

ADDENDUM NO. 1

To the Contract Provisions for
CITY OF ARLINGTON, WASHINGTON

Airport Blvd Phase 1A

PROJECT NO P02.342

May 16, 2012

To the attention of all bidders for the above project:

The following addition(s), revision(s), and /or modifications(s) are made to the Drawings, Contract Documents, Specifications, and previous Addenda for this project:

ATTACHMENTS

1. Bid Schedule
2. Geotechnical Report

GENERAL INFORMATION:

1. Bids are due 2:00 pm on May 24, 2012
2. Bidders shall pay particular attention to the affirmative action and DBE requirements of Section 1-07.11 in the special provisions and the instructions to bidders. Required DBE documentation shall be submitted with proposal package at the time and date stated in the Contract Documents. Failure to include all required documentation shall result in bid being non responsive.

PROJECT MANUAL

Part II – Bid Proposal

Page II-7, Replace Bid Schedule in its entirety

Part VI – Special Provisions

Page VI-1, Delete Section “Description of Additive Alternates” in its entirety.

Page VI-19, Section 1-02.6 is supplemented with the following:

(March 13, 1995)

Alternative Bids

The bidding proposal on this project permits the bidder to submit a bid on one or more alternatives for the construction of the project.

Bid Proposal

The bid proposal is composed of the following parts: Base Bid and Alternatives *** A1, A2, and A3 ***

The base bid includes all items that do not change as to quantity, dimension, or type of construction, regardless of which alternative is bid.

The Alternative portions of the bid proposal contain all items which change as to quantity, dimension, or construction method, depending on which alternative is bid.

Alternative A1

Alternative A1 shall include all labor and materials required to construct the following asphalt overlay from Station 21+00 to 40+48:

1. Longitudinal asphalt plane along existing curb line for a width of 6-ft. Planing shall have 2-in depth at curblines and taper to 0" at 6-ft limit.
2. Transverse asphalt plane at Station 21+00 for a width of 20-ft.
3. 2-in asphalt overlay of existing asphalt placed prior to placement of adjacent new asphalt.
4. Raise road profile shown in plan set by 2-in
5. Reset all structures to grade

The bid items for Alternative A1 are as listed in the bid proposal.

Alternative A2

Alternative A2 shall include all labor and materials required to install the concrete curb and gutter.

The bid items for Alternative A2 are as listed in the bid proposal.

Alternative A3

Alternative A3 shall include all labor and materials required to install landscape planting shown on landscape plans.

All labor and materials required to install soil associated with rain gardens shall be included in the base bid.

The bid items for Alternative A3 are as listed in the bid proposal.

Bidding Procedures

The bidder shall submit a price on each and every item of work included in the base bid. The bidder shall also submit prices on each and every item under the alternative on which the bidder chooses to bid, or, if the bidder chooses to bid on more than one alternative, the bidder shall submit prices for each and every item under each alternative chosen.

The successful bidder will be determined by the lowest total of an alternative plus the base bid. Award will be based on the lowest total subject to the requirements of Section 1-03.

Page VI-79, Replace first paragraph of Section 2-03.3(7) with the following:

Clean surplus soil material may be disposed of within the Contracting Agency furnished site, as detailed on the plans. For informational purposes the maximum capacity of this site is 5000 cubic yards, neat line measurement. Non-soil material shall be disposed of legally at a contractor's provided site.

Page VI-84, Bioretention Soil Mix

Replace "Materials" with the following:

- Topsoil Type B
- Fine Compost
- 300 cy of compost provided by the City

PLANS

Sheet C3.0, Station 21+00

Add Stabilized Construction Entrance per WSDOT Standard Plan I-80.10-01

Sheet C3.3

Delete wheel wash detail in its entirety

Sheet C3.2

Delete wheel wash

QUESTIONS

Q1: Bid Items 209 and 210 call the water service connections as 1" while the Special Provisions on page VI-24 and COA Std Detail W-050 call the water service connections 2". What size is correct?

A1: Bid Schedule has been updated to reflect 2" service connections.

Q2: On page VI-47, it states the DBE Condition of Award Goal is 14%. Does the 14% Goal need to be obtained for each total on the proposal form, or just preference 3?

A2: The 14% goal applies to the total contract awarded to lowest bidder, whether it includes just base bid or base bid plus alternates. Bidders can distribute DBE participation how they see fit, so long as total participation meets 14% of contract awarded.

Q3: On page VI-79 under disposal of surplus material it states "Surplus materials may be disposed of within the Contracting Agency furnished site as detailed in the plans. Then on sheet C1.0 it states "Contractor may dispose of surplus soil material on airport property, as directed by the city." Where is the dispose site in relation to the project site?

A3: Surplus soil material will be distributed within the Airport Business Park plat area shown on Sheet C1.0, and shown as Phase 1, 2, & 3 (NIC). Exact area will be coordinated during construction. Non-soil material will be disposed of legally at a contractor provided disposal site.

Q4: On page VI-84 under Bioretention Soil Mix Materials, it states "compost material provided by the city." Is the city providing the compost material to the project or will the contractor need to include haul? If needing to include haul, where is the compost material pickup in relation to the project site?

A4: They City will provide 300 cy of compost material and deliver to site. Bidder shall provide quantity of compost material as stated in revised Bid Schedule.

This ADDENDUM is to be considered as much a part of the Contract Documents as if it were included in the body of the plans and specifications, and will be incorporated in and made a part of the contract when awarded and when formally executed.

The Bidder shall acknowledge this addendum in writing, under Addenda on page II-8 of the Proposal Form, in order for its bid to be considered responsive.



May 16, 2012

Project Manager

Date

END OF ADDENDUM NO. 1

Base Bid Schedule - Roadway

**City of Arlington
Airport Blvd Phase 1A**

NOTE: All entries must be typed or written in ink. Unit prices for all items, all extensions, lump sum prices, and the total amount of bid must be shown. Show unit prices in both words and figures; where conflicts occur, the written words will take precedence and be used to determine the total amount bid. The total bid amount shall include all work as included in the contract documents and applicable tax.

Item No.	DESCRIPTION	WSDOT Standard Item No.	WSDOT Spec Ref Sect	Approx. Quantity	UNIT	Unit Price	Total Price
	PREPARATION						
101	MOBILIZATION (Unit Price in Words) _____	0001	1-09.7	1	L.S.	\$	\$
102	REMOVAL OF STRUCTURE AND OBSTRUCTION (Unit Price in Words) _____	0050	2-02.5	1	L.S.	\$	\$
103	REMOVING ASPHALT CONC. PAVEMENT (Unit Price in Words) _____	0120	GSP	310	S.Y.	\$	\$
104	CLEARING AND GRUBBING (Unit Price in Words) _____	0025	2-01.5	4.0	ACRE	\$	\$
105	SAWCUT EXISTING PAVEMENT (Unit Price in Words) _____	---	SP	2124	L.F.	\$	\$
	EROSION CONTROL AND ROADSIDE RESTORATION						
107	WATTLE (Unit Price in Words) _____	6479	8-01.5	2400	L.F.	\$	\$
108	INLET PROTECTION (Unit Price in Words) _____	6471	8-01.5	14	EACH	\$	\$
109	STABILIZED CONSTRUCTION ENTRANCE (Unit Price in Words) _____	6468	8-01.5	170	S.Y.	\$	\$
110	EROSION/WATER POLLUTION CONTROL (Unit Price in Words) _____	6490	8-01.5	1	EST.	\$	\$
111	SEEDING AND FERTILIZING (Unit Price in Words) _____	6412	8-01.5	1.1	ACRE	\$	\$
112	FINE COMPOST (Unit Price in Words) _____	6447	8-01.5	500	C.Y.	\$	\$
113	TOPSOIL TYPE B (Unit Price in Words) _____	6410	8-01.5	1,110	C.Y.	\$	\$
114	BIORETENTION SOIL MIX (Unit Price in Words) _____	--	GSP	1,770	C.Y.	\$	\$
	GRADING						
115	ROADWAY EXCAVATION INCL. HAUL (Unit Price in Words) _____	0310	2-03.5	3780	C.Y.	\$	\$
	SURFACING						
116	CRUSHED SURFACING BASE COURSE (Unit Price in Words) _____	5100	4-04.5	5982	TON	\$	\$
117	CRUSHED SURFACING TOP COURSE (Unit Price in Words) _____	5120	4-04.5	322	TON	\$	\$
118	QUARRY SPALLS (Unit Price in Words) _____	1086	4-04.5	1462	TON	\$	\$
	HOT MIX ASPHALT						
119	LONGITUDINAL JOINT SEAL (Unit Price in Words) _____	6514	5-04.5	1988	L.F.	\$	\$
120	HMA FOR PAVEMENT CL. 1/2 IN. PG 64-22 (Unit Price in Words) _____	5739	5-04.5	2928	TON	\$	\$

Base Bid Schedule - Roadway

City of Arlington Airport Blvd Phase 1A

NOTE: All entries must be typed or written in ink. Unit prices for all items, all extensions, lump sum prices, and the total amount of bid must be shown. Show unit prices in both words and figures; where conflicts occur, the written words will take precedence and be used to determine the total amount bid. The total bid amount shall include all work as included in the contract documents and applicable tax.

Item No.	DESCRIPTION	WSDOT Standard Item No.	WSDOT Spec Ref Sect	Approx. Quantity	UNIT	Unit Price	Total Price
	TRAFFIC						
121	PAINT LINE (Unit Price in Words) _____	6806	8-22.5	14100	L.F.	\$	\$
122	PLASTIC CROSSWALK LINE (Unit Price in Words) _____	6857	8-22.5 SP	1440	S.F.	\$	\$
123	PLASTIC STOP LINE (Unit Price in Words) _____	6859	8-22.5	26	L.F.	\$	\$
124	PLASTIC TRAFFIC ARROW (Unit Price in Words) _____	6833	8-22.5	18	EACH	\$	\$
125	PLASTIC BICYCLE LANE SYMBOL (Unit Price in Words) _____	6867	8-22.5	21	EACH	\$	\$
126	PERMANENT SIGNING (Unit Price in Words) _____	6890	8-21.5	1	L.S.	\$	\$
127	PROJECT TEMPORARY TRAFFIC CONTROL (Unit Price in Words) _____	6971	1-10.5	1	L.S.	\$	\$
	OTHER						
128	ROADWAY SURVEYING (Unit Price in Words) _____	7038	7-05.5	1	L.S.	\$	\$
129	MONUMENT CASE AND COVER (Unit Price in Words) _____	7045	8-13.5	5	EACH	\$	\$
130	CEMENT CONC. SIDEWALK (Unit Price in Words) _____	7055	8-14.5	3125	S.Y.	\$	\$
131	CEMENT CONC. CURB RAMP TYPE COMBINATION (Unit Price in Words) _____	7058	8-14.5	7	EACH	\$	\$
132	CEMENT CONC. CURB RAMP TYPE PARALLEL (Unit Price in Words) _____	7058	8-14.5	1	EACH	\$	\$
133	TRIMMING AND CLEANUP (Unit Price in Words) _____	7490	2-11.5	1	L.S.	\$	\$
134	CONSTRUCTION GEOTEXTILE FOR UNDERGROUND DRAINAGE (Unit Price in Words) _____	7550	7-04	5170	S.Y.	\$	\$
135	UNFORSEEN CONDITIONS FORCE ACCOUNT (Unit Price in Words) _____	7715	1-09.6	1	EST.	\$ 20,000.00	\$ 20,000.00
136	REIMBURSEMENT FOR THIRD PARTY DAMAGE (Unit Price in Words) _____	7725	1-07.13(4)	1	EST.	\$ 500.00	\$ 500.00
137	SPCC PLAN (Unit Price in Words) _____	7736	1-07.15(1)	1	L.S.	\$	\$
138	RECORD DRAWINGS (Unit Price in Words) _____	-	GSP, 1-05	1	L.S.		
139	TYPE B PROGRESS SCHEDULE (Unit Price in Words) _____	7003	1-08.3, SP	1	L.S.	\$	\$
TOTAL ROADWAY BASE BID							

Base Bid Schedule - Utilities

**City of Arlington
Airport Blvd Phase 1A**

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Item No.	DESCRIPTION	WSDOT Standard Item No.	WSDOT Spec Ref Sect	Approx. Quantity	UNIT	Unit Price	Total Price
PREPARATION							
201	MOBILIZATION (Unit Price in Words) _____	0001	1-09.7	1	L.S.	\$	\$
202	REMOVAL OF STRUCTURE AND OBSTRUCTION (Unit Price in Words) _____	0050	2-02.5	1	L.S.	\$	\$
WATER							
203	HYDRANT ASSEMBLY (Unit Price in Words) _____	3846	7-14.5	2	EACH	\$	\$
204	RESETTING EXISTING HYDRANTS (Unit Price in Words) _____	3848	7-14.5	11	EACH	\$	\$
205	DUCTILE IRON PIPE FOR WATER MAIN 6 IN. DIAM. (Unit Price in Words) _____	3866	7-09.5	20	L.F.	\$	\$
206	DUCTILE IRON PIPE FOR WATER MAIN 8 IN. DIAM. (Unit Price in Words) _____	3867	7-09.5	166	L.F.	\$	\$
207	GATE VALVE 6 IN. (Unit Price in Words) _____	6155	7-12.5	2	EACH	\$	\$
208	GATE VALVE 8 IN. (Unit Price in Words) _____	6160	7-12.5	6	EACH	\$	\$
209	WATER SERVICE CONNECTION 2 IN. DIAM. (>30') (Unit Price in Words) _____	3858	7-15.5, GSF	1	EACH	\$	\$
210	WATER SERVICE CONNECTION 2 IN. DIAM. (<30') (Unit Price in Words) _____	3858	7-15.5, GSF	12	EACH	\$	\$
SEWER							
211	CONNECTION TO DRAINAGE STRUCTURE (Unit Price in Words) _____	9605	7-05.5	2	EACH	\$	\$
212	PVC SANITARY SEWER PIPE 6 IN. DIAM. (Unit Price in Words) _____	3766	7-17.5	790	L.F.	\$	\$
213	PVC SANITARY SEWER PIPE 8 IN. DIAM. (Unit Price in Words) _____	3767	7-17.5	145	L.F.	\$	\$
214	PVC SANITARY SEWER PIPE 12 IN. DIAM. (Unit Price in Words) _____	3769	7-17.5	225	L.F.	\$	\$
215	MANHOLE 48 IN. DIAM. TYPE (Unit Price in Words) _____	7360	7-17.5	2	EACH	\$	\$
OTHER							
216	SHORING OR EXTRA EXCAVATION CLASS B (Unit Price in Words) _____	7008	2-09.5	30850	S.F.	\$	\$
217	ADJUST WATER VALVE BOX (Unit Price in Words) _____	--	SP	46	EACH	\$	\$
218	ADJUST MANHOLE (Unit Price in Words) _____	3080	7-05.5	4	EACH	\$	\$
						Subtotal Utilities Base Bid Amount	
						8.6% Sales Tax	
						TOTAL UTILITIES BASE BID	

Alternative 1 Bid Schedule - Overlay

**City of Arlington
Airport Blvd Phase 1A**

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Item No.	DESCRIPTION	WSDOT Standard Item No.	WSDOT Spec Ref Sect	Approx. Quantity	UNIT	Unit Price	Total Price
	PREPARATION						
301	MOBILIZATION (Unit Price in Words) _____	0001	1-09.7	1	L.S.	\$	\$
	HOT MIX ASPHALT						
302	PLANING BITUMINOUS PAVEMENT (Unit Price in Words) _____	5711	5-04.5	1350	S.Y.	\$	\$
303	HMA FOR PAVEMENT CL. 1/2 IN. PG 64-22 (Unit Price in Words) _____	5739	5-04.5	540	TON	\$	\$
TOTAL OVERLAY ALTERNATIVE 1							

Alternative 2 Bid Schedule - Curb

**City of Arlington
Airport Blvd Phase 1A**

NOTE: All entries must be typed or written in ink. Unit prices for all items, all extensions, lump sum prices, and the total amount of bid must be shown. Show unit prices in both words and figures; where conflicts occur, the written words will take precedence and be used to determine the total amount bid. The total bid amount shall include all work as included in the contract documents and applicable tax.

Item No.	DESCRIPTION	WSDOT Standard Item No.	WSDOT Spec Ref Sect	Approx. Quantity	UNIT	Unit Price	Total Price
	PREPARATION						
401	MOBILIZATION (Unit Price in Words) _____	0001	1-09.7	1	L.S.	\$	\$
	TRAFFIC						
402	CEMENT CONC. TRAFFIC CURB AND GUTTER (Unit Price in Words) _____	6700	8-04.5	4900	L.F.	\$	\$
	TOTAL CURB ALTERNATIVE 2						

Alternative 3 Bid Schedule - Plantings

City of Arlington Airport Blvd Phase 1A

NOTE: All entries must be typed or written in ink. Unit prices for all items, all extensions, lump sum prices, and the total amount of bid must be shown. Show unit prices in both words and figures; where conflicts occur, the written words will take precedence and be used to determine the total amount bid. The total bid amount shall include all work as included in the contract documents and applicable tax.

Item No.	DESCRIPTION	WSDOT Standard Item No.	WSDOT Spec Ref Sect	Approx. Quantity	UNIT	Unit Price	Total Price
	PREPARATION						
501	MOBILIZATION (Unit Price in Words) _____	0001	1-09.7	1	L.S.	\$	\$
	EROSION CONTROL AND ROADSIDE RESTORATION						
502	PSIPE CAPITAL PEAR (Unit Price in Words) _____	6552	7-05.4	39	EACH	\$	\$
503	PSIPE RED SUNSET (Unit Price in Words) _____	6552	7-05.4	24	EACH	\$	\$
504	PSIPE KARPICK (Unit Price in Words) _____	6552	7-05.4	285	EACH	\$	\$
505	PSIPE DWARF REDWIG DOGWOOD (Unit Price in Words) _____	6552	7-05.4	30	EACH	\$	\$
506	PSIPE SALAL SHRUB (Unit Price in Words) _____	6552	7-05.4	60	EACH	\$	\$
507	PSIPE MOCK ORANGE (Unit Price in Words) _____	6552	7-05.4	60	EACH	\$	\$
508	PSIPE STAR MAGNOLIA (Unit Price in Words) _____	6552	7-05.4	12	EACH	\$	\$
509	PSIPE LEATHERLEAF VIBURNUM (Unit Price in Words) _____	6552	7-05.4	60	EACH	\$	\$
510	PSIPE HEATHER SPECIES (Unit Price in Words) _____	6552	7-05.4	392	EACH	\$	\$
511	PSIPE OREGON GRAPE (Unit Price in Words) _____	6552	7-05.4	588	EACH	\$	\$
512	PSIPE KINNIKINNICK SHRUB (Unit Price in Words) _____	6552	7-05.4	560	EACH	\$	\$
513	PSIPE SWEAT GALE (Unit Price in Words) _____	6552	7-05.4	560	EACH	\$	\$
514	PSIPE SNOW BERRY (Unit Price in Words) _____	6552	7-05.4	560	EACH	\$	\$
515	PSIPE KINNIKINNICK GROUND COVER (Unit Price in Words) _____	6552	7-05.4	9,286	S.F.	\$	\$
516	PSIPE WINTER CREEPER GROUND COVER (Unit Price in Words) _____	6552	7-05.4	6,931	S.F.	\$	\$
517	PSIPE SALAL GROUND COVER (Unit Price in Words) _____	6552	7-05.4	6,931	S.F.	\$	\$
518	PSIPE SMALL FRUITED BULRUSH (Unit Price in Words) _____	6552	7-05.4	8,575	S.F.	\$	\$
519	PSIPE OWLFRUIT SEDGE (Unit Price in Words) _____	6552	7-05.4	8,575	S.F.	\$	\$
520	PSIPE PATH RUSH (Unit Price in Words) _____	6552	7-05.4	8,575	S.F.	\$	\$
TOTAL PLANTINGS ALTERNATIVE 3							

Associated Earth Sciences, Inc.



Celebrating Over 25 Years of Service

August 10, 2009
Project No. EE080711A

Mr. Rob Putnam
18204 59th Drive NE
Arlington, Washington 98223

Attention: Mr. Rob Putnam

Subject: Stormwater Infiltration Evaluation for Arlington Airport Business Park
Arlington, Washington

Dear Mr. Putnam:

This letter-report summarizes the results of Associated Earth Sciences, Inc.'s (AESI's) infiltration testing at the proposed Arlington Airport Business Park in Arlington, Washington.

It is our understanding site development will include the construction of commercial/light industrial buildings, associated paved parking, and public roadways. Stormwater management will include the use of a rain gardens. Proposed site development plans currently show three phases of site development (Phase I, Phase II, and Phase III).

Our stormwater infiltration characterization included:

- Completion of a total of 10 Pilot Infiltration Tests (PITs) in the receptor soils.
 - Four infiltration tests were completed in Phase I
 - Two infiltration tests were completed in Phase II
 - Four infiltration tests were completed in Phase III

Site Conditions

The proposed Arlington Airport Business Park is located on property located north of 172nd Street NE, between 43rd Avenue NE and 51st Avenue NE, as shown on the "Vicinity Map" (Figure 1). Site development currently includes three phases of development (Phase I, Phase II, and Phase III), which are shown on the "Site and Exploration Plan," Figure 2. The approximately 124-acre property consists of undisturbed wooded land mainly on the northern portion of the site and cleared land, generally on the southern portion of the site.

Subsurface Conditions

Site subsurface conditions were evaluated through the review of the site geotechnical report prepared by AESI (dated February 2009) and the completion of exploration pits at each of the 10 infiltration test locations (IT-1 through IT-10). Exploration logs showing subsurface

conditions encountered in the infiltration exploration pits completed by AESI are included in Attachment A

The project site is mantled by a thin layer of loamy topsoil, approximately 6 inches in thickness, which is underlain by Marysville Sand deposits. Marysville Sand Member, which is a subdivision of the recessional outwash commonly encountered within the Puget Sound area, consists of sand with variable but generally low amounts of silt along with trace to little amounts of fine to coarse gravel. At the project site several feet of orange-brown, fine to medium sand generally underlies the topsoil to a depth of approximately 3 feet below grade. The orange-brown sand is underlain by a brown, fine to medium sand with gravel.

Ground water was encountered in the infiltration exploration pits from depths ranging from 9 feet below grade to depths greater than the maximum depth we were able to explore with the available equipment (10 feet below grade). The depth to ground water was generally shallowest (9 feet) along the south portion of the project site, deepening to greater than 10 feet on the northern portion of the site.

We expect the seasonal high ground water level to be shallower than the water levels observed during our infiltration testing, as infiltration testing was completed in July 2009 when ground water levels are typically low. Ground conditions were documented at the project site in January 2009, during our geotechnical investigation.

Ground water conditions encountered in January 2009, during our geotechnical investigation, ranged from approximately 5.5 feet below grade to depths greater than the maximum depth we were able to explore with the available equipment (10 feet below grade). The depth to ground water was generally shallowest (5.5 to 6 feet below grade) along the south portion of the project site, deepening to greater than 10 feet on the northern portion of the site. Ground water levels observed during our January 2009 site investigations are likely representative of the average seasonal high ground water levels at the project site.

Infiltration Testing

We understand Low Impact Development (LID) rain garden elements are proposed for stormwater management/infiltration. Rain gardens will consist of excavated swales adjacent to roadways and in some case along lot lines. The base of the rain gardens will include 18 inches of amended soil to provide treatment.

Ten PITs (IT-1 through IT-10) were conducted at the project site. Four PITs were conducted in Phase I and Phase III, and two PITs were conducted in Phase II. Locations of each infiltration test are shown on the "Site and Exploration Plan," Figure 2. Pilot infiltration testing was completed by excavating test pits to a depth of approximately 4 to 5 feet below grade. Constant head tests were completed by maintaining a constant head in the infiltration pit for a 4-hour soaking period. After 4 hours the infiltration test was extended until a constant rate was achieved, typically 1 hour. At the completion of the constant head portion of the infiltration test, the inflow was stopped and falling head rates were measured. The water

source for the infiltration testing was a City fire hydrant. Water flow was monitored with digital flow meters in gallons per minute (gpm).

Field Infiltration Rates: Phase I

Infiltration tests IT-1, IT-2, IT-3, and IT-4 were completed in Phase I. Infiltration tests completed in Phase I were completed adjacent to the west of the existing paved roadway (51st Ave NE). Field measured constant head rates for infiltration tests completed in Phase I are presented in Table 1 below:

Table 1
Phase I: Field Infiltration Rates

Infiltration Test	Constant Head Infiltration Rate (inches/hour)
IT-1	19
IT-2	41
IT-3	99
IT-4	48
Average	52

Constant head field measured infiltration rates in IT-1 through IT-4 ranged from 19 to 99 inches/hour, with an average rate of 52 inches/hour.

Field Infiltration Rates: Phase II

Infiltration tests IT-7 and IT-8 were completed in Phase II. Field measured constant head rates for infiltration tests completed in Phase II are presented in Table 2 below:

Table 2
Phase II: Field Infiltration Rates

Infiltration Test	Constant Head Infiltration Rate (inches/hour)
IT-7	32
IT-8	41
Average	36.5

Constant head field measured infiltration rates in IT-7 and IT-8 were 32 and 41 inches/hour, respectively, with an average rate of 36.5 inches/hour.

Field Infiltration Rates: Phase III

Infiltration test IT-5, IT-6, IT-9, and IT-10 were completed in Phase III. Phase III consists of two areas of the site bisected by Phase II, which are shown as Phase IIIA and Phase IIIB on the site plan. Field measured constant head rates for infiltration tests completed in Phases IIIA and IIIB are presented in Table 3 below:

Table 3
Phases IIIA and IIIB: Field Infiltration Rates

Infiltration Test	Constant Head Infiltration Rate (inches/hour)
Phase IIIA	
IT-5	26
IT-6	37
Average	31.5
Phase IIIB	
IT-9	23
IT-10	27
Average	25

Constant head field measured infiltration rates in Phase IIIA, tests IT-5 and IT-6, were 26 and 37 inches/hour, respectively. Constant head field measured infiltration rates in Phase IIIB, tests IT-9 and IT-10, were 23 and 27 inches/hour, respectively.

Design Infiltration Rate

Ranges of correction factors to field-measured infiltration rates are presented in Table 3.9 of the Washington State Department of Ecology (Ecology) *Stormwater Management Manual* (SWMM Manual) for: (1) site variability and number of locations tested, (2) degree of long-term maintenance to prevent siltation and bio-buildup, and (3) degree of influent control to prevent siltation and bio-buildup.

A correction factor of 1.5 for the field-measured infiltration rate was selected from the suggested range of 1.5 to 6 for "site variability and number of locations tested" based on the completion of two infiltration tests within the footprints of the proposed rock reservoir elements. It is our opinion the potential for long-term siltation from total suspended solids (TSS) and the potential for bio-buildup (moss buildup and litter fall from surrounding vegetation) and siltation is low as rain garden elements are designed as vegetated swales. Therefore, a combined correction factor of 2 was selected for the degree of long-term maintenance to prevent siltation and bio-buildup and degree of influent control to prevent siltation and bio-buildup, resulting in a total correction factor of 3.5.

The correction factor of 3.5 was applied to the average constant head infiltration rates for the infiltration tests completed in Phases I, II, and III to yield our recommended long-term design infiltration rates. Recommended design infiltration rates for Phases I, II, and III are presented in Table 4.

Table 4
Phases I, II, and III: Long-Term Design Infiltration Rates

Phase	Long-Term Design Infiltration Rate
I	14.8
II	10.4
IIIA	9.0
IIIB	7.1

Ground Water Mounding Analyses

During our January 2009 field explorations, the depth to ground water below existing grade ranged from approximately 5.5 feet in the southern portion of the site to greater than 10 feet on the northern portion of the site. If site grades are not raised it is likely that the separation distance between the bottom of the rain gardens on the southern portion of the property and the high ground water table will be less than the 3 feet prescribed in the Low Impact Development Manual. Water quality treatment in rain garden applications is achieved in the amended soil layer. Therefore, the 3-foot separation prescribed in the LID manual between the rain garden bottom and seasonal high ground water is attributed to the infiltration capacity/performance of the rain garden. A ground water mounding analysis can be completed in areas where there is less than 3 feet of separation to determine if ground water mounding will inhibit the performance of the rain garden.

A mounding analysis involves the development of a three dimensional ground water flow model. The aquifer hydraulic properties used in the model are derived from the subsurface explorations and infiltration testing completed at the site. The rain garden locations are input in the model in the locations and sizes provided by the civil engineer. Stormwater inflow for the design storm event provided by the civil engineer is input in daily or hourly time steps at the rain garden locations. The model is then run to simulate the infiltration of stormwater into the receiving aquifer, which allows an evaluation of the peak ground water mounding condition beneath the rain gardens. The peak mounded ground water level is then compared to the separation distance between the bottom of the rain garden and seasonal high ground water level to determine if the peak ground water mound height exceeds the elevation of the bottom of the rain garden. Recharge cells are assigned in the model at the rain garden locations to allow simulation of stormwater inflow. The mounding analysis may show the rain gardens will function as designed or that an iterative process of increasing the rain garden size to mitigate mounding may be required.

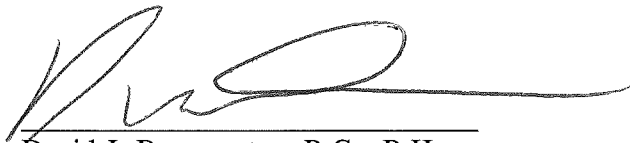
Limitations

We prepared this letter-report for use by Mr. Rob Putnam regarding design infiltration rates at Arlington Airport Business Park in Arlington, Washington. The information presented in this letter-report is based on the above-described research, field activities, and limited reconnaissance. Aquifer characteristics at different locations at the site may vary.

Within the limitations of scope, schedule, and budget, AESI attempted to execute these services in accordance with generally accepted professional principles in the field of hydrogeology at the time this report was prepared. No warranty, express or implied, is made.

We appreciate the opportunity to work with you on this project. If you have any questions regarding this letter-report or require additional information, please do not hesitate to contact our office.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Everett, Washington

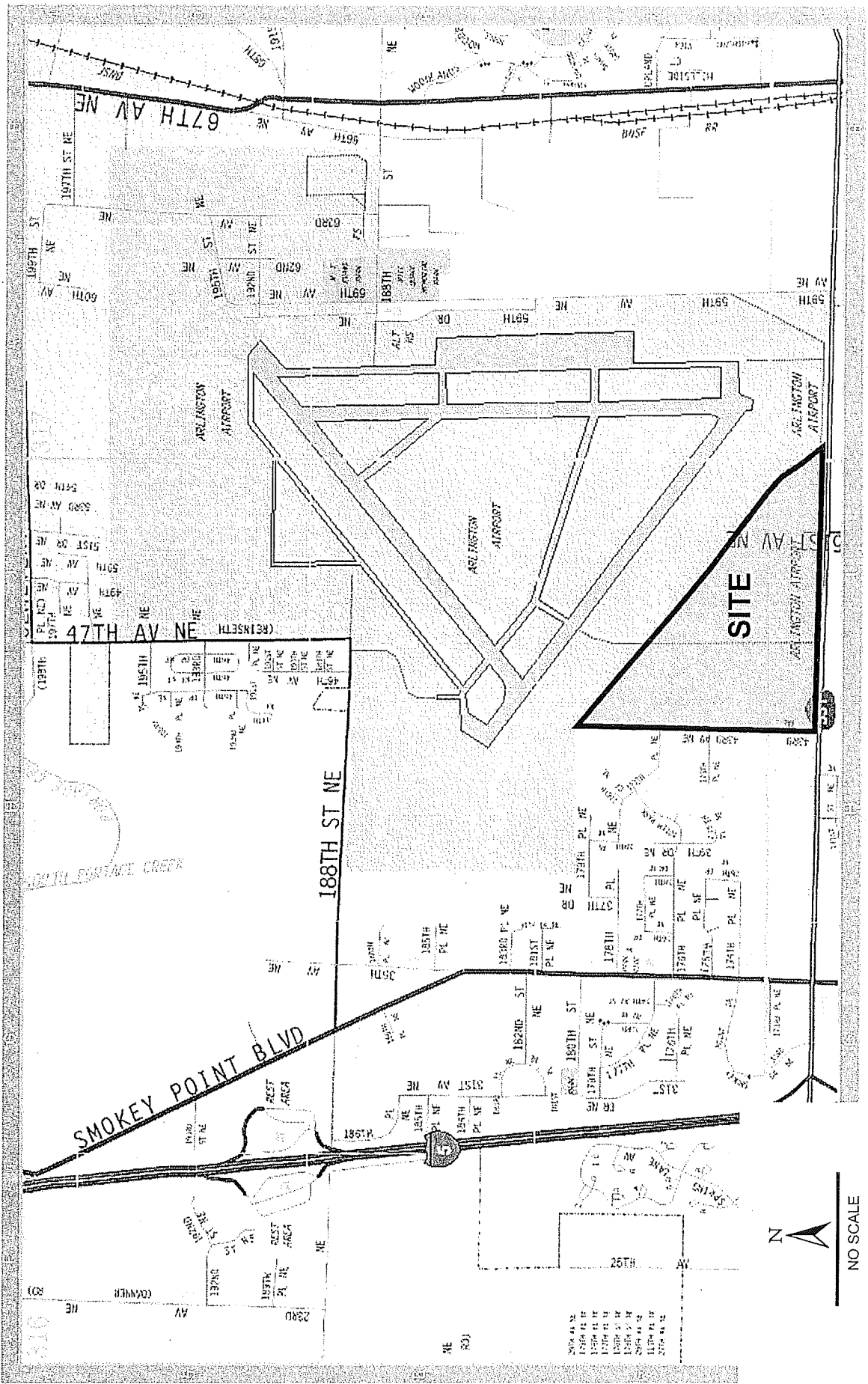


David J. Baumgarten, P.G., P.Hg.
Senior Hydrogeologist



Matthew A. Miller, P.E.
Senior Associate Engineer

- Attachments: Figure 1: Vicinity Map
 Figure 2: Site and Exploration Plan
 Attachment A: Exploration Pit Logs IT-1 through IT-10



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VICINITY MAP
 ARLINGTON AIRPORT BUSINESS PARK
 ARLINGTON, WASHINGTON

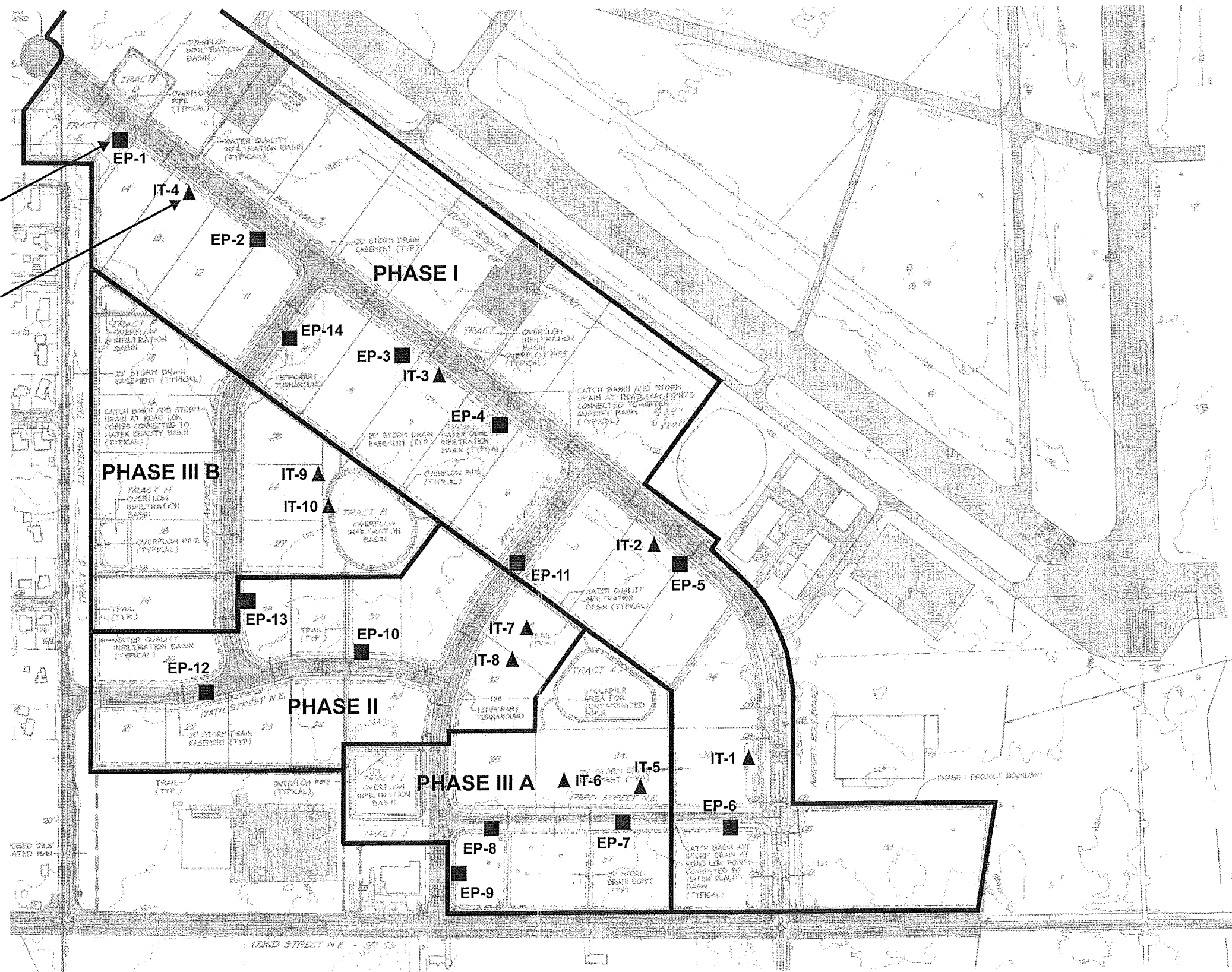
FIGURE 1

DATE 2/09

PROJ. NO. EE080711A

APPROXIMATE LOCATION OF EXPLORATION PIT TYP

APPROXIMATE LOCATION OF INFILTRATION TEST TYP



Reference: Higa-Burkholder Associates, LLC

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**SITE AND EXPLORATION PLAN
ARLINGTON AIRPORT BUSINESS PARK
ARLINGTON, WASHINGTON**

FIGURE 2

DATE 7/09

PROJ. NO EE080711A

ATTACHMENT A

Exploration Pit Logs IT-1 through IT-10

LOG OF EXPLORATION PIT NO. IT-1

Depth (ft)	
	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p>DESCRIPTION</p>
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand)
2	Medium dense, moist, light brown, fine to medium SAND, little silt, few gravel.
3	-----
4	Dense, moist to damp, brown, medium to coarse SAND, trace silt, with gravel. Infiltration test completed at 4' below grade.
5	
6	
7	Bottom of exploration pit at 6.5 feet Ground water encountered at 6'.
8	
9	
10	
11	
12	
13	
14	
15	
16	
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18	
19	
20	

KCTP3 080711A (IT-1 THRU IT-10).GPJ August 4, 2009

Arlington Airport Business Park Arlington, WA

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Project No. EE080711A

July 2009

LOG OF EXPLORATION PIT NO. IT-2

Depth (ft)	
	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p>DESCRIPTION</p>
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand)
2	Medium dense, moist, fine to medium SAND, little silt, few gravel.
3	-----
4	Dense, moist, medium to coarse SAND, trace silt, with gravel.
5	Infiltration test completed at 4.5' below grade.
6	
7	
8	
9	
10	Bottom of exploration pit at 9 feet Ground water was not encountered.
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

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July 2009

LOG OF EXPLORATION PIT NO. IT-3

Depth (ft)	DESCRIPTION
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand)
2	Medium dense, moist, light brown, fine to medium SAND, little silt, few gravel.
3	-----
4	Dense, moist, brown, medium SAND, trace silt, trace gravel.
5	Infiltration test completed at 5' below grade.
6	Dense, moist, brown, medium to coarse SAND, trace silt, with gravel.
7	
8	
9	
10	Bottom of exploration pit at 9 feet Ground water was not encountered.
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

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Arlington Airport Business Park Arlington, WA

Associated Earth Sciences, Inc.



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Approved by:

Project No. EE080711A

July 2009

LOG OF EXPLORATION PIT NO. IT-4

Depth (ft)	DESCRIPTION
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand)
2	Medium dense, moist, light brown, fine to medium SAND, little silt, few gravel.
3	
4	Dense, moist, brown, medium SAND, trace silt, trace gravel.
5	Infiltration test completed at 5' below grade.
6	
7	
8	Dense, moist, brown, medium to coarse SAND, trace silt, with gravel.
9	
10	Bottom of exploration pit at 9 feet Ground water was not encountered.
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

KCTP3 080711A (IT-1 THRU IT-10), GPJ, August 4, 2009

Arlington Airport Business Park Arlington, WA

Logged by: MSP

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Associated Earth Sciences, Inc.



Project No. EE080711A

July 2009

LOG OF EXPLORATION PIT NO. IT-5

Depth (ft)	DESCRIPTION
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand)
2	Medium dense, moist, orange-brown, fine to medium SAND.
3	
4	Medium dense, moist, gray, fine to medium SAND, with gravel.
5	Infiltration test completed at 5' below grade.
6	
7	
8	
9	
10	Bottom of exploration pit at 9.5 feet Ground water encountered at 9' below grade.
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

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Arlington Airport Business Park Arlington, WA

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Project No. EE080711A

July 2009

LOG OF EXPLORATION PIT NO. IT-6

Depth (ft)	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand)
	Medium dense, orange-brown, fine to medium SAND.
2	
3	-----
4	Medium dense, gray, fine to medium SAND, with gravel.
5	Infiltration test completed at 5' below grade.
6	
7	
8	
9	
10	Bottom of exploration pit at 9.5 feet Ground water encountered at 9' below grade.
11	
12	
13	
14	
15	
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Arlington Airport Business Park Arlington, WA

Associated Earth Sciences, Inc.



Logged by: HFW

Approved by:

Project No. EE080711A

July 2009

LOG OF EXPLORATION PIT NO. IT-7

Depth (ft)	DESCRIPTION
	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p>
	<p>Topsoil</p>
1	<p>Vashon Recessional Outwash (Marysville Sand)</p>
2	<p>Medium dense, moist, orange-brown, fine to medium SAND.</p>
3	<p>Medium dense, gray, fine to medium SAND, with gravel.</p>
4	
5	<p>Infiltration test completed at 4.5' below grade.</p>
6	
7	
8	
9	
10	<p>Bottom of exploration pit at 9.5 feet Ground water was not encountered.</p>
11	
12	
13	
14	
15	
16	
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19	
20	

KCTP3 060711A (IT-1 THRU IT-10), GPJ August 4, 2009

Arlington Airport Business Park Arlington, WA

Associated Earth Sciences, Inc.



Logged by: HFW

Approved by:

Project No. EE080711A

July 2009

LOG OF EXPLORATION PIT NO. IT-8

Depth (ft)	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand) Medium dense, orange-brown, fine to medium SAND.
2	-----
3	Medium dense, gray, fine to medium SAND, with gravel.
4	Infiltration test completed at 4' below grade.
5	
6	
7	
8	
9	
10	Bottom of exploration pit at 9.5 feet Ground water was not encountered.
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

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Project No. EE080711A

July 2009

LOG OF EXPLORATION PIT NO. IT-9

Depth (ft)	DESCRIPTION
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand) Medium dense, moist, orange-brown, fine to medium SAND.
2	-----
3	Medium dense, moist, fine to medium SAND, with gravel.
4	Infiltration test completed at 4.5' below grade.
5	
6	
7	
8	
9	
10	Bottom of exploration pit at 9 feet Ground water was not encountered.
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

KCTP3 080711A (IT-1 THRU IT-10).GPJ August 4, 2009

Arlington Airport Business Park Arlington, WA

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Approved by:

Project No. EE080711A

July 2009

LOG OF EXPLORATION PIT NO. IT-10

Depth (ft)	DESCRIPTION
	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p>
	Topsoil
1	Vashon Recessional Outwash (Marysville Sand)
	Medium dense, moist, orange-brown, fine to medium SAND.
2	-----
3	Medium dense, moist, gray, fine to medium SAND, with gravel.
4	Infiltration test completed at 4' below grade.
5	
6	
7	
8	
9	
10	Bottom of exploration pit at 9 feet Ground water was not encountered.
11	
12	
13	
14	
15	
16	
17	
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19	
20	

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