10 Duke Steet West

Kitchener, Ontario

Existing Façade Retention
Structural Assessment & Retention Plan

Project No. 24012

Draft report issued November 17th, 2023

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Report Prepared by:

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CONSULTING ENGINEERS

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1. INTRODUCTION

John G. Cooke & Associates Ltd. (JCAL) was retained by VanMar Developments Inc. (VanMar) to provide consulting structural engineering services as it relates to the retention of portions of the primary façades of the existing building at 10 Duke Street West, in Kitchener, Ontario, for incorporation of these facades with a planned redevelopment on the site. The redevelopment will include the construction of a new tower that occupies much of the footprint of the existing building presently on the site.

VanMar's intent is to retain the existing masonry facades by primarily making use of the steel frame of the existing load-bearing masonry and steel-framed building, supplemented by temporary bracing and supports as necessary, until the façade may be secured to the new permanent structure (designed by other consultants), as construction of the latter progresses.

VanMar received conditional approval of their Site Plan Application - SP22/104/D/AP, the draft version of which, dated June 23, 2023 and available to JCAL, requires "That the Owner's Consulting Engineer … submit a Structural Assessment Report for 10 Duke Street West to be included within the Demolition and Stabilization Plan, … advising on the means and methods to be used to safely remove portions of the existing building and to avoid causing structural damage to the historic portions of the front facades…". This report is intended to satisfy that requirement and be the basis to develop the design further. Designs indicated herein are not for construction but are intended to show concepts and intents that will be developed further and coordinated more closely with the new construction, during production of a set of shoring and sequencing drawings for the purposes of pricing and construction.

JCAL was provided with some photographs of original drawings. These lacked several key details regarding the existing structure and JCAL first undertook an investigation to identify and confirm these details, along with condition of exposed elements that may impact the retention of the facades and the need for any restoration work that might be required in advance. This information was used in developing analytical models and the approach to the retention concept that is discussed herein.

2. TERMS OF REFERENCE

The scope of work for John G. Cooke & Associates Ltd. is based on JCAL proposal P23208, dated September 18, 2023.

3. METHODOLOGY

JCAL completed an investigation of existing conditions, identified applicable codes and standards to be referenced, and completed analysis of the existing and new temporary components to be used in the temporary support of the façade during the course of the new construction and retention.

3.1. Investigation

Jonathan Dee, P.Eng., CAHP of JCAL made an initial visit to the site on September 6, 2023, accompanied by representatives from VanMar and mcCallumSather, the heritage architects who have completed a Heritage Impact Assessment and Conservation Plan for the subject property.

Jonathan Dee and Andrew Azinovic, EIT revisited the site on October 18, 2023. Using hand-tools, investigatory openings were made in several locations where possible. Locations were identified for further investigatory openings, to be made using power tools and with the assistance of VanMar's forces.

These further openings were completed by VanMar at JCAL's direction, and reviewed by Jonathan Dee and Andrew Azinovic, throughout the course of the day on October 30, 2023. The investigation included primarily of the use of a chipper to remove interior terra cotta tile and plaster wall finishes

to view the enclosed structural elements and details, and to remove brick from the interior side of the exterior walls, to determine the construction and condition of the existing wall assembly.

3.2. Applicable Codes and Standards

The primary codes, standards, and guidelines referenced during and applicable to the production of work described in this report and for further development of the retention design are as follows:

- Ontario Building Code 2012, inclusive of latest effective amendments (the OBC)
- Structural Commentaries of the National Building Code of Canada, including Commentary L: Application of NBC Part 4 of Division B for the Structural Evaluation and Upgrading of Existing Buildings
- CSA A23.3-14 - Design of Concrete Structures
- CSA A371-14 - Masonry Construction for Buildings
- CSA S304-14 (R2019) - Design of Masonry Structures
- CSA S16-14 - Design of Steel Structures
- Standards and Guidelines for the Conservation of Historic Places in Canada, published by Parks Canada.

3.3. Analysis

The applicable wind load was calculated to OBC 2012, using a reduced importance factor of 0.75 for calculating loads for serviceability and deflections.

It is our opinion that seismic loading may be neglected during construction, given the brief construction period relative to the 2500-year return period for code-specified seismic loads. However, seismic considerations are relevant in the permanent attachment of the facades to temporary elements that may remain as part of the permanent structure. The applicable seismic load was calculated in accordance with OBC Article 4.1.8.18 for building elements and non-structural components. The applicable seismic loads were calculated, using seismic Site Class C as recommended in the geotechnical report (File no. G21270, Chung & Vander Doelen Engineering Ltd.), and it was determined the above-noted wind forces govern design.

Rigidity and stiffness requirements for the lateral support of the masonry generally governed design, and the limitations stipulated in CSA A371 were followed, of L/600 for unreinforced masonry where flexural stress is perpendicular to the bed joints (i.e., for bending in the vertical direction of the wall) and L/300 for unreinforced masonry where flexural stress is parallel to the bed joints (i.e. for bending in the horizontal direction of the wall).

Analysis of the existing and new temporary components to be used in retaining of the facades was carried out using procedures identified in the above-noted standards documents and using Bentley STAAD structural analysis software.

4. OBSERVATIONS

Observations made during our investigation that relate to the retention of the existing facades are documented below. Sketches of key typical existing details are included in Appendix A.

The building’s structure consists of one-way flat concrete slabs, spanning on steel floor beams. These beams are supported on two interior east-west lines of structural steel columns and, on the load bearing exterior walls at the perimeter of the building. A further general description of the building is otherwise documented in the Heritage Impact Assessment or Conservation Plan and is not repeated here.

4.1. Existing Concrete Slabs

The existing floor slabs were hammer drilled. While only a relatively small drill bit was available, these were measured as accurately as possible and found to be 127 mm (5”) thick and are believed to be overlain with a bonded floor topping for leveling, which is assumed to be on average 25 mm (1”) thick. The floor slabs span in the east-west direction, between floor beams.

These slabs were not scanned for reinforcing steel, but we believe they would contain smooth reinforcing steel bars parallel to the span direction, and temperature steel reinforcement in the opposite direction.

4.2. Existing Structural Steel Framing

4.2.1 Columns

The building’s columns are generally clad with terra cotta tile and plaster. Occasionally this has been overclad with newer drywall and steel studs. Openings were made to expose the structural steel columns within, at

- three locations above the Ground floor level,
- two locations above the 2nd floor level, and
- one location above the 3rd floor level.

The key findings are that the column steel is generally exposed behind the terra cotta tile, with no additional concrete encasing or coatings beyond the grey paint (see Fig. 1). A column splice, suspected to be present but not otherwise documented, was found at both openings made just above the 2nd floor level (see Fig. 2), and not at any of the openings on other floors. This splice location is believed to be typical at all columns and may act as a hinge in the column if not laterally supported in both directions at all times.

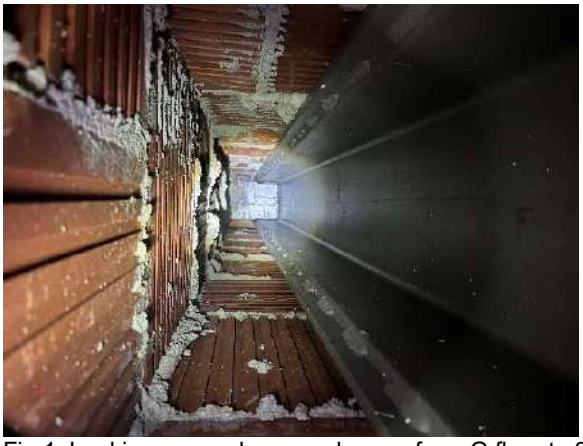

Fig 1: Looking up a column enclosure, from G floor to 2nd

Fig 2: Typical column splice, above 2nd floor

Below the splice, the columns were found to be wide flange profiles with welded top and bottom flange cover plates. The wide flange profile was measured to have a depth of approx. 225 mm and a flange thickness of approx. 19 mm, and the cover plates to be approx. 12 mm thick and 260 mm wide. These may be historic US 8” WF @ 58lbs/ft sections per the 1946 US Steel catalogue. For the purposes of analysis, these were conservatively analysed as modern W200x71 sections, plus the cover plates as measured, which is a similar but conservative selection.

Above the splice, at the 3rd floor opening the upper columns were found to be wide flange profiles with no flange cover plates. The wide flange profile was measured to have a depth of approx. 200 mm and a flange thickness of approx. 12 mm. These may be historic US 8”

WF @ 31 or 35 lbs/ft sections per the 1946 US Steel catalogue. For the purposes of analysis, these were conservatively analysed as modern W200x46 sections, which is a similar but slightly conservative selection.

4.2.2 Beams

The steel floor beams, present interior column lines and with an additional beam at the mid-span of each bay, were understood to bear on the exterior masonry walls. These beams are generally clad in metal lath and plaster with exposed steel beyond.

Openings in the ceiling and wall finishes around a typical beam were made below the 3rd floor beam bearing on the south exterior wall. Lath and plaster was removed and the interior wythes of brick were removed adjacent to the beam (see Fig. 3). As expected based on available documentation, but of significant value to the project to definitively confirm, no steel column within the wall was located. A steel bearing plate is present below the beam, and the beam was found to bear approximately 200 mm (8”), or the full depth of the two interior wythes of backup brick (see Fig. 4). Additionally, the top flanges of the floor beams are noted to be embedded above the soffit of the slab.

Fig 3: Typical beam bearing on brick backup at exterior wall

Fig 4: Typical beam bearing length on exterior wall

4.3. Wall Assembly

4.3.1 Foundation Wall

The foundation wall assembly was investigated at the interior of the basement, toward the east end of the south foundation wall, by removing a portion of the interior plaster and terra cotta (see Fig. 5). The wall assembly was found to consist of, from the interior:

- plaster,
- 76mm (3”) terra cotta tile,
- approx. 13 mm (1/2”) gap, and the
- concrete foundation wall.

Naturally, the removals did not extend through the concrete wall, but the exterior is finished with limestone, which is presumably bearing on a ledge in the concrete foundation wall. Dovetail tracks were noted to be present on the interior face of the concrete foundation wall, and one dovetail anchor was found extending into the terra cotta tile (see Fig. 6). This may suggest that dovetail anchors were used on the exterior stone as well, and future masonry conservation work should be mindful of the fact that dovetail anchors from this period are prone to inconsistent placement and corrosion.


Fig 5: Opening in terra cotta tile at foundation wall, interior


Fig 6: Looking down at opening, dovetail anchor

4.3.2 Above-Grade Masonry Wall

The above-grade load-bearing masonry walls were investigated from the interior, primarily with brick removals completed above the 2nd floor level, near the east end of the north wall, 2nd floor (see Figs. 7 and 8). The interior brick was very difficult to remove and therefore only one opening was made, and conditions were otherwise exposed during investigations of beam pocket and slab-wall interface.

The wall assembly was found to consist of, from the interior:

- plaster,
- 76mm (3") terra cotta tile,
- approx. 13 mm (1/2") gap,
- two wythes of concrete brick backup masonry, laid in common bond, and the
- exterior wythe of clay brick, laid in Flemish bond.

The interior terra cotta tile was noted to be anchored to the backup brick by way of corrugated ties, as one of these was located in the removal area. No ties were noted between backup wythes or to the exterior brick, and the brick wythes are believed to be tied together solely by way of header bricks.


Fig 7: Removals at above-grade masonry wall, interior


Fig 8: Angled view of opening shown in Fig 7.

4.4. Slab-Wall Interface

Determining the slab-wall interface is important to defining a removal methodology that will not impact the integrity of the existing walls and to determining a temporary and permanent approach to laterally securing these walls.

Removal of the interior terra cotta to expose the interior side of the backup brick masonry just above the slab was completed in two locations at the 2nd floor (see Figs. 9 and 10). The interior brick was removed in one location and the slab was noted to extend into the backup masonry. The terra cotta wall tile bears on the slab, and a topping appears to have been placed overtop of the slab. It's likely that the exterior brick wall was built up to the underside of slab level with the slab poured directly onto it. We do not believe that removing the existing slab from the exterior walls is necessary and that doing so may result in unnecessary damage to heritage fabric.

Fig 9: Removals at slab level, S wall, above 2nd floor

Fig 10: Add'l removals of interior finishes at slab level

4.5. Masonry Condition

The backup brick masonry, consisting of the two interior wythes of concrete brick laid in common bond, where exposed in the above-noted investigatory openings, appeared to be in very good condition. Joints were well filled with mortar, including collar joints, the bricks and mortar were intact, and it was quite difficult to remove individual bricks.

The exterior wythe of brick consists of an extruded clay brick, laid in Flemish bond. The mortar joints are generally intact and in good condition, though there are localized areas of debonding and erosion. No signs of systemic delamination or outward displacement of the exterior wythe was noted, and it appears to be well bonded to the backup brick masonry.

The vertical brick piers in the exterior wythe of brick, project slightly towards the exterior. We suspect that this projection is created by thickening the collar joint between the exterior and backup wythes. There is also a continuous vertical mortar joint on the outer wythe, up each side of these piers where they interface with the adjacent brick masonry. A joint like this could create a weak point along a wall where the sections may separate more easily, as vertical masonry joints in general tend to be more poorly filled with mortar compared to horizontal joints. While this typically may be cause for some concern, a header is present at every other course and this is believed to be a true header, offering ample ties between the wythes. Additionally, no systematic separation is noted along these piers suggesting the wall is performing well. See Figures 11 and 12.

No investigation was carried out of the exterior stone cladding at cornices, foundation level, etc. Given the age of the building, these may be keyed into the backup masonry and/or anchored to the backup brick using strap or cramp anchors. Often in buildings of this age anchorage was only provided to the top of the stones. However, no systemic issues were observed of displacement of the stones, and no special care is believed to be required for these in terms of the retention.


Fig 11: Typical projection at brick pier


Fig 12: Typical continuous vertical joint at brick pier

5. RETENTION APPROACH

The overall approach to retaining the existing facades is to retain these in-situ while the new building is constructed within the footprint of the existing. In order to minimize retention costs and impact to exterior areas along the facades, the retention will make use of the existing structural steel framing along the walls to be retained. This will be supplemented with new temporary steel bracing and lateral support members. The existing floors will then be removed and replaced with new floors, at matching levels, at which point the lateral support of the existing walls may be transferred to these new floors.

5.1. Sequencing

Careful sequencing of the work is a key factor in the successful retention of the existing facades in-situ and is necessary to ensure that overall stability and adequate lateral support of the facades to be retained is maintained at all times. The order of operations is anticipated to proceed generally as follows:

1. Remove existing terra cotta tile and interior finishes to enable access to backup masonry and enclosed structural steel elements that will be part of temporary bracing system.
2. Core or cut holes in the roof and floors at piers and install vertical strongbacks from above, using a crane, at the interior face of the existing walls to be retained, where indicated, with
    a. full-height (spliced) strongbacks at braced bays and
    b. partial-height strongbacks at unbraced bays
3. Install temporary steel framing, including
    a. diagonal bracing within existing structural bays where bracing is identified to be installed,
    b. lateral bracing in both directions at all existing column splices, where existing columns are identified to be retained,
    c. lateral support angles to interior face of backup masonry, above all floor levels, and which angles will ultimately become part of the permanent anchorage for these façades.
4. Create separation cuts in the existing façade walls, at points where the existing facades will no longer be retained.
5. Complete the demolition of the portions of the building not to be retained or temporarily to remain as part of the temporary support system, including the facades (salvaging any stone or other material indicated for such), and following an engineered demolition plan.

6. Construct the raft slab in the basement, encasing the base of the remaining existing columns within the raft slab and securing the raft slab to the exterior foundation wall.
7. Remove and replace floors along the interior of the facades to be retained, one at a time, by:
    a. anchoring the vertical strongback at the unbraced bays to the wall at the position indicated, centered on the slab to be removed,
    b. saw-cutting the existing concrete slab to be demolished to free it from the walls to be retained,
    c. temporarily shoring and then cutting close to the walls the existing steel beams bearing on the walls to be retained,
    d. placing the new structural slab, casting around the columns to be temporarily retained,
    e. securing the new slab to the lateral support angles placed above each floor level, and
    f. repeating at the next floor, above.
8. Remove temporary steel bracing and strongback members, leaving the now-permanently affixed lateral support angles.
9. Cut off existing columns that were temporarily retained above the top of the raft slab, remove the columns, and infill new slab openings around them.

5.2. Temporary Bracing

The lateral support of the facades to remain during construction will make use of the existing structural steel, supplemented with temporary steel framing, as described below.

5.2.1 Bracing Within Existing Structural Bays

The existing column lines inboard of the façade walls to be retained will remain in-situ until the walls are laterally supported by the new permanent structure. Several of these column bays will be braced, in both the north-south and east-west directions, with new diagonal bracing members installed between the 2nd and 3rd levels, and from the 3rd floor to the roof level.

At unbraced bays, the existing and new slabs will act as diaphragms, to transfer lateral forces collected at these bays to the braced bays, noted above.

The bracing approach, developed to minimize the amount of bracing that is required, relies on the column bases to be encased within the raft slab, effectively resulting in a fixed connection.

5.2.2 Vertical Strongbacks

As confirmed during our investigation, there are no existing steel columns within the exterior walls to be retained. Vertical strongbacks, steel members placed against and anchored to the interior face of the walls, will be introduced at each column line along the walls to be retained, in order to serve the following functions:

- resolve axial tension and compression forces at braced bays, especially in order to resist tension forces that would otherwise be induced in the masonry by the diagonal bracing,
- bring forces collected by the lateral support angles at demolished floor levels to the diaphragms above and below the strongback, and
- provide an attachment point for the lateral support members perpendicular to the wall that brace the column splices to permit removal of the 2nd floor slab.

The strongbacks will be installed from above, through vertical pockets cored or cut into existing slabs at the interior face of the exterior walls, directly adjacent to the existing floor beams on column lines.

At braced bays, the strongbacks will be effective for the full height of the walls, with a splice between 2nd and 3rd floor levels. At the base of the strongback, they will be vertically and laterally anchored to the raft slab and/or inside face of the existing foundation wall.

At unbraced bays, the strongbacks will be set and repositioned as required to bridge from a removed floor to remaining and new floor diaphragms above and below, respectively.

5.2.3 Horizontal Lateral Support Angle at Existing Floor Levels

An angle will be placed along the full lengths of the walls to be retained, directly above each existing floor level, and anchored to the interior face of the walls with HILTI HIT-HY 270 or similar adhesive anchors.

The angle will span horizontally between vertical strongbacks on column lines. This angle is anticipated to be fairly large at L203x203x19, in order to meet stiffness requirements for lateral masonry support in this condition when slabs are removed.

Upon completion of each new floor slab, this angle and its anchorage to the wall will remain and be secured to the new floor slab.

5.2.4 Lateral Support at Column Splices

As noted in the observations section above, column splices were found above the 2nd floor level, at roughly the mid-height of the overall column, and this is believed to be typical of all existing columns. These splices will become unbraced upon removal of the 2nd floor.

It is necessary to ensure that lateral support remains in place at these splices, until the new 2nd floor structure is completed and may restrain the column or, if lateral support from the 2nd floor is not possible, until the existing column is no longer required.

The lateral bracing will consist of a horizontal steel member, spanning between all column splices along the column line parallel to the wall, and ultimately supported by a braced bay in that column line. In the direction perpendicular to the wall, the splice will be braced by a member that spans from the splice to the steel strongback at the interior face of the wall.

The bracing member will be sized in accordance with the strength and stiffness requirements in steel handbook's procedure for bracing assemblies, in accordance with CSA S16 clause 9.2.6.2.

5.2.5 Other Conditions, Miscellaneous Framing

There are isolated conditions where the typical bracing pattern may not apply, or may conflict with vertical elements in the new construction, such as stair and elevator shafts. These details will be developed as the concept is pushed into further design and as comprehensive temporary framing drawings are produced.

Further coordination with the overall building consultants will be required. We anticipate providing additional steel framing around these elements, or resizing of specific members to resist intermediate loads, should it not be possible to work around temporary framing, or where these new elements may not be relied upon to provide temporary lateral support.

5.3. Disconnecting Material to be Demolished/Removed

5.3.1 Terra Cotta Tile and Interior Finishes

The terra cotta wall tiles and interior plaster finishes, along with recent steel studs and gypsum board, as well as original and more recent ceiling finishes will need to be removed

from most areas in order to install members needed for the temporary stabilization of the walls to be retained.

These components are not load bearing, and they may be removed without impact to the balance of the wall assemblies or structural systems that must remain temporarily. Care must still be taken to make sure removal is completed safely, and to not leave sections of terra cotta tile vertically unsupported.

5.3.2 Wall Cutting and Demolition

The portions of the existing facades to remain must be separated from those portions that are to be demolished, prior to demolition. We propose to make this separation by way of saw-cutting, at an appropriate mortar joint line in the exterior wythe, in a position that will not leave partial bricks or stone fragments with less than a 1:1 aspect ratio of length to course height. The saw cut will penetrate the full depth of the masonry wall assembly.

Upon completion of the cutting, it will be necessary to consolidate the wall ends, by raking out any loose mortar and filling these and any existing voids with new mortar. Additional anchorage will also be provided to secure the cut ends of any stone units to the backup brick.

Finally, we recommend temporarily capping the wall ends with plywood and a membrane, to mitigate water infiltration and any resulting damage until these ends are permanently tied into the building's wall envelope.

5.3.3 Removal of Slabs and Beams

The portions of floor slabs to be demolished must be separated from those portions that will remain temporarily as part of the bracing system. We propose that this be achieved by saw-cutting, in continuation of the line of cutting in the walls.

As the existing floor slabs and beams are pocketed into the facades to be retained, we propose to cut these free at the appropriate times, by saw-cutting along the slab edge near to the wall, and by cutting the beams free from the walls. The remaining stubs of slabs and beams would remain in the walls.

While the slabs are concrete and pose little concern, the beam ends do carry the potential for future corrosion, causing future corrosion jacking of the masonry to be preserved. However, we note that where exposed, the embedded beam end showed only minimal surface corrosion, we noted no significant evidence of corrosion jacking at present. Additionally, the effort and impact to the heritage fabric from attempting to remove these beam ends now would be similar to the effort required to complete this work in the future, if it ever becomes required. For these reasons, we propose to retain the beam stubs within the walls.

6. DISCLAIMER & LIMITATIONS

This report is based on and limited to information supplied to John G. Cooke & Associates Ltd. by VanMar Developments Inc. personnel and representatives, and by observations made during walk-through inspections of the subject property. Only those items that are capable of being observed and are reasonably obvious to John G. Cooke & Associates Ltd. or have been otherwise identified by other parties and detailed during this investigation can be reported.

The work reflects the Consultant's best judgment in light of the information reviewed by them at the time of preparation. There is no warranty expressed or implied by John G. Cooke & Associates Ltd. that this investigation will uncover all potential deficiencies and risks of liabilities associated with the subject property. John G. Cooke & Associates Ltd. believes, however, that the level of detail carried out in this investigation is appropriate to meet the objectives as outlined in the request. We cannot guarantee the completeness or accuracy of information supplied by any third party.

John G. Cooke & Associates Ltd. is not investigating or providing advice about pollutants, contaminants, or hazardous materials.

This report has been produced for the sole use of VanMar Developments Inc. and cannot be reproduced or otherwise used by any third party unless approval is obtained from John G. Cooke & Associates Ltd. No portion of this report may be used as a separate entity; it is written to be read in its entirety.

We trust this report covers the scope of work as outlined in our Terms of Reference. Should there be any questions regarding this report, or if we can be of any further assistance to you, please contact us.

JOHN G. COOKE & ASSOCIATES LTD.

Jonathan Dee, P. Eng., ing., CAHP
Principal

JD/jd
24012/10 Duke - Structural Assessment & Retention Plan

APPENDIX A

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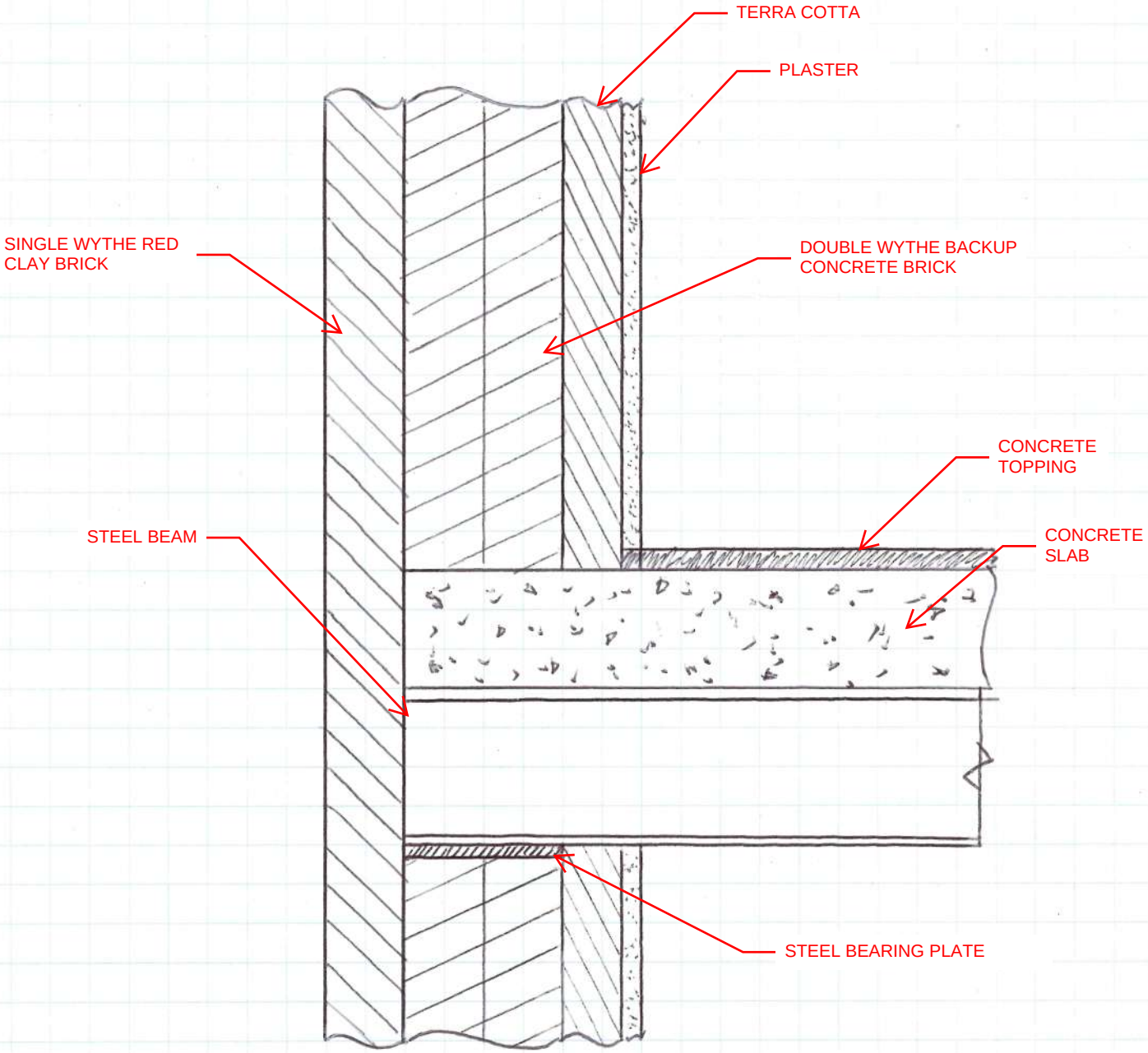
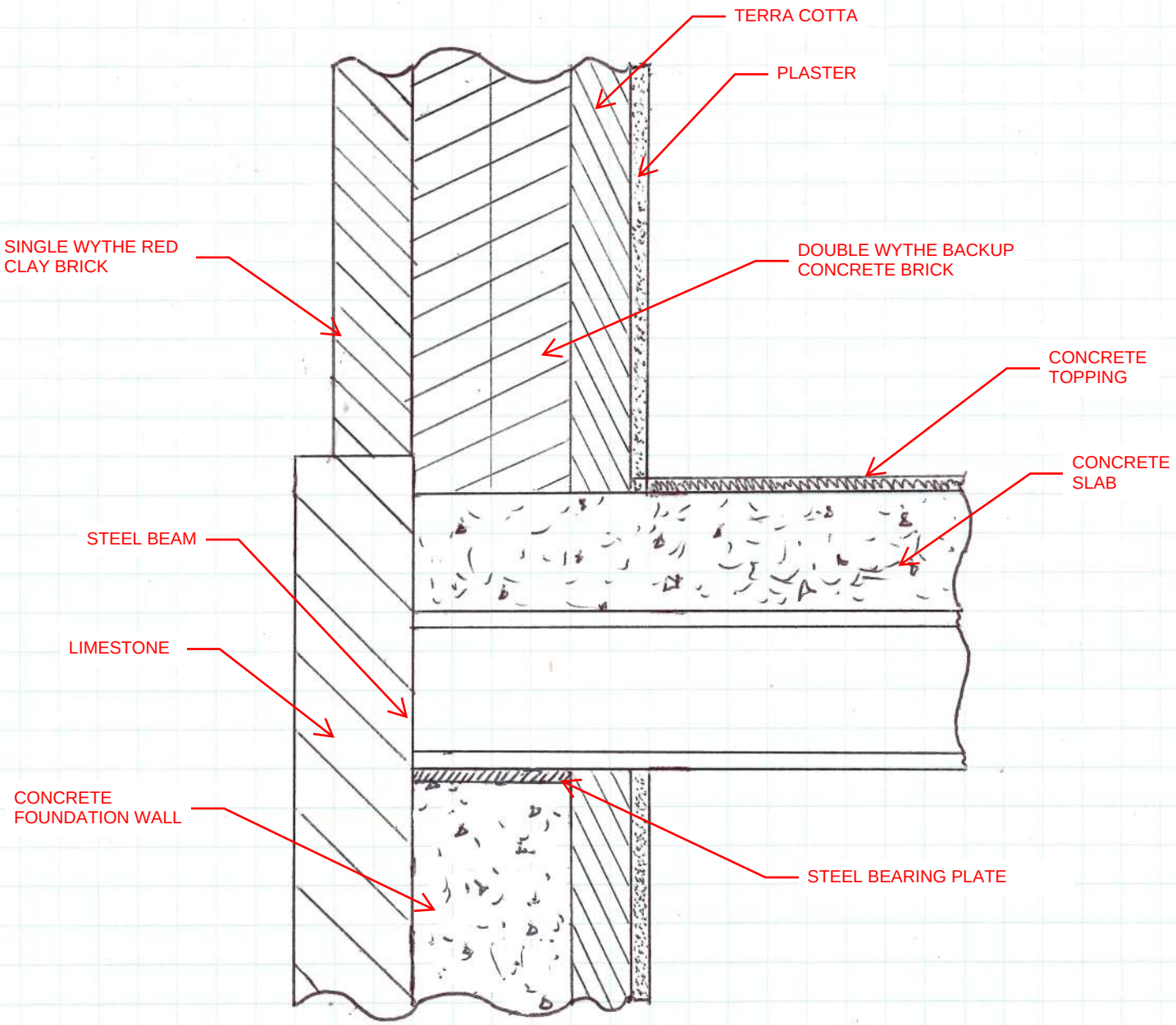
SKETCHES OF TYPICAL EXISTING KEY DETAILS



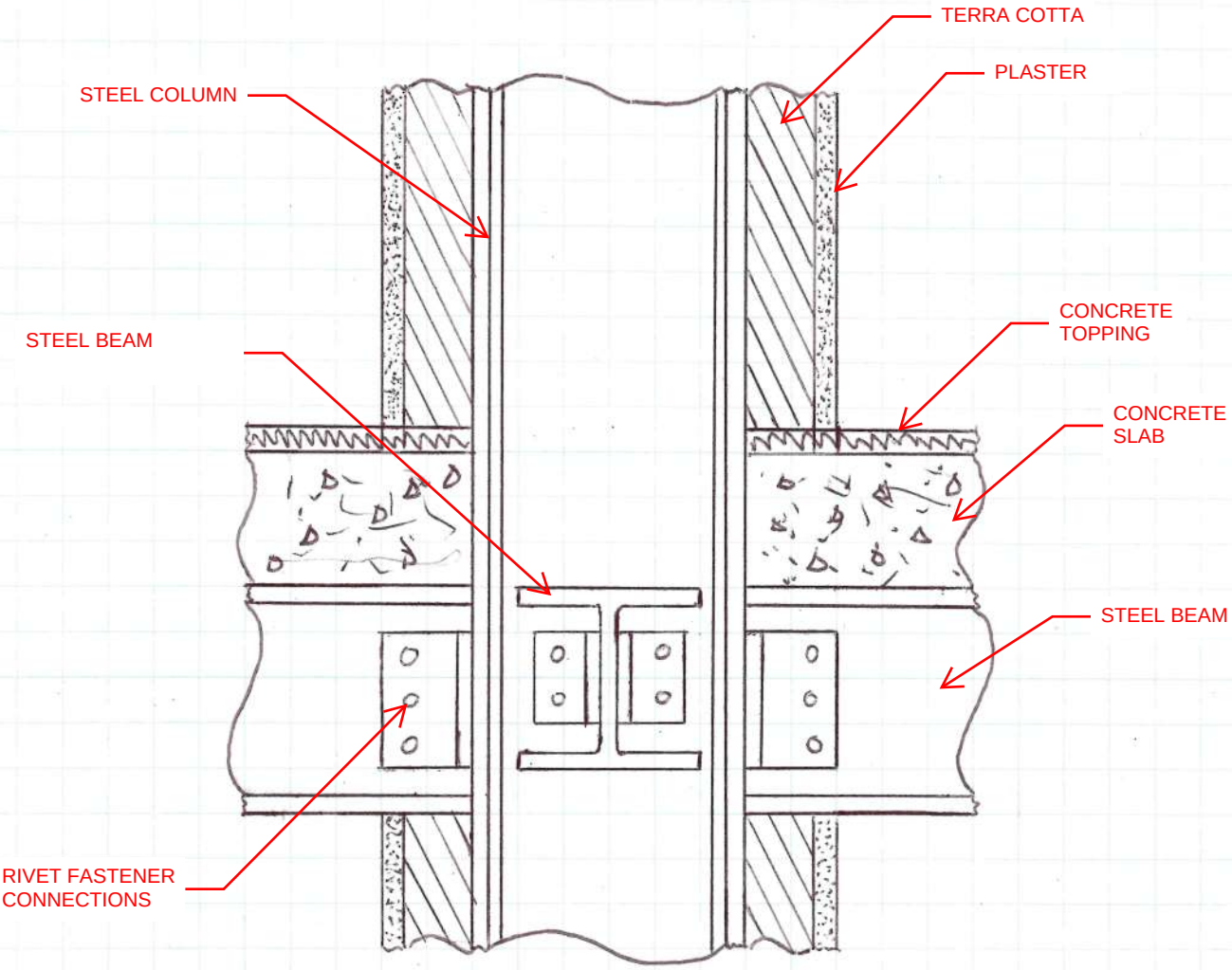
SLAB - WALL CONNECTION - TYP.

24012
Andrew Azimov's
Nov. 3/23



SLAB-WALL CONNECTION - BASEMENT

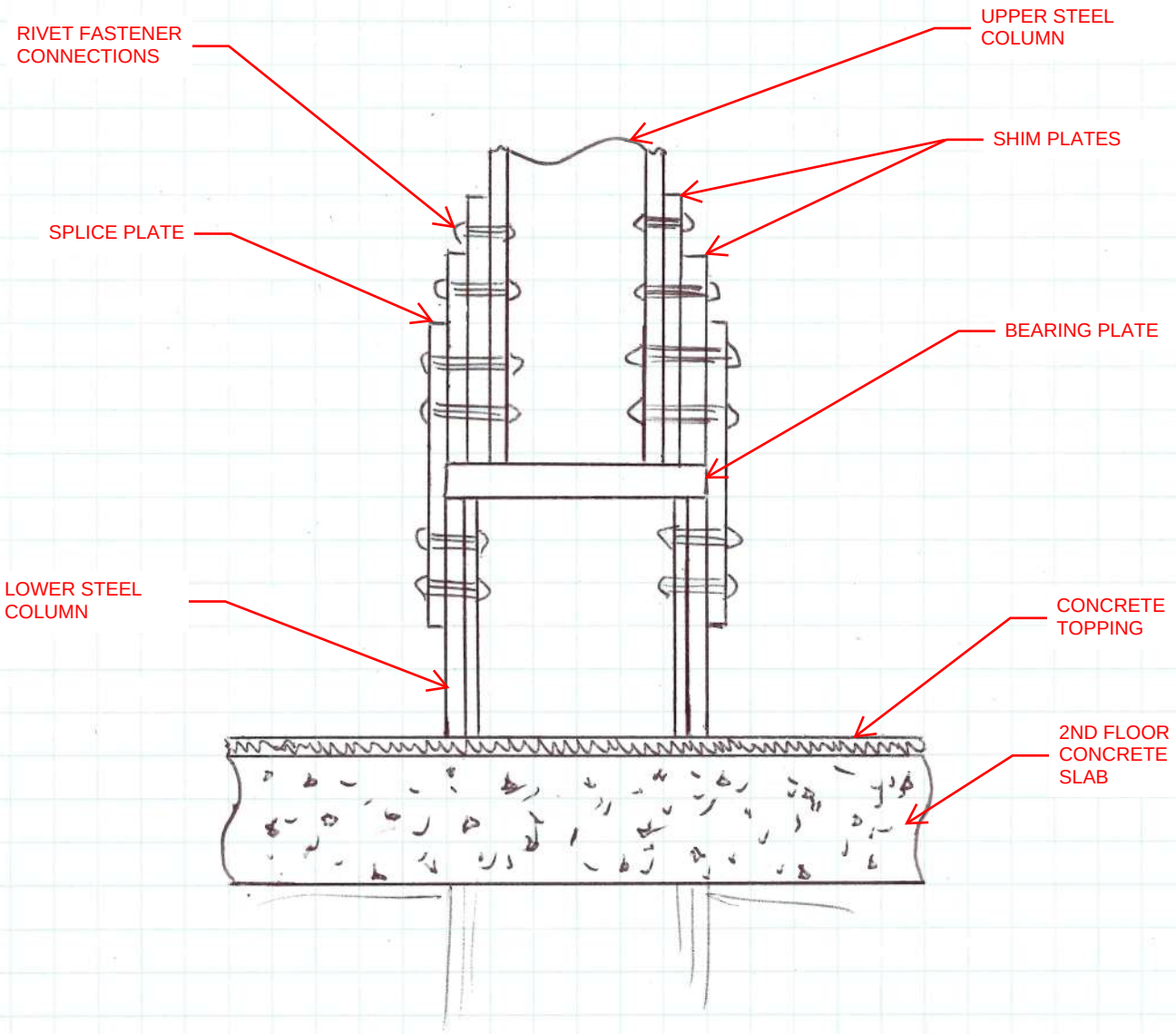
24012
Andrew Azironic
Nov. 3/23



SLAB - COLUMN CONNECTION - TYP.

24012
Andrew Azinovic
Nov. 3/23

NOTE:
TERRA COTTA, PLASTER FINISH, ETC. NOT SHOWN FOR SIMPLICITY.



COLUMN SPLICE – ABOVE 2nd FLOOR

24012
Andrew Azimovi
Nov. 3/23

APPENDIX B

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RETENTION FRAME CONCEPT SKETCHES

FLOOR 1 PLAN

BACKFILLED
ELEVATOR LOBBY
106
ELEV. E1
ELEV. E2
ELEV. E3
ELEV. E4
CORRIDOR ABOVE
SUMP PIT. REFER TO MECH.
FIRE PUMP ROOM
123
VOID
EXTENT OF FIRE RATED CEILING 'CL4a' ABOVE
PUMP ROOM
130
ELEVATOR LOBBY
105
REMOVABLE RAILING AT PLATFORM LIFT
PLATFORM LIFT
207 MAILBOXES
MAIL
113
504 MAILBOXES
90 MAILBOXES
POURED WALL, POTENTIAL INTERFERENCE WITH BRACING. NOT STURCUTRAL.
NO STEEL IN CORNER, SPECIAL CONSIDERATION POSSIBLY REQUIRED
SLOPE UP
4.5%
EMERGENCY GAS LINE IN 2HR RATED ENCLOSURE
ARCHED OPENING. REFER TO ID
WC (F)
119
UNISEX WC
120
UNISEX WC
112
PARCEL & BOH RECEPTION
111
CONCIERGE
104
MAIL LOADING
114
SORTING TABLE
WC (M)
118
JANITOR
122
RETAIL #2
133
DUCTS FOR FUTURE KITCHEN FIT OUT. REFER TO MECH.
WROUGHT IRON FENCE WITH GATE
STORM TANK
131
STAIR A
T01
MECH.
116
BF WASHROOM
121
RESIDENTIAL LOBBY
103
OFFICE ELEVATOR LOBBY
102
ELEV. E5
RETAIL #1
134
BIKE RACK (REFER TO LANDSCAPE)
CACF ROOM EXHAUST DUCT IN 2HR RATED ENCLOSURE
CACF
115
LOUNGE
107
MEETING ROOM
109
COLUMN WEAK AXIS PERPINDICULAR TO WALL, ADDITIONAL BRACING CONSIDERATION.
LATERAL SUPPORT ANGLES BRACING THE WALLS BETWEEN STRONG-BACKS
VERTICAL STRONG-BACKS
VERTICAL STRONG-BACKS, SHIFTED TO AVOID NEW COLUMNS
GAS METER
SIAMESE CONNECTION
MANAGEMENT OFFICE
108
PET SPA
116
MECH. ROOM
117
VEST.
101
CABINET HEATER. REFER TO MECH.
ACTIVE DOOR LEAF
EXISTING FACADE TO BE RETAINED AND SUPPORTED DURING CONSTRUCTION
PROPERTY LINE
RAMP UP
LANDING
RAMP UP
N 60° 26' 10" W
46.6
2023-10-20 5:33:19 PM

ELEVATOR LOBBY
207
VOID
ELEV. E1
ELEV. E2
ELEV. E3
ELEV. E4
OPEN TO LOADING BELOW
CORRIDOR
206
CORRIDOR
204
COMMERCIAL ELEC.
205
OFFICE MECH.
210
STORM TANK
211
STAIR A
VEST.
213
VOID
RAMP UP
OPEN TO BELOW
PIPE SHAFT
GAS RISER
ELEV. E5
OFFICE
201
WASHROOM
203
WASHROOM
202
AND BELOW
EXTENT OF FIRE RATED CEILING 'CL4a' ABOVE
NO STEEL IN CORNER, SPECIAL CONSIDERATION POSSIBLY REQUIRED
NEW WALL, POTENTIAL INTERFERENCE WITH BRACING.
COLUMN LATERAL SUPPORT BEAM, PLACED AT EXISTING COLUMN SPLICE
SEQUENCE SHORING REMOVAL WITH WALL CONSTRUCTION
LATERAL SUPPORT ANGLES BRACING THE WALLS BETWEEN STRONG-BACKS
VERTICAL STRONG-BACKS
BRACED BAY
LATERAL TIES, SHIFTED TO AVOID NEW COLUMNS
VERTICAL STRONG-BACKS, SHIFTED TO AVOID NEW COLUMNS
BRACED BAY
LATERAL SUPPORT ANGLES BRACING THE WALLS BETWEEN STRONG-BACKS
VERTICAL STRONG-BACKS
EXISTING FACADE TO BE RETAINED AND SUPPORTED DURING CONSTRUCTION
PROPERTY LINE
PROPERTY LINE
PROPERTY LINE
PROPERTY LINE
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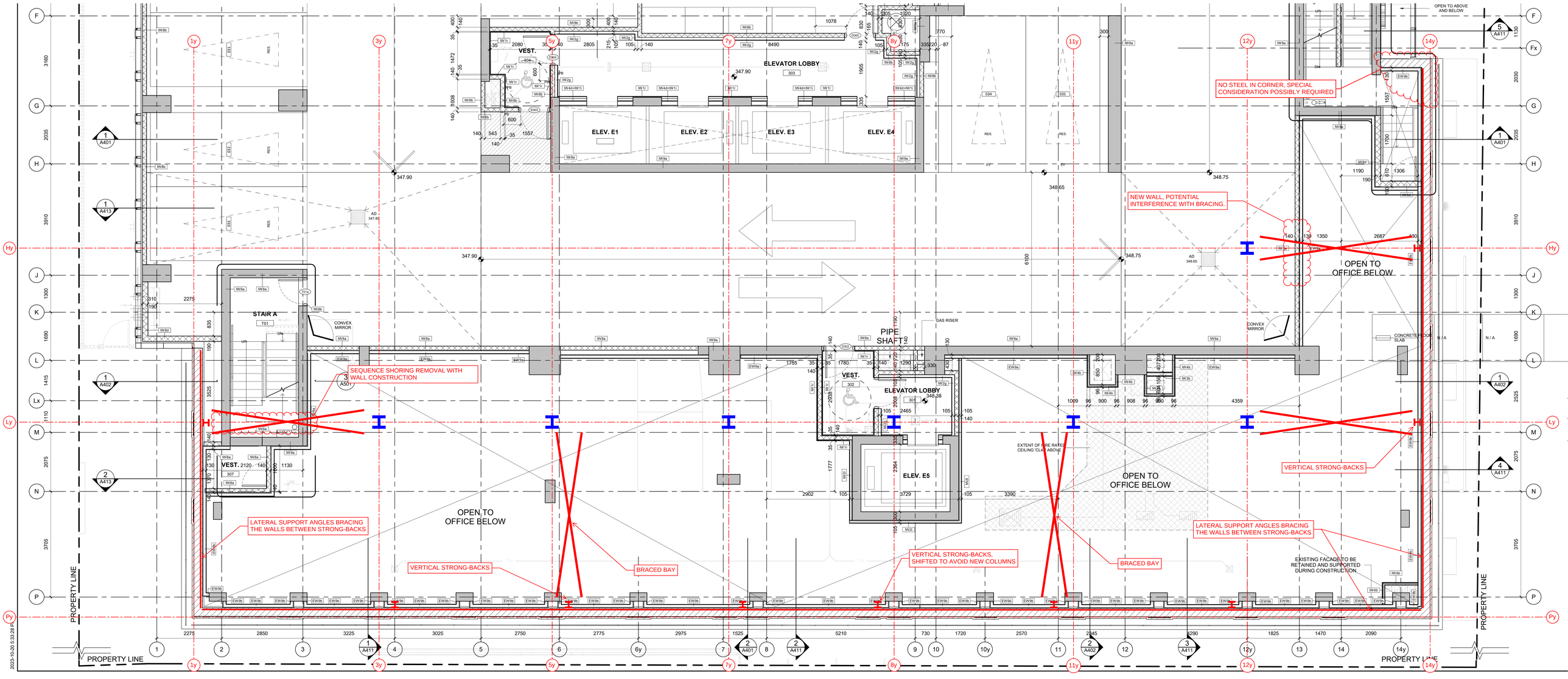
FLOOR 2 PLAN


STAIR A
T01
UP
DN
VEST.
ELEVATOR LOBBY
303
307
302
ELEV. E1
ELEV. E2
ELEV. E3
ELEV. E4
ELEV. E5
PIPE SHAFT
GAS RISER
CONVEX MIRROR
OPEN TO OFFICE BELOW
OPEN TO ABOVE AND BELOW
NO STEEL IN CORNER, SPECIAL CONSIDERATION POSSIBLY REQUIRED
NEW WALL, POTENTIAL INTERFERENCE WITH BRACING.
SEQUENCE SHORING REMOVAL WITH WALL CONSTRUCTION
VERTICAL STRONG-BACKS
LATERAL SUPPORT ANGLES BRACING THE WALLS BETWEEN STRONG-BACKS
BRACED BAY
VERTICAL STRONG-BACKS, SHIFTED TO AVOID NEW COLUMNS
EXTENT OF FIRE RATED CEILING/SLAB ABOVE
EXISTING FACADE TO BE RETAINED AND SUPPORTED DURING CONSTRUCTION
CONCRETE FLOOR SLAB
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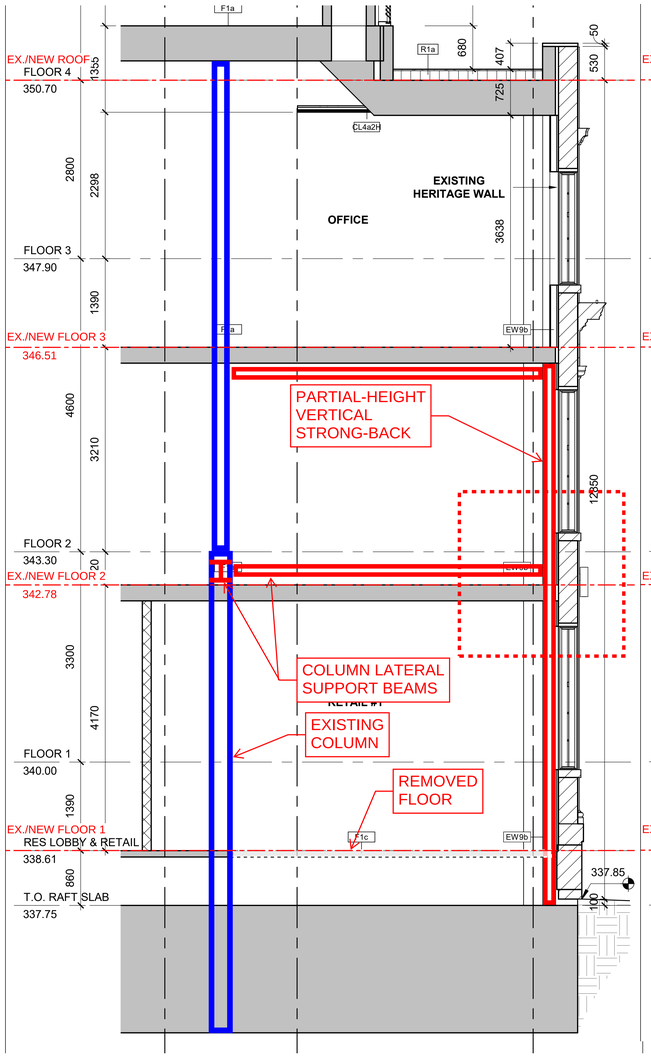
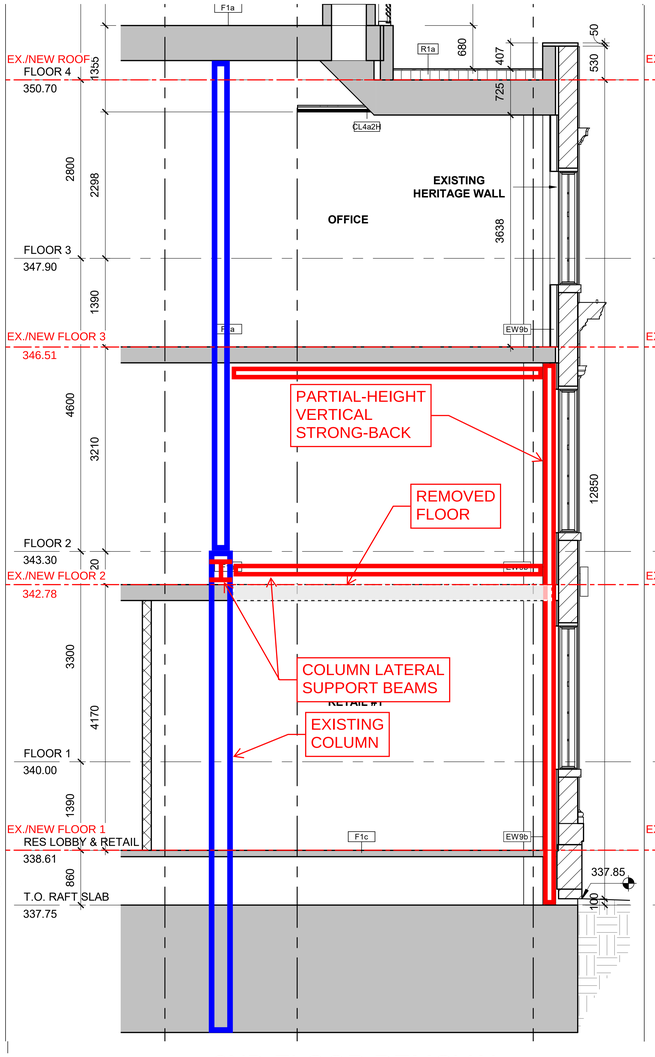
FLOOR 3 PLAN

TYPICAL UNBRACED BAY SEQUENCING



MAIN FLOOR REMOVAL



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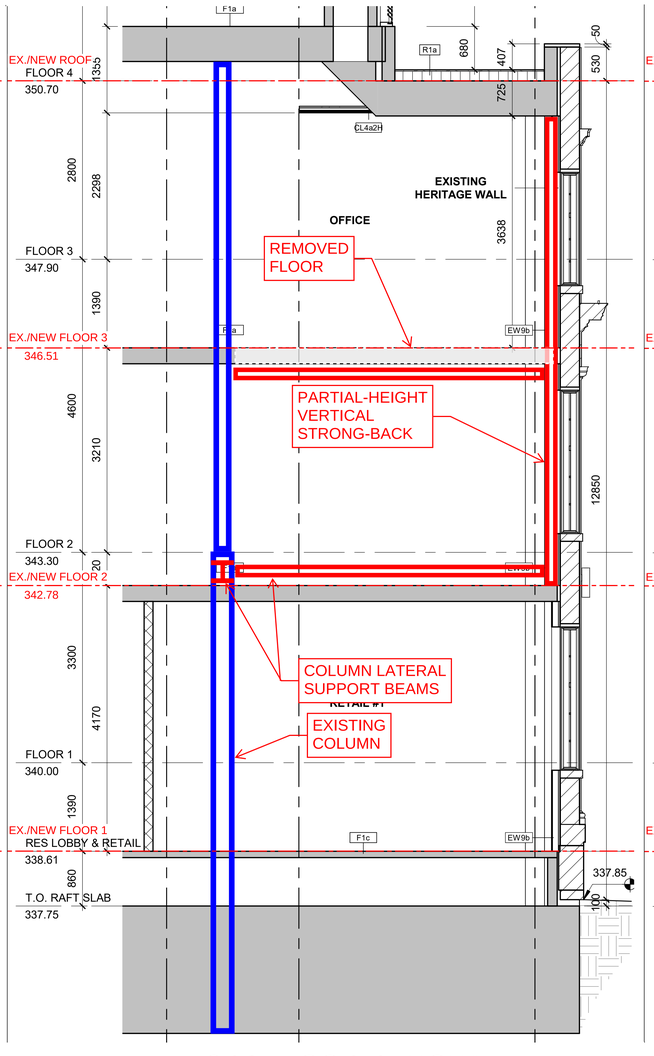

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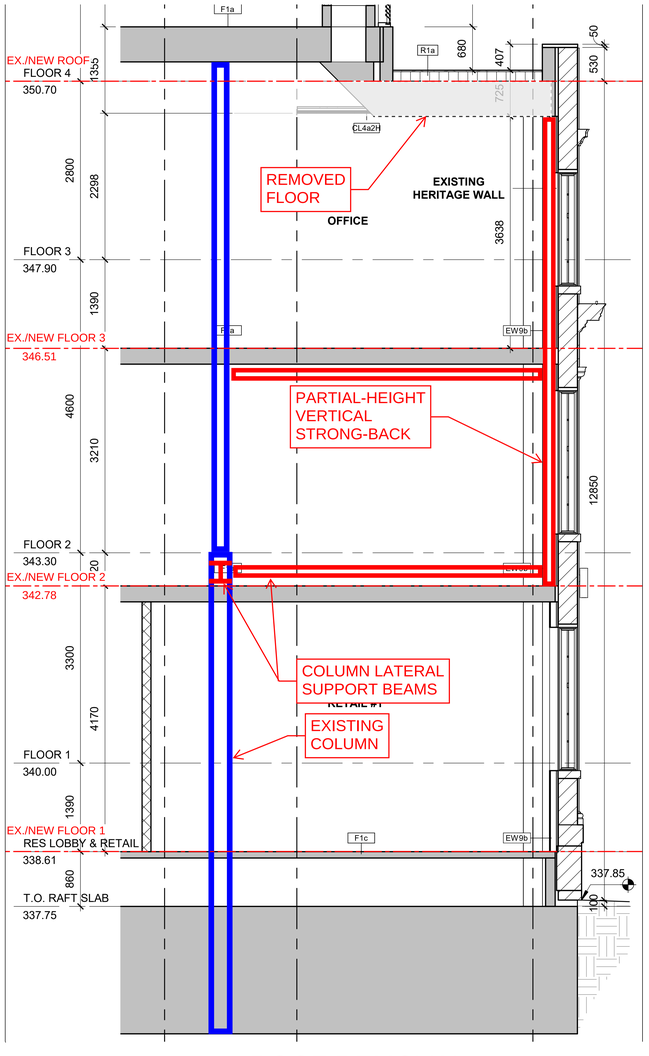
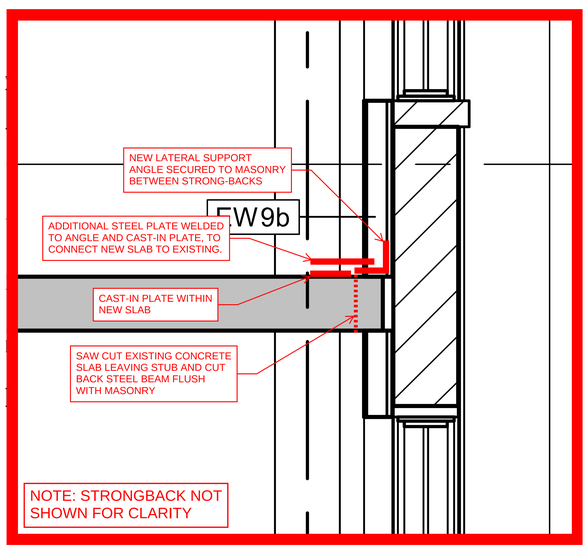
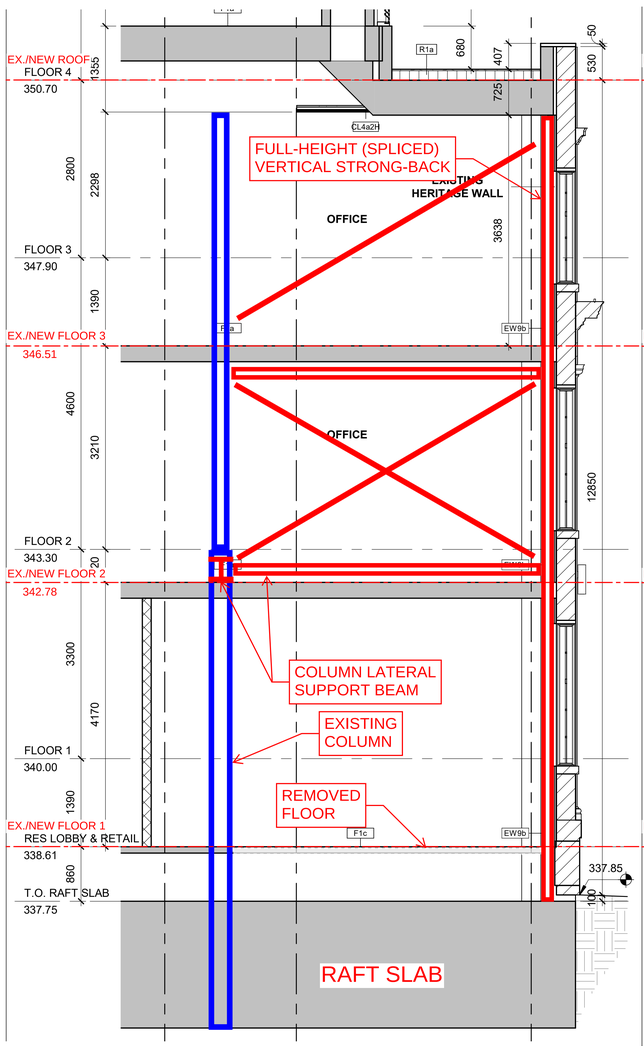


ROOF REMOVAL



NEW SLAB CONNECTION, TYP.

TYPICAL BRACED BAY SEQUENCING



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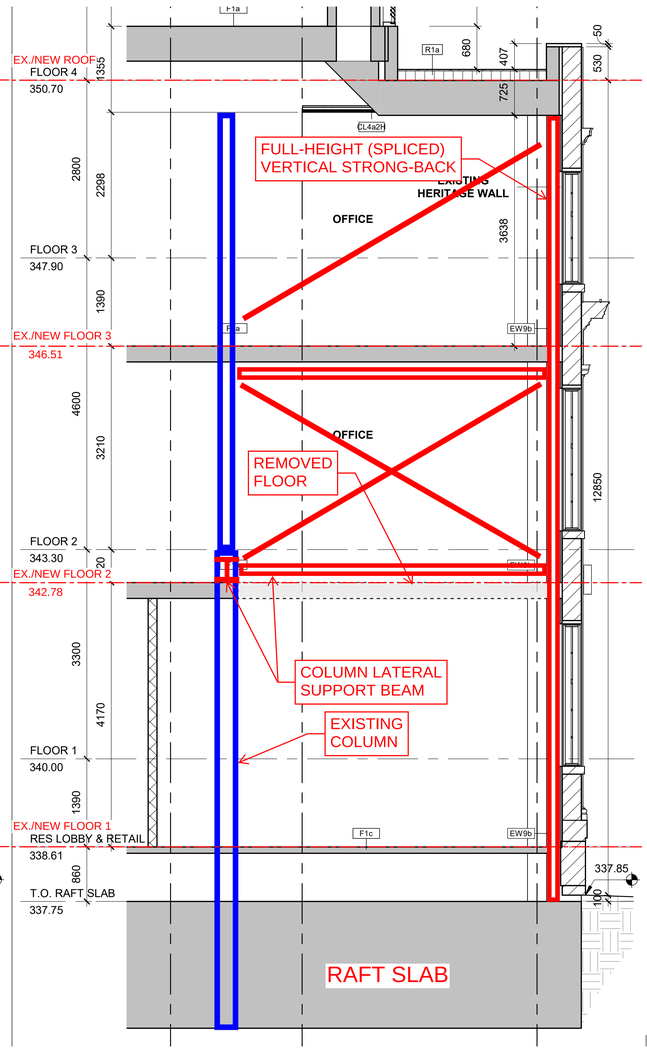

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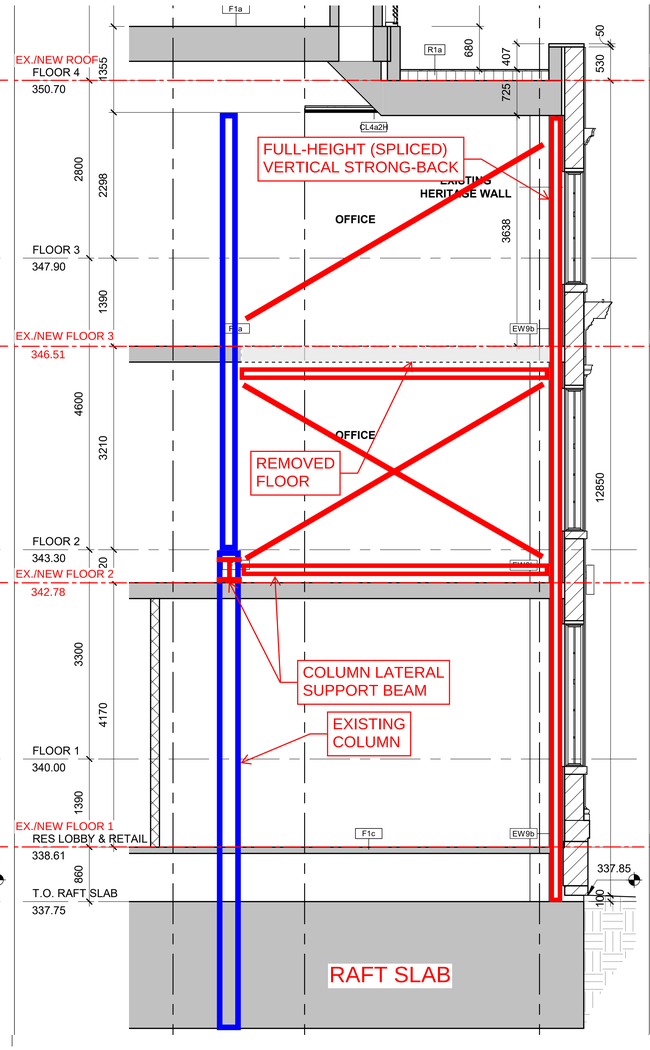

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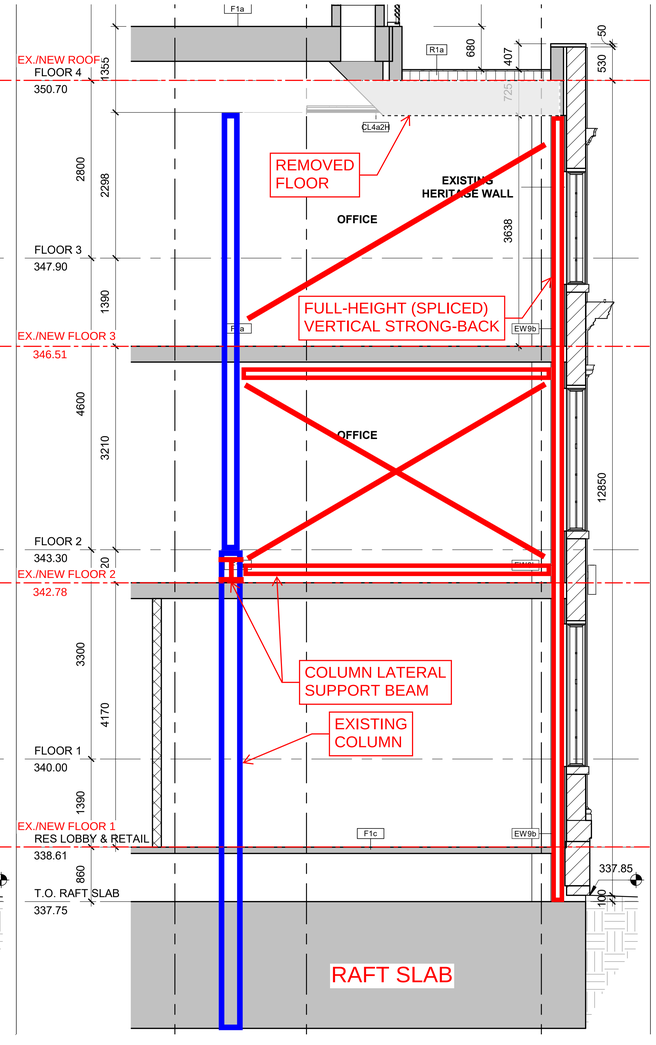

ROOF REMOVAL

APPENDIX C

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02 03 44 – SHORING AND SUPPORT OF PERIOD STRUCTURES

General

1.1 RELATED REQUIREMENTS

.1 Section 02 41 19 – Selective Structure Demolition.

1.2 REFERENCES

.1 Definitions

.1 Bracing: temporary support installed in an excavation or a structure to stabilize against deformations or failure. (Resisting lateral loads).

.2 Dead Shoring or Vertical Shoring: a vertical member with a head plate, sole plate and a means of adjustment for tightening and easing the shore. Used to support dead loads which act vertically downwards.

.3 Heritage Materials: Elements of historic significance or character defining features of a historic place, which document the history of the related building assembly, built feature or constructed element, as defined in the Project Documents.

.4 Shoring: temporary support installed in an excavation or a structure to relieve loads.

.5 Soldier pile: a vertical member which takes the side thrust from horizontal sheeting and which is supported by struts across an excavation. A vertical member used to prevent the movement of formwork; is held in place by struts, bolts, or wires.

.2 Reference Standards

.1 American Society for Testing and Materials (ASTM)

.1 ASTM F1667-18, Specification for Driven Fasteners: Nails, Spikes and Staples.

.2 ASTM F3125/F3125M-21, Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.

.2 Canadian Standards Association (CSA)

.1 CAN/CSA O86-14, Engineering Design in Wood.

.2 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.3 CSA O151-17, Canadian Softwood Plywood.

.4 CSA S16-14, Design of Steel Structures.

.5 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

.3 Deutsches Institut fur Normung E.V. (DIN)

.1 DIN EN 16031, 2012 Edition, September 2012 - Adjustable telescopic aluminum props.

.4 Forest Stewardship Council (FSC)

.5 National Lumber Grades Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber 2022.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings

.1 Submit drawings stamped and signed by Professional Engineer registered or licensed in Province of Ontario.

.2 Shop drawings to indicate shop and erection details in accordance with performance criteria in 2.2.

.3 Submit shoring, bracing, and temporary framing detail drawings signed by Professional Engineer registered or licensed in Province of Ontario.

.4 Provide details on how to avoid introducing stress and damage at the point of contact of shores or bracing with heritage materials.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 01 61 00 – Common Product Requirements.

Part 2 Products

2.1 MATERIALS

.1 Structural wood members: timber and built-up timber, grade No. 1/No. 2.

.1 Forest Stewardship Council (FSC) certified.

.1 Lumber:

.1 FSC certified.

.2 NLGA certified.

.2 Structural steel members to CSA G40.21

.1 Grade 350 for WWF, Rolled W (Wide Flange), and HSS members

.2 Grade 300 for all rolled shapes and plates.

.3 Class C for HSS members.

.4 Type W.

.3 Aluminum or steel adjustable telescopic shoring props to DIN EN16031, with braces and connections to have sufficient capacity to resist loads shown on Drawings and in accordance to Consultant instructions.

.4 Wood connections: Canadian soft wood plywood to CSA O151 sheathing grade.

.1 Forest Stewardship Council (FSC) certified.

.1 Lumber:

.1 FSC certified.

.2 NLGA certified.

.5 Steel connections: steel gusset plates, angles to CSA G40.21, grade 300, type W.

.6 Nails to ASTM F1667.

.7 Wood lag screws, nuts and washers to CAN/CSA O86.1.

.8 High-tensile bolts: to ASTM F3125.

.9 Welding materials: CSA W59.

2.2 PERFORMANCE CRITERIA

.1 Ensure that materials, equipment and procedures:

.1 Safely support existing structure and construction live loads.

.2 Allow work to be accomplished.

.3 Minimize risk of damage to historic elements to remain or be salvaged.

2.3 SOURCE QUALITY CONTROL

.1 Timber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

Part 3 Execution

3.1 EXAMINATION

.1 Before starting work, verify existing conditions and variations from original Contract Documents and notify Consultant in writing, prior to start of Work.

3.2 PREPARATION

.1 Before disturbing any building components, verify that a Designated Substance Report (DSR) has been properly prepared.

.2 Remove machinery installations, services, furnishings, partitions, and stored materials from building.

.3 Before beginning shoring, brace window and door openings as indicated on Drawings.

.4 Before beginning shoring and bracing, protect historic fabric and elements to remain or be salvaged in direct contact with bracing and shoring components. Request review by Consultant.

.1 Provide protection between shoring and bracing to prevent transfer of rust stains to historic fabric.

.5 Before beginning shoring and bracing, perform structural repairs to facilitate shoring and bracing, such as masonry conservation and treatment of corroded steel. Report any loose masonry or corroded steel elements to Consultant.

3.3 INSTALLATION - GENERAL

.1 Begin work in accordance with Consultant’s instructions.

.2 Obtain approval from Consultant, before execution, for alteration to bracing and shoring systems.

.3 Support individual elements that become loose during shoring and bracing installation.

.4 Erect structural timber to CAN/CSA O86.1.

.5 Erect structural steel work to CAN/CSA S16 and CAN/CSA S136.

.6 Weld to CSA W59.

3.4 BRACING OF STRUCTURES

.1 Compensate for unevenness of wall surfaces by installing packing as required, and upon review by Consultant.

.2 Install and relocate bracing as indicated on the Drawings, and in accordance with the sequence of construction indicated on the Drawings.

.3 Coordinate bracing of structure and elements to remain with the new construction, to maintain the sequence indicated on the Drawings.

.4 Remove bracing only upon completion and connection of new construction that is intended to provide the necessary support to the element being shored.

3.5 SHORING OF STRUCTURES

.1 For stone or brick masonry, dismantle as necessary to facilitate raking or flying shores. Consolidate masonry around perimeter of opening. Carefully mark and remove masonry elements to be salvaged and reset in accordance with Consultant instructions.

.2 Compensate for unevenness of wall surfaces by installing packing as required, and upon review by Consultant.

.3 Install and relocate shoring as indicated on the Drawings, and in accordance with the sequence of construction indicated on the Drawings.

.4 Coordinate shoring of structure and elements to remain with the new construction, to maintain the sequence indicated on the Drawings.

3.6 ADJUSTMENT

.1 Monitor performance of bracing and shoring systems and maintain their effectiveness by retightening as required, making adjustments, until support is completion of project.

.2 If adjustments are frequent, repetitive, or exceed 6 mm, notify Consultant.

3.7 SHORING AND BRACING REMOVAL OR RELOCATION

.1 Shoring and bracing shall only be removed upon completion and connection of new construction that is intended to provide the necessary support to the element being temporarily braced or shored.

.2 Remove or relocate temporary shoring and bracing only when the Consultant has given written approval.

.3 Examine contact interface of shoring and bracing with historic fabric in the presence of Consultant. Where the historic fabric has been damaged, restore damaged area to replicate the adjacent comparable finishes to the satisfaction of the Consultant and at no additional cost to the Owner.

.4 Remove temporary shoring bracing from site upon completion of shoring and bracing sequence indicated on Drawings, and upon written approval of Consultant.

END OF SECTION

APPENDIX D

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02 41 19 – SELECTIVE STRUCTURE DEMOLITION

Part 1 General

1.1 SUMMARY

.1 This Section includes the following:

.1 Demolition and removal of selected portions of exterior building components or structural elements.

.2 Demolition of mechanical and electrical equipment.

.3 Demolition and removal of selected site elements.

.4 Repair procedures for selective demolition operations.

.2 This section does not include the following:

.1 Removal of hazardous materials or asbestos abatement.

.2 Demolition of interior building components and finishes.

.3 Drawings contain details that suggest directions for solving some of the major demolition and removal requirements for this project; Contractor is required to develop these details further by submitting a demolition plan prepared by a professional engineer employed by the Contractor.

1.2 RELATED REQUIREMENTS

.1 Section 02 03 44 – Shoring and Support of Period Structures.

.2 Section 04 03 43.19 – Period Stone Dismantling.

.3 Section 04 03 21.19 – Clay Brick Conservation Treatment.

.4 Section 31 23 33 – Excavation, Trenching and Backfilling.

1.3 REFERENCES

.1 Definitions:

.1 Alternate Disposal: reuse and recycling of materials by designated facility, user or receiving organization which has valid Certificate of Approval to operate. Alternative to landfill disposal.

.2 Deconstruction: systematic dismantling of structure in a manner that achieves safe removal/disposal of hazardous materials and maximum salvage/recycling of materials.

.1 Ultimate objective is to recover potentially valuable resources while diverting from landfill what has traditionally been significant portion of waste system.

.3 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.

.4 Demolition: rapid destruction of structure with or without prior removal of hazardous materials.

.5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.

.6 Hazardous Materials or Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

.7 Integrated Pest Management Program (IPM): is a pest control strategy which implements environmental health and safety approaches to minimize the use of toxic pesticides and minimize their exposure to humans and the environment.

.8 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.9 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form.

.1 Recycling does not include burning, incinerating, or thermally destroying waste.

.10 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

.11 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

.12 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from remodelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.13 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.14 Source Separation: acts of keeping different types of waste materials separate, beginning from first time they became waste.

.2 Reference Standards:

.1 Canadian Environmental Protection Act (CEPA)

.1 CCME PN 1326-2008, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.

.2 Canadian Standards Association (CSA)

.1 CSA G40.20/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.3 CSA Group (CSA)

.1 CSA S350 M1980 (R2003), Code of Practice for Safety in Demolition of Structures

.4 Dangerous Goods Transportation Act (DGTA), R.S.O. 1990, c. D.1.

.5 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), 2012.

.2 Canadian Environmental Protection Act (CEPA), 2012

.1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations

.2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34

.4 Motor Vehicle Safety Act (MVSA), 1995

.5 Hazardous Materials Information Review Act, 1985

.6 Ontario Building Code 2012 (Part 8)

.7 National Fire Protection Association (NFPA)

.1 NFPA 241 13, Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Demolition Meetings:

.1 Convene pre-demolition meeting 2 weeks prior to beginning on-site removals, with Contractor's Representative and Consultant, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify project requirements.

.2 Verify existing site conditions adjacent to demolition work.

.3 Co-ordinate with other construction subtrades.

.4 Verify locations where temporary shoring is required, prior to start of demolition in these locations.

.2 Hold project meetings every week.

.3 Ensure key personnel, site supervisor, project manager, and subcontractor representatives attend.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit pre-demolition audit and deconstruction/disassembly plan prior to starting work in accordance with Section 01 35 73 - Procedures for Deconstruction of Structures.

.3 Comply with the requirements of Section 02 61 33 - Hazardous Materials.

.4 Prior to start of Work on site, verify that a Designated Substance Report (DSR) has been completed for the structure. In the event that a DSR is not available, coordinate with the Owner to arrange for such reports to be compiled immediately before building components are disturbed.

.5 Workers, haulers and subcontractors must possess current, applicable Certificates of Approval and/or permits to remove, handle and dispose of wastes categorized Provincially or Municipally as hazardous.

.1 Provide proof of compliance within 24 hours upon request of Consultant.

.6 Demolition Plan: Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction, and as follows:

.1 Proposed Dust Control and Noise Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation.

.2 Inventory: Submit a list of items that have been removed and salvaged after selective demolition is complete.

.3 Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

.4 Pre demolition Photographs: Submit photographs indicating existing conditions of adjoining construction and site improvements prior to starting Work. Include finish surfaces that may be misconstrued as damage caused by selective demolition operations.

.5 Demolition/deconstruction drawings, diagrams or details showing sequence of demolition/deconstruction work and supporting structures, and means and methods to be employed to carry out the work indicated on the Demolition Drawings.

.6 Temporary bracing and shoring, stamped by a qualified Professional Engineer, registered in the Province of Ontario.

.1 Indicate material specifications, all details and information necessary for assembly and erection of temporary shoring, including anchorage to existing building.

.2 Show all superimposed service dead, live and lateral loads, for which the temporary shoring is designed.

.7 A protection plan and methodology to protect adjacent elements designated to remain, from weather related damage, until such time as these elements are permanently protected from weather related damage.

.8 Provide proof and review of approval of shoring erection by a Professional Engineer, licensed in the Province of Ontario. Maintain the shoring in a satisfactory condition for the duration of the work.

.9 Prior to removal of metal flashings/decorative details or items of historical significance, record existing profiles and details accurately. Provide copy of these measurements to the Consultant.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial and Municipal regulations.

.2 Project supervisor with previous deconstruction experience must be present on site throughout demolition/disassembly procedure.

1.7 SITE CONDITIONS

.1 Environmental Protection:

.1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Fires and burning of waste or materials is not permitted on site.

.4 Do not bury rubbish or waste materials.

.5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout project.

.6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction.

.8 Protect trees, plants and foliage on site and adjacent properties and streetscape to remain.

.9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

.2 Structural Vibration Limits

.1 If any of the vibration limits are exceeded, or any other demolition procedure is observed to have a negative impact on the building masonry/structure, stop all work until the situation is remedied and an effective mitigation is submitted and reviewed by the Consultant.

.2 Below are the structural limits for the excavation and demolition on this project.

Dominant Frequency Range (Hz):	**Peak Limit Vibration (mm/s):**
<10	3.0
10 to 50	3.0 to 8.0 (interpolated linearly)
50 to 100	8.0 to 10.0 (interpolated linearly)
>100	10.0

1.8 EXISTING CONDITIONS

.1 If material resembling spray or trowel applied asbestos or other substance listed as hazardous be encountered in course of demolition, suspend work, take preventative measures, and notify Consultant immediately. Proceed only after written instructions have been received from Consultant.

.2 Structures to be demolished are based on their condition on date that tender is accepted.

.1 Remove, protect and store salvaged items as directed by Consultant. Salvage items as identified by Consultant. Deliver to Owner as directed.

Part 2 Products

2.1 EQUIPMENT

.1 Equipment and heavy machinery:

.1 On-road vehicles to: CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.

.2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

.3 Where possible use water efficient wetting equipment/trucks/attachments when minimizing dust.

.4 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

.5 Shoring materials to CSA G40.20/G40.21, Grade 300.

.6 Limit loads imparted on all existing structural slabs by equipment and machinery as follows:

.1 Concentrated loads on structural slabs cannot exceed 5.0 kN. Spacing must not be less than 1.2 m apart.

.2 Uniform area loads cannot exceed 4.8 kPa at Ground Floor level. Uniform area loads cannot exceed 2.4 kPa on all other floors.

.3 Refer to Drawings for loading limitations specific to selected areas of the structure.

.7 Equipment or machinery that will apply loads to existing structural slabs must be reviewed by a Professional Engineer licensed in the Province of Ontario, for conformance with the load limits, prior to use or installation on site.

.8 Equipment or machinery that will apply loads to any elements other than existing structural slabs must be reviewed by a professional engineer licensed in the Province of Ontario, prior to use or installation on site.

.9 Temporary Shoring: All materials used for temporary shoring must meet the material standards noted in the reviewed shoring drawings. Substitutions will not be accepted without the stamped approval of the Engineer who prepared the shoring drawings.

.10 Maximum permissible weight for jackhammers adjacent to existing elements to remain is 7 kg. Modify weight of equipment if necessary, in order to prevent damage to concrete which is to remain in place. Sawcut in advance of breaking concrete wherever possible, and as indicated on Drawings.

.11 Minimum distance between any two operating jackhammers or chipping hammers is three (3) metres or as directed by the Consultant.

Part 3 Execution

3.1 PREPARATION

.1 Protection of in-place conditions:

.1 Work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Prevent movement, settlement or damage to adjacent structures, services, paving, trees, landscaping, adjacent grades, adjacent properties, and all parts of existing building to remain.

.1 Provide bracing, and shoring as required and as indicated on the Drawings.

.2 Repair damage caused by deconstruction, as directed by Consultant.

.3 Support affected structures and, if safety or stability, in whole or in part, of structure being demolished, adjacent structures, services, or parts of existing building to remain appears to be endangered, take preventative measures, stop Work and immediately notify Consultant.

.4 Protect existing building structure, systems, windows, services and equipment, which are to remain.

.5 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

.6 Keep noise and dust to a minimum.

.7 Verify the location of utilities and services designated to remain intact, locations of utility caps to be installed, or designated for removal during demolition in coordination with the Consultant. Allow sufficient time and effort to coordinate with the Consultant to identify such systems and properly trace and label in order to protect and preserve systems during and post demolition process. Repair and make good any damage to any utilities, infrastructures, mechanical and electrical systems designated to remain intact, at no additional cost to the Contract.

.8 Cutting torches or other high heat equipment will not be allowed may be allowed if permits are in place. Note there is a severe risk of sparks from demolition operations leading to smoldering and combustion especially of very dry wood elements. Maintain a fire watch following any hot work and take all necessary precautions to minimize risk of fire from work.

.9 Install vibration monitors at locations identified by Consultant. Connect monitors to Consultant computer network to allow monitoring of exceedances.

.2 Site and Surface Preparation:

.1 Inspect site with Consultant and verify extent and location of items designated for removal, disposal, recycling, salvage and items to remain.

.2 Disconnect electrical and telephone service lines entering buildings to be partially demolished.

.1 Locate, protect and post warning signs on electrical and communication lines and equipment which must remain energized to serve other parts of the site or other properties during period of demolition.

.3 Disconnect and cap designated mechanical services and utility services, in accordance with authorities having jurisdiction.

.1 Natural gas supply lines: remove in accordance with gas company requirements.

.2 Sewer and water lines: remove in accordance with authority having jurisdiction.

.3 Other underground services: remove and dispose of as directed by Consultant or appropriate authority having jurisdiction.

.3 Removal of Hazardous Waste

.1 Prior to start of deconstruction work remove contaminated or hazardous materials from site as directed by Consultant and dispose of in safe manner in accordance with TDGA and other applicable regulatory requirements, in accordance with Section 02 61 33 - Hazardous Materials.

.4 Do not disrupt active or energized utilities traversing premises or designated to remain undisturbed. Where applicable, utilize demolition activities to expose but not damage utility and service lines.

.5 Arrange for temporary lifting and removal of existing equipment installed on roof decks. These include but are not limited to mechanical equipment, vent stacks, soil stacks and other sundry items. Before lifting this equipment, coordinate with Owner.

.6 Furnish all supervision, labour, materials and equipment necessary to accomplish the monitoring, trapping, proper disposal, chemical control for the pest and rodent removal component as per the site specific IPM Plan. The implementation of the IPM will be required from the start of the contractor mobilization, during demolition activities up to the turnover of the site to the owner at project completion.

.7 Remove all loose building materials and contents.

3.2 SHORING ERECTION

.1 Supply and install the shoring sufficient to carry out the scope of work identified on the drawings.

.2 Set shoring anchors in horizontal masonry joints only. DRILLING INTO THE FACE STONE/CLAY BRICK IS NOT PERMITTED. Repointing of masonry joints as shoring is removed will be carried out as part of the masonry contract.

.3 Provide proof of review and approval of shoring erection by a Professional Engineer, licensed in the Province of Ontario.

.4 Maintain the shoring in a satisfactory condition for the duration of the work.

3.3 DISASSEMBLY

.1 Demolition/disassembly work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.2 Refer to Section 04 03 43.19 - Period Stone Dismantling and Section 04 03 21.19 - Clay Brick Conservation Treatment for procedures when historic stone or brick is designated for salvage.

.3 Prior to start of Work remove contaminated or hazardous materials as directed from site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA and other applicable requirements.

.4 Except as indicated, materials removed from structure to be demolished are property of Contractor.

.5 Throughout course of deconstruction, pay close attention to connections and material assemblies. Employ workmanship procedures which minimize damage to material to be salvaged or removed and reused, and of elements and material to remain.

.6 Ensure workers are briefed to carry out work in accordance with appropriate deconstruction techniques and those indicated in the Drawings and Specifications.

.7 Workers must utilize adequate fall protection.

.8 Project supervisor with previous deconstruction experience must be present on site throughout demolition procedure.

.9 Deconstruct in accordance with the Ontario Building Code, Part 8 and applicable safety standards.

.10 Temporary shoring must be approved in writing by the Engineer who prepared the reviewed shoring drawings, prior to proceeding with the demolition.

.11 Blasting operations are not permitted during deconstruction.

.12 Remove all utilities, piping, mechanical and electrical equipment/systems and associated structures completely from areas and assemblies designated to be demolished unless otherwise noted.

.13 Systematically remove finishes, furnishings, building contents, mechanical and electrical equipment of value, and for which suitable reuse and recycling opportunities exist.

.14 Disassemble only in sequence indicated on Drawings and in reviewed Demolition Plan only.

.15 Carefully remove windows and doors from structure where these are not designated to remain.

.16 Disassemble non-loadbearing interior partitions and remove materials from structure.

.17 Wherever possible, transfer material assemblies from heights to ground level for easier disassembly. Take appropriate measures to ensure safety.

.18 Remove and store materials to be salvaged, in manner to prevent damage.

.1 Store and protect in accordance with requirements for maximum preservation of material.

.2 Handle salvaged materials as new materials.

.19 Where existing materials are to be re-used in Work, use special care in removal, handling, storage and re-installation to assure proper function in completed work.

.20 Remove broken or decayed wood components, and corroded steel structural members which Consultant deems to require replacement.

.21 Do not disturb items designated to remain in place.

.22 Maintain structural integrity of structure designated to remain.

.23 Extent of demolition and deconstruction and procedure for deconstruction are shown on Drawings.

.24 Deconstruct to minimize dusting. Keep materials wetted as necessary or as directed by Consultant.

.25 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.

.26 At end of each day's work, leave Work in safe and stable condition.

.27 Demolish masonry and concrete walls in sections suitable for reuse as specified.

.28 Remove structural framing.

.29 Contain fibrous materials to minimize release of airborne fibres while being transported within facility.

.30 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

.31 Use natural lighting to do Work where possible.

.1 Shut off lighting except those required for security purposes at end of each day.

3.4 REMOVAL OF CONCRETE SLABS

.1 Prior to the removal of portions of concrete slabs, perform ground penetration radar scanning of the existing slab. Provide 48 hours advance notice of Testing to Consultant and arrange to perform scanning in presence of Consultant. Based on the results of the scan, the Consultant will decide on the measures in order to minimize structural effect on the existing slabs.

.2 Maintain integrity of existing structure at all times.

.3 Demolish Concrete by methods which do not create impact loads on items that are not to be demolished. Jackhammer or other impact operations that involve breaking up the slabs into small portions will not be permitted.

.4 Remove existing reinforced, cast-in-place concrete floor slabs from areas as indicated. Sawcut the existing concrete slabs and remove only as required. If beams, slab thickening or other structural elements are encountered, stop work and notify Consultant. Do not proceed until written direction has been received from Consultant.

.5 Sawcut the concrete slabs free from surrounding structure and remove in small sections from above. Uncontrolled dropping of any removed portions of slabs to spaces below will not be permitted.

.6 Utilize wet cut saws only. Control dust and prevent from spreading to surrounding areas. Control the slurry generated from cutting operations in the areas of cutting and in the spaces directly below. Operate wet vacuums continuously during cutting operations.

.7 Equipment: Wet Cut, walk behind core cut saw. Provide saw with blade diameter capable of cutting through existing concrete slabs in a single pass. Equip saw with built-in water supply system approved by Consultant.

.8 As work progresses, protect openings in floors with protective barriers and guard rails in accordance with Health and Safety Requirements.

.9 Remove all debris to exterior immediately after removal. Stockpiling of removed materials will not be permitted inside of building at any time.

.10 At the end of each day’s work, leave Work in safe and stable condition.

3.5 SHORING REMOVAL

.1 Remove shoring after completion of the work and dispose off site. Provide additional reinforcing to existing slab before removal of shores if directed by Shoring Engineer. Make good all damage to existing finishes, after shoring is removed.

3.6 MAKING GOOD

.1 Make good materials and finishes which are damaged or disturbed during the process of additions and reconstruction under the Contract.

.2 Where existing work is to be made good, match new work exactly with the old work in material, form, construction and finish unless otherwise noted or specified.

.3 Protect work in the existing building, as completely as possible to hold the replacing of damaged work to a minimum.

.4 Preparation for New Finishes

.1 Remove existing finishes, including painting.

.2 Fill cracks and depressions with suitable filler and finish smooth, as recommended by the manufacturer of the new finishes.

.3 Grind protrusions level with substrates and finish smooth.

.4 Remove all evidences of existing adhesive, grease, oil, soil and other encrustations of foreign material by washing, scraping and grinding if necessary.

.5 Clean and prepare substrates to receive new work.

3.7 CLEANING

.1 Waste Management: separate waste materials for reuse or recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

.1 Label stockpiles, indicating material type and quantity.

.3 Keep processing area clean and free of excess debris.

.4 Upon completion of project, remove debris, trim surfaces and leave work site clean.

.5 Backfill areas as indicated in accordance with Section 31 23 33 – Excavation, Trenching and Backfilling.

.6 Upon completion of project, reinstate landscaped areas, walkways, light standards, affected by Work to condition which existed prior to beginning of Work or otherwise to condition which is indicated on the documents.

END OF SECTION