Feasibility Study Work Plan

BOEING KENT SPACE CENTER FACILITY

South 208th Street

KENT, WASHINGTON

August 2022

Prepared by:

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1.0 Introduction

This Feasibility Study Work Plan (FSWP) was prepared by Dalton, Olmsted, and Fuglevand (DOF) on behalf of the Boeing Company (Boeing). The Boeing Kent Space Center (Site) is located in Kent, Washington on approximately 121 acres bounded by South 208th Street to the south, 68th Avenue South to the east, South 199th Place to the north, and by 59th Place South and a large distribution center to the west as shown in Figure 1. The Washington State Department of Ecology (Ecology) facility site identification number is 2099 and the Cleanup Site Identification number is 12671.

As specified in Boeing's Agreed Order No. DE 12820 (AO; Ecology 2016) with the Washington State Department of Ecology (Ecology), Boeing completed a Revised Remedial Investigation Report (RI) to assess the nature and extent of contamination at the Site (DOF, 2022). For facilities where the results of the RI indicate a potential risk is present for human health and the environment, the Model Toxics Control Act (MTCA) regulations specify that a feasibility study (FS) must be conducted to identify appropriate remedial actions needed to control or mitigate the potential risks.

In a letter to Boeing in June 2022 (Ecology, 2022b), Ecology requested that Boeing:

- Prepare a focused FS on arsenic to evaluate a monitored natural attenuation remedy and environmental covenant; and
- Propose additional data collection in support of the FS related to arsenic present in groundwater at the Site.

This FSWP was prepared to document the planned approach for completing the FS and address data collection activities requested by Ecology after submittal of the RI and in preparation for completion of the FS. This FSWP documents the general approach and objectives that will be implemented to complete the FS. The RI report provides the basis for the FS. The FS will address arsenic in groundwater as the constituent of concern (COC), affected media, and migration pathways identified in the final RI report. The relevant site characterization data, remaining data needed to complete the FS, regulatory requirements, and the general approach planned for the FS are described in this FSWP.

1.1 Work Plan Organization

The FSWP is organized into the following sections:

- **Section 1.0 – Introduction.** This section presents a general overview of the Facility and describes the general document organization.
- **Section 2.0 – Background and Characterization Summary**. This section summarizes the information contained in the RI as it pertains to the FS.
- **Section 3.0** – **Remediation Considerations**. This section presents site-specific factors that may affect performance of the FS.
- **Section 4.0** – **Feasibility Study Scope and Objectives**. This section outlines the scope of the FS and defines the remediation objectives.
- **Section 5.0** – **Regulatory Requirements**. This section is an overview of the regulatory requirements related to this site and how those regulations will be considered in the FS.

- **Section 6.0** – **Remedial Technologies**. This section outlines the remedial technologies to be considered in the FS and the relevance of MTCA model remedies at this site.
- **Section 7.0 – Feasibility Study Methodology**. This section provides a general description of the methods that will be used to evaluate the remediation alternatives and select the preferred alternative.
- **Section 8.0 – Schedule and Reporting.** This section outlines the schedule for additional data collection, data reporting, and preparation of the FS.
- **Section 9.0 – References.**

2.0 Background and Characterization Summary

This section summarizes site information discussed in the 2022 RI Report and post-RI data gaps to be filled in advance of the FS.

2.1 Site Description

The Site occupies approximately 121 acres with 26 parcels of land; 13 of these parcels are currently owned by Boeing and operated by Boeing Defense, Space and Security. The remaining 13 parcels of land were sold by Boeing to Pacific Gateway (also referred to as Panattoni) in 2019. The current layout of the site is shown in Figure 1.

The Site is located in the Green River Valley. The Green River is located approximately 0.3 miles west of the Site. The average elevation of the Site is approximately 25 to 30 feet above mean sea level. Surface topography at and in the vicinity of the Site is generally level and slopes slightly toward the Green River to the west-northwest (USGS, 1995). The Site is zoned I1 for Industrial Business District and I2 for Mixed Industrial District (Figure 2).

The Site is currently operating under a Resource Conservation and Recovery Act (RCRA) interim-status permit issued by the US Environmental Protection Agency (EPA). Boeing seeks to remove the Facility from coverage under the permit and entered into the AO with Ecology, the administrator of the RCRA corrective action program, as part of that process. Work conducted under the AO is managed by the Boeing Remediation Group under project manager Todd Swoboda.

2.2 Site Geology and Hydrogeology

Geology at the site is consistent with conditions anticipated for this part of the Green River valley. The site is relatively flat and soil types are predominantly sand, sandy silts, and silt. Shallow groundwater is present at approximately 7 to 11 feet below ground surface and the elevation of the water table varies seasonally by several feet. Groundwater flows predominantly to the north, but flat, varying in flow direction from northwest to northeast with a slow groundwater flow rate measured between 30 and 70 feet per year.

Groundwater is not currently a source of drinking water at the site. Groundwater and stormwater at the site discharge to Mill Creek during the wet season and heavy precipitation events. Mill Creek discharges to the Green River approximately 3.5 miles north of the site. During the dry season, groundwater and stormwater at the site also discharge to an on-property detention pond which is constructed with restricted outflow catch basins. Mill Creek has been the focus of several historical studies that found it did not meet Surface Water Quality criteria under Washington Administrative Code (WAC)173-201A-200 that would be expected to support aquatic life, nor did it meet recreational use levels.

2.3 Nature and Extent of Contamination

Soil, soil vapor, ambient air, indoor air, groundwater, stormwater, and stormwater conveyance system sediment samples were collected as part of the RI and concurrent due diligence investigations. The majority of samples did not reveal concentrations above screening levels and no new sources of contamination were identified. The nature and extent of contamination at individual Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) were each investigated. Where releases or sources were identified, they have been addressed and the RI did not identify any instances of unaddressed contamination that presents an unacceptable risk to human health or the environment at any SWMU or AOC.

Arsenic concentrations in groundwater collected as part of this RI varied widely, from less than 2 to 266 µg/L. The highest concentrations are present, in general, at the shallowest depths of approximately 10-15 feet. No other COCs were identified for consideration in a FS. At the request of Ecology, Boeing will conduct a focused FS to evaluate a Monitored Natural Attenuation (MNA) remedy for arsenic in groundwater and an environmental covenant.

Boeing agreed to collect additional data in support of the FS to further evaluate the nature and extent of arsenic concentrations in groundwater and evaluate downgradient areas of anticipated arsenic re-adsorption, particularly and near stormwater management or surface water features. As discussed in the RI, dissolved arsenic concentrations likely correlate with total organic carbon (TOC), ferrous iron, and oxidation-reduction potential (ORP). Microbial degradation of TOC is likely responsible for establishing and maintaining reduction-oxidation (REDOX) conditions, which is conducive to the dissolution of arsenic and is present in the shallow groundwater of the Site.

As documented in the RI, the historical, pre-development agricultural land surface at the Site received airborne arsenic fallout from the ASARCO smelter. In addition, hydrocarbon releases have occurred in the past but affected soils have been remediated via source removal and do not appear to continue to drive groundwater REDOX. TOC in native soils likely promotes REDOX conditions in the shallow groundwater which allows native and ASARCO-plume arsenic in the soil to mobilize in shallow groundwater. These conditions result in variable dissolved arsenic concentrations across the Site and in the larger area. Ecology has recognized similar conditions in the Kent valley.

No specific arsenic releases have been identified at the Site via historical records review or site investigation.

In summary, the conceptual site model for arsenic at the Site shows:

- Arsenic is present in the Site soils at sporadic and variable concentrations and appears to be within the ranges of anthropogenic background values of regional and abutting areas.
- Soil and stormwater data do not indicate an arsenic release from operations of the KSC Site.
- Arsenic in shallow groundwater is mobilized due to anaerobic degradation of TOC, which favors the migration of dissolved arsenic as an uncharged hydroxy-complex in the trivalent (As^{3+}) form (Herath, et al, 2016).

- Geochemistry, particularly TOC and REDOX, are expected to have a large influence on the extent of elevated arsenic concentrations in groundwater and re-adsorption downgradient of higher concentration areas.
- Groundwater containing arsenic may discharge to surface water via storm water conveyances, or through groundwater discharge to surface water. However, surface waters are aerobic, unlike the anaerobic groundwater, and the trivalent form of arsenic will convert to As(V) oxidation state and form negatively charged hydroxyions, which are likely to adsorb to particulate matter and mineral surfaces (Herath, et al, 2016).

The results of the stormwater sampling performed as part of the RI support this model, as the concentrations in stormwater samples are orders of magnitude lower than those observed in groundwater. A United States Geological Survey (USGS) study of the Green River also supports the change in arsenic mobility due to the change in REDOX conditions from anaerobic groundwater to aerobic surface water. The bulk of arsenic loading to the Duwamish Waterway is attributable to downstream transport of particulate-bound arsenic during storm events (USGS, 2018).

2.4 Pre-Feasibility Study Data Collection

Ecology has determined that Boeing adequately evaluated all COCs except arsenic in groundwater and therefore requested additional data collection to support a focused FS on arsenic to evaluate a MNA remedy and environmental covenant for the Site (Ecology 2022a). Data collection will be conducted with the following emphasis:

1. Identify, to the extent practicable, the nature and extent of site-wide groundwater arsenic contamination and the downgradient location of arsenic re-adsorption zones, focusing on three areas:
    a. Area 1 – North of sampling locations LAI2, LAI3, and MW-1 to the north.
    b. Area 2 – North and northwest of MW-7.
    c. Area 3 – North of Building 18-62.
2. Evaluate the arsenic pathway in relationship with groundwater and surface water features by:
    a. Continuing to monitor the migration of groundwater contamination northwest toward the wetland area north of the NDP and City of Kent Storm Water Pond during dry seasons.
    b. Monitoring near and north of NDP, MW-8, -9, 11, 12 and downgradient of MW-10 to confirm that no groundwater contamination will migrate offsite.

To satisfy the data gaps emphasized, Boeing will conduct the following work:

- Install an additional five groundwater monitoring wells throughout the site (Figure 1).
- Conduct four quarters of groundwater monitoring events including water level measurements and groundwater sample collection for dissolved arsenic and TOC.

Figure 3 shows previous sampling locations for reference, and Figure 1 shows proposed new monitoring well locations.

2.4.1 Groundwater Monitoring Well Installation

Boeing proposes to install five additional groundwater monitoring wells to further evaluate site-wide groundwater geochemistry and its effect on dissolved arsenic concentrations and storm and surface water features. The additional groundwater monitoring wells provide a well network that will monitor throughout the Site, including in areas downgradient of historical hydrocarbon remediated soils. Two wells will be installed in the vicinity of previously decommissioned monitoring wells MW-2 and MW-3 along the eastern boundary of the site. An additional three wells will be installed in the emphasized areas identified above by Ecology in a February 2022 letter (Ecology, 2022a). Proposed locations are shown in Figure 1.

Wells will be constructed with 2-inch diameter PVC casings and well screens. Each well will be constructed with 5-ft screens set at a depth to intersect the groundwater table (previously encountered between 7 to 11 ft bgs). The groundwater monitoring wells will be constructed with hollow-stem auger drilling methods consistent with the well installation methodology previously used at the site and described in more detail in the Final RI Work Plan and Sampling and Analysis Plan (Landau, 2016).

During drilling, soil samples will be collected for inspection and geologic classification, and to document the shallow subsurface stratigraphy. Select soil samples from each of the new well locations will be submitted for the analysis of total organic carbon (TOC) and arsenic.

2.4.2 Groundwater Monitoring

Boeing proposes to conduct the following data collection activities, as summarized in Table 1:

- Measure water levels at all monitoring wells and staff gauges, and record the pond water level elevation for the City of Kent's neighboring stormwater pond across all seasons for one year to evaluate the groundwater flow direction and gradient.
- Collect groundwater samples on a quarterly basis for one year for laboratory analysis of dissolved arsenic and TOC.

The sampling outlined above will follow the methods outlined in Appendix A Sampling and Analysis Plan of the RI Workplan (Landau, 2016). Samples will be submitted for laboratory analysis to Analytical Resources Inc. in Tukwila, WA. and analyzed for dissolved arsenic and TOC.

2.4.3 Analytical Methods

Samples will be submitted for laboratory analysis to Analytical Resources Inc. and analyzed for dissolved arsenic and TOC. The analytical methods and anticipated reporting limits and detection limits for groundwater samples are listed in the Final Quality Assurance Project Plan (QAPP) in the Final RI Work Plan (Landau, 2016). Data management will similarly follow those described in the QAPP (Landau, 2016).

Other sample collection details including sample containers, sample labeling, and quality assurance measures will follow those described in Section 8 (Quality Assurance and Quality Control), Section 9 (Equipment Decontamination), and Section 10 (Residual Waste Management) of the Sampling and Analysis Plan (SAP) appended to the Final RI Work Plan (Landau, 2016), as well as the quality assurance protocols described in the site specific QAPP (Landau. 2016).

3.0 Remediation Considerations

The site conditions must be considered when developing and evaluating potential remediation alternatives. Geochemical conditions, site development, and controls in place and planned in the future will affect the approach to arsenic remediation.

3.1 Arsenic Geochemistry

As discussed in the RI, arsenic is a heavy metal that can easily be dissolved and transported in groundwater under reducing conditions known to be prevalent both at the Site and the greater Green River valley. As expected, dissolved arsenic correlates with TOC, ferrous iron, and ORP at the site because microbial degradation of TOC is likely responsible for establishing and maintaining reduction/oxidation (REDOX) conditions present in the shallow groundwater.

Dissolved oxygen readings less than 1.0 mg/L are indicative of anaerobic conditions and can be the result of microbial degradation of organic carbon. Dissolved oxygen readings at this Site are generally less than 1.0 mg/L and are considered anaerobic. The majority of higher arsenic concentrations detected in groundwater at the Site correspond to lower ORP values, as might be expected if anaerobic conditions are influencing arsenic concentrations.

Iron oxides containing arsenic can be dissolved in groundwater in the presence of TOC, whether from naturally occurring organic matter (as in the case of former wetlands) or from anthropogenic sources of organic carbon, such as agricultural land use or releases of total petroleum hydrocarbons (TPH). TOC measured in groundwater samples to date ranged from 2.5 mg/L to 66 mg/L. The RI found that arsenic is consistently found to be higher at locations where TOC was also higher at the Site.

Geochemistry, particularly TOC and REDOX, are expected to have a large influence on the extent of elevated arsenic concentrations in groundwater and re-adsorption downgradient of higher concentration areas.

3.2 Site Use

The Site is located in an industrial park, and local planning and zoning supports continued similar types of land use. Boeing sold approximately half of the property to another party in 2019 and that portion of the site is undergoing redevelopment as an industrial and business park. As part of the conditions of the partial property sale, Boeing filed Covenants, Conditions, and Restrictions (CCR) on the property that require the following:

- No sensitive land use (residential, school, daycare, hospital, assisted living, medical office, extended stay hotel) or agricultural use.
- No drinking water wells or other use of groundwater under the property.
- Provisions related to stormwater management and protection; severance of stormwater infrastructure between Sale and Retained Properties; and compliance with all applicable laws and permits.
- Soil over-excavation and vapor barriers are required for new buildings in the area of former industrial buildings 18-42 and 18-43; vapor intrusion evaluations are required for new buildings in other areas.
- Future Owners to take necessary steps to record and comply with restrictive covenants, institutional controls, and soil management plans if so required.

Similar controls are expected to be placed on the rest of the Site.

Groundwater is not currently a source of drinking water at the site but is interconnected to stormwater management features on and offsite. Stormwater detention facilities on and offsite influence groundwater flow direction in variable ways depending on intensity of storm events, seasonal groundwater elevations, and flow controls to discharge water bodies connected to these facilities.

3.3 Previous Site Remediation

As mentioned in Section 3.1, the presence of TOC, whether naturally occurring or from anthropogenic sources, may affect geochemistry that then influences observed concentrations of arsenic at the Site. Ecology noted their concern regarding the consideration of TPH as an anthropogenic source at the Site in their 2022 RI communications (Ecology, 2022a). With regards to these sources, several small releases occurred and cleanups have been completed at the Site to address those releases. No major unaddressed fuel or hydrocarbon releases are known to be present at the Site. Groundwater samples collected as part of the RI were frequently tested for TPH and found only lower-level detections of TPH remain at the Site.

4.0 Feasibility Study Scope and Objectives

In Ecology's 2022 RI communications (Ecology, 2022a) Ecology agreed that Boeing has adequately evaluated all COCs except arsenic in groundwater. Ecology concurred with Boeing that hydrocarbon releases from petroleum source areas may have contributed to groundwater REDOX condition changes and that elevated arsenic concentrations in groundwater could have resulted from changes in groundwater geochemistry. Boeing submitted the Revised RI to Ecology in July 2022 and acknowledged Ecology's request to conduct a FS to evaluate a MNA remedy for arsenic in groundwater.

As discussed in Ecology's June 2022 letter regarding the need for a FS, the scope of the FS will be limited to evaluating an MNA remedy and environmental covenant for the site since source removal of potential TPH sources has already been performed.

4.1 Remedial Action Objectives

To effectively develop and focus remediation alternatives, it is necessary to establish remediation objectives for the site. The overall remediation objective is to reduce the risks to human health and the environment resulting from arsenic in groundwater at the site to acceptable levels.

Specifically, the remediation objectives for the site include the following:

- Minimize infiltration and resultant leaching of arsenic to groundwater from the fill materials that may be a source of this COC.
- Prevent discharge of groundwater affected by arsenic at levels that may cause adverse effects to human health and the environment.

The remedial alternatives developed for the FS will be designed to attain these objectives.

5.0 Regulatory Requirements

Regulatory requirements for general and site-specific aspects that the FS will achieve are described in the following sections.

5.1 Applicable or Relevant and Appropriate Regulations

The FS will discuss compliance of the preferred remedial alternative with applicable or relevant and appropriate regulations (ARARs), including state and federal laws, in accordance with WAC 173-340-350, WAC 173-340-710.

Groundwater screening levels were developed in the RI Work Plan to be protective of drinking water and surface water and reviewed and updated in the RI (DOF, 2022).

5.2 MTCA Requirements

Regulations issued pursuant to MTCA specify the requirements for completing an FS and selecting a cleanup action. These requirements must be addressed in the FS. Each remedial alternative considered in the FS must be designed to comply with MTCA. These rules provide general requirements for both the FS and the remedial alternatives, specify procedures for establishing cleanup levels and points of compliance, and provide minimum requirements for establishing institutional controls and selecting the preferred cleanup actions.

5.2.1 General Requirements

In general, MTCA requires a FS to comply with applicable state and federal laws and regulations. WAC 173-340-350 (8) specifies the following general requirements and guidelines for conducting an FS:

- Alternatives considered in the FS must be protective of human health and the environment by addressing Site risks and exposure pathways.
- A reasonable number and type of alternatives must be considered in the FS.
- Alternatives may consist of several components, including removal/destruction technologies, containment or immobilization technologies, engineering controls, institutional controls, and monitoring.
- Alternatives may include remediation levels to define when cleanup action components will be used.
- If appropriate, residual risks that may remain after implementation of a remedial alternative must be considered.
- Remedial alternatives capable of attaining the standard point of compliance (POC) must be included in the FS unless it is demonstrated that all such alternatives cannot be implemented.
- Conditional POCs (CPOCs) may be included in remedial alternatives considered in the FS. CPOCs are allowed if it is not practicable to meet groundwater cleanup levels at the standard POC in a reasonable restoration timeframe.
- Alternatives must be evaluated relative to the criteria of WAC 173-340-360.
- At least one permanent cleanup action alternative must be considered unless permanent alternatives are determined to be impracticable or have disproportionate costs per WAC 173-340-350(8)(c)(ii)(B).

5.2.2 Cleanup Standards

MTCA regulations require that remedial action alternatives achieve cleanup standards. MTCA regulations establish three primary components for cleanup standards:

- Clean up levels (CULs) for constituents of concern;
- The point of compliance (POC) where these CULs must be met; and
- Other regulatory requirements that apply.

The FS will review and define the cleanup standards for arsenic in groundwater at the site.

5.3 Point of Compliance

To develop and evaluate cleanup alternatives in the FS, a POC must be defined. As defined in the MTCA regulations, the POC is the point or points at which CULs must be attained. Sites that achieve the cleanup standards at the point of compliance and comply with applicable state and federal laws are presumed to be protective of human health and the environment, as approved by Ecology. The POC or multiple POCs will be used in the FS for design and evaluation of potential remedial alternatives. After approval of the FS, the proposed final POC(s) will be incorporated into the Cleanup Action Plan (CAP) and final design for the cleanup alternative selected in the FS.

6.0 Remedial Technologies

As described in Ecology's June letter, the FS will be a focused FS that evaluates alternate MNA implementation approaches with complimentary institutional controls. Additional characterization will be completed prior to the FS, as discussed in Section 2, to support development of appropriate alternatives for MNA and institutional controls. These data will aid in developing the area(s) addressed in the FS. Alternative conditional points of compliance will be compared and evaluated with respect to restoration timeframe. Institutional controls will be assessed to control exposure during the restoration timeframe.

7.0 Feasibility Study Methodology

This section provides a general description of the methods that will be used to evaluate the remediation alternatives and select the preferred alternative. The alternatives developed for the FS will be evaluated relative to the criteria specified in the MTCA rules to select the preferred alternative. The following subsections summarize the MTCA evaluation criteria and describe how the criteria will be considered in the FS.

7.1 Human Health Impact Evaluation

The cleanup standards will be established in accordance with MTCA regulations and protective of human health. The cleanup alternatives to be developed and evaluated in the FS will be designed to attain cleanup levels at the POC. Each alternative will include institutional controls, as appropriate, to ensure that the alternative is protective of human health.

7.2 Environmental Impact Evaluation

Environmental impacts associated with the site are limited by site-specific conditions and site use. Potential environmental impacts will be evaluated by establishing cleanup standards in accordance with

MTCA requirements that are protective of the environment and ensuring that remedial alternatives will effectively limit the potential for environmental impact.

7.3 Cost Evaluation

Cost estimates will be prepared for each remedial alternative considered in the FS. These cost estimates (i.e., +30% to –50%) will be prepared using published cost estimating tables, empirical data, vendor information, and professional engineering judgment. The estimates will be based on conceptual designs prepared for each alternative. The accuracy of estimated costs for the different alternatives will be approximately the same. Contingencies will be included to cover incidental costs not specifically addressed in the estimates. The cost estimates will include initial implementation costs and recurring costs associated with maintenance and monitoring. The costs will include future costs for the estimated restoration time of the specific alternative or a maximum life of 30 years, whichever is less. Future costs will be included in the total alternative cost using present worth analysis.

7.4 Restoration Timeframe Evaluation

Each alternative presented in the FS will be evaluated as to whether it provides for a reasonable restoration timeframe, as required under the MTCA regulations. This includes consideration of risks and toxicity posed by the site, practicability, site use, institutional controls, ability to monitor, and natural attenuation.

7.5 Institutional Controls

Institutional controls will be developed in accordance with the requirements of WAC 173-340-360 (2)(e). Institutional controls will be clearly identified and described to develop fully protective remedial alternatives.

7.6 Preferred Alternative Selection

The MNA alternatives will be ranked to identify the baseline alternative in accordance with WAC 173-340-360 (3). Initially, the alternatives will be ranked from most to least protective. The highest ranked practicable alternative will be selected as the baseline alternative. The ranking to identify the baseline alternative will be based on the components of the remediation alternatives that address affected groundwater.

Remediation alternatives will be compared and evaluated to select the preferred alternative. The baseline alternative will be clearly identified and used as the basis of comparison for all other alternatives. Remediation alternatives will be evaluated in accordance with the criteria identified in the MTCA regulations, specifically WAC 173-340-360 (3)(f), as appropriate.

A quantitative and qualitative comparison will be used to compare the alternatives for practicability. The preferred MNA alternative will be selected in the FS report. Selection of the preferred alternative will be based on a comparison to the following criteria:

- Protectiveness and risk reduction
- Permanence
- Restoration time frame
- Cost

- Long-term effectiveness
- Management of short-term risks
- Technical and administrative implementability
- Consideration of public concerns

The costs and benefits for the alternatives will be assessed to evaluate any disproportionality of costs and benefits. A qualitative ranking of high, moderate, and low will be used to rank each alternative relative to most of these criteria. Cost will be compared quantitatively using present-worth cost estimates. The rationale for assigning the qualitative ranking will be presented in the FS report. The preferred alternative will be selected based on the overall qualitative and quantitative rank.

8.0 Schedule and Reporting

The current project schedule and plan for reporting is summarized below. Any deviations from this schedule will be approved by Ecology.

- The revised RI was submitted to Ecology in July 2022.
- Boeing prepared this draft FS Work Plan in response to Ecology's June 1, 2022 letter requesting submission within 90 days of that letter.
- Well installation and data collection will be scheduled upon approval of this work plan and based on driller availability. Boeing will notify Ecology of the date once established. Results of the data collection events will be validated and managed in the same manner as RI data (Landau, 2016).
- Ecology is currently drafting an AO amendment to include the requirement for preparation of the FS.
- Bimonthly reporting per the AO continues.
- Boeing will meet with Ecology, as needed, to discuss results prior to preparing the FS.
- Boeing will submit the draft FS after completion of the data collection described in this Work Plan and report findings by a mutually agreed upon date with Ecology.

Ecology is working to revise the AO to incorporate the finalized RI and subsequent FS requirement.

Groundwater monitoring well installation and subsequent sampling will be scheduled upon approval of this work plan and based on driller availability. Boeing will notify Ecology of the date once established. Results of the data collection events will be validated and managed in the same manner as other RI data and will be reported to Ecology as part of bimonthly reports (Landau, 2016). The data collected will be used to support the Feasibility Study and selected remedy.

9.0 References

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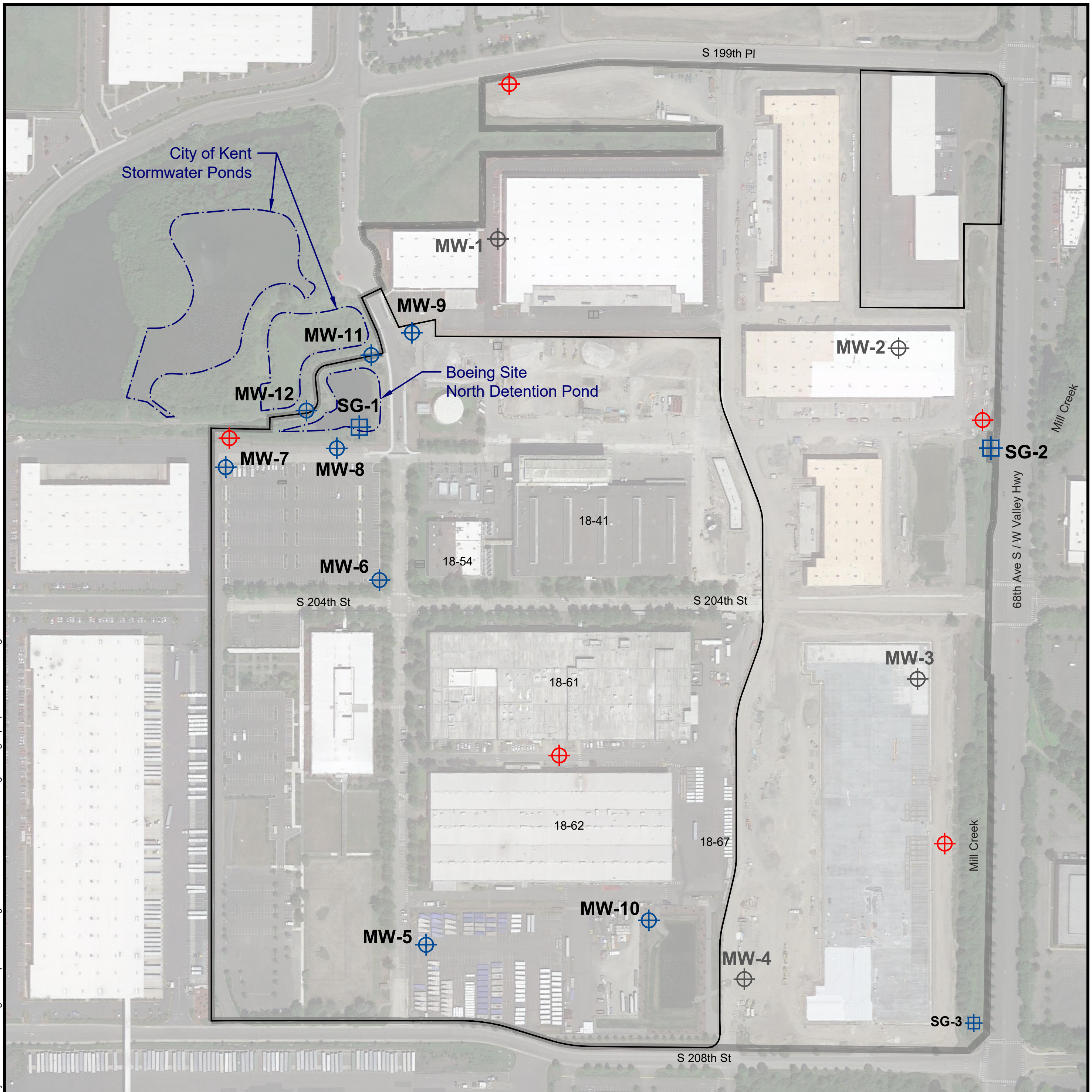
Figures



Legend

- Proposed Groundwater Monitoring Well
- MW-7 Groundwater Monitoring Well
- MW-3 Decommissioned Groundwater Monitoring Well
- SG-1 Staff Gauge
- Stormwater Feature
- Site Boundary
- Boeing Current Property Boundary

N

0 400
Scale in Feet

Boeing Space Center
Kent, Washington

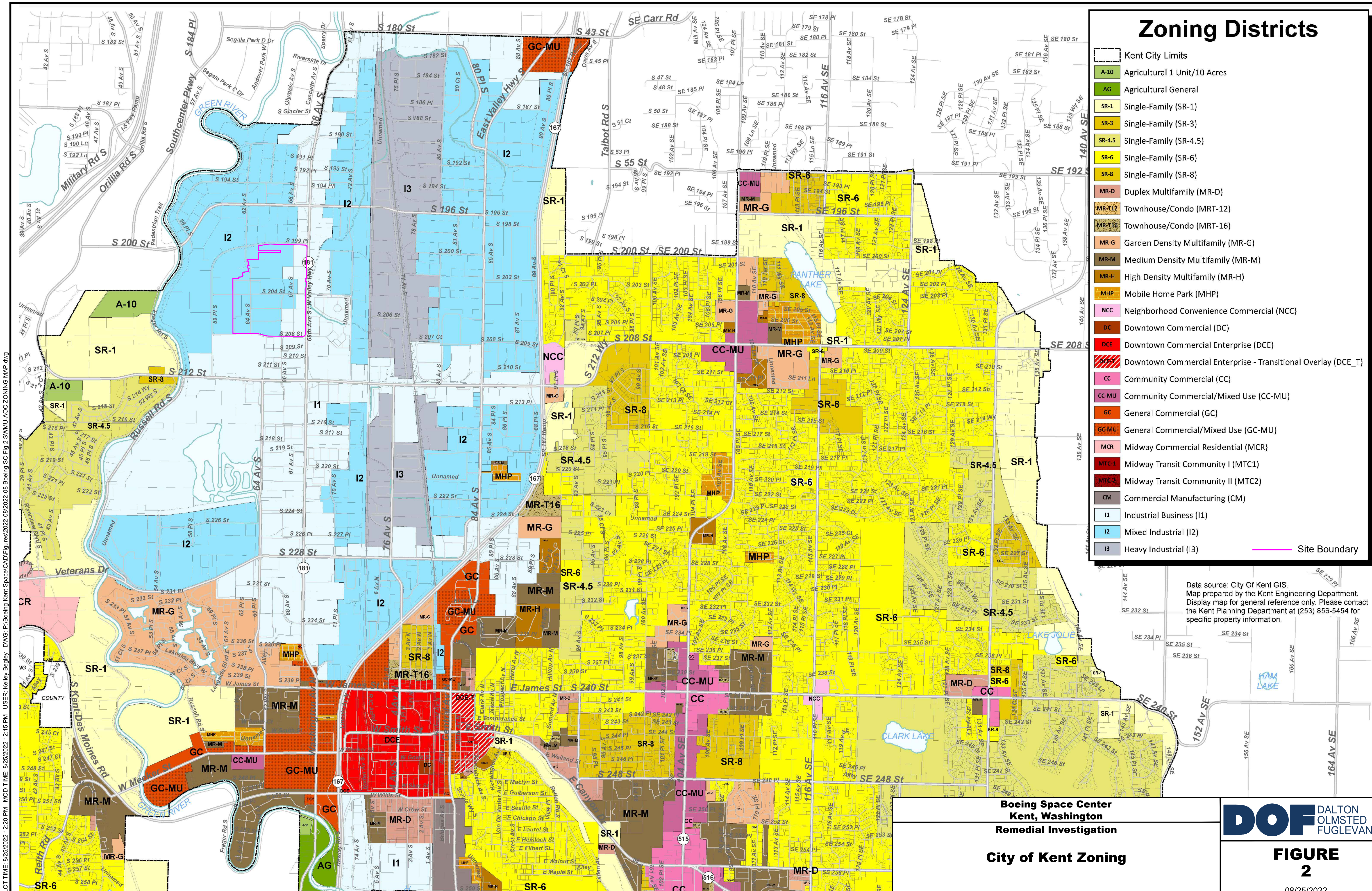
Feasibility Study Work Plan

Proposed Data Collection Locations

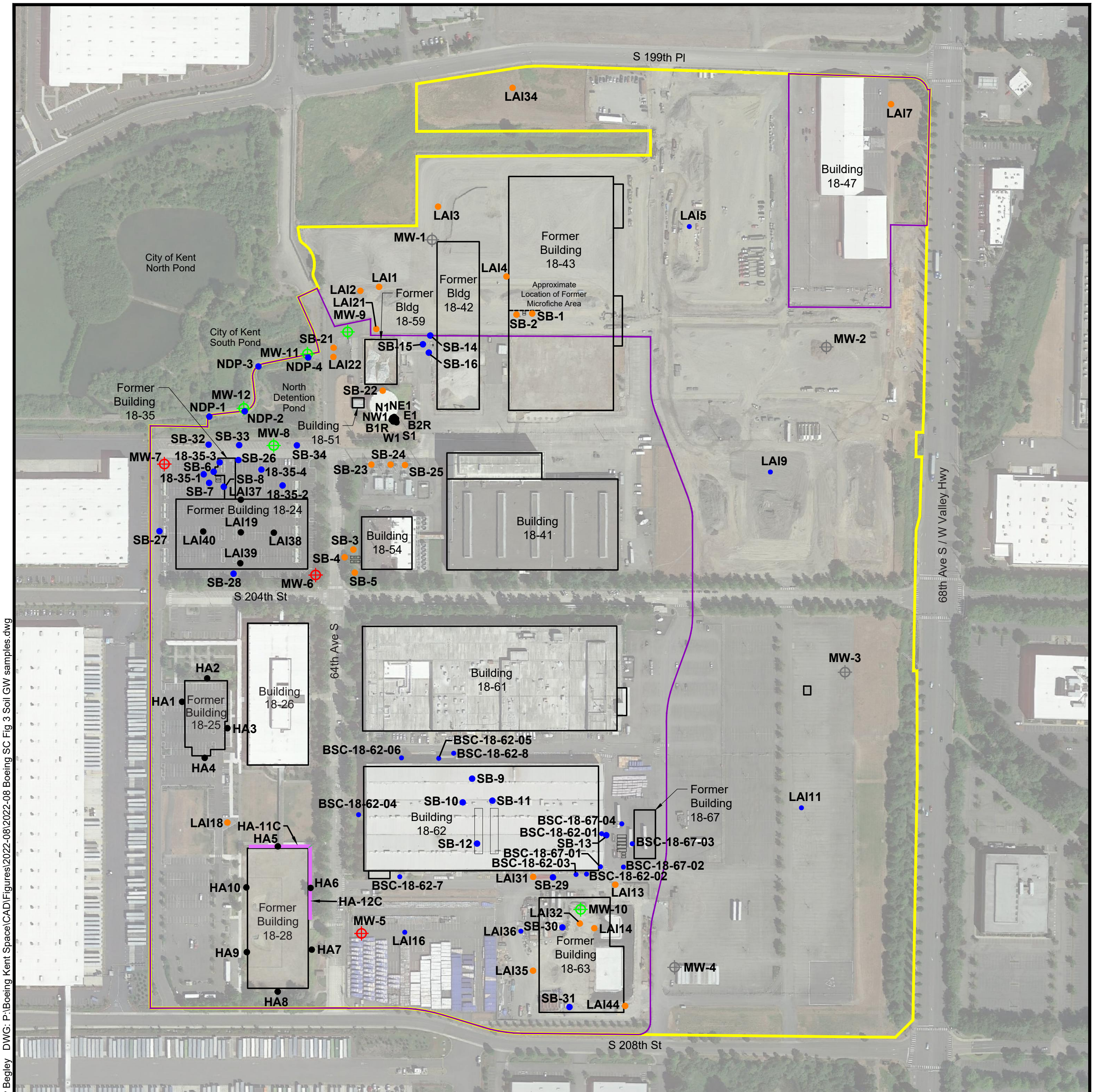
DOF DALTON OLMSTED FUGLEVAND

FIGURE 1

PLOT TIME: 8/25/2022 4:56 PM MOD TIME: 8/25/2022 4:54 PM USER: Kelley Begley DWG: P:\Boeing Kent Space\CAD\Figures\2022-08\2022-08 Boeing SC Fig 1 prop data collect.dwg



Zoning Districts
Kent City Limits
A-10 Agricultural 1 Unit/10 Acres
AG Agricultural General
SR-1 Single-Family (SR-1)
SR-3 Single-Family (SR-3)
SR-4.5 Single-Family (SR-4.5)
SR-6 Single-Family (SR-6)
SR-8 Single-Family (SR-8)
MR-D Duplex Multifamily (MR-D)
MR-T12 Townhouse/Condo (MRT-12)
MR-T16 Townhouse/Condo (MRT-16)
MR-G Garden Density Multifamily (MR-G)
MR-M Medium Density Multifamily (MR-M)
MR-H High Density Multifamily (MR-H)
MHP Mobile Home Park (MHP)
NCC Neighborhood Convenience Commercial (NCC)
DC Downtown Commercial (DC)
DCE Downtown Commercial Enterprise (DCE)
DCE-T Downtown Commercial Enterprise - Transitional Overlay (DCE_T)
CC Community Commercial (CC)
CC-MU Community Commercial/Mixed Use (CC-MU)
GC General Commercial (GC)
GC-MU General Commercial/Mixed Use (GC-MU)
MCR Midway Commercial Residential (MCR)
MTC-1 Midway Transit Community I (MTC1)
MTC-2 Midway Transit Community II (MTC2)
CM Commercial Manufacturing (CM)
I1 Industrial Business (I1)
I2 Mixed Industrial (I2)
I3 Heavy Industrial (I3)
Site Boundary
Data source: City Of Kent GIS.
Map prepared by the Kent Engineering Department.
Display map for general reference only. Please contact the Kent Planning Department at (253) 856-5454 for specific property information.
Boeing Space Center
Kent, Washington
Remedial Investigation
City of Kent Zoning
DOF DALTON OLMSTED FUGLEVAND
FIGURE
2
08/25/2022
PLOT TIME: 8/25/2022 12:20 PM MOD TIME: 8/25/2022 12:15 PM USER: Kelley Begley DWG: P:\Boeing Kent Space\CAD\Figures\2022-08\2022-08 Boeing SC Fig 2 SWMU-AOC ZONING MAP.dwg



LEGEND

- Soil Sample Only
- Monitoring Well Groundwater Sample Only
- Monitoring Well Soil and Groundwater Sample
- Monitoring Well-Abandoned
- Soil and Groundwater Sample
- Groundwater Sample Only
- Site Boundary
- Boeing Property

NOTES:

Locations with prefix "LAI", "BSC" or "18" predate were conducted prior to the RI or as part of property due diligence.

Historical pre-RI sampling points and building features are based on historical maps provided in the RI Work Plan.

Aerial Photography: Google Earth Pro, August 14, 2020.

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0 400
Scale in Feet

Boeing Space Center
Kent, Washington
Remedial Investigation

Soil and Groundwater Sample Locations

DOF DALTON OLMSTED FUGLEVAND

FIGURE 3

PLOT TIME: 8/25/2022 12:20 PM MOD TIME: 8/25/2022 12:11 PM USER: Kelley Begley DWG: P:\Boeing Kent Space\CAD\Figures\2022-08\2022-08 Boeing SC Fig 3 Soil GW samples.dwg

Tables

DALTON OLMSTED FUGLEVAND

Table 1
Proposed Pre-Feasibility Study Data Collection
Boeing Kent Space Center

Location	Water level	Dissolved Arsenic	TOC	Groundwater Quality Parameters	Notes
Analytical Method	--	EPA 200.8	EPA 9060A	Field Meter	
MW-1	--	--	--	--	well abandoned
MW-2	--	--	--	--	well abandoned
MW-3	--	--	--	--	well abandoned
MW-4	--	--	--	--	well abandoned
MW-5	X	X	--	X	well installed in 2017
MW-6	X	X	--	X	well installed in 2017
MW-7	X	X	--	X	well installed in 2017
MW-8	X	X	X	X	well installed in 2020
MW-9	X	X	X	X	well installed in 2020
MW10	X	X	X	X	well installed in 2020
MW-11	X	X	X	X	well installed in 2021
MW-12	X	X	X	X	well installed in 2021
MW-13	X	X*	X*	X	Proposed FS Data Gap Well
MW-14	X	X*	X*	X	Proposed FS Data Gap Well
MW-15	X	X*	X*	X	Proposed FS Data Gap Well
MW-16	X	X*	X*	X	Proposed FS Data Gap Well
MW-17	X	X*	X*	X	Proposed FS Data Gap Well
SG-1	X	--	--	--	NDP staff gauge
SG-2	X	--	--	--	Mill Creek staff gauge
SG-3	X	--	--	--	68th Ave S ditch staff gauge
NW Kent Pond	X	--	--	--	Kent Stormwater Pond north of NDP

Notes:
TOC = Total Organic Carbon
* = Select soil samples for TOC and arsenic during well installation
-- = not applicable