

## Memorandum

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Company:	Alamo Manhattan Properties, LLC	Date:	February 6, 2020
Address:	3012 Fairmount Street, Suite 100		
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cc:	n/a		
GDI Project:	AlamoMan-6-12		
RE:	Willamette Greenway Concrete Pier		
	Alamo Manhattan Blocks		
	Portland, Oregon		

This memorandum discusses the extreme geotechnical challenge associated with preserving the concrete pier in the Willamette Greenway adjacent to Block 44 of the proposed Alamo Manhattan Blocks development in Portland, Oregon. The pier is located at the north end of the stacked concrete block seawall and is not in service. Based on explorations and analysis, the subsurface soil below the pier is subject to liquefaction and associated lateral ground displacement toward the Willamette River during a seismic event.

The pier is stable in its current static conditions; however, mitigation of lateral ground displacement required to meet current code requires installation of a soil improvement buttress between the pier and the river. Because the pier is located at the riverbank, there is not sufficient space to install a conventional buttress.

Alternatives to a conventional buttress are experimental and expensive, involving structural modification of the pier and anchorage to buried elements behind a buttress that would have to extend all the way outside of the greenway setback. Even if an anchorage system was able to be designed and installed to resist the potential of immense lateral forces, failure due to differential liquefaction settlement between the wall and anchorage location would remain a possibility. In our opinion, attempting to preserve the existing concrete pier to meet current code requirements would be cost prohibitive and involve unconventional approaches that would still not necessarily eliminate concerns over lateral movement from a seismic event.

## NNP:BAS:sn

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