

**PORT CODE
PROCEDURE**

NO. PCP-023

DATE : December 1, 2020 (Revision 01)

SUBJECT : **Design Considerations for Foundations Near Lightweight Cellular Concrete**

TITLE : **Design of Foundations Near Lightweight Cellular Concrete**

PURPOSE : The purpose of this Port Code Procedure (PCP) is to provide guidance on the design of foundation structures near lightweight cellular concrete (LCC) at the Mission Rock Project. This PCP describes the type of structures and their associated foundations which shall not rely on nearby LCC in the design of foundations and also describes types of improvements which can rely on nearby LCC for foundation design. The Port Building Permit Group shall assure compliance with this PCP during the plan check review process for an applicable Structured Street System permit application.

REFERENCE : 2016 Port of San Francisco Building Code (the "Code")
2016 Port of San Francisco Plumbing Code
2016 California Building Code
ASCE 7-10, Minimum Design Loads and Associated Criteria for Buildings and other Structures

DISCUSSION : A compensating lightweight fill consisting of LCC will be used to allow for the raising of grades within the public Right of Way (to accommodate future sea level rise) at the Mission Rock project site without adding weight to the underlying compressible soils. Therefore, the LCC will act as the substrate to support the planned infrastructure and improvements within the Right of Way. In accordance with PCP-022 Goal #4, LCC shall perform adequately to provide vertical support of the roadway after a major seismic event.

To limit potential damage or distress to the LCC, significant structures (such as the proposed buildings on Parcels A, B, G, and F within the Phase 1 development) shall not apply significant lateral loads to the LCC under seismic loading or any other design load combinations. To mitigate this risk, lateral design of significant structures should ignore the passive resistance within the depths where LCC is present in the surrounding ROW by providing a compressible material or other means of separation between the LCC and the below-grade portion of the structures.

2019 Port of San Francisco Building Code

LCC PASSIVE RESISTANCE FOR STRUCTURES AND IMPROVEMENT

This Port Code Procedure is written to affirm the Mission Rock LCC passive resistance design criteria for the design of significant structures and improvements adjacent to or within the LCC.

Streets supported on LCC will be surrounded by new buildings. The foundations or below-grade elements of these buildings shall not rely on LCC for passive (lateral) resistance. This includes foundations, piles, pile caps, and any below grade walls adjacent to the LCC. Foundations shall not impose significant lateral loads or stresses on the LCC, and the designer shall not rely on the LCC for lateral resistance.

To mitigate the risk of lateral load from substantial structures, a compressible material shall be placed between the LCC and the below-grade portion of the structures. The compressible material thickness shall be determined based on the calculated earthquake-induced lateral deflection of the below-grade portion of the structures.

Exceptions shall be made for minor structures in the LCC, such as light pole foundations and small light weight structures (such as the pavilion building planned for China Basin Park), subject to approval by the Chief Harbor Engineer or authorized delegate. For light poles or other minor improvements, passive resistance can be relied upon provided the entire foundation element is embedded in LCC. LCC passive resistance may be calculated based on conventional geotechnical approach using an equivalent internal friction angle of 35 degrees and zero cohesion; a minimum factor of safety of 1.5 should be used when calculating allowable passive resistance.

For more information, please contact:

The Port of San Francisco
 Permit Information Desk
 Pier 1, The Embarcadero
 San Francisco, CA 94111
 Phone: (415) 274-0554
 Email: permit-desk@sfport.com

Rod Iwashita
 Chief Harbor Engineer
 Port of San Francisco

Date