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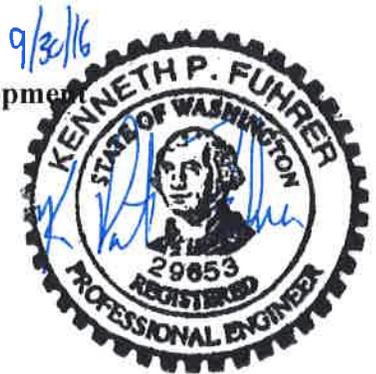
TECHNICAL MEMORANDUM

TO: CKCC Project Team & Stakeholders

FROM: Pat Fuhrer, P.E.

SUBJECT: Central Kitsap Community Campus ("CKCC") Redevelopment
Project Civil Issues and Opportunities

DATE: September 30, 2016



INTRODUCTION

The purpose of this Technical Memorandum is to evaluate potential site issues with regards to site grading and utility infrastructure. Research of various documents was conducted and as-builts related to the YMCA project were obtained. Meetings were also conducted with key department and utility managers to discuss issues and opportunities for future development.

SUMMARY

Redevelopment of the CKCC site has a few issues civil and geotechnical that need further study prior to site development, and also presents potential resource opportunities:

- Constraint: High ground water levels, limits effectiveness of many stormwater LID measures.
- Constraint: Downstream storm water pipe capacity, may require on-site flow attenuation.
- Constraint: Poplars Avenue Right-of-Way contains many utilities, and would be expensive to relocate for new structural construction.
- Constraint: If future structures exceed 3-story building height, water pumping will likely be needed to supply adequate flow and pressure to satisfy domestic use and fire sprinkler needs.
- Opportunity: A stormwater treatment park, a recycled water park, and possibly a combination of both, would be a valuable community and educational asset as well as serve as open space. An open space park of this nature would ideally be sited in the SE corner of the Campus along Silverdale Way.

Once a preferred site plan has been selected, additional site specific geotechnical studies can be undertaken to evaluate subsurface soil conditions as they relate to storm drainage design and building construction recommendations.

GENERAL

The CKCC property is bordered on all sides by developed public right-of-ways and other commercial development, and as such utility infrastructure is readily available for connection by future development on the CKCC property.

Based upon my review of the *Subsurface Exploration, Infiltration Testing, Geologic Hazard, and Preliminary Geotechnical Engineering Report* prepared by Associated Earth Sciences, Inc. revised June 5, 2009, much of the southeast corner of the CKCC property had groundwater to the surface or near surface. Additionally, soils exploration along Poplars Avenue were classified as “recent alluvium” sediments, which are sediments up to 5-ft. thick and deposited in modern river and stream valleys. These soils, in their current condition, “are not considered suitable” for structural support.

No soils exploration has been known to have been performed on the CKCC property east of Poplars Avenue, however I would anticipate similar sub-surface soil conditions.

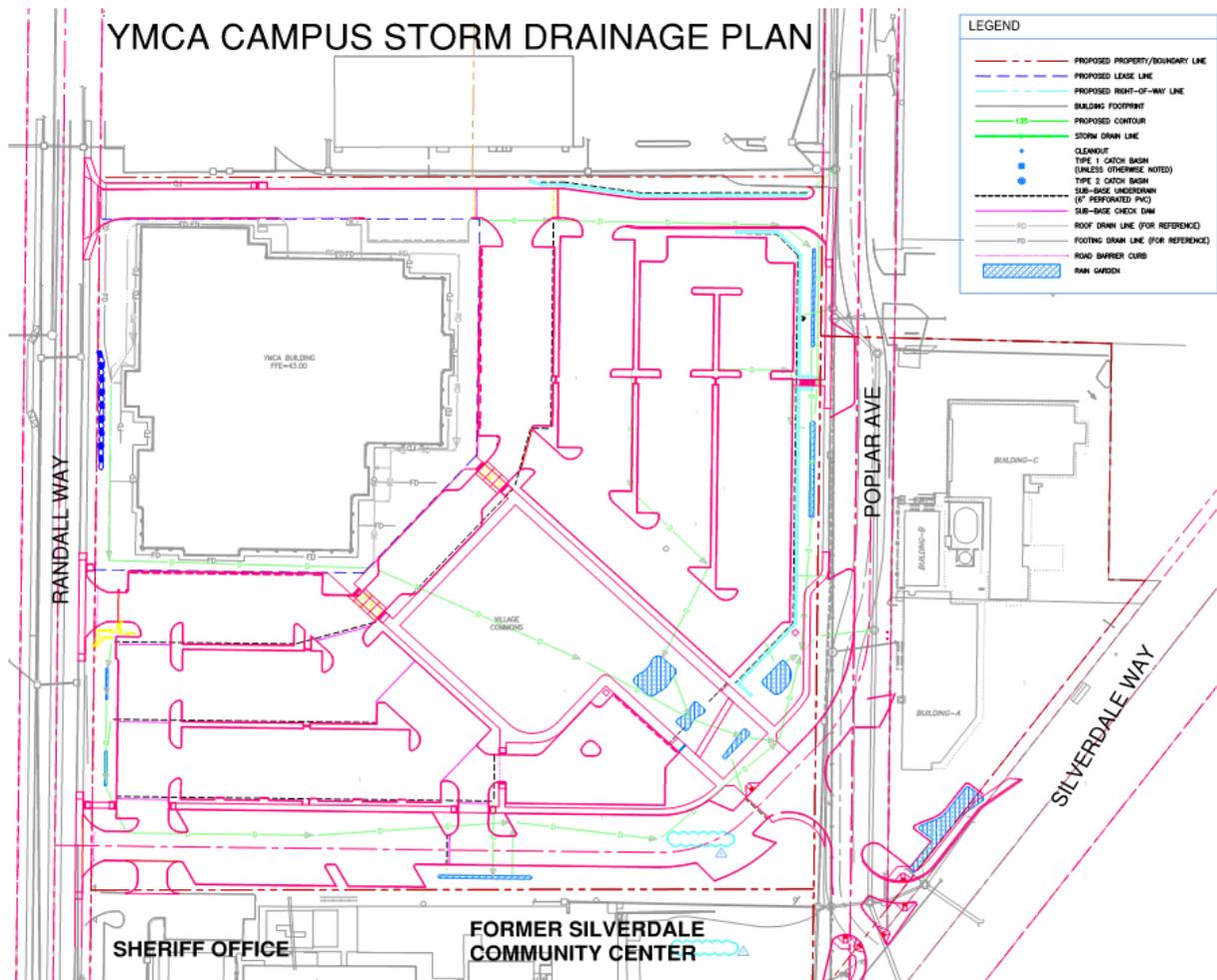
It should be noted that Poplars Avenue is the former location of Clear Creek Road which was one of the main road corridors before Silverdale became developed. The utility network that exists in the right-of-way is extensive and includes protected telecommunication lines with Naval Submarine Base Bangor. Utility relocations costs could be quite costly if the redevelopment project contemplates new structural construction within the existing right-of-way of Poplar Avenue.

STORMWATER

Stormwater improvements for future development will be required to be designed and constructed in accordance with Title 12 of the Kitsap County Code, which relates to and regulates storm water management. Runoff from the CKCC site west of Poplars Avenue, including the YMCA project, connects to the storm drain trunk-line in Poplars Avenue. East of Poplars Avenue, runoff from the CKCC property flows to the storm drain trunk-line in Silverdale Way. These two trunk-lines then flow southerly across the existing Firestone Building site, and discharge on the south side of Bucklin Hill Road into Dyes Inlet.

When County Road Improvement District 4 was designed and constructed in the mid-80’s, the stormwater conveyance system was designed to convey the 25-year developed peak storm without detention and assuming full build-out conditions. County Code was later modified to require downstream stormwater conveyance to have 100-year, 24 hour flow capacity. As such, and consistent with the YMCA storm water project design, the storm water management system will need to be analyzed and implemented to limit the peak flow from the 100-year rainfall event to the 25-year capacity available downstream.

The storm water improvements installed on the Campus property with the YMCA project reduced peak storm water flows to the allowed amount from that portion of the Campus property that was developed by the YMCA project, so any redevelopment of the YMCA project site area would be required to demonstrate that the peak flow is not being increased. For example, if the redevelopment project replaces existing impervious surface with impervious surface, and the net difference is equal to or less than that which was replaced, then no further storm water flow mitigation is necessary. If the redevelopment project replaces existing pervious areas with new impervious areas, and/or removes LID measures previously installed, then additional mitigation to limit the site's peak flow to the allowed amount would be required.

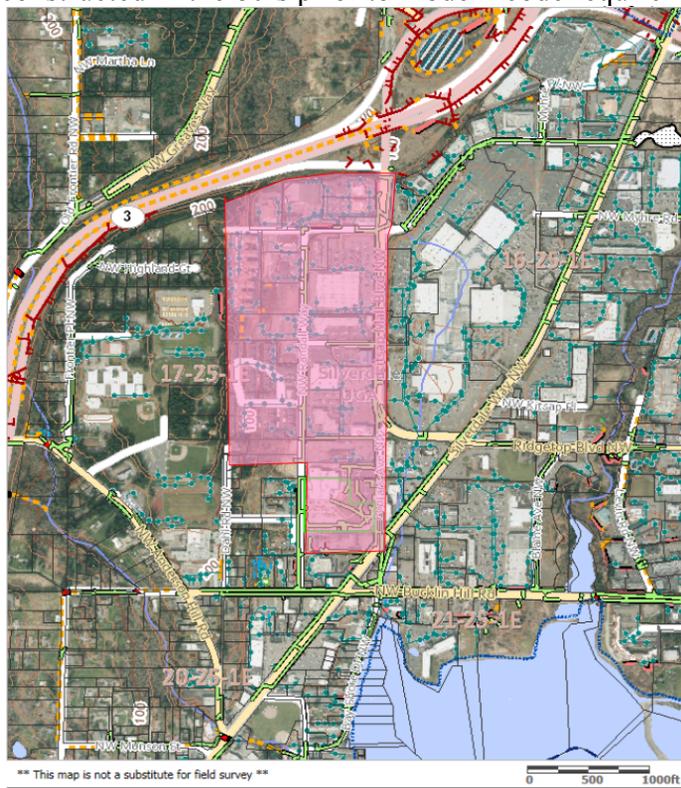


Redevelopment of the Sheriff's office site and the Silverdale Community Center site will need to provide additional mitigation to limit storm water flows to the CRID 4 design capacity allowed. Likewise on the east side of Poplars Avenue, flow mitigation will be required to limit the storm water runoff to the 25-yr peak flow capacity in the downstream pipe network. Flow mitigation

measures could include a combination of bio-retention cells (raingardens), pervious pavement surfaces, and detention storage.

Kitsap County is currently in the process of updating its Title 12 storm water code and must do so by Dec. 31, 2016 to meet NPDES Phase II implementation requirements. Low Impact Development features, such as bio-retention cells and pervious paving, will be required to be implemented with new construction, unless determined to be infeasible due to site constraints. Since this is a redevelopment project, mindful study of the site's underlying soils will be needed so as not to cause any unintended flooding or damage from any proposed LID facilities.

This project's proximity to the large diameter storm sewer trunk-line presents a possible opportunity to provide runoff treatment of the first-flush stormwater flows from upstream tributary catchment areas. Most of the projects in this approximately 90-acre basin were constructed in the 80's prior to modern code requirements for storm water pollutant capture.



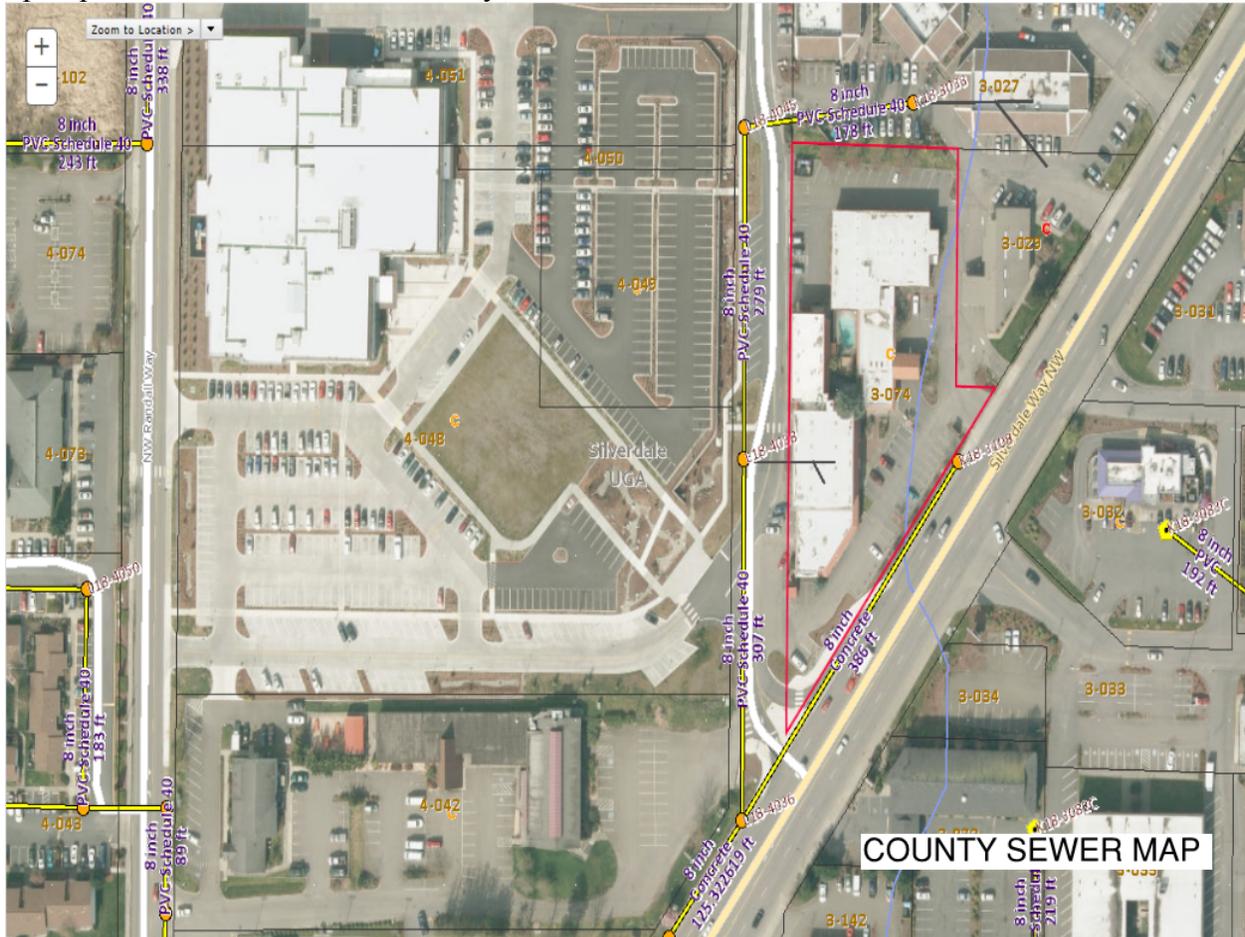
UPSTREAM STORM WATER BASIN MAP-90 Acres

From meetings and discussions with Kitsap County Surface & Storm Water Program Manager Chris May, P.E., redevelopment of this site has the potential to include a stormwater park amenity, similar to Kitsap County's Stormwater Park recently constructed in Manchester. The upstream tributary area is similar in size to the Manchester project, so a similar footprint area of approximately 120' x 208' could be reserved on the CKCC site for this purpose, preferably in the southeast corner of the CKCC property in the vicinity of the right-in, right-out intersection that may be removed.

SANITARY SEWER SERVICE

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Based on discussions with Kitsap County Public Works Sewer Utility Staff, there are no known sanitary sewer constraints or capacity issues for the redevelopment of the CKCC property. Sewer is available in both Randall Way and Poplars Avenue, and is sufficiently deep enough that a pump station should not be necessary.



DOMESTIC WATER SUPPLY

Silverdale Water District operates the water distribution system which serves the Silverdale area, and recently completed an extensive upgrade of their distribution system in the core. 12" mains exist in Randall Way and Silverdale Way, and an 8" main lies in Poplars Avenue. The YMCA Building is also looped with an 8" main. Static water pressure on the CKCC site varies between 90-95 psi. Fireflow and fireflow storage is also available to serve the project.

It is likely that if future proposals contemplate more than 3-story construction, domestic water booster pumping will likely be required to supply adequate pressures and flows to the higher floor level plumbing fixtures and fire sprinklers.

RECYCLED WATER

August 26, 2016

In 2004, the Kitsap County Commissioners adopted Water as a Resource policy for treating water as a resource, and not as just a part of the waste stream. The Silverdale Water District, as part of their recent system upgrade and other capital improvements, has installed the backbone of the future distribution pipe network in Silverdale and several places along the planned corridor connecting to the Central Kitsap Wastewater Treatment Plant. The YMCA site has this “purple pipe” connected to the building for water re-use, and while currently not operational, it is also stubbed out for irrigation. Redevelopment of the CKCC site will need to install recycled water piping as part of its project, and consider the sustainable benefits inherent to its future use.

In a meeting with the Manager of the Silverdale Water District Morgan Johnson, he shared a recent field trip to visit the LOTT Clean Water Alliance projects around the Lacey/Olympia/Tumwater/Thurston County. This multi-agency team has developed numerous projects to recycle wastewater and put it to beneficial uses. Of particular interest is LOTT’S Regional Services Center, which houses the Wet Science Center, and offers free family activities and environmental workshops, which includes a simulated stream and wading pools using recycled water. A recycled “water park” could become a community asset at the CKCC site, and further the Water as a Resource policy.



NATURAL GAS

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A phone interview was conducted with an engineer with Cascade Natural Gas, and there is capacity to serve a redevelopment project as their high pressure gas main lies along the east side of the CKCC site in Silverdale Way.

OTHER DRY UTILITIES

No capacity or other availability issues are known to exist for power supply, telephone service, and internet service for the project.

PHASED DEVELOPMENT CONSIDERATIONS

There are no foreseeable obstacles to phasing the redevelopment of the Central Kitsap Community Campus relative to civil site and utility work. The aforementioned utility corridor in Poplar Avenue will be expensive to relocate if future structural construction contemplates the use or vacation of this right-of-way, however a structure could theoretically span this corridor such that utilities could remain intact in their present location. Likewise, a storm water/reclaimed water park could be part of a later phase of site development and the first phases of the redevelopment project would need to mitigate storm water separately within their phase footprint. Sanitary Sewer, water main piping, and other dry utilities would require careful consideration in their placement to avoid service disruption or relocation costs from future phase construction as well. Temporary facility plans may be needed to be designed and developed to mitigate parking and any other needs of the YMCA and other adjacent users so that they can continue to operate if the particular redevelopment phase impacts their patrons. In summary, phased development will need to address the magnitude of any utility relocation and temporary facility construction in order to develop an accurate budget for the given phase.