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January 23, 2024

Aaron Young
northwest studio
1205 E Pike Street, #2F
Seattle, WA 98122

Subject: City of Mercer Island Public Works Department Maintenance Building review
Quantum Project #23452.01

Dear Aaron Young:

On Thursday, January 11, 2024, I met you and a representative of the City of Mercer Island on site and performed a structural observation of the existing structure of the City of Mercer Island Maintenance Building and the related outbuildings. Based on what could be observed during that visit, a review of the existing structural drawings dated 5/28/1980, and a review of the Stemper/MLA report dated 5/24/2023, it is my opinion that the building and the related outbuildings are not in danger of collapse under normal building operation.

Since our office has been retained to perform a new analysis utilizing ASCE 41, the IBC, and the IEBC for the purpose of designing efficient seismic upgrades, we reviewed areas that relate to that analysis and design. These included the main storage area roof (green roof) and the two wood-framed roof areas: the office and the high-bay garage.

It is my understanding that in order to repair the current leaks within the storage area roof, the soil which covers that main roof surface of the Maintenance Building may be permanently removed and replaced with only a new roof membrane. While there is no known concern with the gravity load design of the roof, the removal of this large amount of seismic mass will significantly improve the seismic performance of the overall structure and is therefore highly recommended.

As noted in the Stemper/MLA report, there is a concern with the connection of the two wood-framed roof areas, the office and the high-bay garage, to the exterior CMU walls. In other major earthquakes, the lack of a robust, positive attachment from masonry walls to the roof diaphragms has led to partial and full wall collapses. Therefore, we recommend that a code-compliant retrofit be made in the near term. This retrofit could be accomplished from the exterior as part of a re-roof to minimize the impact to the building use.

Though the related outbuildings do not form a part of the project's scope of work, while on site we did walk those outbuildings. No immediate structural issues were observed at the outbuildings; however,

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they have a few vulnerabilities that should be monitored to ensure that they do not pose structural concerns in the future.

- The wood-framed buildings are “pole-buildings” and depend on pressure treated wood posts for their vertical and lateral support. A likely location for rot is just below the ground line and rot could progress for many years before it is displayed in a visible location.
- There are many locations where large trees have been planted close to the outbuildings. There is some danger of trees or branches falling on the buildings, or roots damaging the foundations and walls.
- The concrete outbuildings showed a few locations of water intrusion through cracks. Although not seen currently, this could cause the rusting of reinforcement, leading to concrete spalling and the loss of structural strength of the overall concrete construction.

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Please feel free to call me at 206-957-3900 if you have any questions regarding our responses.

Sincerely,
Quantum Consulting Engineers, LLC

Scott Tinker, P.E., S.E., Principal