Mount Baker Infrastructure Study

Seattle, WA

Prepared for the City of Seattle Office of Housing and Enterprise Community Partners

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KPFF Project No. 2200081

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1. STUDY SUMMARY AND EXECUTIVE LEVEL SUMMARY FINDINGS

An infrastructure study has been completed for the potential redevelopment of three parcels owned by the City of Seattle in the Mount Baker Neighborhood near the Mount Baker Link light rail station, identified in the figures below.

Figure 1-1: Mount Baker TOD Parcel Location

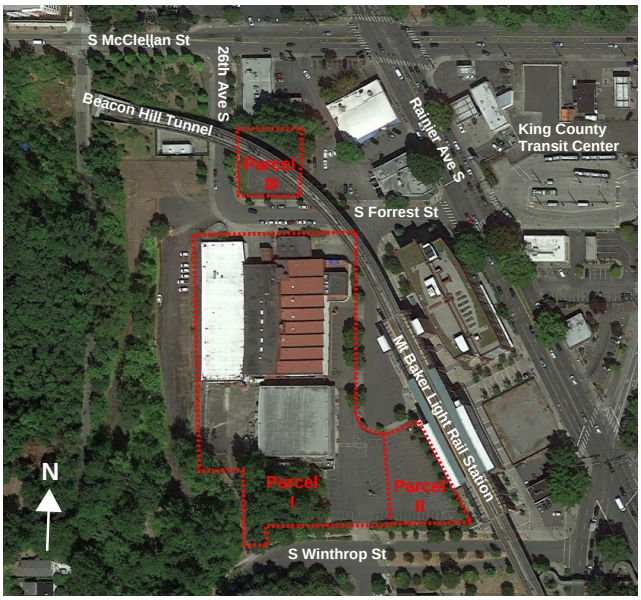

Figure 1-2: Parcel Overview

This study can be used by the City of Seattle and prospective development teams to better understand the opportunities and cost considerations for site redevelopment.

The City of Seattle's current vision for Parcel I and II, noted in Figure 1-2, is a redevelopment for affordable housing use with approximately 400 units, with a transit-oriented focus due to the excellent site accessibility to the nearby Sound Transit Link light rail station and King County Metro Bus Service. The approximate size of combined Parcel I and II area is 166,500 square feet (~3.8 acres), and they are well suited for redevelopment. Parcel III is not a strong candidate for redevelopment due to an existing Sound Transit link light rail guideway within parcel limits. This parcel was not evaluated for redevelopment opportunities to the same level of detail as Parcels I and II.

Information presented here has not been developed for a specific building plan, but the study does envision significant multi-story redevelopment.

This study's purpose is to review, evaluate, and document key information relevant to future redevelopment decisions on the site.

The study includes findings relevant to:

1. Site Overview and Current Use
2. Property Development Restrictions
3. Existing Site Environmental and Geotechnical Considerations
4. Potential Building Foundation Types and Considerations
5. Existing Utility Infrastructure and Future Utility Needs for Redevelopment
6. Site Circulation Recommendations

7. ALTA survey documentation completed in April 2022

Executive Level Key Findings

Site Overview and Current Use

The study reviewed three City of Seattle owned parcels for future development, with two adjoining parcels, referred hensforth as “the site,” with a combined area of roughly 3.8 acres of area attractive for significant affordable housing redevelopment. A non-adjoining parcel north of South Forest Street with an approximate size of 0.3 acres is encumbered by an existing Sound Transit link light rail guideway and, more likely than not, not a suitable site for affordable housing redevelopment. See Figure 1-2 and Table 1-1 for additional site information.

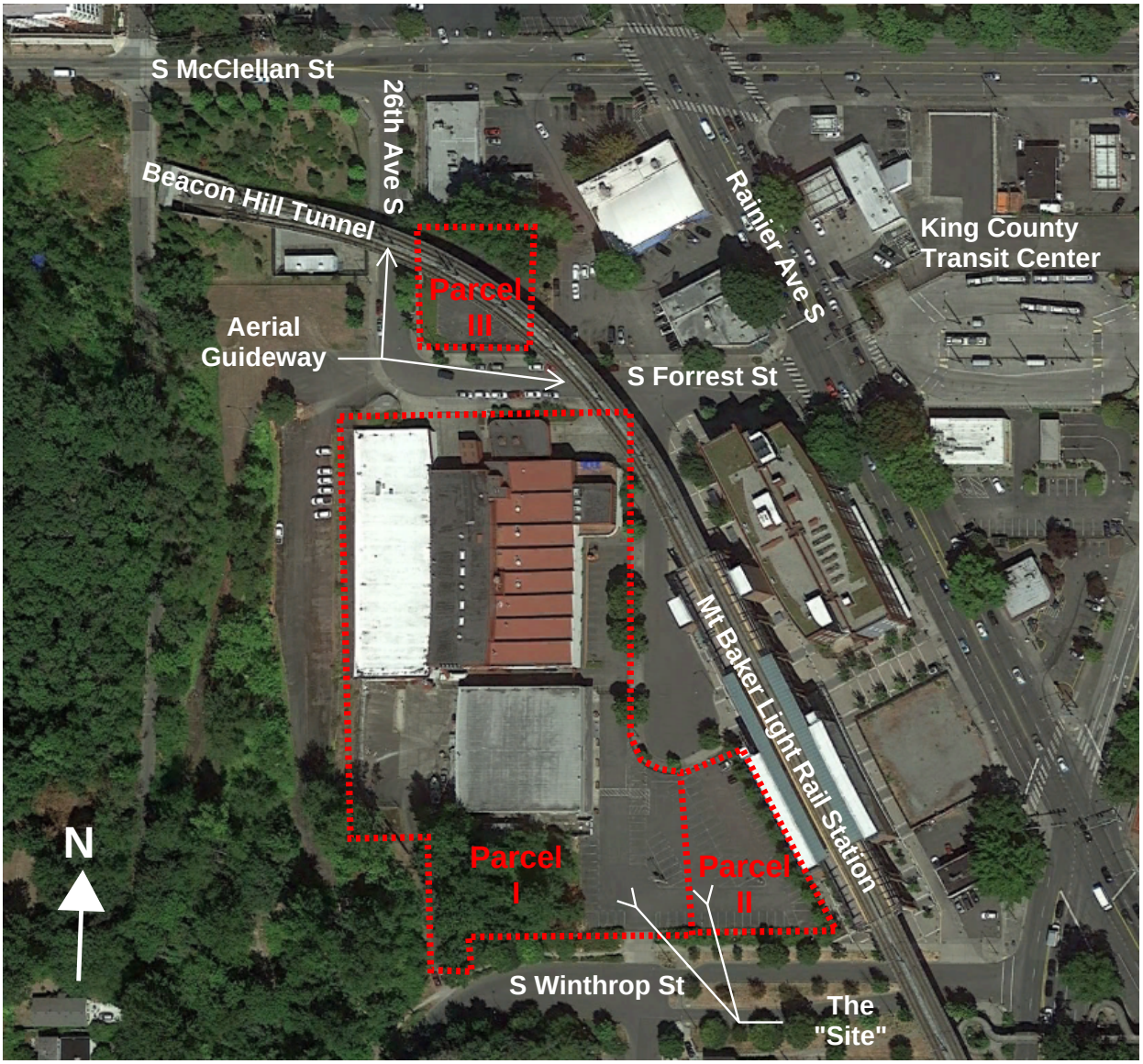

Figure 1-3: Detailed Site Overview

King County Parcel Number	Study and ALTA Survey Parcel Designation	Approximate Parcel Size in Acres	Current Use
308500-2100	Parcel I	**3.3**	**Service Buildings – mostly non-operational laundry facilities**
713880-0025	Parcel II	**0.5**	**Surface parking**
713830-0015	Parcel III	**0.3**	**Surface parking and Aerial Guideway**

Table 1-1: Parcel Summary

Property Development Restrictions

Redevelopment of the site will require awareness and consideration for a number of existing processes and site constraints.

Legal restrictions and development standards for site development include:
- Seattle Municipal Code Zoning Regulations
- Seattle Citywide and Neighborhood Design Guidelines
- Existing Legal Easements

The site is in the Mount Baker Station Area and Town Center. The property, at the time of this study, is zoned SM-NR 95 (M) (previously designated as SM-NR 85). SM-NR is a Seattle Mixed-North Rainier zoning designation with a commercial height limit of 95 feet. The site also falls within the Mount Baker Station Area Overlay District. Overlay districts are established to conserve and enhance the City of Seattle's unique environmental features, preserve history, assist in declining areas, balance major redevelopments with neighborhoods, and promote safety and enjoyment for all people.

A high-level summary of easements with influence on redevelopment of the site include
- utility easements
- easements allowing the Central Puget Sound Regional Transit Authority (CPSRTA) access to maintain and operate the guideway within the property
- A slope easement within Parcel I

The western limits of Parcel I contain steep slopes, which complicate redevelopment opportunities. In addition, the southwest corner of the site is mapped as a wildlife habitat. Mitigation during development is likely required near this wildlife habitat.

KPFF recommends a site-specific zoning review by a future development team to ensure current zoning requirements are known and properly considered.

Existing Site Environmental and Geotechnical Considerations

This study reviewed environmental and geotechnical studies produced by others for the site and identified some key considerations for future site development.

The reports identified environmental contamination within the site. Some key findings include:

- There is a 4,000-gallon underground storage tank (UST), historically used to store fuel, on the north end of the site. It is believed this UST has leaked and may have been emptied and abandoned in place.
- Fill material located on the site contains higher concentrations of petroleum-based hydrocarbons, DRPH and ORPH, in groundwater and fill material, which exceeded applicable MTCA (Model Toxics Control Act) Method A cleanup level. Per the State of Washington Department of Ecology Cleanup Levels and Risk Calculation website, MTCA cleanup levels are "concentrations of hazardous substances in the environment that are considered sufficiently 'protective of human health and the environment under specified exposure conditions.'"

The geotechnical reports for this site identified some key findings useful for site development planning including:

- Groundwater has been encountered on the site at a range of 4 feet to 16 feet below ground surface (bgs). KPFF understands that future development may include underground parking, and groundwater will need to be a design consideration. Depending on excavation depths, construction dewatering or alternate operations may need to be implemented.

- Based on the information included in the Geotechnical Evaluation, this site is mapped by the City of Seattle as a steep slope, potential slide, and liquefaction hazard environmentally critical areas (ECAs) containing areas of known previous landslides.

- The depth to competent soils for foundation support ranges from 10 to 40 feet below the existing grade on the site, with the shallower 10-foot depths to competent soil located toward the western edge of the site and the deeper 40-foot depths toward the eastern edge of the site.

The reports provide a planning-level summary of the environmental and geotechnical conditions within the site. KPFF has analyzed information from these reports and summarized key findings. No site specific environmental or geotechnical investigations were done on the site by KPFF as part of this study.

Potential Building Foundation Types and Considerations

The team completed a planning level analysis of foundations for a large 400 unit redevelopment on the site. Based on a review of the site, available geotechnical data and planning level analysis, we have the following findings and insight:

- Foundation types for multi-story construction will more than likely require a combination of conventional spread foundations and deep foundations consisting of pile foundations, pile caps and structured slab at grade with grade beams – Conventional spread foundations could be utilized over the western portion of the site where competent soils are exposed as part of the excavation for the below-grade parking level.
- The extent of deep foundations and total added construction cost could be limited by adjusting the location and configuration of the buildings within each concept to locate more of the footprint toward the western portion of site, which is most suitable for conventional spread foundations.

- Global site stability will likely require the use of a permanent system to retain the steep slope to the west – A permanent soldier pile and lagging wall with tiebacks has been identified as one method to stabilize the site.
- The overall added probable construction cost to construct deep foundations at this site and provide global site stability for a 400 unit development will likely range between $5.6 and $8.1 million, in 2022 dollars, depending on proposed building layouts.

Existing Utility Infrastructure and Future Utility Needs for Redevelopment

- The site has good access to nearby utility services.
- Obtaining future utility service will, more likely than not, be cost comparable to typical City of Seattle developments of similar size.

Site Circulation Recommendations

Redevelopment of the site for transit-orientated development will require site roads and pathways to accommodate needs of residents, maintenance providers, and visitors.

At this stage of development, we recommend the following:

- Develop site circulation to meet existing and future utility provider access needs, including turning space needs for vehicles.
- Prioritize vehicle access to the site from South Forest Street.
- Prioritizing safe and quick pedestrian access from the regional light rail system to any future buildings.

ALTA survey documentation completed in April 2022

An ALTA survey was completed in April 2022 for the site by Bush, Roed & Hitchings, a professional survey firm. The ALTA survey includes a detailed land parcel map, which includes legally recorded existing easements, property boundaries, improvements of the property, utilities, and significant observations within the site.

Some key easements of consideration when redeveloping the property include::

- Utility easement for the City of Seattle, Parcels I and II.
- Side Sewer easement, 6 feet wide, Parcel 1.
- Guideway easement; Central Puget Sound Regional Transit Authority (CPSRTA), Parcel III.
- Guideway easement; CPSRTA, Parcel I.
- The Board of Regents of UW grants CPSRTA access for maintenance, inspection, construction, operation, repaid, or reconstruction of the project easement, Parcel I.

2. SITE OVERVIEW AND CURRENT USE

The study evaluated three City of Seattle owned properties within the Mount Baker light rail station vicinity (Figure 2-1). Two adjoining properties (King County parcel numbers 7138800025 and 3085002100), referenced henceforth as the site, encompass approximately 3.8 acres and appear suited for significant affordable housing redevelopment. A third parcel, King County parcel number 7138300015, referenced henceforth as the guideway parcel, is located north of the Site across South Forest Street. This parcel is bisected with a Sound Transit aerial guideway and is not a strong candidate for significant affordable housing redevelopment.

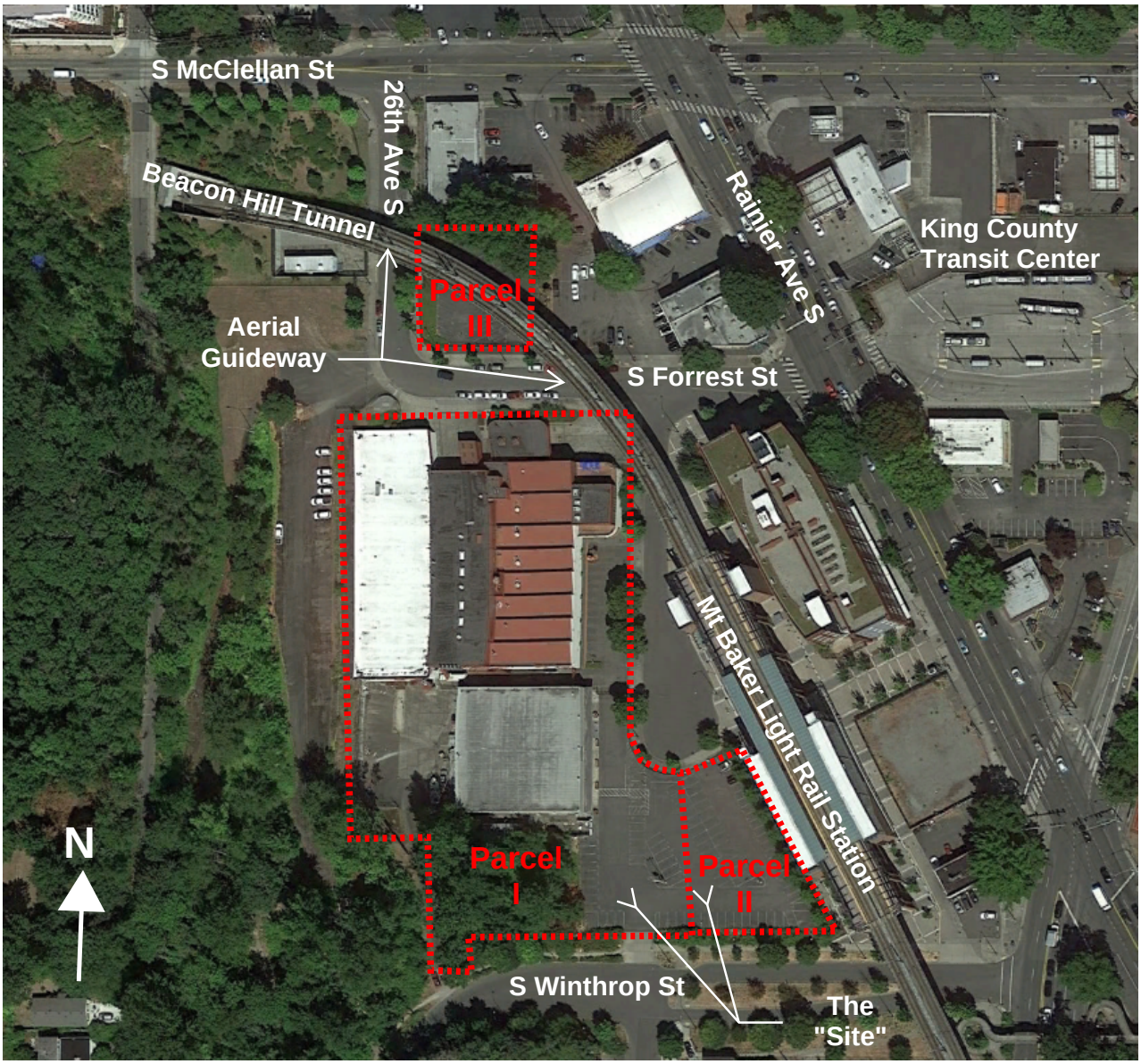

Figure 2-1: Detailed Site Overview

This study, and supporting ALTA survey documentation, uses the following parcel naming conventions.

King County Parcel Number	Study and ALTA Survey Parcel Designation	Approximate Parcel Size in Acres	Current Use
308500-2100	Parcel I	**3.3**	**Service buildings – mostly non-operational laundry facilities**
713880-0025	Parcel II	**0.5**	**Surface parking**
713830-0015	Parcel III	**0.3**	**Surface parking and aerial guideway**

Table 2-1: Parcel Summary

Within the Site, the western parcel (King County Parcel Number 308500-2100) is nearly rectangular in shape, and measures 144,680 square feet (3.32 acres) in size, with dimensions of roughly 285 feet in the east-west direction and 510 feet in the north-south direction. Two existing buildings are currently located on this parcel, with the northern portion of the parcel occupied by the former University of Washington Consolidated Laundry Building (UW Laundry) and the southern portion of the parcel containing a smaller, square-shaped building formerly known as King's Hall.

The eastern parcel (King County Parcel Number 713880-0025) is roughly trapezoidal in shape, and measures approximately 20,732 square feet (0.48 acres). The eastern parcel is currently paved for use as a parking lot with no existing structures.

The westernmost parcel slopes from west down to the east with approximately 25 feet of grade change across the parcel, with approximately 10 to 15 feet of this grade held behind a retaining wall along the west edge of the UW Laundry and the balance spread over the width of the parcel. The easternmost parcel is fairly flat with little change in grade across the parcel.

The guideway parcel is roughly rectangular with north-south dimensions of approximately 115 feet and east-west dimensions of approximately 120 feet. The guideway parcel has an existing Sound Transit Link light rail aerial guideway bisecting the site with an approximate clearance of twenty feet between existing grade and the bottom of guideway.

Figure 2-2: Guideway Parcel Looking North from South Forest Street

3. PROPERTY DEVELOPMENT RESTRICTIONS AND CONSIDERATIONS

Redevelopment of the site will require awareness and consideration for a number of existing processes. This section provides a high-level overview of these considerations.

Legal restrictions and development standards for site development include:

- Seattle Municipal Code Zoning Regulations
- Seattle Citywide and Neighborhood Design Guidelines
- Existing Legal Easements

Seattle Municipal Code Zoning Regulations

The site is in the Mount Baker Station Area and Town Center. The property, as of June 2022, is zoned SM-NR 95 (M) (previously designated as SM-NR 85). See Figure 3-1 below from the Seattle Zoning Maps. SM-NR is a Seattle Mixed-North Rainier zoning designation with a commercial height limit of 95 feet. The site also falls within the Mount Baker Station Area Overlay District. Overlay districts are established to conserve and enhance the City of Seattle's unique environmental features, preserve history, assist in declining areas, balance major redevelopments with neighborhoods, and promote safety and enjoyment for all people.

The City of Seattle Municipal Code Chapter 23.48 covers the requirements for a "Seattle Mixed" (SM) zone. The SM designation allows a wide range of residential and commercial development, but limits high-impact uses not typically found within residential neighborhoods, such as heavy manufacturing, drive-in businesses, and large surface parking lots.

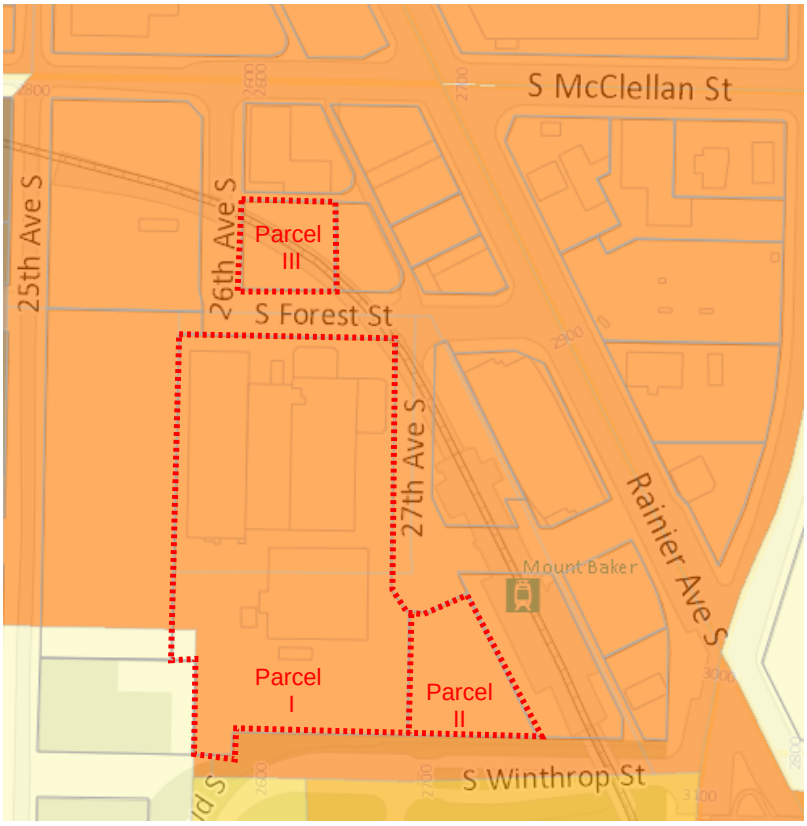

Figure 3-1: Seattle Zoning Map
(Orange color = SM-NR 95 (M) zoning)
(Underlay courtesy of Seattle Department of Construction and Inspection)

The City of Seattle's zoning code applies floor to area ratio (FAR) calculations to SM-NR 95, limiting the development potential of the site. The FAR limits for use in zone SM-NR 95 is 6.25. A minimum FAR of 2 applies when more than 1,000 square feet of gross floor area is added to a lot located in a Station Area Overlay District. Portions of the lot designated as a steep slope are not included when calculating lot size for the purpose of determining the minimum FAR requirements, as stated above. For developments exceeding a FAR of 4.5, the applicant shall make a commitment that the proposed development will meet the green building standard and shall demonstrate compliance with that commitment.

In order to obtain extra floor area, the development shall provide amenities to the public. Developments containing extra floor area in the proposed development must meet and demonstrate compliance with the green building performance and provide a Transportation Management Plan (TMP) that no more than 40 percent of trips to and from the development will be made using single-occupant vehicles. To obtain bonus residential floor area for affordable housing, the applicant may use the performance option, the payment option, or a combination of these options per the Seattle Municipal Code Chapter 23.58A.014.

The site abuts South Winthrop Street, and therefore must adhere to the upper-level setback requirements. Any portion of a structure taller than 45 feet is required to be set back from a lot line abutting South Winthrop Street. A setback of 1 foot for every 2 additional feet of height is required for any portion of a structure exceeding the maximum height of 45 feet, up to a maximum setback of 15 feet measured from the street lot line.

KPFF recommends a site-specific zoning review by a future development team to ensure current zoning requirements are known and properly considered.

Citywide and Neighborhood Design Guidelines

The City of Seattle applies citywide and neighborhood-specific design guidelines for all new development within the city. The overarching goal of the design guidelines—and the Design Review Program—is to foster design excellence in private development of new multifamily and commercial projects throughout the city.

The guidelines also support the Design Review Program as a forum for the public to participate in discussions about new projects in their community, and as a means of allowing flexibility in the application of Land Use Code requirements. The Seattle Design Guidelines apply to all projects required to undergo design review in all areas of the city except downtown.

These guidelines are used by architects when designing proposed development projects for specific neighborhoods, and they assist the Neighborhood Design Review boards when assessing and evaluating the designs of these development projects.

General citywide design guidelines applicable to this site are the Seattle Design Guidelines for Design Review.

Specific neighborhood design guidelines applicable to this site are the Mount Baker Town Center Neighborhood Design Guidelines (2017).

Other neighborhood-specific plans that are applicable to guide design and development of this site include:

- Mount Baker Town Center Urban Design Framework (2011)
- North Rainier Neighborhood Plan Update (2010)
- North Rainier Neighborhood Plan (1999)
- Outside Citywide Public Space Design Toolbox (2020)
- Outside Citywide (2019)

Design projects located within a neighborhood that has neighborhood-specific guidelines are required to consult both sets of guidelines—neighborhood and citywide—in the development and review of the project design. Neighborhood guidelines would prevail if there were conflict with the citywide guidelines.

Existing Legal Easements
An ALTA survey was prepared in April 2022 for the site. Based on the ALTA survey results, numerous recorded legal easements exist within the site for a variety of purposes. See Section 8 of this report for more detailed information on the ALTA Survey.

A high-level summary of easements with influence on redevelopment of the site include utility easements, easements allowing the Central Puget Sound Regional Transit Authority (CPSRTA) access to maintain and operate the guideway within the property, and a permanent access for the Board of Regents of UW.

Sound Transit Link Light Rail Station – Mount Baker
A nearby Sound Transit Link light rail station provides excellent access to the regional transportation system from the site.

Potential Transit Center Relocation and Site Access
King County Metro, Sound Transit, and the Seattle Department of Transportation (SDOT) have expressed interest in the potential relocation of the existing King County Mount Baker Transit Center to this site, with a focus on the eastern side. Site access would need to be evaluated if the transit center relocation project were to move forward.

4. EXISTING SITE ENVIRONMENTAL AND GEOTECHNICAL CONSIDERATIONS

This study reviewed previous environmental and geotechnical studies performed at, or nearby, the site. The reports are listed below and are attached in Appendix A:

- A Phase I and Phase II Environmental Site Assessment report prepared in October and December of 2019, respectively, by SoundEarth Strategies, Inc. for the City of Seattle Department of Finance and Administrative Services.
- A Geotechnical Feasibility Report prepared by PanGeo, Inc. in December 2019 for Enterprise Community Development.

The reports have provided a planning-level understanding of the environmental and geotechnical conditions within the site. KPFF has analyzed information from these reports and summarized key findings. No specific investigations were done on the site as part of this study.

Environmental Site Considerations

Prior to the UW Laundry Facility occupying the site, this property had been occupied by a single-family residence, a vegetable garden, Rainier Lanes bowling alley, various surface parking lots, retail space, and event space. Of those occupants, the current UW Laundry Facility and previous bowling alley have most likely contributed to site contamination. At the time when the bowling alley occupied the site, storage, use, and disposal of chlorinated and petroleum-based solvents were highly unregulated. This has increased potential risk of impacts to the subsurface.

There is a 4,000-gallon underground storage tank (UST) on the north end of the site for the laundry facility shown in Figure 4-1 below. The UST was previously used to store fuel oil. According to the UW Laundry Facility manager, the UST may have leaked and may have been emptied, but no further investigations have been performed to confirm those statements.

Of the off-site parcels analyzed in the vicinity, the parcels to the west are of highest importance due to groundwater flowing in the easterly direction. However, the property to the west was previously a single-family residence that has since been demolished. It now serves as a parking lot. The property to the southwest is currently undeveloped and is a designated public park space. These properties do not pose notable risk to the site.

While the Phase I Assessment identified unknown fill material used for grading, the use of borings in the Phase II Assessment identified anthropogenic fill material beneath portions of the site. The three borings in this area contained higher concentrations of petroleum-based hydrocarbons, DRPH and ORPH, in groundwater and soil depths corresponding with the fill material. The absence of DRPH and ORPH at other borings indicate that the impacts are likely associated with the fill material placed in 1983.

DRPH and ORPH concentrations detected in the groundwater samples exceed the applicable MTCA (Model Toxics Control Act) Method A cleanup level. Per the State of Washington Department of Ecology Cleanup Levels and Risk Calculation website, MTCA cleanup levels are “concentrations of hazardous substances in the environment that are considered sufficiently ‘protective of human health and the environment under specified exposure conditions.’”

SoundEarth's assessments recommend a soil management plan be prepared prior to site redevelopment, which would be used to address potential discoveries likes oil impacts and USTs.

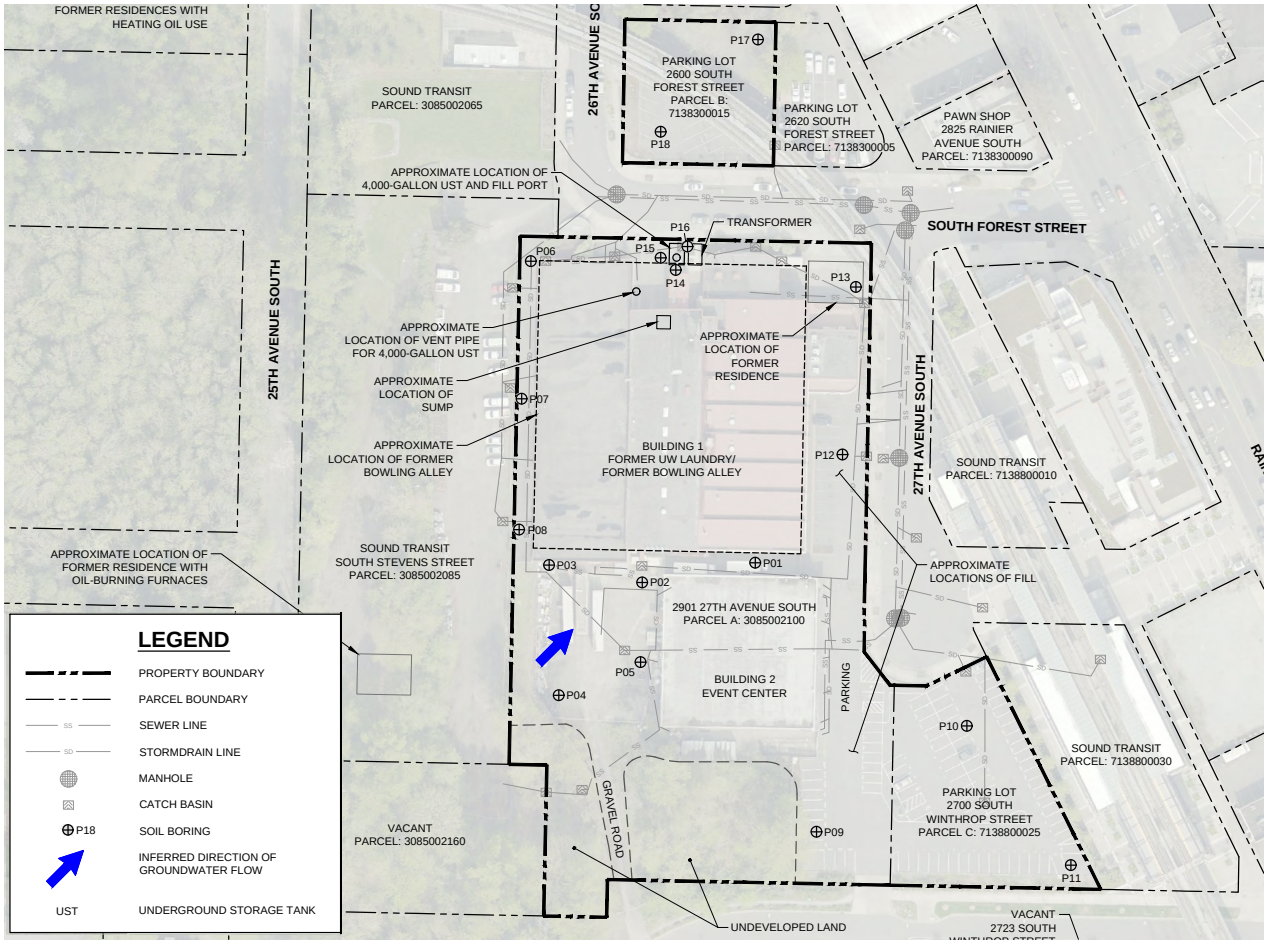

Figure 4-1: Environmental Assessment Site Plan

(Image courtesy of the Phase I Environmental Assessment Report by Sound Earth Strategies , December 2019.)

In addition, the southwest corner of the site is mapped as a wildlife habitat, as shown in Figure 4-2 below from the map on the City of Seattle Department of Construction and Inspections (SDCI) Environmentally Critical Areas (ECA) website. This area has been identified by the Washington Department of Fish and Wildlife. Mitigation during development is required for wildlife habitat conservation areas.

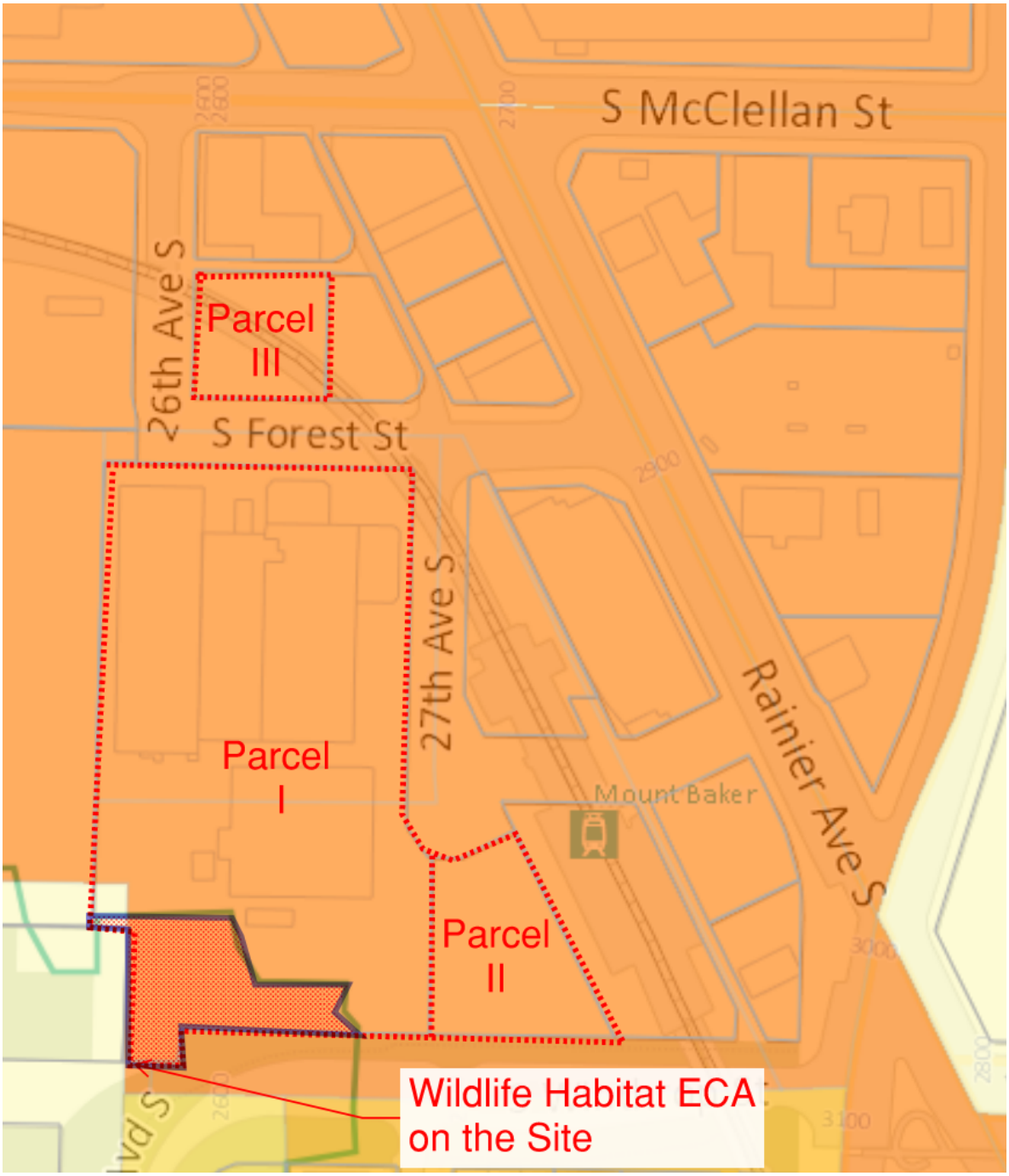

Figure 4-2: Approximate Extent of SDCI Mapped Wildlife Habitat ECA
(Underlay courtesy of SDCI, 4/27/22.)

Geotechnical Site Considerations

Depth of groundwater has been encountered at a range of 4 feet to 16 feet below ground surface (bgs). KPFF understands that future development may include underground parking, and groundwater will need to be a design consideration. Depending on excavation depths, construction dewatering or alternate operations may need to be implemented.

Based on review of the SDCI ECA maps, the site contains a steep slope ECA, a potential and known landslide ECA, and a liquefaction-prone ECA. These ECAs are discussed in more detail below.

Steep Slope ECA

The southwest corner of the site is mapped as a steep slope ECA. Site observations did not show recent slope movement. The City requires a setback of 15 feet from steep slope areas unless a *Relief from Prohibition on Steep Slope and Erosion Hazard Area Development* is granted by the City. It may be possible to obtain the "relief" if the slopes were created by previous legal grading and the slopes did not meet the definition of a Steep Slope ECA prior to that grading.

Potential and Known Landslide ECA

The west portion of the site is mapped as a potential landslide hazard ECA due to geologic conditions and is also mapped as Uncertain Landslide Area.

The west portion of the site is also mapped as a known slide ECA due to slope failures to the west. These historical slope failures were recorded in the early 1930s and late 1950s.

When development occurs in potential and known slide areas, the Seattle Building Code requires complete stabilization of the entire developed area of the site.

Seismic Hazard (Liquefaction) ECA

Almost all of the site is mapped as a seismic hazard ECA, which is defined by the City as an area that will be susceptible to liquefaction during a design-level seismic event. Various types of foundation support to provide mitigation against liquefaction of soils during redevelopment are discussed in Section 5.

KPFF recommends a site-specific geotechnical evaluation of the site by a future development team.

5. POTENTIAL BUILDING FOUNDATION TYPES AND GEOTECHNICAL CONSIDERATIONS

Introduction

KPFF prepared a high-level building foundation type and cost analysis for the site based on:

- Existing geotechnical information and recommendations prepared by others.
- Concept-level engineering evaluation for two potential building site layouts prepared by the City for heights up to 95 feet, with a full buildout of approximately 400 units.

A future development team should consider these findings and recommendations informative in nature and purpose. Final selection of cost-effective foundation types may vary based on building configurations moved into development and future market conditions.

Potential Building Foundation Types

Full utilization of the site for multi-story construction will more than likely require:

- Combination of conventional spread foundations and pile foundations, assuming that a portion of competent soils is exposed along the western portion of the site when excavating for the below-grade parking level.

Geotechnical Considerations for Final Design

- More economical foundation types are likely possible on the western portion of the site, as the number and overall costs of deep pile foundations likely increases the further east on the site development is constructed.
- Existing soil conditions on the site will likely require deep foundation types, such as pile foundations.
- Groundwater will likely be encountered if below-grade construction is advanced.
- Future development will need to include mitigation against potential future landslides and liquefaction of soils supporting the proposed buildings.

Alternatives Evaluated

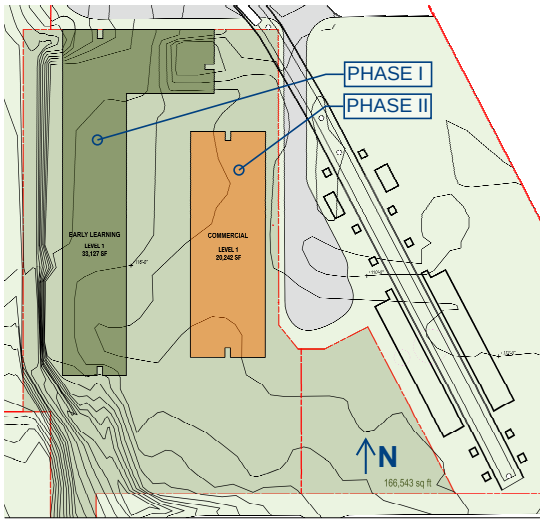

Figure 5-1: SPUDS Concept 1, Level 1

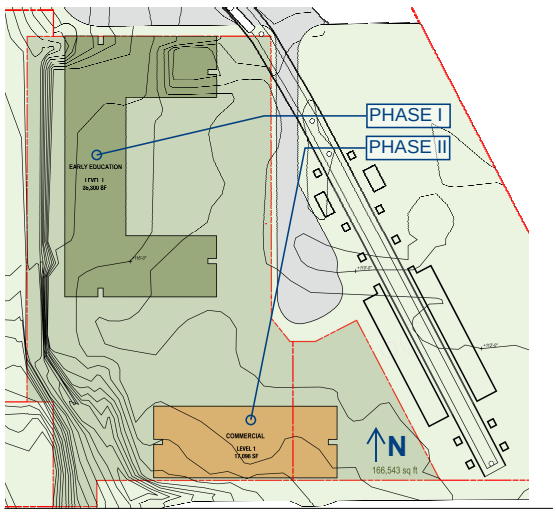

Figure 5-2: SPUDS Concept 2, Level 1

As part of this effort, KPFF evaluated foundation systems required for two site redevelopment concepts developed by the City, referred to as the Site Planning and Urban Design Study

(SPUDS) Concepts 1 and 2 in this study. These alternatives are presented in Figures 5-1 and 5-2.

Preliminary massing identified in the SPUDS concepts propose development of two buildings in two separate phases, where each building would consist of eight stories of development over one below-grade parking level. The program for each building would generally consist of six residential levels, either one or-two commercial levels, and one below-grade parking level.

For this study, KPFF has assumed a structural system of up to five levels of wood on three levels of concrete, with one below-grade parking level, when identifying foundation types and costs.

Currently, the Seattle construction market suggests a combination of wood or cold-formed stud framing on a podium of concrete with concrete columns that are consistently located on each level from the top of podium through the below-grade parking level will be the most economical structural system for this site.

High-Level Foundation Cost Estimates

A summary of probable deep foundation construction cost ranges is included in Tables 5-1 and 5-2. These tables include a range of total cost to construct the deep foundations for this site, a range of cost to construct on a flat site with good soil with the same program, then lastly a presentation of the added cost to construct deep foundations for this Mt Baker TOD site. The added cost to construct deep foundations at this site and provide global site stability ranges between $5.6 and $7.2 million for all phases of Concept 1 and between $6.3 and $8.1 million for all phases of Concept 2. When amortized over the total gross square footage (GSF) of each concept, the increase in cost per GSF is between $12 to $16/GSF for Concept 1 and between $14 to $18/GSF for Concept 2.

This cost would include:

- Excavation and dewatering
- Shoring, consisting of soldier pile and lagging with tiebacks, for global site stability to the west and building excavation support
- Deep foundations, including piles, pile caps
- Conventional spread foundations, (where possible)
- Structured slab at grade system, consisting of grade beams and one way slab
- WA state tax and contractor markup of 10%

The percentage increase in probable foundation construction cost, depending on concept and building configurations, ranges between 25 and 75 percent over the typical cost of foundations constructed on a flat development site with competent soils. Phase II buildings show the highest increase of between 65 and 75 percent for Concept 1 and Concept 2 Phase II Buildings, respectively, when compared to a flat site with good soils due to their being located wholly within the portion of site requiring deep foundations as well as a structured slab at grade. Phase I buildings show a lower increase of between 25 and 30 percent for Concept 1 and 2, respectively. This lower increase is due to the fact that large portions of each of those buildings are located in a portion of the site suitable for conventional spread foundations, albeit still with a structured slab at grade.

More discussion is provided in the sections below related to possible adjustments to the location and configuration of the buildings within each concept that could decrease the

overall added construction cost for this site. One example would be to adjust the configuration of the Concept 2 Phase I Building to be configured more closely to the Concept 1 Phase I Building, with more of the footprint located on the portion of site suitable for conventional spread foundations. As seen in the tables below, the added foundation cost to accommodate the Concept 2 Phase I Building configuration could range between $1,4 and $1.9 million, when compared to the cost to construct foundations for the Concept 1 Phase I Building.

CONCEPT / ELEMENT	MT BAKER SITE DEEP FOUNDATION COST (LOW)	MT BAKER SITE DEEP FOUNDATION COST (HIGH)	FLAT SITE GOOD SOIL TYPICAL FOUNDATION COST (LOW)	FLAT SITE GOOD SOIL TYPICAL FOUNDATION COST (HIGH)	COST DELTA ADDED FOUNDATION COST (LOW)	COST DELTA ADDED FOUNDATION COST (HIGH)
CONCEPT 1 - PHASE I (WEST BUILDING)	$8,600,000	$11,000,000	$6,800,000	$8,700,000	$1,800,000	$2,300,000
					~$6 / GSF	~$8 / GSF
CONCEPT 1 - PHASE II (EAST BUILDING)	$7,000,000	$9,000,000	$4,300,000	$5,500,000	$2,700,000	$3,500,000
					~$17 / GSF	~$22 / GSF
GLOBAL SITE STABILITY COST	$1,100,000	$1,400,000	$0	$0	$1,100,000	$1,400,000
CONCEPT 1 - TOTAL COST	$16,700,000	$21,400,000	$11,100,000	$14,200,000	$5,600,000	$7,200,000
					~$12 / GSF (TOTAL PROJECT)	~$16 / GSF (TOTAL PROJECT)

NOTES:
-COSTS SHOWN INCLUDE TAX AND A CONTRACTOR MARKUP OF 10%
-DEEP FOUNDATION COSTS INCLUDE ELEMENTS SUCH AS PILES, PILE CAPS, SPREAD FOOTINGS, STRUCTURED SLAB AT GRADE WITH GRADE BEAMS, EXCAVATION, DEWATERING, AND SHORING FOR BUILDINGS AS WELL AS GLOBAL SITE STABILITY
-TYPICAL FOUNDATION COSTS INCLUDE ELEMENTS SUCH AS SPREAD FOOTINGS, SLAB ON GRADE, EXCAVATION, DEWATERING, AND SHORING FOR BUILDINGS

Table 5-1: Concept 1 – Foundation Cost Summary

CONCEPT / ELEMENT	MT BAKER SITE DEEP FOUNDATION COST (LOW)	MT BAKER SITE DEEP FOUNDATION COST (HIGH)	FLAT SITE GOOD SOIL TYPICAL FOUNDATION COST (LOW)	FLAT SITE GOOD SOIL TYPICAL FOUNDATION COST (HIGH)	COST DELTA ADDED FOUNDATION COST (LOW)	COST DELTA ADDED FOUNDATION COST (HIGH)
CONCEPT 2 - PHASE I (NORTH BUILDING)	$10,000,000	$12,900,000	$7,600,000	$9,800,000	$2,400,000	$3,100,000
					~$8 / GSF	~$10 /GSF
CONCEPT 2 - PHASE II (SOUTH BUILDING)	$6,600,000	$8,500,000	$3,800,000	$4,900,000	$2,800,000	$3,600,000
					~$21 / GSF	~$27 / GSF
GLOBAL SITE STABILITY COST	$1,100,000	$1,400,000	$0	$0	$1,100,000	$1,400,000
CONCEPT 2 - TOTAL COST	$17,700,000	$22,800,000	$11,400,000	$14,700,000	$6,300,000	$8,100,000
					~$14 / GSF (TOTAL PROJECT)	~$18 / GSF (TOTAL PROJECT)

NOTES:
-COSTS SHOWN INCLUDE TAX AND A CONTRACTOR MARKUP OF 10%
-DEEP FOUNDATION COSTS INCLUDE ELEMENTS SUCH AS PILES, PILE CAPS, SPREAD FOOTINGS, STRUCTURED SLAB AT GRADE WITH GRADE BEAMS, EXCAVATION, DEWATERING, AND SHORING FOR BUILDINGS AS WELL AS GLOBAL SITE STABILITY
-TYPICAL FOUNDATION COSTS INCLUDE ELEMENTS SUCH AS SPREAD FOOTINGS, SLAB ON GRADE, EXCAVATION, DEWATERING, AND SHORING FOR BUILDINGS

Table 5-2: Concept 2 – Foundation Cost Summary

Geotechnical Conditions Influences

Based on the information included in the Geotechnical Evaluation, this site is mapped by the City of Seattle as a steep slope, potential slide, and liquefaction hazard environmentally critical areas (ECAs) containing areas of known previous landslides.

The depth to competent soils for foundation support ranges from 10 to 40 feet below the existing grade, with the shallower 10-foot depths to competent soil located toward the western edge of the site and the deeper 40-foot depths toward the eastern edge of the site.

The Geotechnical Evaluation indicates that the site may fall under Seismic Site Class F under the 2018 International Building Code (2018 IBC) due to the presence of liquefiable soils. The site class is a factor used by designers to determine seismic design parameters for a site for the purposes of designing the final building structure. More study is needed by the future developer to confirm the final Seismic Site Class for design.

The geotechnical evaluation findings show promise for foundation systems using a combination of conventional spread foundations and pile foundations, assuming that a portion of competent soils is exposed along the western portion of the site when excavating for the below-grade parking level. The evaluation further noted that either augercast or small-diameter piles could be used to support columns on pile caps where competent soils were not exposed by the project excavation; however, it was noted that augercast piles are likely the most economical option. The geotechnical engineer indicated that ground improvement systems, such as rammed aggregate piers, would not be appropriate to improve soil bearing for this site.

The Geotechnical Evaluation recommends the use of a structured slab-at-grade for the floor slab in the lowest, below-grade level. A structured slab-at-grade would consist of a system of grade beams spanning between pile caps which support a one-way slab spanning between these grade beams.

The Geotechnical Evaluation identified a few other items for consideration by future developers when constructing on this site, which will be discussed briefly within the following Summary of Findings. These include items such as the presence of groundwater up to within 4 feet below grade that may necessitate construction dewatering or more permanent system for below-grade structures; global setback from the steeper sloped western portion of the site; and global site stabilization required by the City to mitigate the slide-prone portions to the west.

Global Site Stabilization

The Seattle Building Code will require that any development be set back from steep slopes within the site by at least 15 feet in addition to requiring the full development site be stabilized against potential impacts of ECA conditions found on the site. The Geotechnical Evaluation has indicated that future development will need to include mitigation against potential future landslides and liquefaction of soils supporting the proposed buildings.

Information provided in the Geotechnical Evaluation indicates that a combination of retaining structures and control of surface water drainage could be utilized to stabilize the site against slide potential, in addition to development of a demolition plan that protects any in-place retaining structures while the final site stabilization is constructed. Existing retaining

structures may include those integral to the UW Laundry structure or any standalone retaining walls that may exist on-site.

The Geotechnical Evaluation notes that retaining structures for either temporary and/or permanent shoring or to stabilize the site may consist of soldier pile walls with tiebacks and lagging, integrated with or designed as standalone from the building. A geotechnical engineer should be consulted as part of the final design to determine the most appropriate approach based on the assumed final soil conditions present on-site and the final building configuration.

Groundwater Control

The Geotechnical Evaluation identifies the presence of groundwater between four to fourteen feet below the current finished grade. Dewatering activities during construction will likely be required. As part of the final design, the future developer should evaluate if either a permanent dewatering system is required, or the building should be constructed to mitigation fluctuating groundwater water levels.

Liquefaction Mitigation

Mitigation of liquefaction potential on-site could be achieved with the use of piles extending down into competent soils for foundation support. According to the Geotechnical Evaluation, piles should adequately address the effect of soil liquefaction. The evaluation notes that a structured slab-at-grade for the lowest below-grade level is part of liquefaction mitigation. As a reminder, a structured slab-at-grade would consist of a system of grade beams spanning between pile caps that support a one-way slab spanning between these grade beams. This type of slab is much more robust than a basic slab supported on grade because it is designed for the liquefaction event where soil can no longer support the slab at grade. It will add to the overall foundation cost for the project. See additional input below in the conceptual-level cost summary.

Design considerations to produce cost-effective foundations include:

- **Use consistent column systems between floors.** In concrete podium construction, it is more cost-effective to utilize a column system that is consistent throughout the concrete levels. Or, said another way, it is more efficient for the columns to be in the same location from floor to floor so they “stack.” Transfer of column loads due to shifting column locations as you move up through the building podium will drive a need for adding transfer beams, increase the podium slab depth, and require more complicated detailing for the localized podium structure, which add cost to the project.
- **Utilize building floorplates which have cost effective foundations.** The final column layout selected for future development should maximizing functional parking in the below-grade level(s) and have consistent column placement through the building podium. Varying-width buildings may lead to underused below-grade space, with higher costs without additional value.
- **Optimized Finished Floor Elevations**. The final elevation of the bottom of excavation and the finished floor elevation of the lowest below-grade parking level should be optimized to put as much of the building foundation on competent bearing soil as economically possible. Some options include:
    - Global adjustments to optimize finished floor elevation of Level 1 and below-grade parking levels so the bottom of excavation bears on as much competent

soil as possible and reduces the total quantity of pile-supported foundations needed, as well as the total length of piles for each building.
    - Consideration of a second below-grade parking level, which may be cheaper than a single-story garage with deep foundation piles.

Additional Foundation Design Considerations

Follow-up evaluation of the topics noted below could improve the building performance:

- Design Considerations for Structures Supported by Combination Conventional Spread and Pile Foundations
    - Shear Wall Placement: The placement of shear walls or other lateral force-resisting system elements in a building with a structure supported on both conventional spread and pile-supported foundations should be closely analyzed to avoid placement of the shear wall or associated foundation such that it would span across the interface between these two separate foundation type areas. Ideally, the shear wall and foundation would be placed in a location that places the entire footprint within one type of foundation system or the other. Spanning across the interface between conventional spread footings and pile-supported foundations presents the difficulty of predicting the differing behaviors of these support systems. If placement of a shear wall across this interface is unavoidable, it is usually possible to conservatively support the whole shear wall and foundation on piles to better predict behavior of this element. However, closer analysis would be needed to confirm compliance with all codes and consideration is given to how these elements are detailed and constructed.
    - Differential Settlement: It is known that building structures settle over time due to a number of sources, such as long-term gravity loading and from settlement induced by seismic events. The goal for any structural analysis is to design a structure that settles relatively evenly across the full building footprint. Differential settlement in a building can induce additional unwanted loads in a structure that may not be able to be accommodated by the structure. Deep foundation systems, such as those supported on piles, tend to have much lower overall building settlement through time when considering settlement due to gravity and that induced by seismic events due to the stiff nature of the piles and the soils on which they bear. Buildings supported on conventional spread foundations on soils closer to the surface are typically less stiff than pile-supported foundations and may experience somewhat higher overall settlement through time when compared to settlement in a pile-supported foundation. As part of the final design for this development, close analysis should be performed to adjust conventional spread foundation designs such that they have similar settlement to the pile-supported regions both in the long-term gravity loading and from settlement induced by seismic event.
    - Slab Detailing: Portions of future development supported on pile foundations will include a structured slab-at-grade, whose configuration is discussed in more detail above. This structured slab-at-grade is a stiffer slab system than the traditional slab-on-grade utilized in a building with conventionally supported spread footing foundations. Like the discussion on placement of shear walls above and detailing when located near the interface between stiffer pile-supported foundations and the less stiff conventional spread foundations, consideration should be given to detailing the interface of the slab-on-grade with the structured slab-at-grade to avoid differential settlement. One approach could

be to detail the stiffer structured slab-at-grade to support the free edge of the less stiff slab-on-grade, to allow these slab interfaces to move and settle similarly.

Additional study may be necessary to further validate the preliminary information contained here.

Site Case Studies

Case Study Assumptions

KPFF has evaluated two building layouts noted in this section and results are presented below.

Some key assumptions include:

- The access to below-grade parking for each of these building concepts discussed below is assumed to be from South Forest Street to the north.
- The Level 1 finished floor elevation is approximately 116 feet (per Sound Transit Datum), the Parking Level 1 finished floor elevation is approximately 105 feet, and bottom elevation of global excavation for foundations of 99 feet.
- A speed ramp is assumed to connect the Level 1 program with the Parking Level 1, with two-way drive aisle assumed on this below-grade level serving two outer rows of parking stalls.
- The depth to competent soil to support foundations identified in the Geotechnical Evaluation and the required 15-foot embedment in this material is shown approximately with two lines, with the upper line illustrating depth to competent soils and the bottom line illustrating the required 15-foot embedment within that competent soil layer.

From the Geotechnical Evaluation, the depth to competent soils varies between 10 feet below grade on the west, near the toe of the slope, and then increases to 40 feet below grade toward the eastern edge of the site, as shown by the slope of the two lines in the upcoming figures. For the purposes of this study, KPFF has assumed the use of 24-inch-diameter augercast piles, based on the recommendations included within the Geotechnical Evaluation.

Case Study, Concept 1: Findings

The SPUDS Concept 1 buildings are located toward the northern portion of the site with the L-shaped Phase I building pushed further west toward the slope and the more rectangular Phase II building located further east in the flatter portion of the site. Based on the extent of competent soils for support of foundations in the Geotechnical Evaluation, a large portion of the Phase I building could be supported on conventional spread foundations, with the exception of the very eastern edge of the north-south stem and the protrusion of the “L” to the east. Columns along the eastern edge of the north-south stem and within the protrusion of the “L” to the east would need to be supported on piles, as would the full footprint of the Phase II building to the east. Preliminary pile lengths for the Phase I building vary from between approximately 16 to 32 feet in length, while the Phase II building pile lengths vary between 28 to 40 feet, with the longest piles located furthest east under the eastern edges of each of the Concept 1 buildings. Figures 5-3 through 5-5 below illustrate the extent of the pile-supported foundations in plan and provide two sections through the below-grade excavation to illustrate the relative depth of piles increasing as you move further east within the site.

The Phase I building concept location appears to be pushed as far west as permitted by code or physically viable given site constraints by the SPUDS Team; however, the Phase II building may be able to reduce overall pile lengths to some extent if shifted slightly further west. The total savings in pile length may not overcome any additional impacts to program with this shift, but it allows for some ability to adjust quantity or total length of pile-supported foundations if needed.

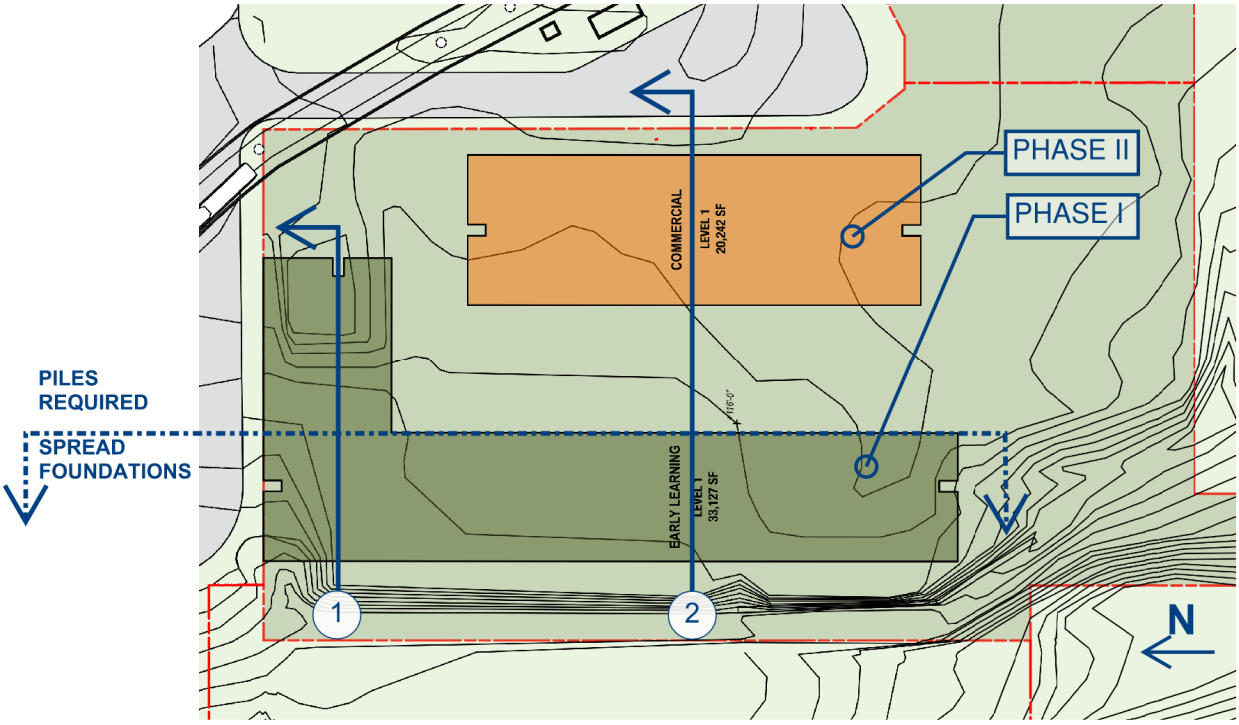

Figure 5-3: SPUDS Concept 1 Level 1 Plan

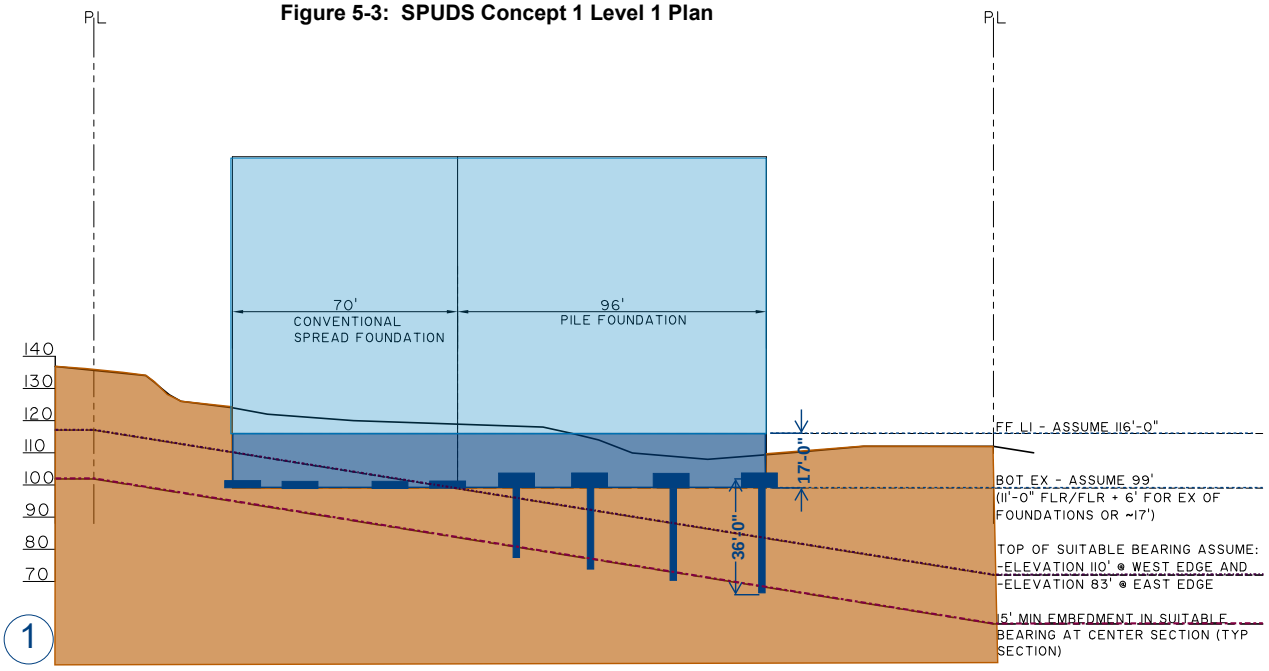

Figure 5-4: SPUDS Concept 1, Section 1 Through West Building Excavation, Looking North

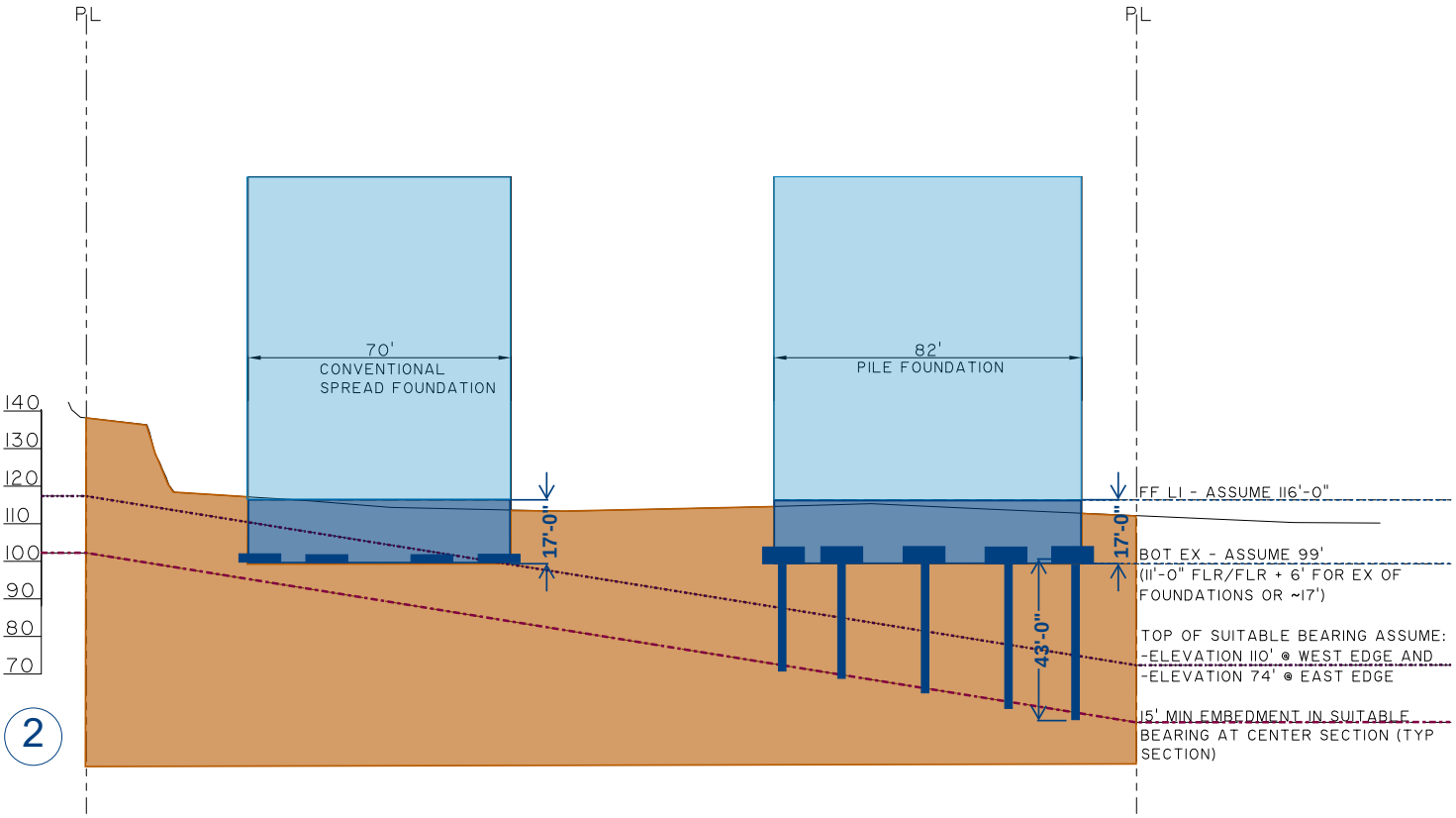

Figure 5-5: Spuds Concept 1, Section 2 Through West and East Building Excavation, Looking North

Case Study, Concept 2: Findings

The SPUDS Concept 2 buildings are located with the U-shaped Phase I building pushed toward the northern portion of the site and the more rectangular Phase II building pushed further south toward South Winthrop Street and into a portion of the site with slightly more slope or topographic relief. Based on the extent of competent soils for support of foundations identified in the Geotechnical Evaluation, a small fraction of the western portion of the Concept 2 U-shaped Phase I building could be supported on conventional spread foundations; however, the eastern edge of the north-south stem, as well as both protrusions of the U-shaped building that extend to the east would require pile-supported foundations. The full footprint of the Phase II building to the south would require pile-supported foundations. Preliminary pile lengths for the Phase I building vary from between approximately 15 to 32 feet in length, while the Phase II building pile lengths vary from 21 to 54 feet, with the longest piles located furthest east under the eastern edges of each of the Concept B Buildings. Figures 5-6 through 5-8 below illustrate the extent of the pile-supported foundations in plan and provide two sections through the below-grade excavation to illustrate the relative depth of piles increasing as you move further east within the site.

The Concept 2 U-shaped Phase I building configuration when compared to the Concept 1 L-Shaped Phase I building appears to require a substantial increase in the total quantity of pile-supported foundations needed over conventional spread foundation, which also leads to a substantial increase in total pile lengths needed to support the concept building footprint. This can be seen in the prior figure sections, which generally illustrate that as more of the building extents are pushed to the east into the area of the site, requiring deeper pile lengths to reach suitable pile bearing, the larger the quantity of pile-supported foundations and ultimately the larger total pile length that is required to construct a similar square footage of transit-oriented development (TOD). The total quantity of pile-supported foundations and total pile length needed for the Concept 2 Phase I building configuration are substantially higher when compared to the requirements for Concept 1 Phase I building with the total quantity of pile-supported foundations for Concept 2 Phase I building being 55% higher, while the total length of piles required increases by approximately 65% when compared to the Concept 1 Phase I building. As noted earlier, this could increase the probable construction cost for this Concept 2 Phase I building by between $1,4 and $1.9 million over the configuration of the Concept 1 Phase I building with more of the building located on portions of the site suitable for conventional spread foundations and structured slab at grade.

If a building layout similar to Concept 2 is moved forward into final design, we recommend evaluating cost-saving opportunities by pulling more of the footprint back to the west in order to decrease the total quantity of pile-supported foundations and avoid the added pile lengths needed when building further east on the site. This may optimize the configuration to limit the deep foundation costs. Additional input related to potential cost savings between these Phase I building configurations is also included in the cost summary section below.

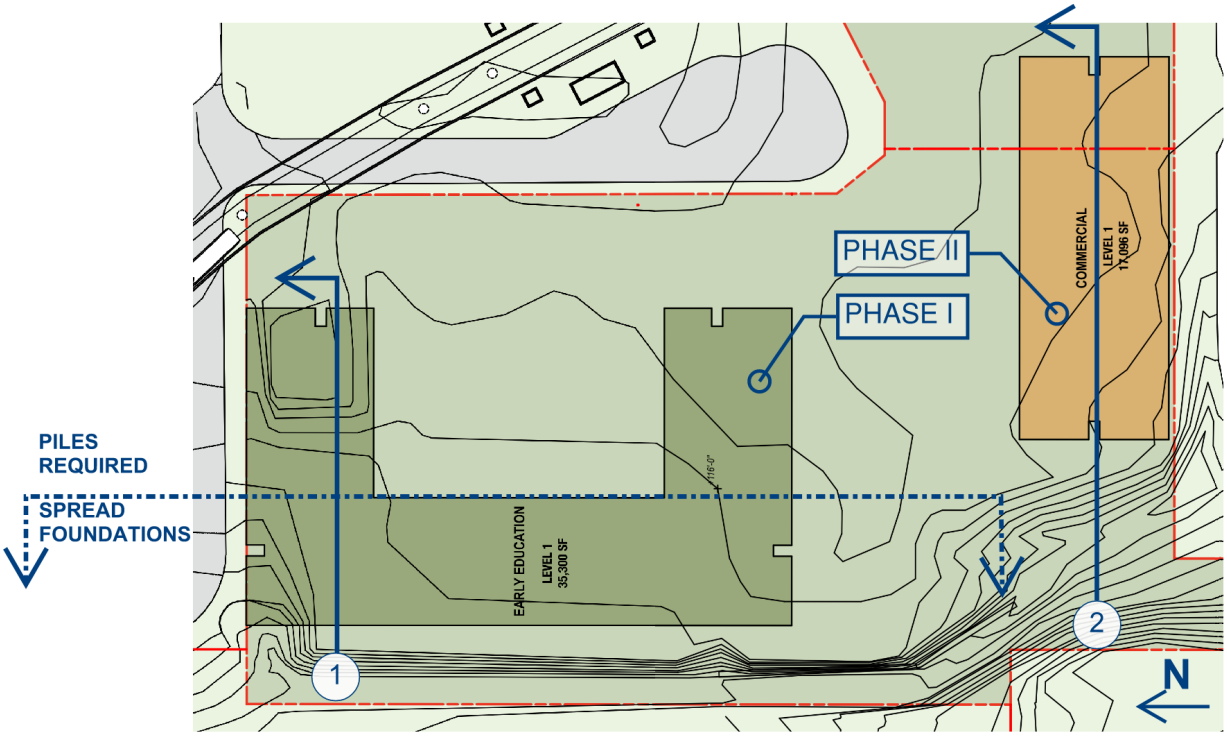

Figure 5-6: SPUDS Concept 2, Level 1 Plan

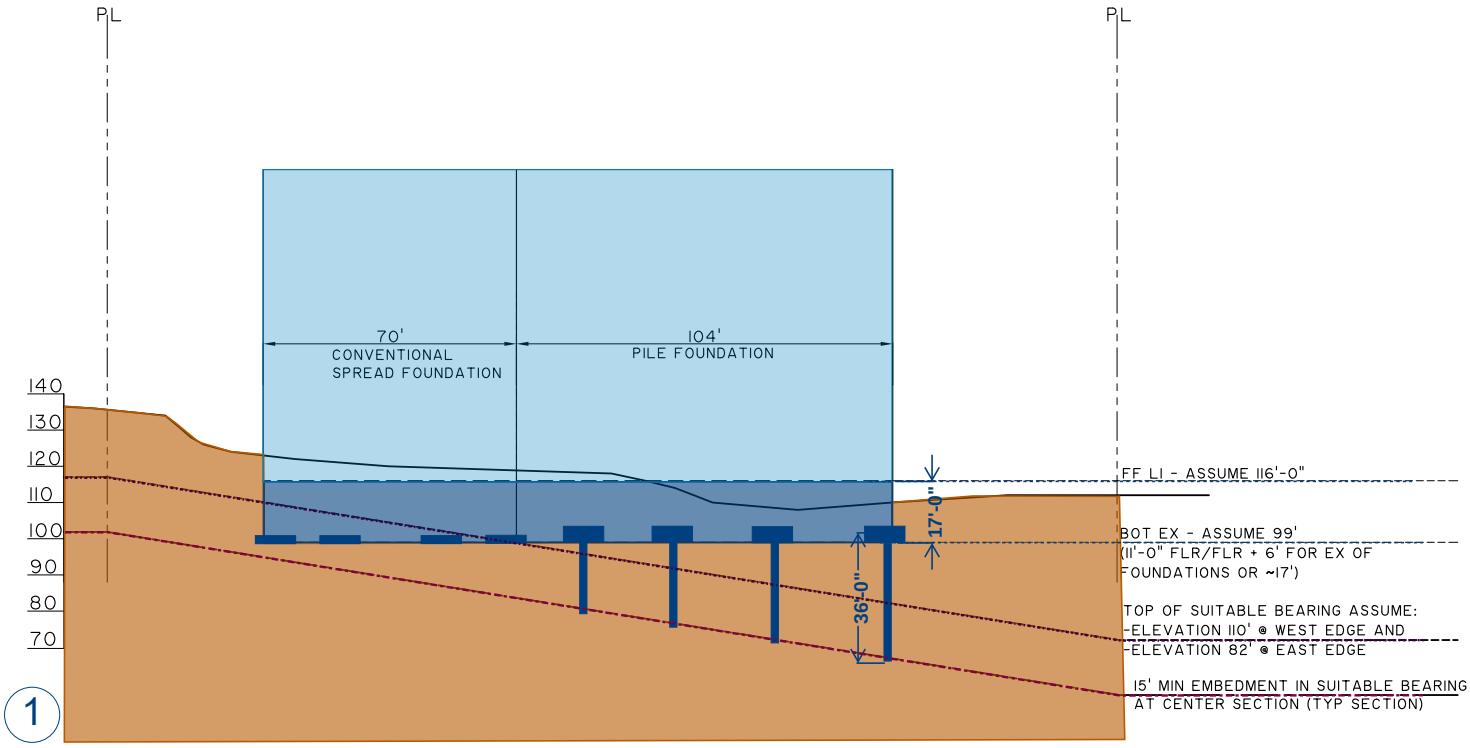

Figure 5-7: SPUDS Concept 2, Section 1 Through North Building Excavation, Looking North

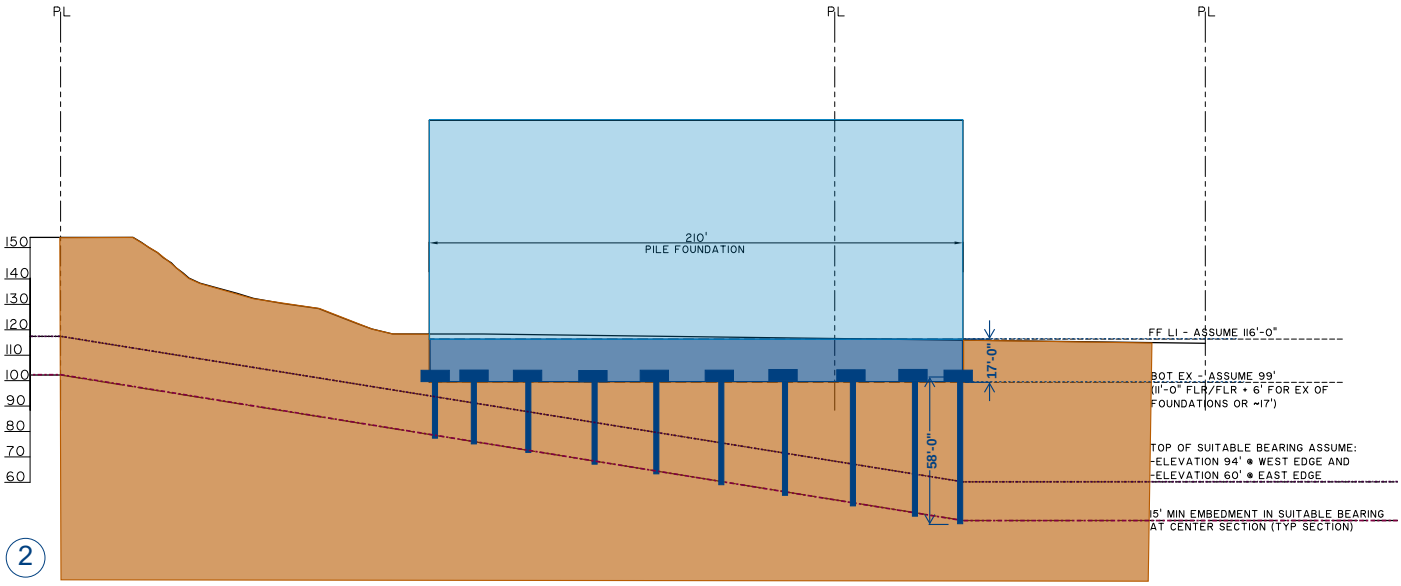

Figure 5-8: SPUDS Concept 2, Section 2 Through South Building Excavation, Looking North

6. EXISTING UTILITY INFRASTRUCTURE AND FUTURE UTILITY NEEDS FOR REDEVELOPMENT

Introduction

A planning-level evaluation of the existing utility infrastructure and future utility needs for redevelopment of the site has been completed by KPFF. This evaluation included review of nearby utilities adjacent to the site to help vet utility needs and potential utility infrastructure costs.

Findings

- The site has good access to nearby utility services.
- Obtaining future utility service will, more likely than not, be cost comparable to typical City of Seattle developments of similar size.

Background

The Study team reviewed available record information and developed a utility analysis which estimates the utility needs of two eight-story multifamily buildings totaling approximately 400 units in conjunction with the two Site Planning and Urban Design Study (SPUDS) Concepts prepared by Walker Macy, Weinstein A+U, and Perteet, Inc., dated June 9, 2021.

KPFF has reviewed the project ALTA survey, available City record drawings, and City of Seattle online utility and GIS maps. From our review of information, there are no existing regional utilities that bisect the site, with utilities only surrounding the site in the existing public right-of-way, so relocation of regional utilities is not anticipated.

In addition to reviewing and identifying adjacent utilities, KPFF was asked to develop cost estimates associated with the utility concepts. The opinion of utility conceptual costs is based on utility size comparisons to other City of Seattle projects and resulting unit costs as obtained from other developments within the City. For comparative purposes, the conceptual costs assume the building sizes listed in Table 6-1, as estimated based on the two SPUDS Concepts, and assume each building will receive its own services (which may require lot line adjustment(s)). Figures 6-1 and 6-2 depict the SPUDS Concepts that Table 6-1 and associated cost estimates are based on.

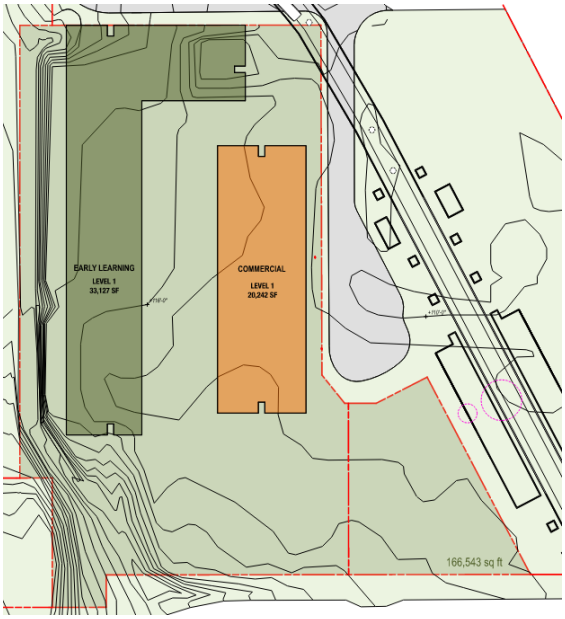

Figure 6-1: SPUDS Concept 1

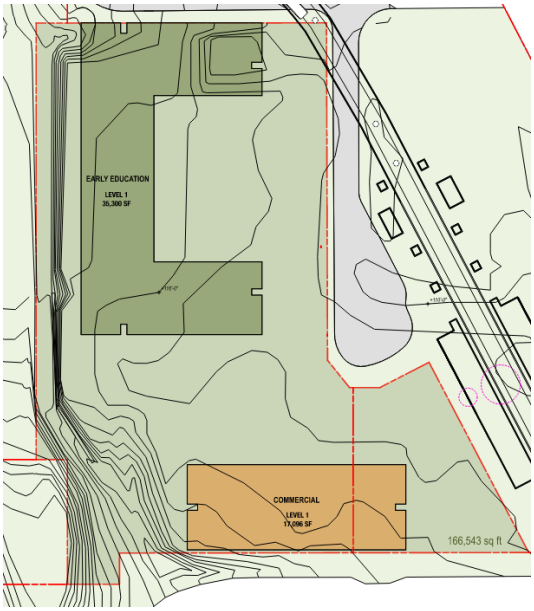

Figure 6-2: SPUDS Concept 2

Table 6-1: Estimated Building Sizes

SPUDS Concept	Northwestern Building	Southeastern Building
1	280,000 sf (~35k/floor, eight floors)	280,000 sf (~35k/floor, eight floors)
2	160,000 sf (~17.5k/floor, eight floors)	140,000 sf (~17.5k/floor, eight floors)

Information specific to the various utilities surrounding the site are described in the following sections.

Storm Drainage And Sewer

Existing Conditions

Based on the City of Seattle Development Services Office (DSO) Water and Sewer Map, separate storm drainage and sewer mains are located adjacent to the property site along both South Forest Street and 27th Avenue South, including existing service laterals which provide discharge points for the current property use. Refer to Figure 6-3.

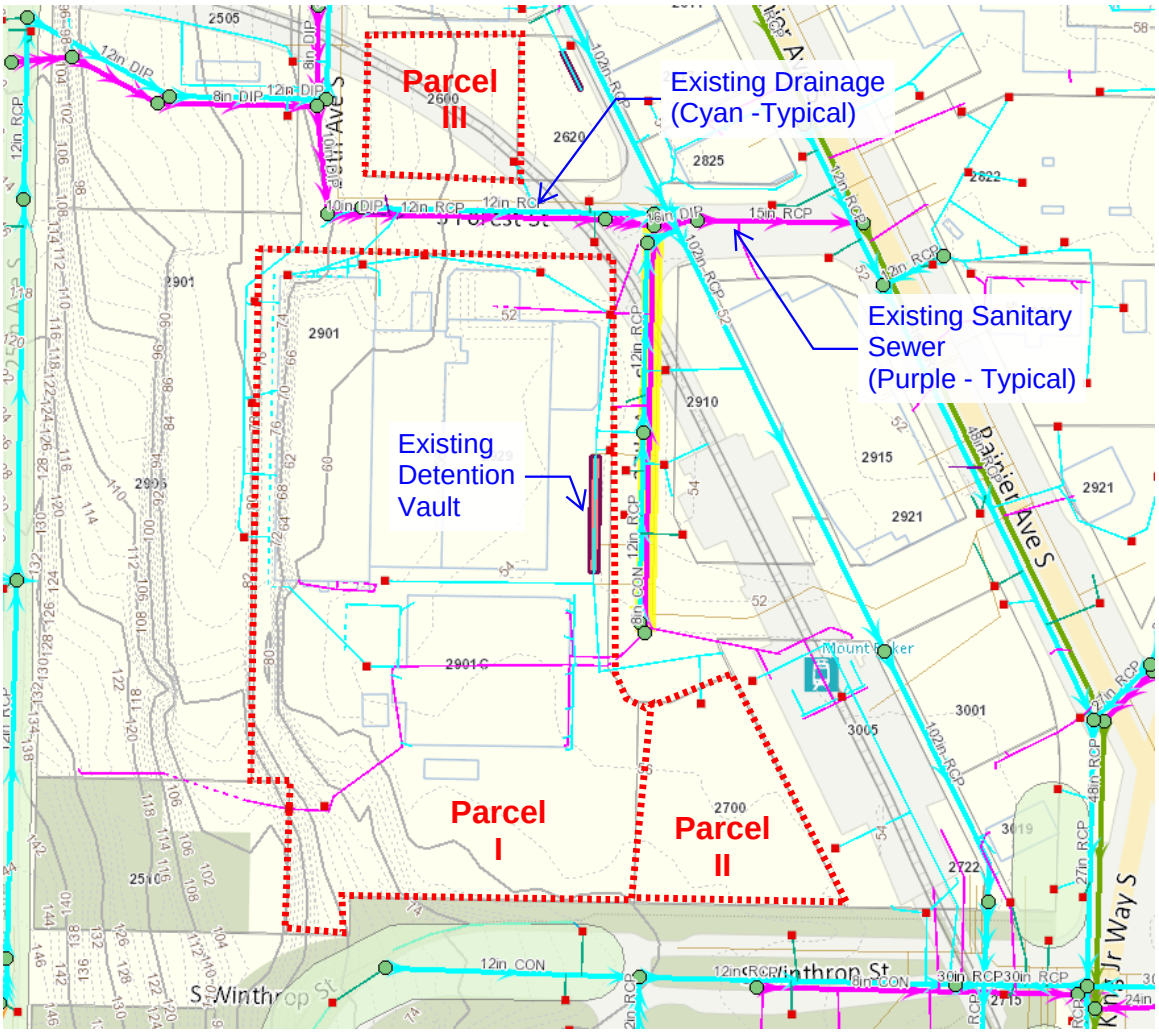

Figure 6-3: Existing Storm Drainage and Sanitary Sewer
(Image courtesy of City of Seattle DSO Map, 6/8/22.)

The existing storm drainage main within South Forest Street is a 12-inch main that originates near 26th Avenue South and flows to the east where it connects to a 102-inch storm drainage main that runs to the southeast just east of the light rail station, approximately 130 feet west of Rainier Avenue South. This main is located at a depth of approximately 10 to 16 feet, with an invert of ~ 56.4 feet at the upstream structure and a pipe slope of ~ five percent toward the east.

The existing storm drainage main within 27th Avenue South is a 12-inch main that originates within the turnaround cul-de-sac and flows to the north where it connects to the same 102-inch storm drainage main. This line is at a depth of ~13 feet, with an invert of 41.0 feet at the upstream structure within the cul-de-sac and a pipe slope of 0.5 percent toward the north.

The existing storm drainage main within South Winthrop Street is a 12-inch main that originates near the west limits of the property and flows to the east where it connects to the same 102-inch storm drainage main. This main is located at a depth of approximately 10 feet,

with an invert of 67.6 feet at the upstream structure and a pipe slope of 6.5 percent toward the east.

Within the property site, there is an existing detention facility located along the east property line, which was presumably sized based on the prior development of the site and may need to be removed depending on the plans for redevelopment of the site.

The existing sewer main north of the site originates on the hillside northwest of the property and is routed to the south along South 26th Avenue South, where it turns east along South Forest Street and parallels the property before increasing in size from 12 inches to 16 inches near 27th Avenue South before connecting to a 48-inch combined sewer running within Rainier Avenue South. Within South Forest Street, this line is at a depth similar to the storm drainage, with an invert of 56.0 feet at the upstream structure and a pipe slope of 5.2 percent toward the east.

The existing sewer main within 27th Avenue South is an 8-inch main which originates within the turnaround cul-de-sac and flows to the north where it connects to the same sanitary sewer running east-west within South Forest Street. This line is at a depth of approximately 11 feet, with an invert of 42.2 at the upstream structure within the cul-de-sac and a pipe slope of 0.2 percent toward the north.

Proposed Conditions

Based on the SPUDS Concepts and the estimated building square footages noted above, we would estimate that the northwestern building would require two separate 8-inch side sewer laterals (with the size limited by the combined sewer size) and two storm drainage laterals; however, this would need to be confirmed during the building design process through plumbing fixture calculations. SPUDS Concept 1 would have these laterals connecting to the drainage and sewer mains located within South Forest Street, while SPUDS Concept 2 may accommodate connections between laterals and the mains within South Forest Street and/or 27th Avenue North.

For the southeastern building, we anticipate that the building would require one to two separate 8-inch side sewer laterals and one to two storm drainage laterals. These sizes and counts would need to be confirmed during the building design process through plumbing fixture calculations. SPUDS Concept 1 would have these laterals connecting to the drainage and sewer mains located within 27th Avenue South, while SPUDS Concept 2 may accommodate connections between laterals and the mains within South Winthrop Street and/or 27th Avenue North.

Concept-Level Cost Estimate

The cost associated with drainage and side sewer laterals can vary depending on complexity of installation, which includes, but is not limited to, the number and location of crossing utilities, traffic control requirements, and required restoration. For the site conditions, known constraints, and depth of existing mains at connection, a conceptual-level cost would be approximately $60-70k per side sewer lateral, or approximately $250k for the northwestern building and approximately $200k for the southeastern building. If some of these laterals are able to exit the building in the same general location and be routed to the main in a shared trench, the project could realize some cost savings.

Water

Existing Conditions

Based on the City of Seattle DSO Water and Sewer Map, water mains are located adjacent to the property site along both South Forest Street and 27th Avenue South. Refer to Figure 6-4.

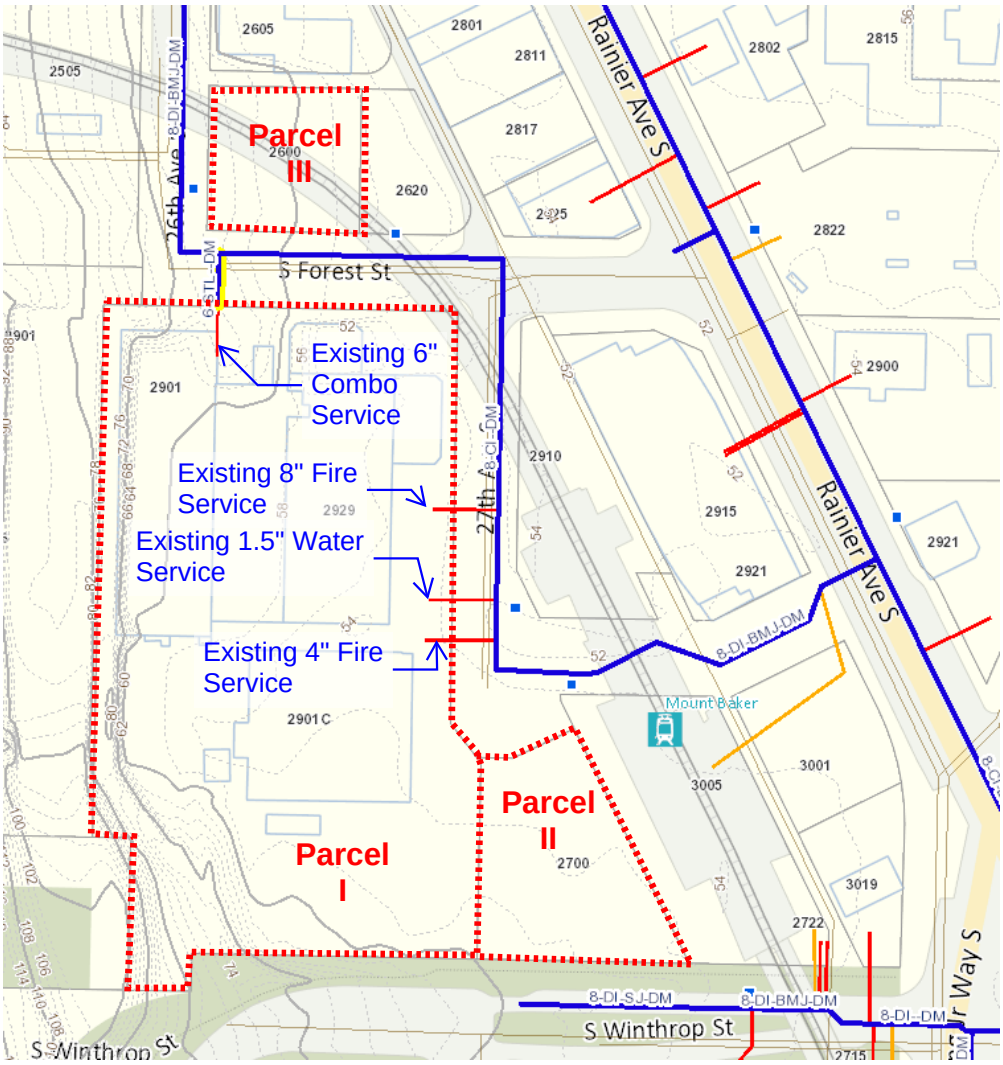

Figure 6-4: Existing Water Services

(Image courtesy of City of Seattle DSO Map, 6/8/22.)

The existing water main is looped around the north and east sides of the property site by way of 26th Avenue South, South Forest Street, 27th Avenue South, and the pedestrian plaza under the light rail station. This loop is an 8-inch loop, consisting of both ductile iron and cast iron water mains. According to the DSO map, the buildings on the property are currently fed by a 6-inch combination service, a 1.5-inch domestic service, and two fire services (4-inch and 8-inch).

Proposed Conditions

Based on the SPUDS Concepts and the estimated building square footages noted above, we would estimate that the northwestern building would require a 6-inch domestic service and an 8-inch fire service. These sizes would need to be confirmed during the building design process through plumbing calculations. It is anticipated that these services would connect to the South Forest Street water main in both SPUDS Concepts 1 and 2.

For the southeastern building, we estimate that the building would require a 4-inch domestic service and a 6-inch fire service. It is anticipated that these services would connect to the 27th Avenue South water main in both SPUDS Concepts 1 and 2; however, the water main within South Winthrop Street might be a possibility if allowed by Seattle Public Utilities (SPU).

Concept-Level Cost Estimate

The water service installation costs are estimated by SPU based on site-specific conditions and will be determined by SPU following an approved water service application submittal. For the conceptual-level cost estimate, the anticipated water service sizes have been compared to other City of Seattle projects. For the northwestern building, a conceptual cost for the 6-inch domestic service, 8-inch fire service, and associated connection charges should be expected to be in the range of $115k-125k. For the southeastern building, a conceptual cost for the 4-inch domestic service, 6-inch fire service, and associated connection charges should be expected to be in the range of $90k-100k. These costs include the installation of the water service vault and service lines from the watermain to the union at the property line, installed by SPU. Some contractor assistance should be anticipated to aid the SPU crews, and the conceptual cost excludes final surface restoration, which would be completed in conjunction with the project's frontage improvements.

Power and Communications

Existing Conditions

Based on the project ALTA survey and other documentation received during the utility study, we understand that power and communications were installed underground along Rainier Avenue South, South Forest Street, and 27th Avenue South during the light rail station construction. Refer to Figure 6-5.

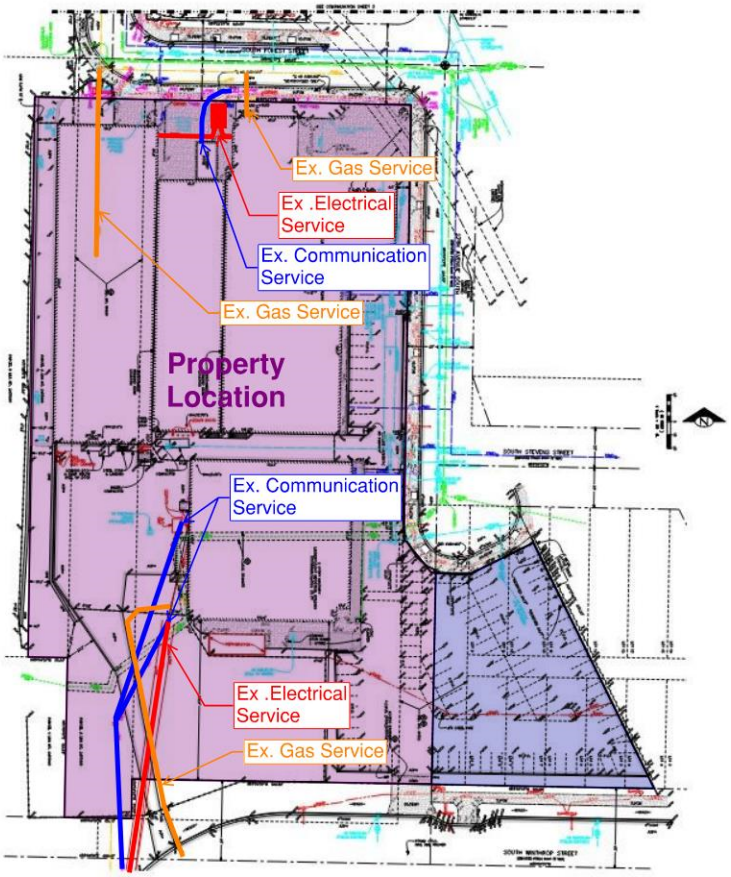

Figure 6-5: Existing Electrical, Communication, and Gas Services
(Image courtesy of ALTA Survey, 5/3/22.)

Electrical service to the northern building appears to be fed from a large electrical vault located within the driveway serving the site off South Forest Street. Communication service to the northern building also appears to feed the site near the driveway from the communication lines running east-west within South Forest Street.

Electrical and communication service to the southern building appears to be fed aerially from existing poles from the south along Cheasty Boulevard South/S Winthrop Street.

Proposed Conditions

Based on the building sizes associated with the SPUDS Concepts, it is anticipated that the electrical service connections to the site will be routed to either an external transformer or in-building transformer and electrical room. The electrical equipment and/or rooms will need to be sized based on the electrical demands as calculated by the project electrical engineer, with service connections to these transformers coordinated with Seattle City Light (SCL).

For the northwestern building, we expect that the building will be fed from the electrical system within South Forest Street, similar to how the existing northern buildings are currently fed. The site communication service is also anticipated to be fed from the existing communications within South Forest Street.

For the southeastern building, the building will likely be fed from the overhead electrical and communication systems within Cheasty Boulevard South, similar to how the existing

southern building is currently fed. Depending on the building design, the electrical service may transition underground via a termination pole to enter the building from underground, in lieu of an aerial connection.

Concept-Level Cost Estimate
The costs associated with the exterior transformer pad and/or in-building transformer/ electrical room will need to be advanced in conjunction with the building design. For conceptual planning, costs associated with underground electrical and communication service connections can range from $500-$1,000 per linear foot of installed service.

Gas

Existing Conditions
Based on the project ALTA survey, gas mains are located adjacent to the property site along South Forest Street and along Cheasty Boulevard South and South Winthrop Street. Refer to Figure 6-5.

Proposed Conditions
Based on the building locations associated with the SPUDS Concepts, it is anticipated that building gas services, if desired by the development, will originate from South Forest Street for the northwestern building and from Cheasty Boulevard South and South Winthrop Street for the southeastern building.

Concept-Level Cost Estimate
The costs associated with the gas services will need to be coordinated with Puget Sound Energy (PSE) during design, as PSE will be responsible for the design, permitting, and installation of the gas services from their mains to the building service meters.

7. SITE CIRCULATION RECOMMENDATIONS

Redevelopment of the site for transit-orientated development will require site roads and pathways to accommodate needs of residents, maintenance providers, and visitors.

At this stage of development, we recommend the following:

- Develop site circulation to meet existing and future utility provider access needs, including turning space needs for vehicles.
- Prioritize vehicle access to the site from South Forest Street.
- Prioritizing safe and quick pedestrian access from the regional light rail system to any future buildings.

Nearby Transportation Network

The site is located near heavily utilized principal arterials Rainier Avenue South and Martin Luther King Jr. Way South. It is south of South McClellan Street, a heavily used minor arterial. The site is adjacent to the Mount Baker Link light rail station, which runs north-south on the east side of the site, and is in proximity to the Mount Baker Transit Center located to the northeast at the intersection of South Forest Street and Rainier Avenue South. Interstate 5 access is just 1 mile west of the property via South McClellan Street and South Spokane Street.

Transportation options to the site include auto, bicycling, bus service, light rail service, and by foot. There are currently no protected bike lanes going to or near the site, but there are neighborhood streets with sidewalks leading to the site from 27th Avenue South.

Site Access Recommendations

Site redevelopment may include vehicle access to underground parking. Based on KPFF's experience with developments throughout the City of Seattle, preferred vehicle access may be from South Forest Street to the north, as this street is less developed and has less through traffic. An alternative site access point for fire or utility maintenance access, for example, may be from South Winthrop Street to the south.

Potential Transit Center Relocation onto Site

King County Metro, Seattle Department of Transportation, and Sound Transit have all expressed interest in providing better pedestrian, bicycling, and bus-to-light rail transfer connections to the Mount Baker light rail station for over a decade. A potential relocation of the King County Mount Baker Transit Center and layover to this site has been considered to facilitate safer pedestrian bus-to-light rail transfers. Possible use of part of the site for this purpose has been evaluated by the forementioned agencies, but has not advanced beyond high level planning efforts. Relocation of the transit center to the site is challenging from multiple perspectives, and co-locating bus transfer and layover space near a large affordable housing development with ground floor child-care and early learning uses warrants more investigation.

We understand there is still interest in potentially providing enhanced transit service through the eastern limits of the site by King County Metro and recommend future development take this possibility into consideration.

If space preservation is required for future transit projects within the site, we recommend an easement be provided to King County Metro.

8. ALTA SURVEY

An ALTA survey was completed in April 2022 for the site by Bush, Roed & Hitchings, a professional survey firm. The ALTA survey includes a detailed land parcel map, which highlights legally recorded existing easements, property boundaries, improvements of the property, utilities, and significant observations within the site.

The survey also details the surveyor's findings concerning the property boundaries and how they relate to the legal title. See Appendix B for ALTA survey.

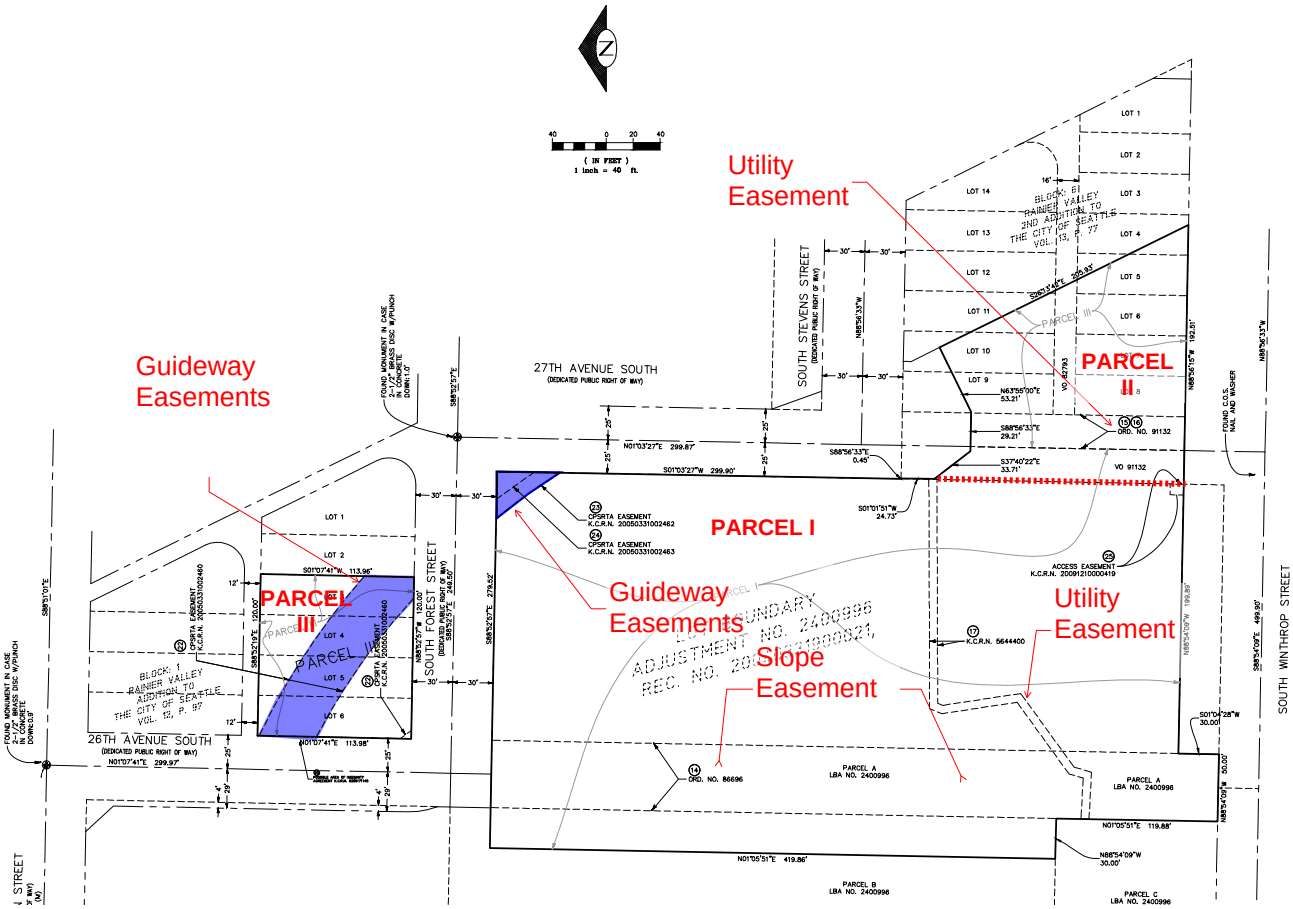

Figure 8-1: Key Easement Overview

(Note- See ALTA Survey for complete easement information)

Key Easements

Easements related to redevelopment potential on the site identified within the ALTA survey including:

- Utility easement for the City of Seattle, Parcels I and II.
- Side Sewer easement, 6 feet wide, Parcel 1.
- Guideway and access easements; Central Puget Sound Regional Transit Authority (CPSRTA), Parcel III and Parcel I
- University of Washington Permanent Access Easement.
- Slope easements

The University of Washington access easement noted above is likely no longer needed and we recommend eliminating the easement if possible.

Figure 8-1 above highlights guideway, utility and slope easements within the three study parcels.

Appendix A

Phase I and II Environmental Site Assessment Reports
and Geotechnical Feasibility Report

Attached Electronically

Appendix B

ALTA Survey

Attached Electronically