to the portico's support base, including its support structure, granite paving, granite stairs, and granite-clad column plinths.

5.1.1 Basis of Recommendations

Please see subsection IV-5.1.1, which applies fully to this Option 2 approach as well.

5.1.2 Recommended Corrective Actions

Please see subsection IV-5.1.2, which applies fully to this Option 2 approach as well.

In brief, this work consists of performing additional evaluation as part of the next phase of corrective work, which will hopefully allow examination of the concealed portions below the portico entry paving.

5.2. Marble Columns

5.2.0 General

This subsection pertains to the portico's four marble columns and associated capitals.

5.2.1 Basis of Recommendations

Please see subsection IV-5.2.1, which applies fully to this Option 2 approach as well.

5.2.2 Recommended Corrective Actions

Please see subsection IV-5.2.2, which applies fully to this Option 2 approach as well.

In brief, this work consists of core-drilling and reinforcing the columns, injecting cracks with epoxy, restoring or replacing the stone column capitals and capping them with 2-layer flashing caps, and cleaning and polishing the eroded column surfaces.

5.3. Stone Cladding on Exterior Building Wall

5.3.0 General

This section pertains to the stone cladding along the building's exterior wall, but only where it occurs under the portico roof. While this cladding wraps the entire base of the south façade, it forms the structural support for the N-S stone beams of the portico roof. Consequently, at the portico, this cladding is used in a structural fashion.

5.3.1 Basis of Recommendations

Please see subsection IV-5.3.1, which applies fully to this Option 2 approach as well.

5.3.2 Recommended Corrective Actions

Please see subsection IV-5.3.2, which applies fully to this Option 2 approach as well.

In brief, this work consists of replacing the existing damaged cladding with a new, color-matched, pre-cast concrete cladding over new reinforced concrete support columns and walls, along with new flashings, sealant joints, etc., as described in subsection IV-5.3.2.

5.4. Portico Roof Structure

5.4.0 General

This section pertains to the elements comprising the portico's roof structure, including the entablature beam, embedded concrete beam above the entablature, stone crossbeams, steel lintels, stone water table, concrete roof slab, stone ceiling panels, and related elements.

5.4.1 Basis of Recommendations

Please see subsection IV-5.4.1, which applies fully to this Option 2 approach as well.

5.4.2 Recommended Corrective Actions

Please see subsection IV-5.4.2, which applies fully to this Option 2 approach as well.

In brief, this work consists of replacing the entire portico roof structure with a new structure of cast-in-place concrete beams, steel decking and framing, pre-cast concrete cladding, new flashings, etc. as described in subsection IV-5.4.2.

5.5. Stone Railing

5.5.0 General

This section pertains to the stone elements comprising the portico roof's perimeter railing.

5.5.1 Basis of Recommendations

Please see subsection IV-5.5.1, which applies fully to this Option 2 approach as well.

5.5.2 Recommended Corrective Actions

Please see subsection IV-5.5.2, which applies fully to this Option 2 approach as well.

In brief, this work consists of replacing the entire railing with a new one of pre-cast concrete capped with new flashings, etc. as described in subsection IV-5.5.2.

5.6. Portico Roof, Drains, and Associated Flashings

5.6.0 General

This section pertains to the portico's roof membrane, drains, and associated flashings.

5.6.1 Basis of Recommendations

Please see subsection IV-5.6.1, which applies fully to this Option 2 approach as well.

5.6.2 Recommended Corrective Actions

Please see subsection IV-5.6.2, which applies nearly fully to Option 2 as well. It differs only in that rather than retrofitting through-wall flashings in the existing brick above the portico roof, such flashings, consisting of single-ply membrane capped with 16 oz. copper, would cap over new steel ledgers supporting the new brick veneer. In all other respects, the work would be identical.

In brief, this work consists of replacing the existing portico roof membrane, installing through-wall flashings under the railings, adding two new overflow drains, etc. per subsection IV-5.6.2.

6. INTERIOR ARCHITECTURAL ELEMENTS

6.0. General

This section addresses issues related to the interior architectural elements including the wall, floor and ceiling construction and finishes.

6.1. Interior Faces of Exterior Building Walls

6.1.0 General

This subsection pertains to the interior architectural elements affected by the seismic retrofit and exterior wall renovation, which primarily impacts interior faces of exterior walls.

6.1.1 Basis of Recommendations

Please see subsection IV-6.1.1, which applies fully to this Option 2 approach as well.

6.1.2 Recommended Corrective Actions

Please see subsection IV-6.1.2, which applies fully to this Option 2 approach as well.

7. MECHANICAL SYSTEMS

7.0. General

This section addresses issues related to the building's mechanical systems, including heating, ventilation, plumbing and fire sprinkler systems.

7.1. General Mechanical Systems

7.1.0 General

This subsection pertains to the mechanical systems affected by the work on the exterior walls and mechanical systems affected by other seismic retrofit work.

7.1.1 Basis of Recommendations

Please see subsection IV-7.1.1, which applies fully to this Option 2 approach as well.

7.1.2 Recommended Corrective Actions

Please see subsection IV-7.1.2, which applies fully to this Option 2 approach as well.

8. ELECTRICAL SYSTEMS

8.0. General

This section addresses issues related to the building's electrical systems, including power, lighting and communication systems.

8.1. General Electrical Systems

8.1.0 General

This subsection pertains to the electrical systems affected by the work on the exterior walls and by other seismic retrofit work.

8.1.1 Basis of Recommendations

Please see subsection IV-8.1.1, which applies fully to this Option 2 approach as well.

8.1.2 Recommended Corrective Actions

Please see subsection IV-8.1.2, which applies fully to this Option 2 approach as well.

9. ESTIMATED CONSTRUCTION COST OF OPTION 2

9.0. General

This section presents the summarized construction cost estimate for Option 2, which is based on the full cost estimate prepared by HMS, Inc., with subsequent modifications by Jensen Yorba Lott Inc., and PL:BECS.

As this Option 2 replaces all exterior cladding elements, a higher level of certainty is assumed concerning its likely costs, compared to Option 1. For this reason, the assumed contingency for phases 2 and 3 of Option 2 is 25% lower than the corresponding contingencies for Option 1.

It should further be noted that this preliminary evaluation obviously did not attempt to design in detail every aspect of each option, but rather attempted to define each approach to a schematic level, sufficient to allow only very rough construction cost estimates to be prepared. For this reason, the costs of each phase of each option are rounded to the nearest $ 100,000, and realistically, even this level of precision implies a higher degree of certainty than can be justified by the schematically-defined work scope descriptions. The reader is encouraged to round these estimates to the nearest $ 1,000,000.

It should also be clarified that these estimates relate only to the projected construction costs, and that in any case and with any approach, appreciable additional costs should be anticipated to cover temporary relocation of occupants, design and engineering fees, possible soil studies, and other, non-construction related expenses.

9.1. Estimated Construction Cost of Option 2

The estimate is broken down by the 3 construction phases

Construction Phase 1 is scheduled for May to December 2013. This phase will consist of seismic reinforcing and renovation of the Portico along with repairs to the ground floor structure in the crawl space and providing drainage in the crawl space.

Construction Phase 2 is schedule for May to December 2014. This phase will consist of seismic reinforcing of the south wall from the foundations to the roof along with renovation of the exterior south wall assembly. The work will also include replacing the steam heating system on the south wall with a hydronic heating system.

Construction Phase 3 is schedule for May to December 2015 and May to December 2016. This phase will consist of seismic reinforcing of the east, west and north walls from the foundations to the roof along with renovation of the remaining exterior wall assemblies. The work will also include replacing the steam heating system in the remainder of the building with a hydronic heating system.

The cost of the three construction phases follows:

Construction Phase 1:	$ 1.1 million.
Construction Phase 2:	$ 6.7 million.
Construction Phase 3:	$ 14.1 million.
Total	**$ 21.9 million.**