# Work Plan
# Geotechnical Exploration Program
# Bellevue Airfield Park Development
# (Former Eastgate Landfill)
# Bellevue, Washington

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Prepared for

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# FIGURES

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# 1.0 INTRODUCTION

This document presents Landau Associates' work plan for conducting a geotechnical exploration program for the proposed Bellevue Airfield Park (Park) development at the site of the former Eastgate Landfill in Bellevue, Washington (Figure 1). The proposed new public park when completed will include two synthetic turf athletic fields, restroom facilities, play and picnic areas, pedestrian trails, expansion and improvements to existing stormwater management facilities, and lighting and parking improvements.

A portion of the Park site overlies the closed Eastgate Landfill, which has environmental restrictions and ongoing monitoring requirements under the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) voluntary cleanup program (VCP) and an environmental covenant for the site (Ecology 2008).

The environmental covenant summarizes the following landfill management systems that exist on the property:

- Soil cap layer and hardscape areas
- Infiltration controls
- Leachate collection system
- Landfill gas migration control system
- Groundwater monitoring well network.

The environmental covenant prohibits activities that could adversely affect the existing landfill management systems without prior notice and approval from Ecology. Accordingly, this work plan has been prepared to: summarize the subsurface exploration program for the proposed Park development that will penetrate the soil cap at certain locations; describe how the soil and refuse encountered will be managed to prevent the release or exposure of potentially contaminated material to the environment; and describe how the explorations will be backfilled and how the soil cap will be restored.

## 1.1 Site Description

The proposed Bellevue Airfield Park is located adjacent to the I-90 Business Park in Bellevue, Washington (Figure 1). A master plan for the Park, entitled "Bellevue Airfield Park, Eastgate Area Properties Master Plan," was prepared in 2012 for the City of Bellevue Parks & Community Services Department by The Portico Group (The Portico Group 2012). The Eastgate Area Properties are comprised of three parcels totaling 27.21 acres within the Phantom Lake watershed. The City previously purchased portions of these properties from The Boeing Company (Boeing) and the Bellevue School District with the intent of developing an active-use community park. An access road (SE 30$^{th}$ PL, also referred to as the "Shared Entrance Road") has already been constructed along the southern side of the proposed Park as part of the Advanta Office Commons development.

The proposed Park site includes the former Eastgate Landfill, which was operated by King County as a municipal solid waste landfill and accepted household and demolition wastes from 1951 until it was closed and covered in 1964. The Bellevue Airfield runway was subsequently extended over the former landfill, and operated until 1983. After landfill closure, Cabot, Cabot & Forbes purchased property, including most of the landfill, and developed the I-90 Business Park. Boeing acquired portions of the former Eastgate Landfill property and adjacent properties in 1980 and 1983. The Boeing-owned property was partially developed by Boeing in the mid to late 1980s; however, no buildings have been constructed directly over the former landfill to date. Closure activities performed at the landfill by King County; Cabot, Cabot & Forbes; the City of Bellevue; or Boeing include landfill capping with a soil cover, groundwater monitoring, stormwater management, leachate collection, and landfill gas migration control (Landau Associates 2000). Leachate is collected on the north side of the landfill in a French drain that discharges to the King County sanitary sewer. Groundwater monitoring wells and landfill gas extraction and monitoring wells are located around the perimeter of the landfill. Monitoring well locations, the gas extraction system, the leachate collection system, and the approximate landfill area are shown on Figure 2.

In 2007 to 2008, the Advanta Office Commons development (including three buildings designated buildings A, B, and C, a parking garage, and the shared entrance road) was constructed by Schnitzer Northwest LLC (Schnitzer) adjacent to the southern end of the landfill. This resulted in construction of relatively low-permeability hardscape surfaces (asphalt roadways and parking areas) over a portion of the southern extent of the landfill.

## 1.2 Surface Conditions

The surface of the existing soil cap layer over the former Eastgate Landfill exhibits a generally hummocky topography with depressions and ridges that drain toward the stormwater collection systems and to stormwater detention Ponds A and C (shown on Figures 2 and 3). Elevations across the upper portions of the soil cap over the landfill range from 350 to about 335 ft (NAVD 1988). Vegetation across the former landfill typically consists of maintained grass and gravel pathways, with asphalt paved surfaces over the southern portion of the landfill associated with the shared entrance road, parking areas, and the former helicopter pad that is currently used as a basketball court. Along the northern face of the landfill, the site slopes moderately down to the north toward Pond A (the existing three cell stormwater detention pond), with elevations ranging from 340 to about 300 ft. A gravel path circles Pond A, which is located near the bottom of a generally flat north-south trending valley. Moderate to steep slopes covered with heavy vegetation bound the east and west side of the valley where Pond A is located. Existing site topography is illustrated on Figure 2.

## 1.3 Previous Subsurface Investigations

As part of developing this geotechnical exploration work plan for the proposed Park development, we reviewed the following reports and exploration logs:

- Groundwater Investigation, Former Eastgate Landfill, Bellevue, Washington, dated September 26, 2000, prepared by Landau Associates.
- Annual Groundwater Monitoring and Well Construction Detail Report, Former Eastgate Landfill, Bellevue, Washington, dated May 23, 2008, prepared by Landau Associates.
- Groundwater Monitoring Well Logs, dated 2007, prepared by SCS Engineers.
- Gas Probe Monitoring Well Logs, dated 2007, prepared by SCS Engineers.
- Closing Report, Geotechnical Services during Construction, Eastgate Landfill, Landfill Gas Collection System, Bellevue, Washington, dated October 29, 1986, prepared by GeoEngineers.
- Geotechnical and Environmental Studies, Bellevue Airport Site, Bellevue, Washington, dated May 28, 2002, prepared by AMEC Earth & Environmental.
- Report on Site Characterization Study, Portion of Boeing Eastgate Property, Bellevue, Washington, dated December 21, 2004, prepared by Golder Associates.
- Report, Geotechnical Engineering Services, Duct Bank Relocation, Boeing Eastgate Landfill, Bellevue, Washington, dated June 28, 2004, prepared by GeoEngineers.
- Eastgate Landfill Interim Status Report, dated April 22, 1986, prepared by Sweet, Edwards, & Associates.
- Eastgate Landfill Phase II Report, dated June 30, 1986, prepared by Sweet, Edwards, & Associates.
- Eastgate Landfill Summary Report, dated January 17, 1986, prepared by Sweet, Edwards, & Associates.
- Geotechnical Report, Parking Lot Subsidence Investigation, Boeing Computer Center, Bellevue, Washington, dated November 4, 1994, prepared by Converse Consultants NW.

Golder Associates carried out a geophysical study in 2004 on the southern boundary of the landfill area along the shared entrance road for the Advanta Office Commons development located to the south of the project site (Golder Associates 2004). Golder Associates conducted 6 induced polarization (IP) surveys and 10 electromagnetic (EM-31) surveys to define the limits of the landfill in that area. The approximate locations of these 2004 survey lines are shown on Figure 2.

As part of our current site investigation, Global Geophysics conducted a geophysical study across the closed landfill area between November 2015 and February 2016. Global Geophysics conducted 10 induced polarization (IP) surveys, 10 electromagnetic (EM-61) surveys, and 10 ground penetrating radar (GPR) surveys to help define the limits of the landfill across the site. The approximate locations of these recent survey lines are shown on Figure 2.

## 1.4 Subsurface Conditions

Based on previous studies, five geologic units have been identified at the site, in addition to the landfill solid waste materials. Previous reports have included borings for a variety of project and site features and have also included figures that show the relative position of the identified units. Approximate

locations of selected borings from past studies and site work are shown on Figure 2. The geologic units and landfill solid waste are summarized below in order of increasing depth from the ground surface.

- Soil Fill - soil fill overlies most of the developed areas of the site and also is present as the soil cap layer over the underlying landfill area. The soil fill generally consists of silty, fine to medium sand with occasional fine gravel. The thickness of the soil fill over the landfill solid waste was typically reported to vary from about 2 to 19 ft across the site.
- Landfill Solid Waste - the solid waste fill material below the surficial soil fill generally consists of a mixture of soil and municipal solid waste including brick, timber, asphalt, wood, paper, metal, plastic, glass and concrete. The solid waste was landfilled between 1951 and 1964 (Landau Associates 2000), so the putrescible portions of the waste would likely be in an advanced state of decay or not present. The solid waste material varies in thickness and was generally encountered to depths of about 2 to 42 ft below ground surface (bgs) across the site.
- Alluvium – alluvium underlies the fill materials, and is typically an unconsolidated silty fine sand with clayey silt interbeds that underlies the northern area and forms the upper side slopes of the former landfill. The maximum identified thickness of alluvium was 12 ft. The top of the alluvium is interpreted to be the pre-development ground surface.
- Glacial till – the glacial till is typically a very dense, silty sand containing variable amounts of fine to medium gravel and scattered cobbles. Glacial till was observed to be discontinuous at the site, generally below the southern bottom and side slopes of the landfill and, where encountered in borings, ranged from about 9 to 42 ft thick. It was not interpreted to be present in the vicinity of detention Pond A.
- Advance Outwash – advance outwash encountered below the glacial till and alluvium is typically a dense, slightly silty to silty, fine to medium sand with minor amounts of gravel. Silt lenses were commonly encountered within the advance outwash deposits. The maximum encountered thickness of advance outwash was greater than 37 ft.
- Lacustrine deposits – lacustrine deposits underlie the advance outwash unit and apparently becomes finer-grained with depth. The upper portion consists of interbedded sand and silt and the lower portion consists of silt interbedded with thinly laminated sand and silty sand. The lower limit of this unit is below the depth of exploratory borings advanced at the site to date.

The landfill is located within a glacially carved valley that trends north-south, and a glacial till layer underlies most of the former landfill. Two groundwater aquifers have been identified below the Site: a shallow perched aquifer in the solid waste and alluvial materials, and a deeper intermediate aquifer encountered in the advance outwash (advance outwash aquifer). Where the glacial till is present, it forms a confining layer above the advance outwash aquifer. The base of the advance outwash aquifer is likely confined by the lacustrine deposits. Groundwater in the advance outwash aquifer has a generally easterly flow in the vicinity of the landfill area. Groundwater in the perched aquifer generally follows the slope of the glacial till below the landfill along the base of the valley, which slopes to the north. Because the glacial till is not very permeable, perched groundwater likely flows north along the upper surface of the glacial till. The absence of the glacial till in some areas (e.g., at

the northern portion of the former landfill) may allow some groundwater in the shallow perched aquifer to migrate downward to the advance outwash aquifer (Landau Associates 2006, 2008).

# 2.0 GEOTECHNICAL FIELD EXPLORATION PROGRAM

In order to evaluate subsurface conditions for the geotechnical design of the proposed Park development (including structure foundations, light standard foundations, retaining walls, pavement design sections, settlement analysis, seismic design parameters, underground utilities, and earthwork), additional subsurface explorations are required. The following describes the planned activities for this geotechnical exploration program.

A health and safety plan for subsurface exploration activities will be prepared by Landau Associates prior to the start of field work. The geotechnical investigation will be coordinated and observed by a qualified geologist or geotechnical engineer from our staff. The geologist or geotechnical engineer will maintain a log of subsurface conditions encountered in the explorations, collect representative soil samples from the explorations, and transport the soil samples to our laboratory for further evaluation and testing. Field activities proposed for the geotechnical investigation will include:

- Complete an underground utility locate (1-800-424-5555 “Call before you Dig”) prior to the start of field explorations. In addition, LAI will be reviewing utility as-built drawings provided by the City to confirm that there are no potential conflicts with existing underground utilities. Exploration locations will be adjusted as necessary to avoid conflicts with existing underground utilities.
- Conduct a subsurface exploration program at the approximate locations shown on Figure 3. These locations will be staked in the field using hand-held global positioning system (GPS) equipment. The subsurface explorations will include:
  - Advancing 18 hollow-stem auger borings to characterize subsurface soil and groundwater conditions and obtain representative soil samples for geotechnical laboratory testing. The borings will be advanced by a qualified drilling contractor under subcontract to Landau Associates. Boring depths are anticipated to range from about 20 and 40 ft BGS. The borings will be advanced utilizing hollow-stem auger drilling techniques. Samples will be collected at 2½- and 5-ft intervals utilizing Standard Penetration Test (SPT) equipment and methods.
  - Excavating 15shallow test pits using a rubber-tired backhoe to depths ranging from about 3 to 5 ft BGS for pavement design purposes and to verify the horizontal limits of the landfill (as inferred by the recently completed geophysical survey)..
  - Advancing 9 hand auger borings in the wooded area in the northwest area of the park to support pavement and utility design for the proposed parking area and picnic shelters.
  - Representative disturbed soil samples will be collected from the subsurface explorations for further classification and physical testing. Groundwater levels, if encountered at the time of exploration, will be recorded on the exploration logs.
- Exploration equipment will be decontaminated between each boring and test pit that encounters refuse or other contaminated materials and prior to leaving the site.
- Upon completion of the subsurface explorations, the explorations will be backfilled and the surficial soil cap layer will be restored. The boreholes will be decommissioned in accordance

with Washington Administrative Code 173-160. Test pits will be backfilled using excavated soils placed in 12- to 18-inch loose lifts and tamped to a firm condition with the backhoe bucket (backfill soils will not be compacted to any specified density). Hand auger borings will be backfilled with excavated soils and tamped with a steel rod or hand compactor. At exploration locations that penetrate the existing soil cap layer over the closed landfill area, care will be taken to segregate a sufficient quantity of surficial soil cap material so that it can be reused to restore at least the upper 18- to 24-inch of the soil cap. Disturbed areas will be restored and reseeded as appropriate.

- Investigation-derived wastes will be temporarily stored in 55-gallon drums. The drums will be stored at a designated location on the site as shown on Figure 3. Each drum will be labeled with the project name, Landau Associates' field representative name, accumulation date, and boring(s) from which the soil cuttings were generated. Upon completion of the drilling, the waste soils will be characterized and profiled for offsite landfill disposal, and will be subsequently removed from the site and disposed by a waste soil handling firm working under subcontract to Landau Associates. Decontamination water will be disposed via discharge to an onsite sanitary sewer manhole.

No piezometers or groundwater monitoring wells will be installed as part of the current geotechnical exploration program.

# 3.0 GEOTECHNICAL LABORATORY TESTING

Geotechnical laboratory testing will be conducted on selected soil samples to determine pertinent physical and engineering properties of the subsurface soil encountered. The following summarizes the planned geotechnical laboratory testing program.

- Laboratory testing completed in Landau Associates' soils laboratory will include visual and textural examination, moisture content determinations (ASTM D-2216), grain size analyses (ASTM D-422) and/or Atterberg limits testing (ASTM D-4318).
- Additional geotechnical laboratory testing may be required upon visual examination of the collected soil samples, including soil shear strength and permeability testing.

# 4.0 USE OF THIS WORK PLAN

This geotechnical exploration work plan has been prepared for the exclusive use of Walker Macy, the City of Bellevue, and Ecology for specific application to the proposed Bellevue Airfield Park development at the site of the former Eastgate Landfill in Bellevue, Washington. No other party is entitled to rely on the information included in this document without the express written consent of Landau Associates. Further, the reuse of information provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff.

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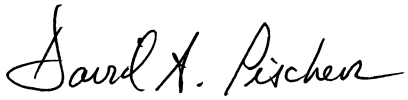

David A. Pischer, PE
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CE/KWW/DAP/rgm

# 5.0 REFERENCES

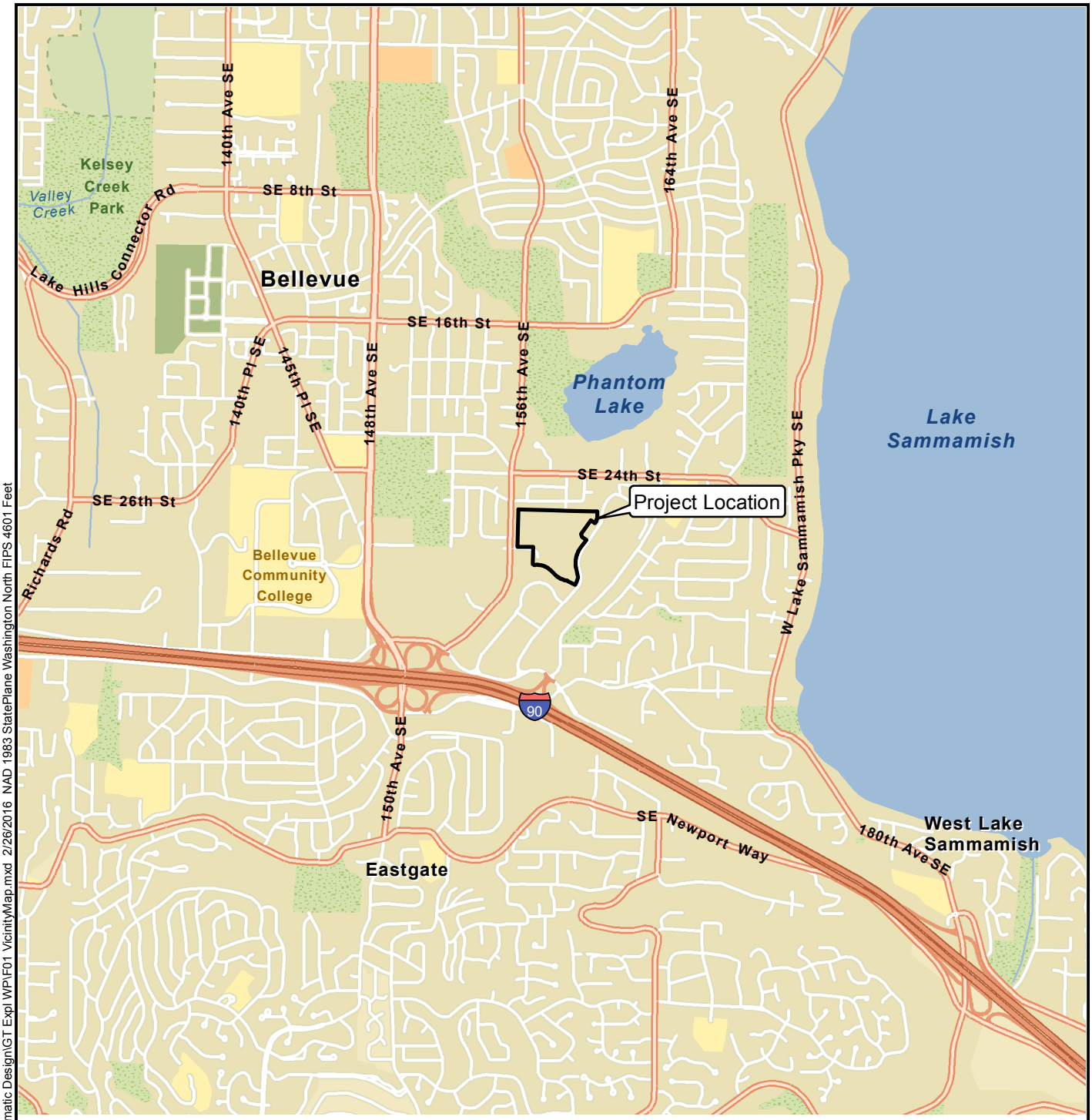
Golder Associates, Inc. 2004. *Report on Site Characterization Study, Portion of Boeing Eastgate Property, Bellevue, Washington.* December 21.

Landau Associates. 2008. *Annual Groundwater Monitoring and Well Construction Detail Report, Former Eastgate Landfill, Bellevue, Washington.* Prepared for The Boeing Company. May 23.

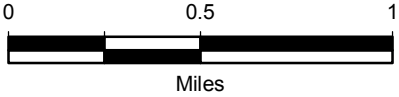
Landau Associates. 2006. *Further Action Groundwater Monitoring Work Plan.* December 14.

Landau Associates. 2000. *Engineered Systems Report, Former Eastgate Landfill, Bellevue, Washington*. September 26.

The Portico Group. 2012. *Bellevue Airfield Park, Eastgate Area Properties Master Plan.*









Data Source: Esri 2012

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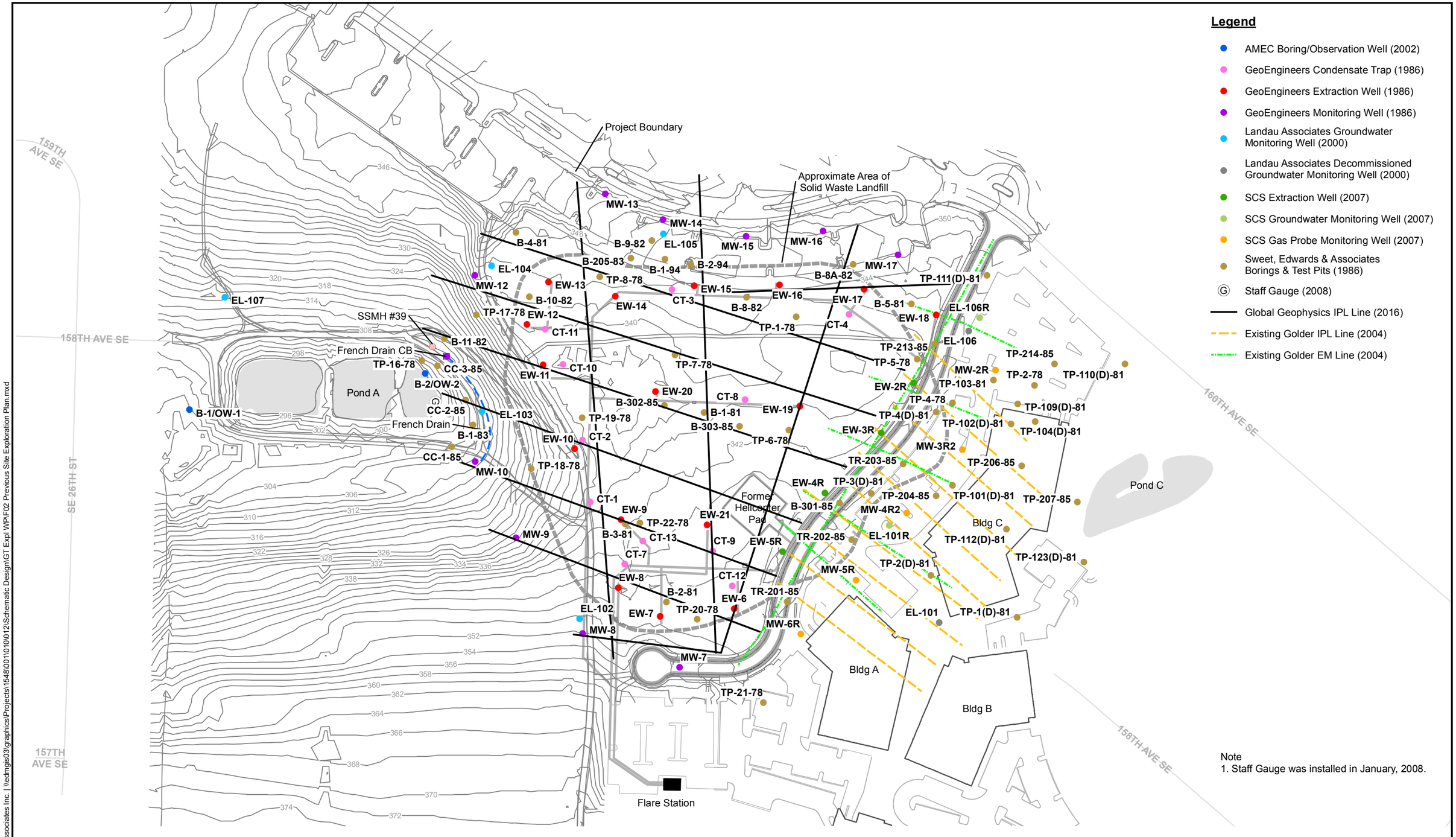
| Bellevue Airfield Park<br>Bellevue, Washington | **Vicinity Map** | Figure<br>1 |




## Legend

- AMEC Boring/Observation Well (2002)
- GeoEngineers Condensate Trap (1986)
- GeoEngineers Extraction Well (1986)
- GeoEngineers Monitoring Well (1986)
- Landau Associates Groundwater Monitoring Well (2000)
- Landau Associates Decommissioned Groundwater Monitoring Well (2000)
- SCS Extraction Well (2007)
- SCS Groundwater Monitoring Well (2007)
- SCS Gas Probe Monitoring Well (2007)
- Sweet, Edwards & Associates Borings & Test Pits (1986)
- Ⓖ Staff Gauge (2008)
- Global Geophysics IPL Line (2016)
- Existing Golder IPL Line (2004)
- Existing Golder EM Line (2004)

Note
1. Staff Gauge was installed in January, 2008.

*Sources: City of Bellevue Topographic Survey 2011; Golder Associates Geophysical Survey 2004, Global Geophysics 2016*

Landau Associates Inc. | \\edmgis03\graphics\Projects\154800\10\0012\Schematic Design\GT Expl WP\F02 Previous Site Exploration Plan.mxd

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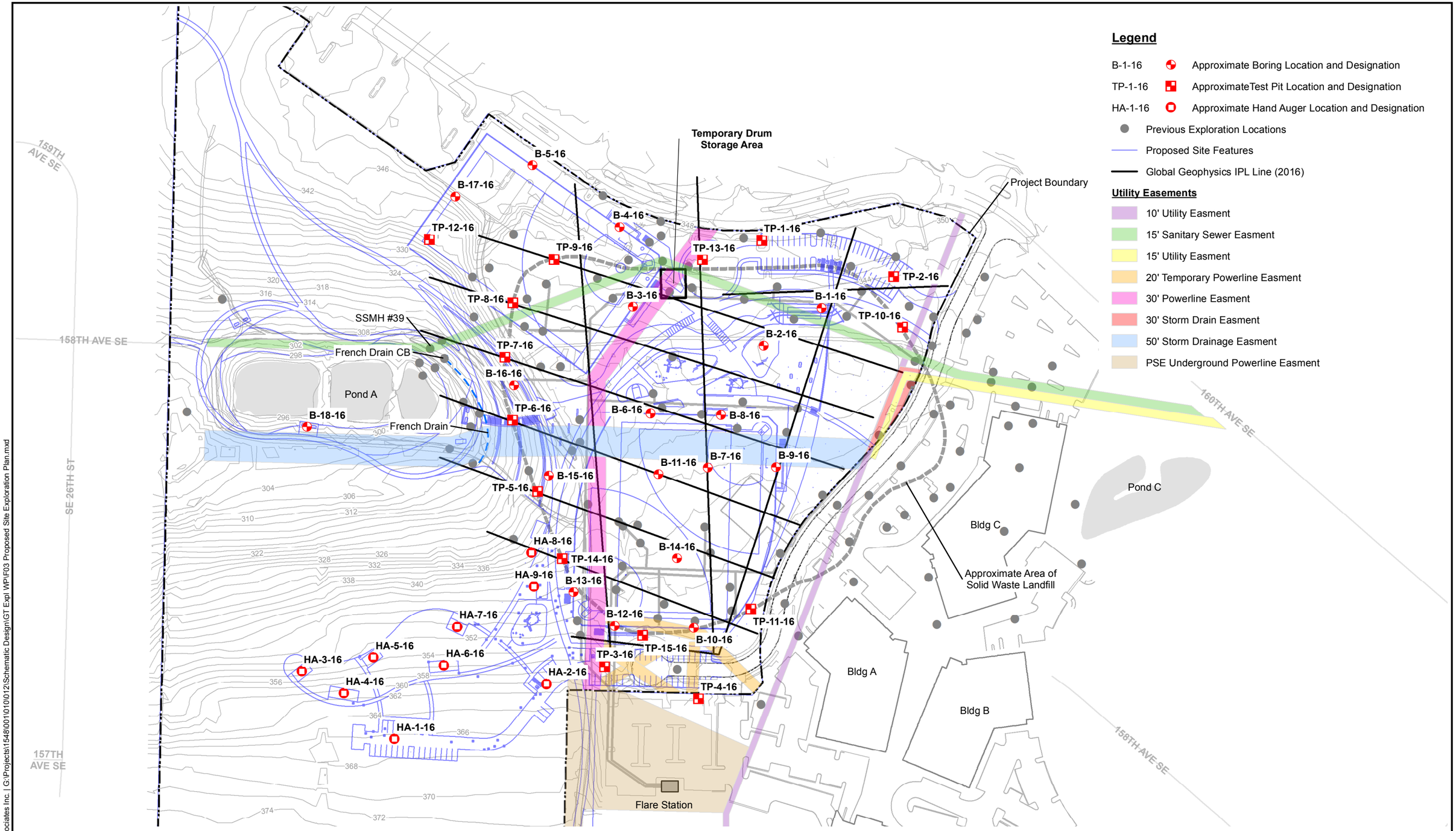
| Bellevue Airfield Park<br>Bellevue, Washington | **Previous Site Exploration Plan** | Figure<br>2 |




Sources: City of Bellevue Topographic Survey 2011; Golder Associates Geophysical Survey 2004, Global Geophysics 2016

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| Bellevue Airfield Park<br>Bellevue, Washington | **Proposed Site Exploration Plan** | Figure<br>3 |

Landau Associates Inc. | G:\Projects\1548\001\010\012\Schematic Design\GT Expl WP\F03 Proposed Site Exploration Plan.mxd