May 11, 2022

Andrew Leon
Planner
Community Planning and Development (CPD)
City of Mercer Island

Re: Koneru Short Plat (SUB 21-008/CAO 22-003)
6610 East Mercer Way
Mercer Island, Washington

This revised letter combines our comments for SUB21-003 and CAO22-003 and supersedes our previous letters dated February 16, 2022 (SUB21-008) and February 23, 2022 (CAO22-003). This letter is provided to address whether the proposed subdivision complies with the following Mercer Island City Codes (MICC).

- MICC 19.07.160 Geologically hazardous areas.
- MICC 19.09.090 Building pad. (Specifically, 19.09.090(A)(1)(b) and (c) as well as 19.09.090(A)(2)(c).
- MICC 19.07.180(C)(6)(d) Watercourses

MICC 19.07.160 Geologically hazardous areas

A review of the geotechnical report provided for the proposed development (Geotech Consultants, June 8, 2021) and their response to comments (Geotech Consultants, April 12, 2022) indicates the presence of liquefiable soils at the site.

The International Building Code requires use of the Maximum Considered Earthquake (MCE) in determining liquefaction potential of a site. This MCE has a 2% probability of exceedance in 50 years (return period of 2475 years).

The geotechnical response (Geotech Consultants, April 12, 2022) indicated:

"This liquefaction could occur between the groundwater table (5- to 7-foot depth) and the dense soils, which were found at an approximate depth of 30 feet."

"Using two different methods, NovoLIQ estimates that a total of approximately 12.5 inches of ground settlement is possible following widespread liquefaction extending to a depth of 30 feet."

"NovoLIQ provides estimates for this lateral movement using five different methods. The results, which are attached, indicate that lateral ground movement of 5 to 10 feet could theoretically occur in the MCE."

"Based on the available information, significant lateral ground movement could occur during the MCE. The risk of this is no higher than on nearby waterfront properties that are underlain by similar loose soils and which have recently been developed with new homes. The theoretical lateral movements are large enough that no pile system, drilled or driven, can prevent them from occurring, or can withstand the potential lateral movements without shearing off."

"The appropriate mitigation against foundation collapse in the event of lateral spreading was determined to be achieved by the reinforced grade beams or mat slab that interconnects the piles. In the event that the ground moves sideways a sufficient distance to bend or break the piles, the grade beams/mat slab would serve to hold the structure in one piece, even if it tilts a significant amount. This approach is still the underlying mitigation for foundation collapse contained in our Geotechnical Engineering Study."

"Ground improvement to prevent liquefaction and/or lateral spreading is both infeasible and inappropriate for a waterfront residential site such as this one…"

The geotechnical engineer of record, Geotech Consultants, Inc., has provided a risk statement in their June 8, 2021 report that conforms to MICC 19.07.160.(B)(3)(c).

"Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties;"

However, the appropriateness of this risk statement will depend highly on the structural design of the development and therefore cannot be made until that design takes into consideration the anticipated settlement and deformation due to liquefaction of the onsite soils under MCE loading.

MICC 19.09.090 Building pad. Specifically, 19.09.090(A)(1)(b) and (c) as well as 19.09.090(A)(2)(c)

- 19.09.090(A)(1)(b). Disturbance of the existing, natural topography as a result of anticipated development within the building pad shall be minimized;

- 19.09.090(A)(1)(c). Impacts to critical areas and critical area buffers shall be minimized, consistent with the provisions of Chapter 19.07 MICC; and

- 19.09.090(A)(2)(c). Building pads shall not be located within:
  (c) Critical areas, buffers or critical area setbacks; provided building pads may be located within geohazard hazard areas and associated buffers and setbacks when all of the following are met:
  i. A qualified professional determines that the criteria of MICC 19.07.160(B)(2) and (3), Site Development, are satisfied;
  ii. Building pads are sited to minimize impacts to the extent feasible; and
  iii. Building pads are not located in steep slopes or within 10 feet from the top of a steep slope, unless such slopes, as determined by a qualified professional, consist of soil types determined not to be landslide prone.

In my opinion, the proposed development meets the requirements of MICC 19.09.090(A)(1)(b) and (c). Meeting the requirements of 19.09.090(A)(2)(c)(i) cannot be determined at this time. The requirements could be met if the structural design of the development can tolerate the estimated range of post-liquefaction ground movements without building collapse.

Therefore, we agree with the statement on the cover sheet of the plans. ***"This request does not guarantee that the lots will be suitable for development now or in the future."***

MICC 19.07.180(C)(6)(d) Piped Watercourses

- Piped watercourse setback widths shall be reduced to: (i) ten feet on lots with a lot width of 50 feet or more, and (ii) five feet on lots with a width of less than 50 feet, when daylighting is determined by qualified professional(s) to result in one or more of the following outcomes:
  i. Increased risk of landslide or other potential hazard that cannot be mitigated;
  ii. Increased risk of environmental damage (e.g., erosion, diminished water quality) that cannot be mitigated;
  iii. The inability of a legally established existing lot to meet the vehicular access requirements of this title; or
  iv. The inability of a legally established existing lot to meet the building pad standards in section 19.09.090.

Geotech Consultants, Inc., provided a letter dated August 24, 2021, discussing the geotechnical feasibility of watercourse restoration across the northwest corner of the property.

We generally agree with the conclusions provided in their letter which would, at a minimum, meet the requirement stated in MICC 19.07.180.(C)(6)(d)(ii).

Summary

There are significant geotechnical and structural design issues associated with the development of this site. Whether these issues are adequately addressed during design of the development will determine whether the requirements of MICC19.09.090(A)(2)(c)(i) and 19.07.160 can be met.

Should further information be required, feel free to contact me.

Sincerely,

City of Mercer Island – CPD

Michele Lorilla, P.E.
Geotechnical Peer Reviewer