

COUNTY OF MILWAUKEE
INTEROFFICE COMMUNICATION

Date: October 16, 2020

To: Supervisor Jason Hass, Chairperson, Committee on Finance & Audit

From: Vince Masterson, Capital Budget Coordinator, Office of Performance, Strategy and Budget; Department of Administrative Services

Subject: Capital Project WM05101 – MPM North Stairwell Structural Wall Repair

Issue

The Committee on Finance & Audit, at its October 16, 2020 meeting, requested information regarding life/safety issues related to Capital Project WM05101 – MPM North Stairwell Structure Wall Repair (Capital Project).

Background

The Capital Project received planning and design appropriations of \$79,125 as part of the Adopted 2020 Capital Improvements Budget. The County Executive's Recommended Capital Improvements Budget includes appropriations of \$375,780 for the construction phase.

Pursuant to follow-up with the County's Architectural and Engineering (AE) staff, it was indicated that the Capital Project directly cures life/safety issues related to the museum facility. In particular, two areas of need are being addressed. One is a deteriorating support angle which is in the north stairwell. This angle supports a concrete structural slab that is part of the MacArthur Square structure. Due to water infiltration, the support angle has been rusting for several years. If left unrepaired and water infiltration continues, failure of the support angle will happen.

The second area is a mezzanine floor slab above the museum's ground floor restrooms, which is also supported by a steel angle. This steel angle is pulling away from the existing museum foundation wall, literally pulling its anchors out of the wall. Currently, a temporary shoring is in place for both concrete structural slabs.

A structural investigation was done by GRAEF Engineering and is included as Attachment #1.

Recommendation

This report is provided for informational purposes only. No action is required.

Attachment #1



Graef Report.pdf



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July 24, 2019

Mr. Philip Schmidt, AIA
Milwaukee County - Department of Administrative Services
Facilities Management Division
633 W. Wisconsin, Suite 1005
Milwaukee, WI 53203

SUBJECT: MPM – North Stairwell Vestibule, phase one
Structural Investigation Report

Dear Mr. Schmidt:

Observations

We have been on site several times reviewing the structural deterioration in the north stairwell, the upper level vestibule and the mezzanine floor slab above the Men's and Women's Toilet Rooms. The North Stairwell and Vestibule structural slabs are part of MacArthur Square adjacent to the north exterior wall of the Milwaukee Public Museum (MPM). The Mezzanine floor slab is part of MPM. Most of these slabs span to the north wall of the museum and are supported by a series of angles (L6x6x3/8) bolted to the north wall. Each concrete slab of MacArthur Square has a plate embedded in the underside of the slab. The embedded plates bear on the angles that are bolted to the north wall allowing the slabs to move horizontally from the wall, like an expansion joint.

Vestibule - The ceiling of the upper level vestibule is a concrete slab that bears on an angle (L6x6x3/8) that is anchored to the north wall of the museum. Due to deteriorated waterproofing materials on the top of the structure, this angle has been exposed to water and is corroded (See Photograph 1, Appendix A). The bolts are not visible because the vertical leg of the angle is up turned and hidden from view by the slab. We assume the anchors are corroded as well, since we have seen this condition in other adjacent areas of the museum. The concrete framing around the door that separates the vestibule from the stairway has a very large crack at the top south corner of the door adjacent to the north wall of the museum (See Photographs 2 and 3, Appendix A). The reinforcement in this concrete is exposed at the crack. The rebar does not adequately reinforce this corner thus contributing to the cracked condition (See Photograph 4, Appendix A).

Stairway – The ceiling of the stairway is the same slab as the one in the vestibule and it is supported at the north wall of the museum in the same manner as the vestibule. The deterioration of the support angle diminishes the further west you go in the stairway. Much of it is hidden from view by an acoustical tile ceiling. The far west end of the stairway looks better than the vestibule deterioration, but there are signs of water penetration and spalling.

Mezzanine Floor Slab – The crawl space is west of the stairway and located above the men's and women's rest rooms. Existing building drawings indicate the crawl space floor is a

4" thick concrete slab on metal deck (1-1/2" deck + 2-1/2" concrete slab). The deck above the men's room runs north-south and is supported at the north wall of the museum by an upturned steel angle anchored to the north wall. The deck above the women's room runs east west and is supported at the west end by an upturned angle anchored to a north-south retaining wall. Many of the anchors supporting the slab above the men's room are visible and experiencing varying degrees of failure. There are signs of spalling around several anchors (See Photograph 5, Appendix A) and two that are completely pulled out of the wall. These anchors have a very short embedment, not typical of other areas we have observed in the past. The anchors supporting the slab above the women's room are not visible and the slab and angle appear tight to the wall. I suspect they are in sound condition.

Conclusions and Recommendations:

Water penetration in the vestibule and stairway has caused corrosion resulting in loss of section properties of the supporting angle. We suspect the anchors for this angle are corroded as well. Cracks in the wall adjacent to the vestibule door are likely due to shifting of the slab above the door and poor placement of reinforcement at the door jamb/header interface. The anchors supporting the crawl space slab above the men's room that are failing are likely due to a combination of inadequate embedment of the anchors and minor shifting of the slab relative to the north wall.

Hence, we recommend temporary shoring of the vestibule, stairway and mezzanine floor slab above the men's toilet room. Solutions for this deterioration shall be designed in Budget Year 2020. Construction should be performed in Budget Year 2021. and constructed.

Sincerely,

Graef-USA Inc.

John Kannall, P.E
Project Manager

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APPENDIX A



Photograph 1: Corrosion above horizontal angle leg in vestibule



Photograph 2: Crack at doorway looking west in vestibule



Photograph 3: Crack at doorway looking east from stairway



Photograph 4: Lack of proper reinforcement at doorway crack



Photograph 5: Anchor pulled out of wall at mezzanine slab