SUMMARY

A structural building assessment was completed in May 2019 per the request of the Manitoba Housing and Renewal Corporation, of the multi-unit tenant property Center Village located at 575 Balmoral Ave in Winnipeg, Manitoba. Many significant issues were found with the property which need to be corrected in order to bring the property back into satisfactory condition.

INTRODUCTION

Upon review of the Cohlmeyer Architectural (and sub-consultant engineering) construction drawings provided by MHRC, it has been determined that the buildings are constructed of wood stud framed walls, with exterior sheathing & stucco finish. Roof framing consists of wood rafters, sheathing, and modified bitumen membrane. Floor framing for second and third floors consists of wood joists, sheathing, and concrete topping. Insulation used is a combination of batt insulation, foam board, and spray foam throughout. Foundations are comprised of concrete piles, grade beams, and slab-on-grade main floors.

It is noted however that as-built or sealed record drawings are unavailable, therefore the construction drawings are being used for this review and are presumed to be in general conformance with actual construction methodology, but unable to verified without the removal of finishes.

DEFICIENCIES

The most critical issue is the foundation uplift occurring at the north end of building A. The northwest corner of the east wing has experienced a significant uplift, causing failure of the exterior sheathing on the building, as well as associated failure of the stucco finish. Also being uplifted at this corner is the interior floor slab and exterior sidewalk. This uplift is jamming the window unit located at the corner,

causing inoperability and possible failure of the window frame. The cause of the uplift of the foundation cannot be attributed to one specific cause unless significant excavation work is completed, but is suspected to be caused either due to improper construction techniques, or water infiltration with frost heaving. It is possible that the pile is heaving, and lifting the grade beam & slab with it, or the grade beam has separated from the pile and is heaving along with the slab. The drawings indicate that crushable void forms were to be placed below the grade beams and slabs to avoid heaving due to expansion of the underlying soil. Either they were not installed, or the void form was not deep enough to compensate for the expansion under freeze/thaw conditions leading to the jacking. This jacking was not noticed to be occurring in other locations on the property in either this building or the other buildings. This leads to the conclusion of something being different at this particular location. A possible different soil strata, improper or not-installed void forms, incorrect void form product/substitution, or significant water accumulations compared to the rest of the site. Also of note at this corner, is a discrepancy between the drawings and the as-built condition. The architectural drawings show two separate window units butted up at the corner, which would allow for jack and king studs at the corner to properly support the floor and walls above. The actual window installed is a single-unit corner window, which leaves part of the floor and wall above unsupported unless framed differently than shown on the drawings.

Fig. 1:. Jacking corner of Bldg A (unit a8).

Fig. 2: Another view of jacking.

Fig. 3: Damaged wall and stucco due to jacking.

Also within the Unit a8 located at this spot in Building A are issues with the underslab plumbing. Heaving is causing the plumbing connection points to lift out of the slab. The result is the floor drain & cleanout, the shower drain, and the toilet flange to be raised approximately 1.5 inches above the slab. The toilet is still connected to the flange, and is precariously balanced on the top flange elevated above the slab.

Fig. 4: Shower drain lifted out of shower floor.

Fig. 5: Toilet raised off floor due to drain lifting.

Fig. 6: Floor drain raised out of floor.

Throughout the site, sidewalks are uneven, sloped, and unaligned. Several step-ups and downs occur which do not meet code requirements for height. These are risks for trip and fall, as well as causing accessibility issues for those with mobility restrictions.

Poor drainage of the sidewalks is an interrelated concern. The sidewalks have shifted and become misaligned & sloped, with water collecting against foundation walls unable to drain away, and forms ice pads in the winter increasing the risk of slip and falls even more.

An item of note is there is a discrepancy in the Architectural and Structural drawings regarding the sidewalk construction. The Architectural drawings indicate that the sidewalks were to have been structural with a thickened-edge and voidform underneath the slab (but not under the thickened edge) while the Structural drawings only indicate voidform under a specific exterior concrete stair location. It is unknown why the discrepancy exists, but it appears that the sidewalks were constructed in accordance with the Structural drawings, which would be expected for concrete works. Having voidform under the sidewalks as indicated on the Architectural drawings would not have necessarily prevented the heaving and shifting of the sidewalks.

Fig. 7: Example of uneven sidewalk.

Fig. 8: Multiple elevations to walk through: concrete pad to left of metal platform, metal platform, lower concrete slab, uneven/ unmatched sidewalk.

Several locations throughout the site on various buildings have cracked and failing stucco. The locations and heights of the damaged stucco lead to the conclusion that the failure has been caused by impact from objects, most likely vehicles driving through the north courtyard. There are also locations where stucco is missing from below windows and doors. As to why this stucco is missing stucco, it is difficult to determine but a possible reason could be the stucco was damaged or removed during window frame or door frame replacement and was simply not replaced.

Fig. 9: Example of missing stucco below door.

Fig. 10: Example of damaged stucco. Wall patch as well as corner bottom.

All of the exterior steel access stairs, platforms, guards, and handrails are covered in surface corrosion. At this point, the amount of corrosion has not affected the structural integrity of them, but this is a cosmetic and serviceability issue. There exists a steel which is specifically intended to be left to develop a rusted patina, known as weathering steel, but this would be inappropriate to use in a contact/touch situation. With corroded handrails, people are less likely to grip them not wanting to dirty or contaminate their hands, and therefore increase their risk of fall and related injury. If the corrosion is left to continue, there is a chance that corroded metal particles and flakes will begin to come loose, and if hands are placed on, then embedment into the skin and injury could result.

Fig. 11: Example of corroding stairs.

Fig. 12: Example of staining occurring on stucco due to stair corrosion.

Numerous locations have window accent trims where the paint is peeling, and joints have separated/opened up leading to a deteriorated appearance. The peeling paint is most likely caused simply by the exposed cut edge of the metal trims allowing the paint to lift over time. The joint gaps are being caused either from improper installation (gaps at time of install) or shifting/loosening of the fasteners.

Fig. 13: Peeling window trims.

Fig. 14: Another example of peeling trim.

Fig. 15: Split corner in window trim.

A concern exists over the method of framing the cantilever floors. Every building onsite has a second floor and sometimes a third floor yet on top, where a large cantilever exists. Both the second and third floors cantilever out approximately 6 feet with an approximately same distance backspan. This is very undesirable in wood framed structures, where the usual standard of practice is the cantilever distance is limited to no more than 1/4 to 1/3 of the backspan in order to limit deflection and vibrations and ensure structural stability. It appears as though all outer edges of the cantilevers are sagging approximately an inch, and in units without furniture or people in the room. Interior floor concrete topping is cracking in most cases. Wood structures have a greater propensity to suffer from creep, which is a permanently induced and often continuously-increasing deflection from dead loads.

Fig. 16: Interior view of cantilever.

Fig. 17: Exterior example of cantilever dropping at outer edge.

A last and important item of note is the perceived compromised safety and security on site due to the layout and shape of the buildings. There are numerous hidden spots, blind spots, and areas beyond clear line of sight from the roadways and unit entrance doors. Also of concern is the ability of first responders to have clear and easy access to units. With very tall and very narrow spaces, there is limited firefighting access. Limited mobility and clear "spray lines" exist throughout.

Fig. 18: A typical secluded entrance way where a security assessment may prove beneficial.

RECOMMENDED CONCEPTUAL REPAIRS

The repair of the Building A foundation will be the largest capital expenditure portion of repairs to the site. The slab outside the building and inside must be removed to inspect and repair the foundation. Excavation will be required to allow access, remove accumulations of soil which are preventing the concrete from returning back to original position. Possible replacement of the foundation may even be required but cannot be determined until the foundation issues are daylighted. The north wall of Building A should be repaired after the foundation issue has been corrected. Stucco finish and sheathing will have to be removed, and the stud framing inspected for any damage due to the uplift forces. Then the wall can be repaired, re-sheathed, and re-stuccoed. Windows will have to be replaced if the frames and operators are damaged, which is highly likely based on site observations. Windows which span around the corner as single-units should be replaced with two separate window units abutting the corner, with proper studs in the corner in order to support the upper levels.

The interior slab must be removed to retrench and replace all the underslab plumbing in the unit affected by the uplift. This should be completed simultaneously with the foundation repairs as noted above.

To ensure safe walkways (eliminate the unaligned sidewalks & trip hazards) and to ensure proper drainage, the courtyards will require replacement of the sidewalks and door landings. During this work, all of the site should be regraded to ensure all rainfall is directed towards and into the storm sewer grates.

Patching of the damaged stucco is a simple repair to restore the exterior weather protection. Approximately a dozen spots up to approx. 1 square foot each are scattered throughout the site. This patching can be completed at the same time the north wall of Building A is re-stuccoed. A word of caution, patching stucco often ends up with the patch material being a slightly different colour than the original stucco. This may not be of concern to MHRC, but if so, they have the option to paint the exterior walls after completion of the repairs. This painting will then become an ongoing maintenance item every few years.

All of the exterior access stairs, platforms, guards, and handrails should be properly cleaned and coated with a rust inhibiting paint system to prolong life and reduce the risk of resident injuries.

All of the window accent metal trims should be properly cleaned and coated with new paint to keep as an accent feature. Adjustment can be attempted to bring the gapped corners into contact by bending the pieces slightly or by loosening, adjusting alignment, and retightening the fasteners. An alternative would be to simply remove the metal trims, but the remaining fastener holes would require filling and patching. Alternatively, MHRC could remove all the paint and leave the galvanized/galvalume substrate exposed. This would result in the trims having a bright metal finish but overtime they will discolour and loose their brightness.

The second largest capital expenditure work recommended is for the cantilever portions of the buildings. To properly support the upper floors and roof, additional structure is required. The first option may be to install braces from the underside of the outer edge back diagonally to the foundation wall at the floor slab. This will help support the outer edge, reducing deflections, and direct forces into the building foundations. Unfortunately, this may restrict pathways of travel around the site. The second option would be to install support columns on new foundations along the outer edge of the cantilevers. This would be less restrictive to paths of travel however it would be a more expensive option as new foundation work would be required.

MHRC has indicated concerns about site security. Concerns regarding site security need to be further studied and developed by a qualified Professional Security Consultant, but could potentially include: additional lighting, visibility mirrors at blind corners, and security cameras. All items installed be tamper/vandal-proof.

FENCING OPTION

Initially there was to be included a design review of possible implementation of security fencing around the site, however that consideration was put on hold at this point. It is noted however, upon a cursory review of the site, due to the building spacing and layouts including entrance locations that adding fencing to the site cannot be easily accomplished without significantly restricting the movement of residents, and fire and police access.

COST ESTIMATES

Item	Engineering Cost	Construction Cost	Total Cost
Building A heaving inc. replace 3 windows	$75,000	$347,000 to $521,000	$420,000 to $596,000
Building A plumbing replace (unit a8 only)	$12,000	$103,000 to $155,000	$115,000 to $167,000
Sidewalks replacement & site grade	$8,000	$97,000 to $146,000	$105,000 to $154,000
Stucco repairs (assumes 12 patches)	$3,000	$28,000 to $42,000	$31,000 to $45,000
Exterior steel stairs & guards refinish	$3,000	$62,000 to $93,000	$65,000 to $96,000
Window trims (193) + replace 1 window	$3,000	$205,000 to $308,000	$208,000 to $311,000
Cantilever repairs (no-foundation option)	$50,000	$173,000 to $260,000	$223,000 to $310,000
Security (assumes 20 mirrors, 12 lights, 6 cameras)	$30,000	$60,000 to $90,000	$90,000 to $120,000
Total	**$184,000**	**$1,075,000 to $1,613,000**	**$1,259,000 to $1,797,000**

*Estimates are based on Class D, for preliminary budgeting only

Using the Architectural drawings for information, there are 25 units totalling 16,840 square feet (excluding decks). The total cost estimate above results in the following average distributions:

Per unit: $50,360 to $71,880
Per sq ft: $74.76 to $106.71.

CONCLUSION

We trust this provides a suitable summary of the issues and possible solutions for the Center Village property. If there are any questions or concerns, please feel free to contact the undersigned.

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