

## TECHNICAL MEMORANDUM

**TO:** Ann Hillier – City of Bainbridge Island Planner

**FROM:** Rik Langendoen – Applicant's Project Manager

**COPY:** Mercury Michael – Applicant

**DATE:** January 21, 2019

**FILE NAME:** Euclid House RUE

**PROJECT NO.:** PLN51139 RUE

**SUBJECT:** Summary of RUE Alternatives Assessment & Comparison  
Notice of Complete Application-Related Site Development Alternative

**DISCUSSION:**

### ***INTRODUCTION***

This technical memorandum was prepared in conjunction the above-mentioned Reasonable Use Exception (RUE) application submitted to the City of Bainbridge Island (CoBI) by the applicant on December 19, 2018. The applicant received a Notice of Complete Application (NoCA) from CoBI dated January 2, 2019 in which CoBI requested consideration of an alternative that consists of reconfiguring the locations of the proposed single-family residence (SFR) and associated infrastructure presented in the above-mentioned RUE application. If the alternative was found to be infeasible, CoBI requested detailed information for staff to relay to the RUE-related hearing examiner. This technical memorandum presents the requested detailed information.

The following presents a brief summary of both the applicant's proposed site development and the alternative presented in the NoCA, and then the results of an alternatives assessment that compares the two different approaches and their respective anticipated outcomes.

### ***SUMMARY OF APPLICANT'S PROPOSED SITE DEVELOPMENT***

As presented in the Narrative Summary submitted to CoBI in the above-mentioned RUE application, the subject parcel is constrained by a Category IV wetland. After applying the relevant 40-foot-wide wetland buffer and associated 15-foot-wide building setback per the Bainbridge Island Municipal Code (BIMC), there is insufficient space available for the construction of the proposed SFR with a 1200-square-foot footprint, associated required infrastructure (on-site septic (OSS) system, stormwater drainage system, combined driveway / off-street parking), and construction-related staging unless an RUE is approved (Figures 1 and 2).

In addition, the subject parcel has a total vertical relief of about 12 to 14 feet, which creates challenges in terms of providing foundation support for the SFR and related infrastructure without impacting the wetland.

In summary, and as discussed in more detail in the above-mentioned Narrative Summary, the proposed site development would incorporate all recommendations presented in the CoBI Site Assessment Review (SAR) review letter dated May 8, 2019 to allow reasonable use of the property, including the following key elements:

- The application for a building permit would include demonstrated compliance with applicable minimum requirements (MRs) 1 through 5 of the City's adopted stormwater manual through development of a Stormwater Site Plan.

- Site soils and areas that support infiltration would include full-downspout infiltration (splash blocks) combined with permeable pavement<sup>1</sup>.
- Surface stormwater from driveway and other hard surfaces would receive pre-treatment prior to discharging to the wetlands utilizing permeable pavement.
- The project would utilize minimal excavation foundation systems per the *2012 Low Impact Development Guidance Manual for Puget Sound* as means of minimizing impacts to the site and the adjacent wetlands, which would include pin piles or piers (<https://www.diamondpiers.com/how-it-works>). Therefore, negligible fill placement and/or ground disturbance would occur within the wetland buffer and building setback area.
- To minimize adverse impacts to the wetland, the SFR is proposed to be constructed in the southwestern corner of the parcel (Figure 1). The house would be cantilevered from the street level utilizing the pin piles or piers, creating a 10 to 12 feet vertical separation from the ground surface (Figure 2) with no stairway or other direct access to the wetland mitigation area, wetland buffer and wetland, which would prevent encroachment and demonstrate compliance with RUE review criteria 3 and 4 to the extent practicable considering the site constraints.
- The proposed site development has been minimized to the least reasonable extent and designed to mitigate impacts to the wetland, and may improve the function of the wetland when compared to the existing conditions due to the implementation of the Mitigation Plan<sup>2</sup> and the diversion of stormwater from the adjacent parcel to the south to the wetland.

The need for the OSS system creates several challenges in terms of the proposed site development. Due to site constraints associated with the wetland-related buffer, topography, and soil conditions, the OSS would require a buried pressurized system that would include two tanks and mechanical components consisting of wastewater treatment and air blower, in addition to the drainfield. The OSS-related tanks and mechanical system cannot be realistically installed on a slope without fill placement due to the need for vehicle access for maintenance and possible repair after installation. Therefore, these components are proposed to be installed between the SFR and southern property boundary, as highlighted on Figure 1. The OSS tanks and mechanical system installation would be at or near the existing site grades.

The 16-foot wide alleyway created by the underground OSS tanks and mechanical system would also allow for vehicle and equipment access to the primary and reserve drainfields for maintenance and possible repair after installation (Figure 1), as well as provide a critical staging area during the construction of the SFR.

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<sup>1</sup> Due to the site civil survey determining that the site slopes are steeper than mapped by the Bainbridge Island GIS maps, it was determined that a rain garden sized per the Rain Garden Handbook for Western Washington meeting the 'GOOD' performance standard was not feasible.

<sup>2</sup> Existing invasive plants (primarily English ivy, nettles and non-native blackberry) would be removed and wetland mitigation planting with native vegetation would be implemented to enhance the existing wetland function.

### ***SUMMARY OF ALTERNATIVE PRESENTED IN NOCA***

As described in the above-mentioned NoCA, and as shown on Figures 3 and 4, the recommended alternative to the site development layout includes reversing the SFR and OSS in the north-south orientation, with the SFR setback the minimum 5-foot distance from the southern property boundary/lot line, and the OSS situated north of the SFR. The intent was to:

- Allow for the standard impervious surface setback between the SFR and the wetland mitigation area edge, with the OSS tanks and mechanical components located between the SFR and the wetland mitigation area edge, and to help prevent future encroachment into the wetland mitigation area.
- Provide a construction staging area within the 15-foot impervious surface setback area.
- Improve on compliance with RUE criteria 3 and 4 as presented in the BIMC 16.20.080<sup>3</sup> by placing lower impact development (i.e. buried septic tanks and mechanical components) with vegetation/lawn at the ground surface within the wetland buffer and closest the wetland edge.

The alternative as presented in the NoCA would be feasible and likely achieve the above-mentioned intent if the subject parcel was flat lying with minimal topographic relief. However, due to the roughly 12 feet of topographic relief the alternative would require on the order of 700-plus cubic yards of fill soil placement within the wetland buffer and mitigation area, and possibly encroach upon the wetland<sup>4</sup>. Therefore, the mitigation area would be reduced in size by roughly 30-plus percent.

The fill would need to be imported and compacted in order to prevent post-construction settlement and possible damage to the OSS-related piping and prevent erosion.

It may be possible to construct retaining walls to reduce the amount of fill placement, but the retaining walls and related fill soil placement would need to occur within the wetland buffer and reduce the size of the mitigation area.

### ***ALTERNATIVE ASSESSMENT RESULTS & COMPARISON***

In summary, the alternative recommended in the NoCA would be feasible and effective at achieving the intended outcomes if the site was flat lying. However, when the site topographic relief is considered the alternative would likely result in significant adverse impact to the wetland due to the need to add significant quantities of fill soil and/or retaining walls. The alternative would likely not comply with RUE criteria 3 and 4 as intended.

In comparison, the applicant's proposed site development would include negligible if any fill placement within the wetland buffer and building setback area, and minimal ground disturbance due to use of low impact pin piles or piers for foundation support of the SFR. Because the SFR would be cantilevered from the street level utilizing columns placed on pin piles or piers, thereby creating a 10 to 12 feet vertical separation with no stairway or other direct access to the wetland mitigation area, wetland buffer and wetland, it would prevent encroachment and demonstrate compliance with RUE review criteria 3 and 4 to the extent practicable considering the site constraints.

The following table summarizes the comparison between the applicant's proposed site development and NoCA-related alternative.

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<sup>3</sup> See [BIMC 16.20.080](#), criteria 3 and 4, and [BIMC 16.20.030](#) mitigation sequencing as required under criterion 3.

<sup>4</sup> This is based on the assumption that the maintenance vehicle access corridor around the SFR would be 10 feet wide, and the corridor for the OSS-related tanks and mechanical system would be 16 feet wide as required by the OSS system engineer.

**TABLE 1 – COMPARISON BETWEEN THE APPLICANT’S PROPOSED SITE DEVELOPMENT AND NOCA-RELATED ALTERNATIVE**

<b>Comparison Criteria</b>	<b>Applicant’s Proposed Site Development</b>	<b>NoCA-Related Alternative</b>
Proposed layout	<ul style="list-style-type: none"> <li>• OSS tanks and mechanical system located along south parcel boundary, and installed near existing grade.</li> <li>• SFR located between OSS tanks with mechanical system and wetland mitigation area with SFR cantilevered over the slope using pin piles or piers for foundation support within the wetland buffer and mitigation area.</li> </ul>	<ul style="list-style-type: none"> <li>• SFR located along south parcel boundary</li> <li>• OSS tanks and mechanical system located between SFR and wetland mitigation area.</li> <li>• Both the SFR and OSS tanks and mechanical system would require significant fill soil and possible retaining walls for foundation support, which would significantly impact the wetland buffer, mitigation area, and possibly the wetland.</li> </ul>
Amount of fill in wetland buffer, building setback & mitigation area <sup>5</sup>	Negligible if any	Approximately 700 cubic yards (not including swell/shrinkage of the soil from loose in truck to compacted condition)
Encroachment upon wetland mitigation area <sup>6</sup>	None	Approximately 30%
Encroachment upon wetland buffer <sup>7</sup>	Approximately 20%, but the cantilevered above the ground surface.	Approximately 50% with possible impact to the wetland
Compliance with RUE review criteria	Would comply with RUE criteria 3 and 4 due to minimizing the impact on critical areas in accordance with mitigation sequencing ( <a href="#">BIMC 16.20.030</a> ), and the proposed impact to the critical area would be the minimum necessary to allow reasonable use of the property ( <a href="#">BIMC 16.20.080</a> ).	Would not comply with RUE criteria 3 and 4 as intended due to not minimizing the impact on critical areas in accordance with mitigation sequencing ( <a href="#">BIMC 16.20.030</a> ), and the proposed impact to the critical area would not be the minimum necessary to allow reasonable use of the property ( <a href="#">BIMC 16.20.080</a> ).

<sup>5</sup> Assuming all fill placement and no retaining walls. The slope of the fill soil as shown is likely at the steepest practicable angle (2H: 1V), and would likely be less steep, depending on geotechnical engineering recommendations. Even if retaining walls were utilized, ground disturbing construction and fill soil placement would be necessary within wetland buffer, building setback and mitigation area.

<sup>6</sup> Same as footnote 4.

<sup>7</sup> Same as footnote 4.

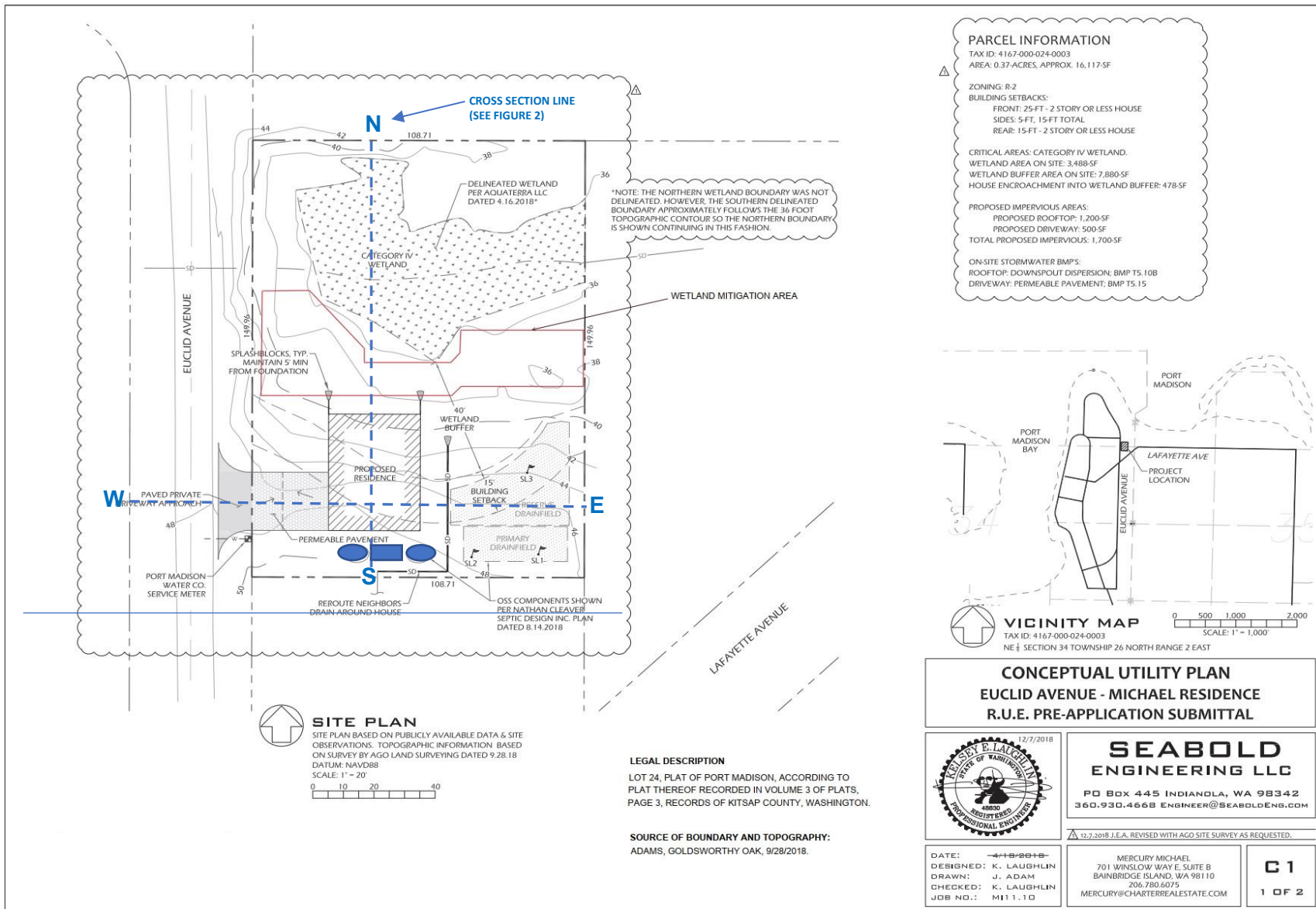


FIGURE 1 – PROPOSED SITE DEVELOPMENT PLAN WITH CROSS SECTIONS

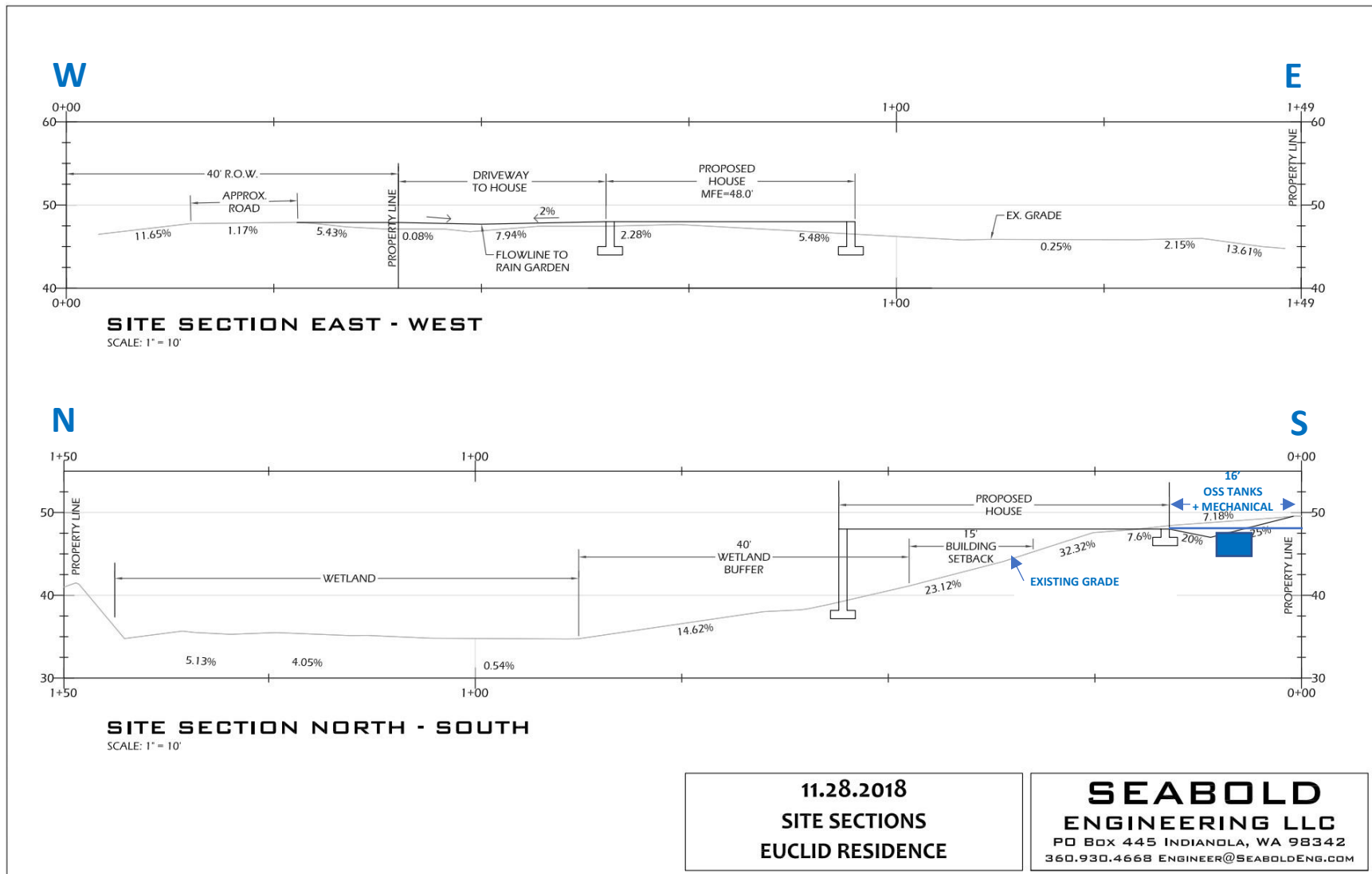


FIGURE 2 – PROPOSED SITE DEVELOPMENT CROSS SECTIONS

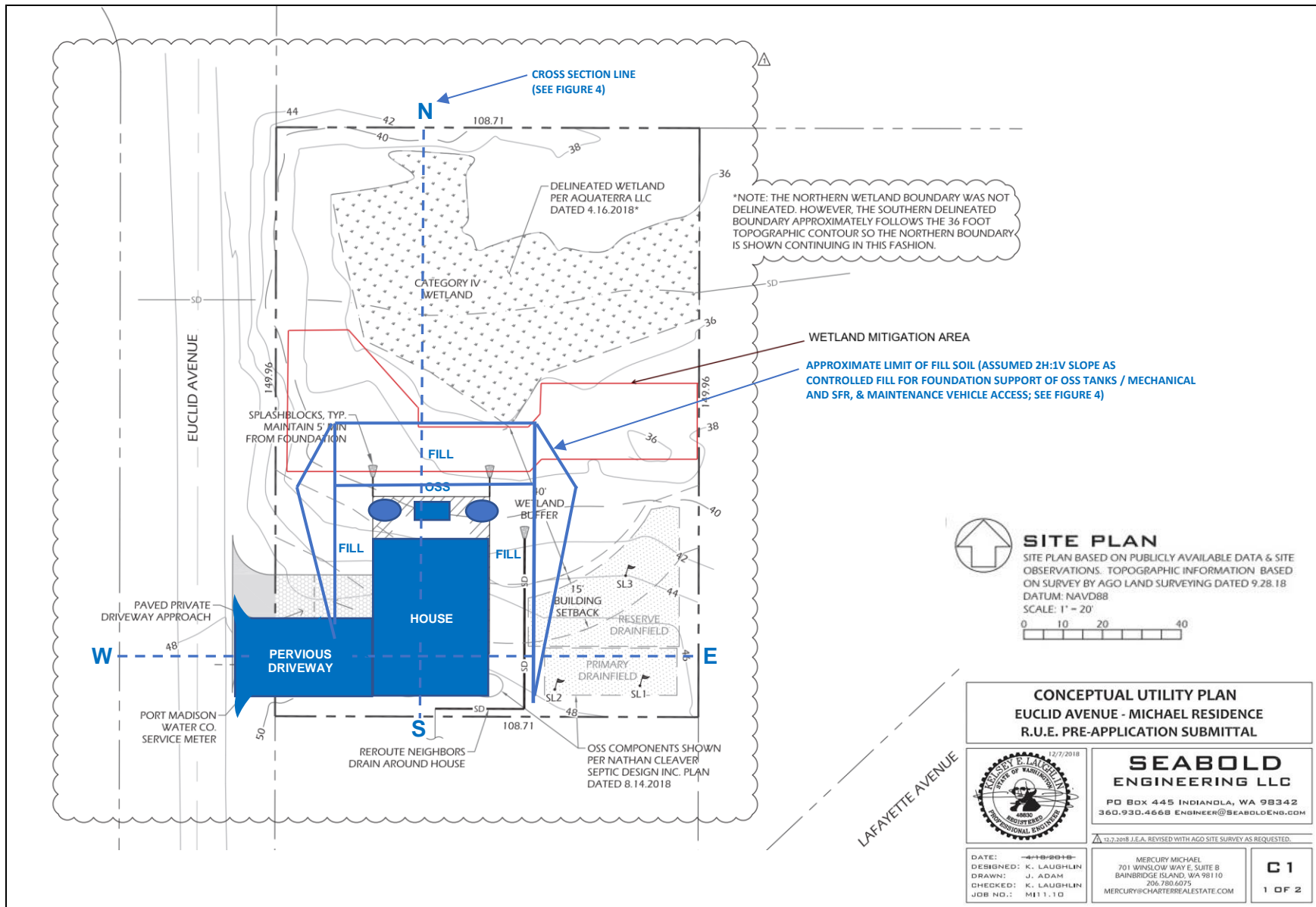
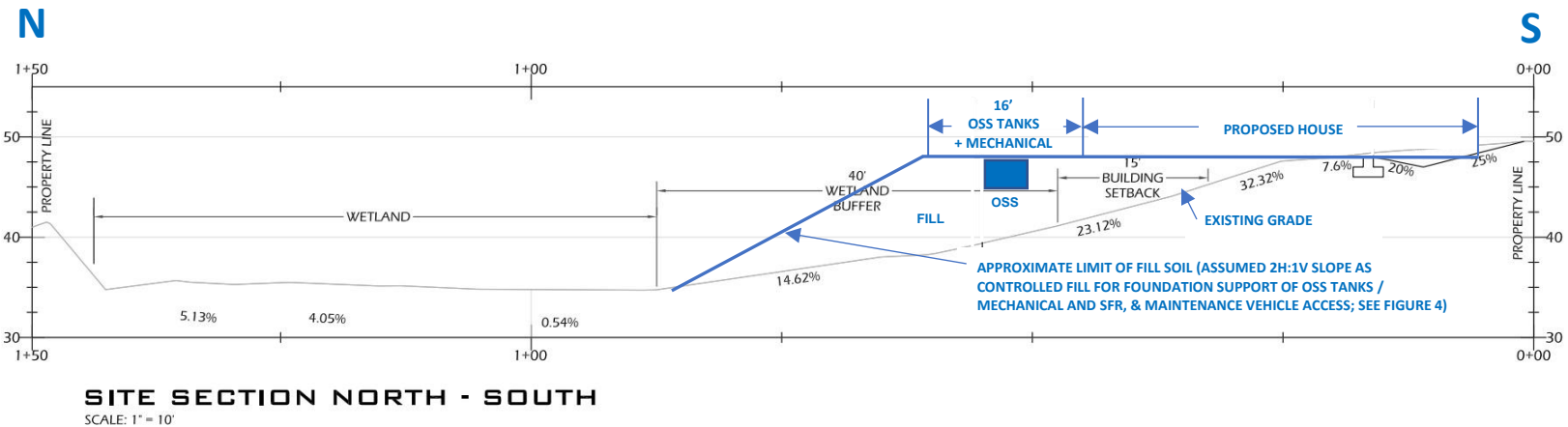
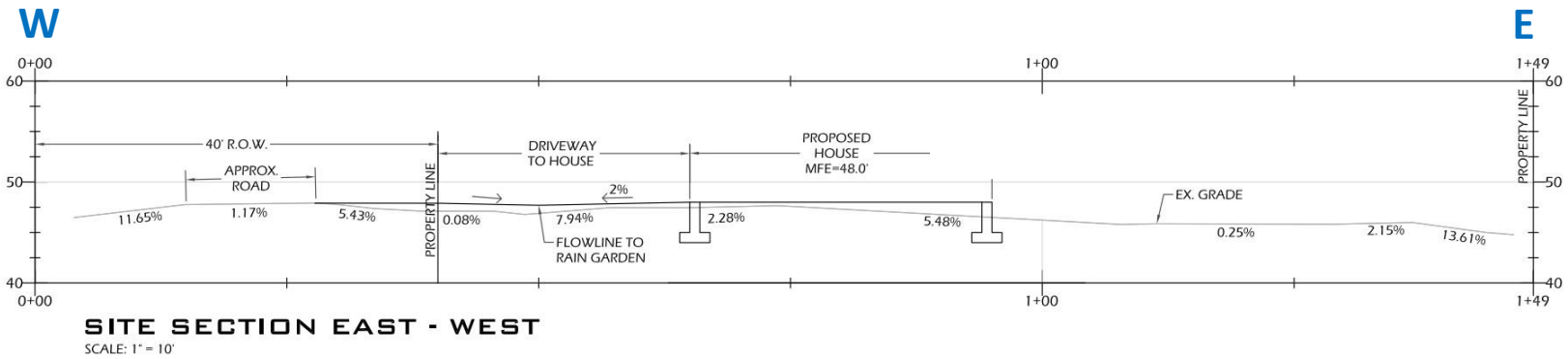


FIGURE 3 – SITE DEVELOPMENT LAYOUT AS RECOMMENDED IN NOCA





11.28.2018  
SITE SECTIONS  
EUCLID RESIDENCE

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**FIGURE 4 – CROSS SECTIONS OF SITE DEVELOPMENT AS RECOMMENDED IN NOCA**