



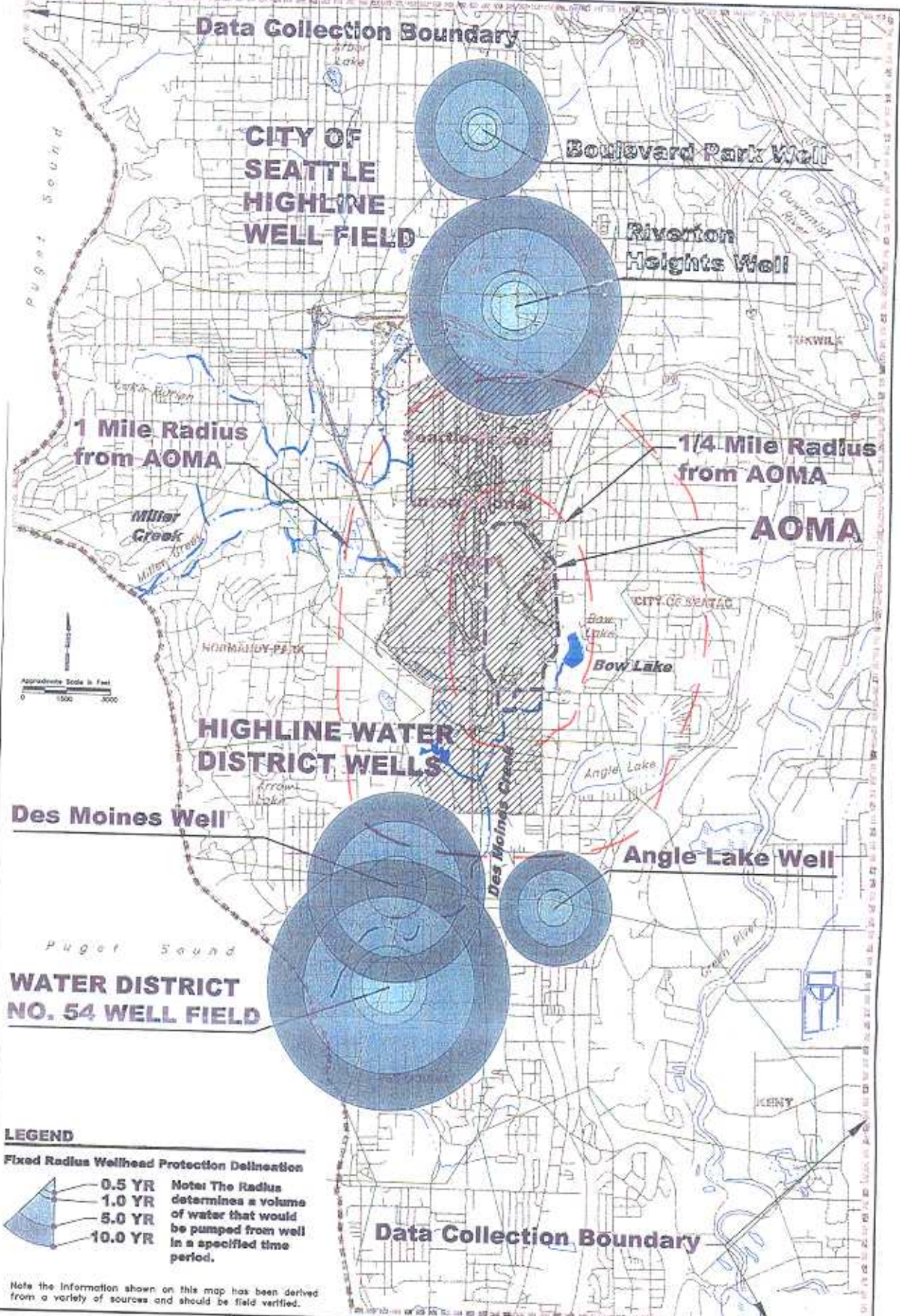
12/8/99

# Port of Seattle

## Seattle-Tacoma International Airport Ground Water Study

### Conceptual Flow Model Boundary Presentation

Associated Earth Sciences, Inc.  
S.S. Papadopoulos and Associates, Inc.



**LEGEND**

**Fixed Radius Wellhead Protection Delineation**

- 0.5 YR
- 1.0 YR
- 5.0 YR
- 10.0 YR

Note: The Radius determines a volume of water that would be pumped from well in a specified time period.

Note the information shown on this map has been derived from a variety of sources and should be field verified.

AR 043188



**AOMA Boundary**

**PAN AM Fuel Farm (PAFFF)**

**Delta Auto Gas Cluster Tanks (DELAG)**

**Delta Fuel Farm (DELFF)**

**NWA Fuel Farm (NWBFF)**

**South Satellite Baggage Tunnel (NWA Hydrant Line) (NWHHS2)**

**Gate B2 (GATEB2)**

**PAN AM Avgas Tanks (PAFAT)**

**Budget Auto Facility (BDGPL)**

**NWA Hangar Tanks (NWFHT)**

**RAC Auto (Hertz/National/Avis) (RACFT)**

**United/Continental Fuel Farms (UNFUF/CONFF)**

**NWA Hydrant System Closure (NWABN)**

**Continental Airlines Hydrant System Closure (CONHS)**

Approximate Scale in Feet  
0 250 500



DATE: 06/06/98  
DRAWN BY: JLS/BAE

**Airport Operations and Maintenance Area (AOMA)**  
Ground Water Study  
Seattle - Tacoma International Airport

PROJECT NO. 997016  
DATE: 2a

AR 043189

**AOMA Boundary**

**Continental Airlines Hydrant System Closure (CONHS)**

**South Satellite Baggage Tunnel (NWA Hydrant Line) (NWHHS2)**

**PAN AM Fuel Farm (PAFFF)**

**Delta Auto Gas Cluster Tanks (DELAG)**

**Delta Fuel Farm (DELFF)**

**PAN AM Avgas Tanks (PAFAT)**

**Gate B2 (GATEB2)**

**Budget Auto Facility (BDGPL)**

**NWA Fuel Farm (NWBFF)**

**NWA Hangar Tanks (NWFHT)**

**RAC Auto (Hertz/National/Avis) (RACFT)**

**United/Continental Fuel Farms (UNFUFCOMFF)**

**NWA Hydrant System Closure (NWABN)**



**LEGEND**

- Boring
- Cone Pen
- Extr Well
- Gas Probe
- Geotech
- Man Well
- Piezometer
- Rec Well
- Unknown



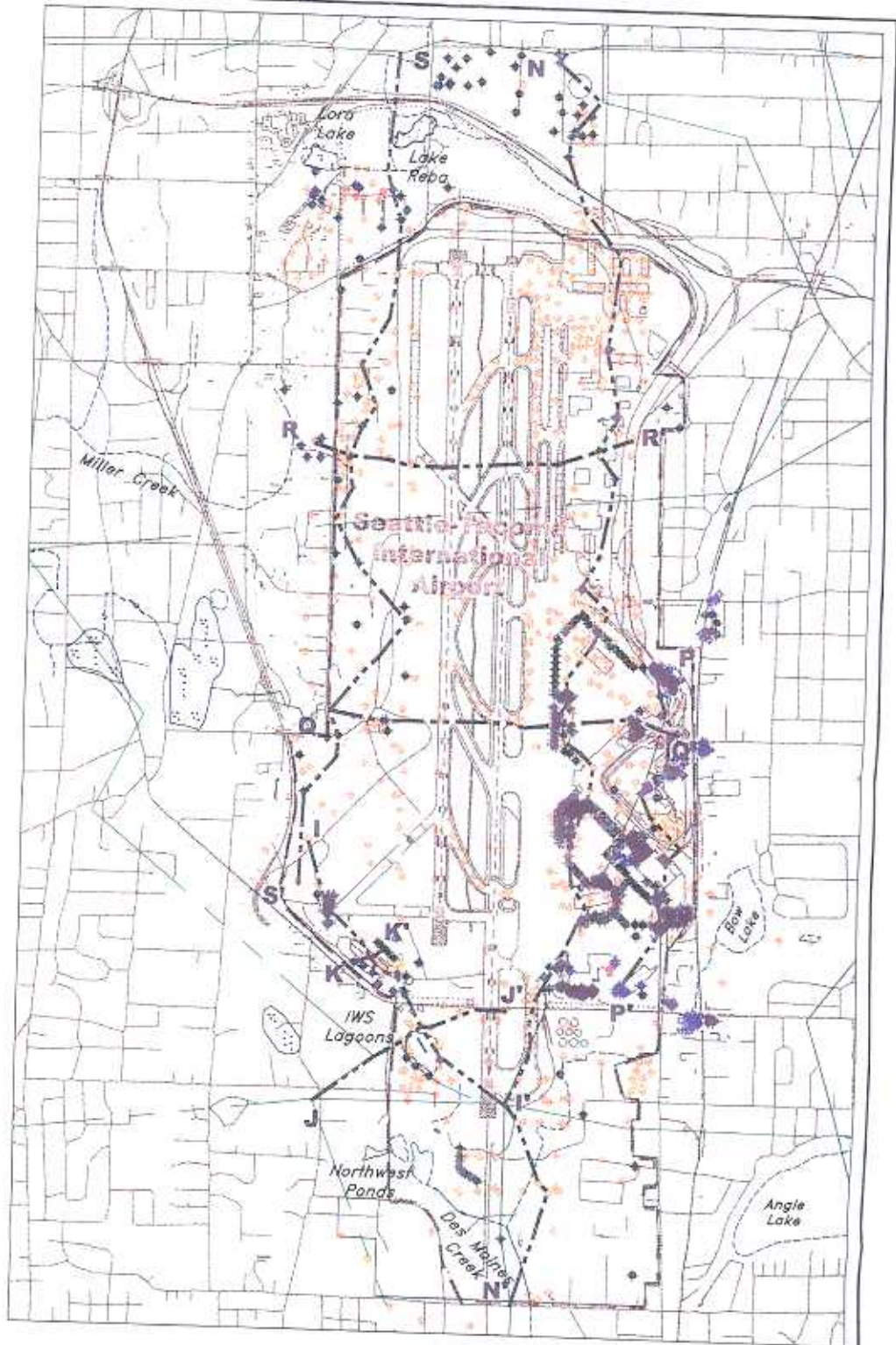
DATE: 06/05/98  
COMPILED BY: JAY/BA

**Airport Operations and Maintenance Area (AOMA)**  
Ground Water Study  
Seattle - Tacoma International Airport

PROJECT NO: 897016  
PAGE NO: 2b

AR 043190





**LEGEND**

- Boring
- Cone Pene
- Extr Well
- Gas Probe
- Mon Well
- Piezometer
- Rec Well
- Geotech
- STIA Area Cross Section Line
- - - STIA Area Boundary

Note the information shown on this map has been derived from a variety of sources and should be field verified.

AR 043191

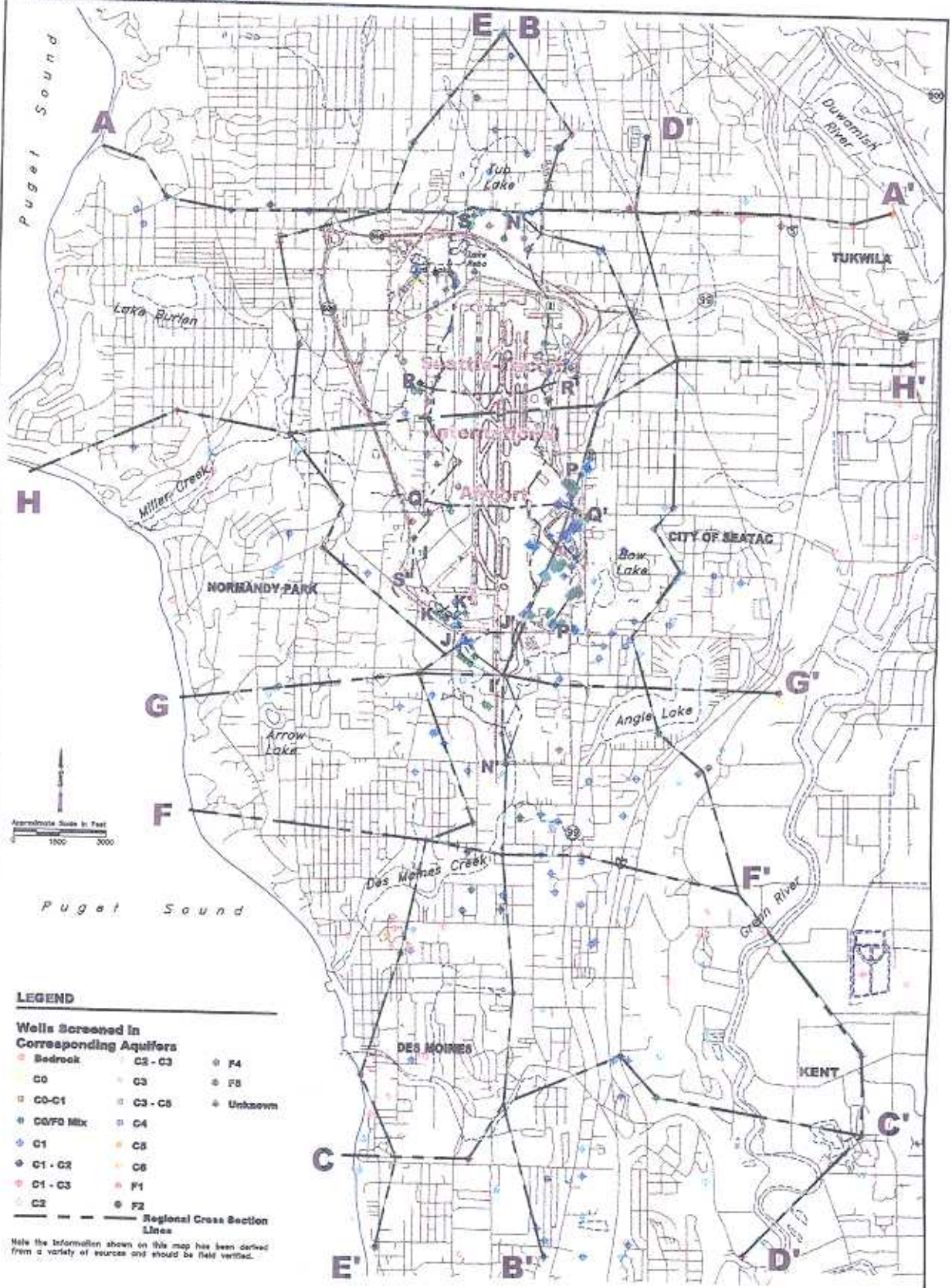
**AEI** ASSOCIATED  
EARTH  
SCIENCES, INC

DATE  
05/06/99  
REVISION  
JIS/MLB

**STIA GEOLOGIC CROSS SECTION LOCATION**  
Ground Water Study  
Seattle - Tacoma International Airport

PROJECT NO.  
PW7016  
PAGE NO.  
**3**

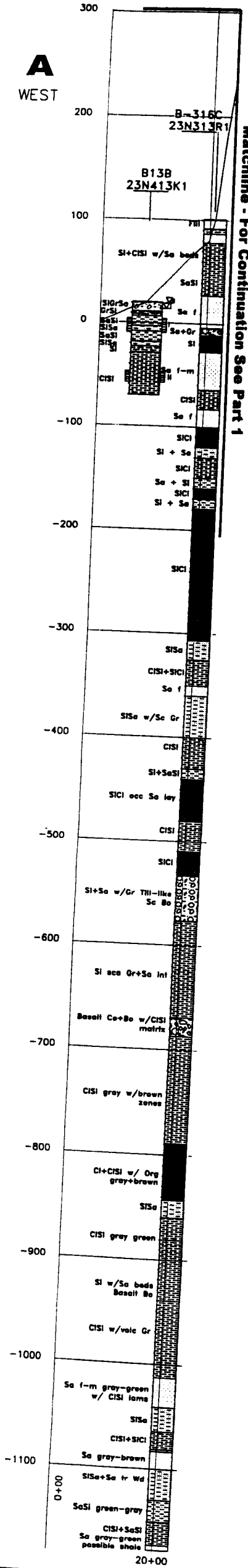




AR 043192



**A**  
WEST



**AS** ASSOCIATED  
EARTH  
SCIENCES, INC

DATE:  
09/15/99  
DESIGNED/DRAWN:  
DHM/TEAM

SCALE  
Horizontal 1" = 2000'  
Vertical 1" = 100'

**REGIONAL GEOLOGIC CROSS SECTION A-A' Part 2**  
Study Area  
Seattle - Tacoma International Airport

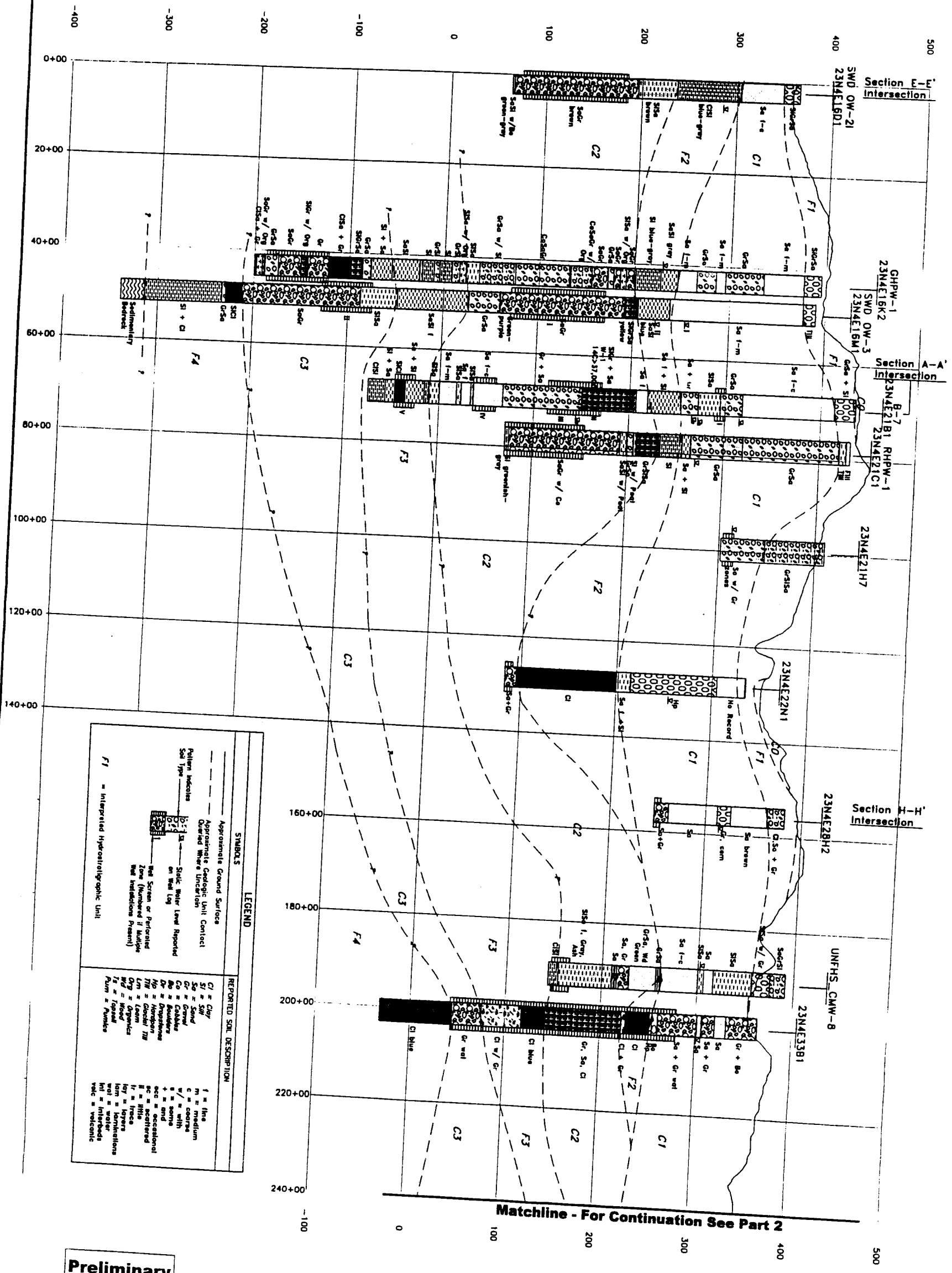
**Preliminary**

PROJECT NO  
BV97016J  
FIGURE NO  
-

AR 043194



**B**  
NORTH



SYMBOLS		LEGEND	
---	Approximate Ground Surface	---	Approximate Geologic Unit Contact
---	Approximate Where Uncertain	---	Approximate Where Uncertain
---	Pattern Indicates Soil Type	---	Stippled Water Level Reported on Well Log
---	Well Screen or Perforated Zone (Numbered if Multiple Well Indications Present)	---	Well Screen or Perforated Zone (Numbered if Multiple Well Indications Present)
REPORTED SOIL DESCRIPTION		REPORTED SOIL DESCRIPTION	
C1 = Clay	S1 = Sand	f = fine	m = medium
Co = Silt	So = Silty	c = coarse	w/ = with
Gr = Gravel	Gr = Gravel	s = some	cc = occasional
Dr = Drift	Dr = Drift	tr = trace	ly = layers
M = Muck	M = Muck	int = interbedded	wat = water
W = Wet	W = Wet	vol = volcanic	
P = Pumice	P = Pumice		

Preliminary

Matchline - For Continuation See Part 2

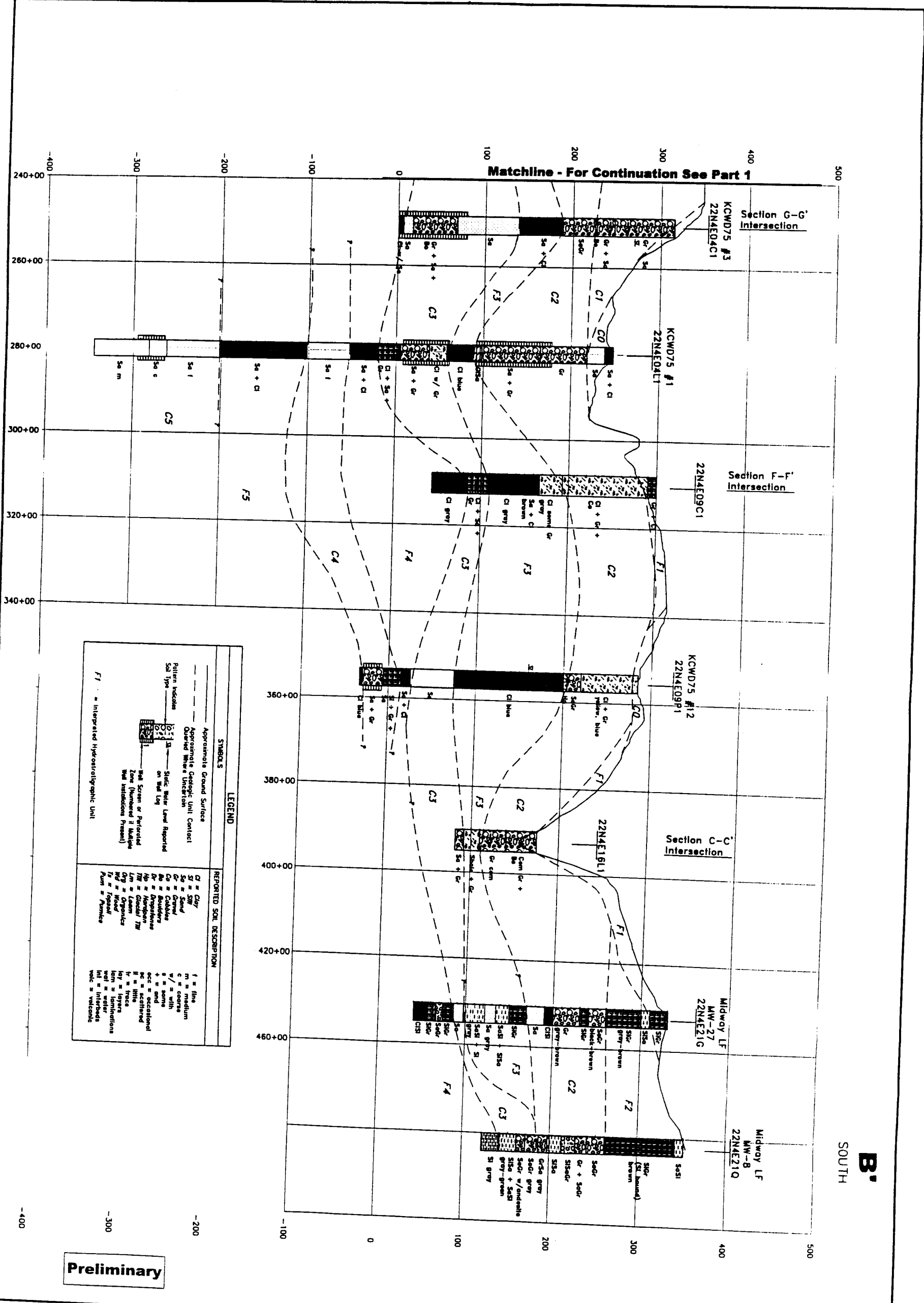


DATE: 10/4/99  
 DESIGNED/DWG: DHM/TEAM  
 SCALE: Horizontal 1" = 2000', Vertical 1" = 100'

**REGIONAL GEOLOGIC CROSS SECTION B-B' PART 1**  
 Sta 0+00 TO Sta 280+00  
 Seattle - Tacoma International Airport

PROJECT NO: BV97016J  
 FIGURE NO: 1

AR 043195



LEGEND	
	Approximate Ground Surface
	Approximate Geologic Unit Contact
	Approximate Water Underflow
	Piezometer
	Static Water Level Reported on Well Log
	Well Screen or Perforated Well (Numbered if Multiple Well Sections Present)
	Interpreted Hydrogeologic Unit
REPORTED SOIL DESCRIPTION	
C1 = Clay	f = fine
S1 = Sand	m = medium
Co = Silt	c = coarse
Ca = Silt/clay	w/ = with
Co = Silt/clay	s = some
Dr = Drift	sc = sand
Ap = Alluvium	sc = silt/clay
Aw = Alluvium	h = thin
Am = Alluvium	l = layers
At = Alluvium	stn = stratification
Av = Alluvium	int = interbedded
Aw = Alluvium	vec = volcanic

Preliminary



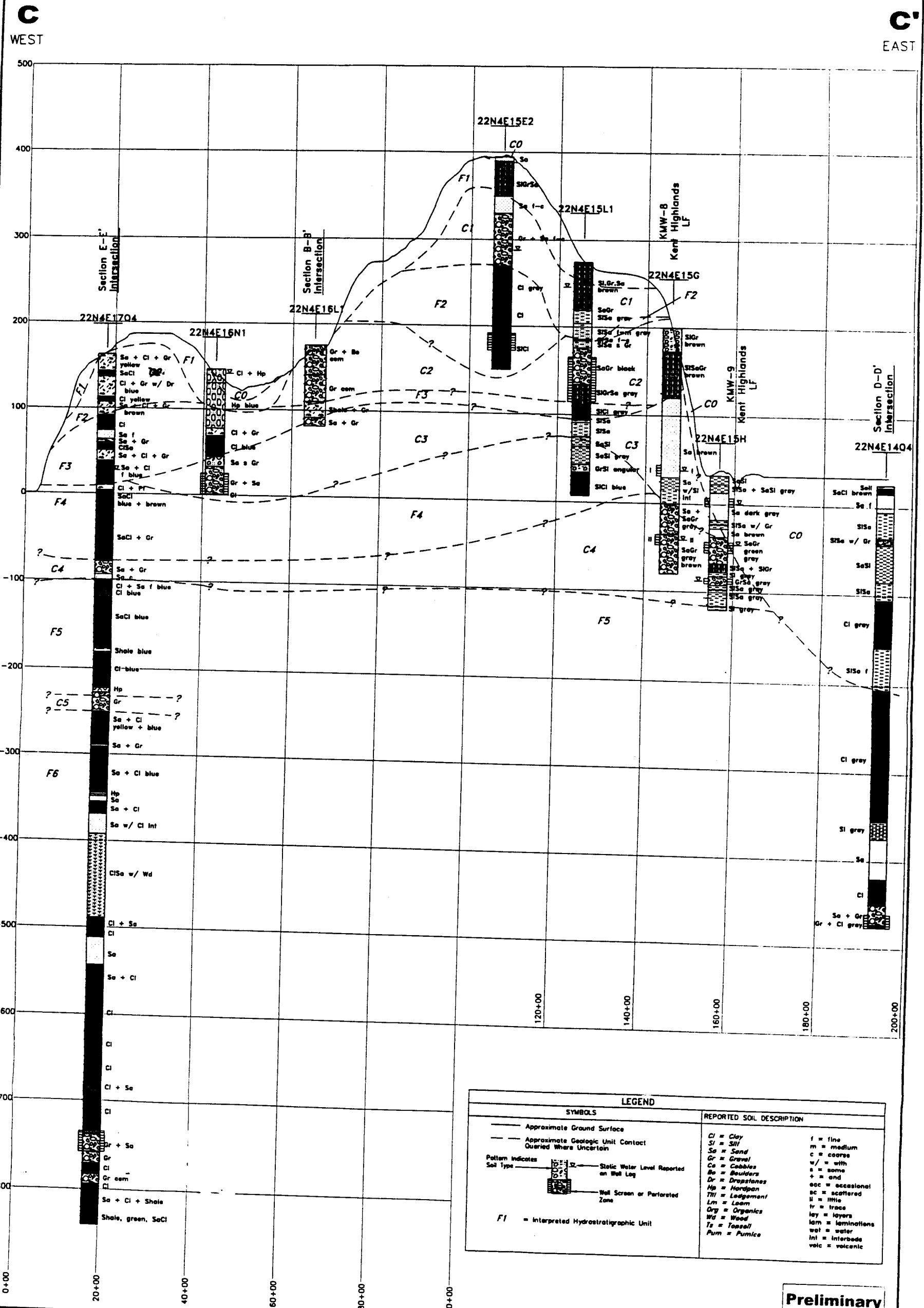
DATE: 10/4/99  
 DESIGNED/DRAWN: DHM/TEAM  
 SCALE: Horizontal 1" = 2000', Vertical 1" = 100'

**REGIONAL GEOLOGIC CROSS SECTION B-B' PART 2**  
 280+00 to 445+00  
 Seattle - Tacoma International Airport

PROJECT NO: BV97016J  
 FIGURE NO: 1

AR 043196





LEGEND	
SYMBOLS	
	Approximate Ground Surface
	Approximate Geologic Unit Contact Queried Where Uncertain
	Pattern Indicates Soil Type
	Static Water Level Reported on Well Log
	Well Screen or Perforated Zone
<i>F1</i>	Interpreted Hydrostratigraphic Unit
REPORTED SOIL DESCRIPTION	
<i>Cl</i> = Clay	<i>f</i> = fine
<i>Sl</i> = Silt	<i>m</i> = medium
<i>Sa</i> = Sand	<i>c</i> = coarse
<i>Gr</i> = Gravel	<i>w/</i> = with
<i>Ca</i> = Cobbles	<i>s</i> = some
<i>Dr</i> = Driftstones	<i>+</i> = and
<i>Hp</i> = Horstpan	<i>occ</i> = occasional
<i>Lm</i> = Lodgement	<i>sc</i> = scattered
<i>Org</i> = Organics	<i>ll</i> = little
<i>Wd</i> = Wood	<i>tr</i> = trace
<i>Ts</i> = Tassel	<i>lay</i> = layers
<i>Pum</i> = Pumice	<i>lam</i> = laminations
	<i>wat</i> = water
	<i>int</i> = interbed
	<i>volc</i> = volcanic

Preliminary

**AS** ASSOCIATED EARTH SCIENCES, INC

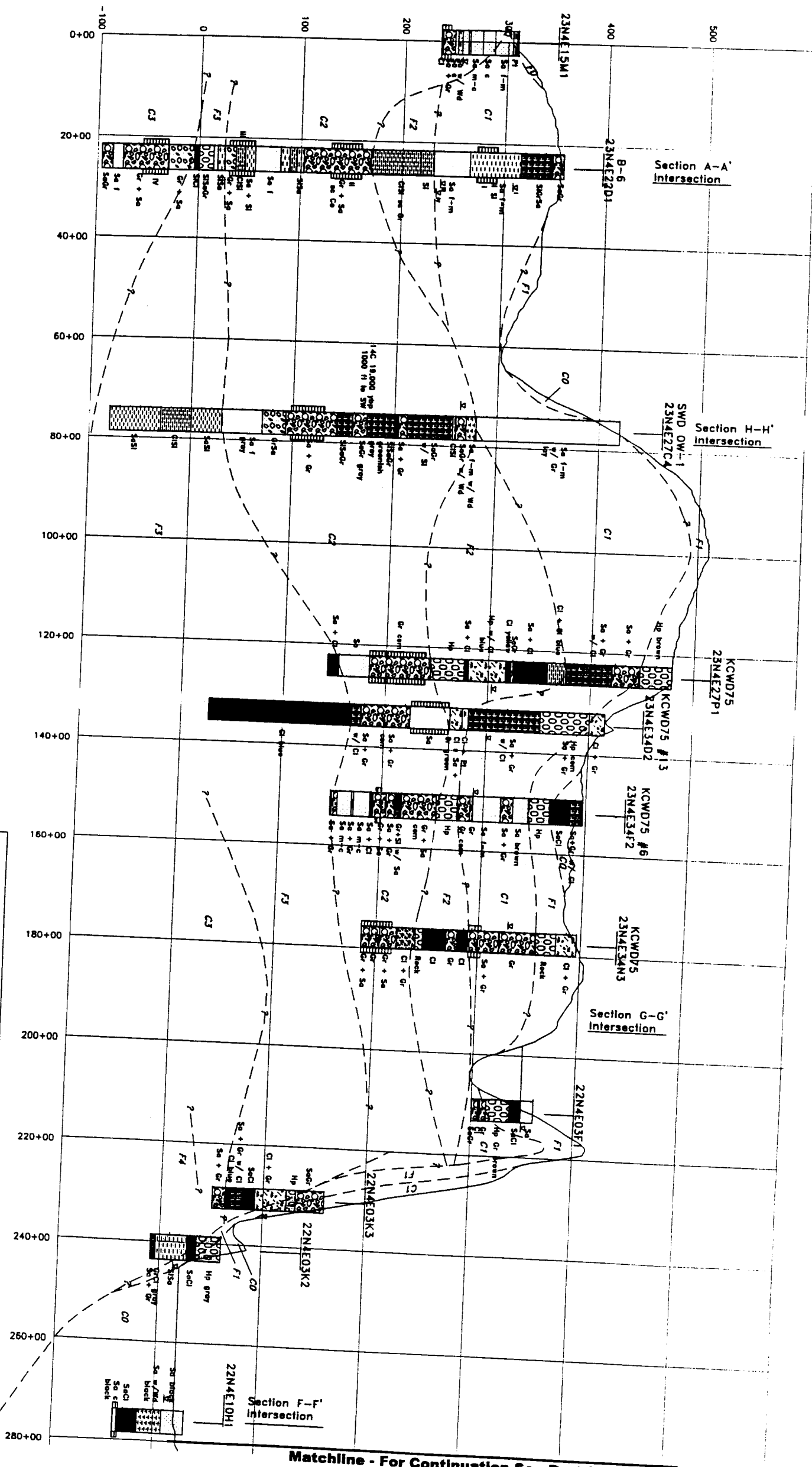
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 DESIGNED/DRAWN: DHM/TEAM  
 SCALE: Horizontal 1" = 2000', Vertical 1" = 100'

**REGIONAL GEOLOGIC CROSS SECTION C-C'**  
 Study Area  
 Seattle - Tacoma International Airport

PROJECT NO: BV97016J  
 FIGURE NO: 6

AR 043197

**D**  
NORTH



SYMBOLS		REPORTED SOIL DESCRIPTION	
---	Approximate Ground Surface	Cl = Clay	f = fine
---	Approximate Geologic Unit Contact	Si = Silty	m = medium
---	Observed Where Uncertain	Ss = Sand	c = coarse
---	Static Water Level Reported on Well Log	Gr = Gravel	w/ = with
---	Well Screen or Perforated Zone	Co = Cobble	s = some
---		Dr = Driftstone	cc = calcareous
---		TM = Till	sc = scuffed
---		Ln = Loam	ll = little
---		Dry = Dry	fr = trace
---		Mo = Moist	tr = trace
---		Fs = Fossiliferous	br = brackish
---		Pum = Pumice	int = interbedded
---			volc = volcanic

Preliminary

Matchline - For Continuation See Part 2



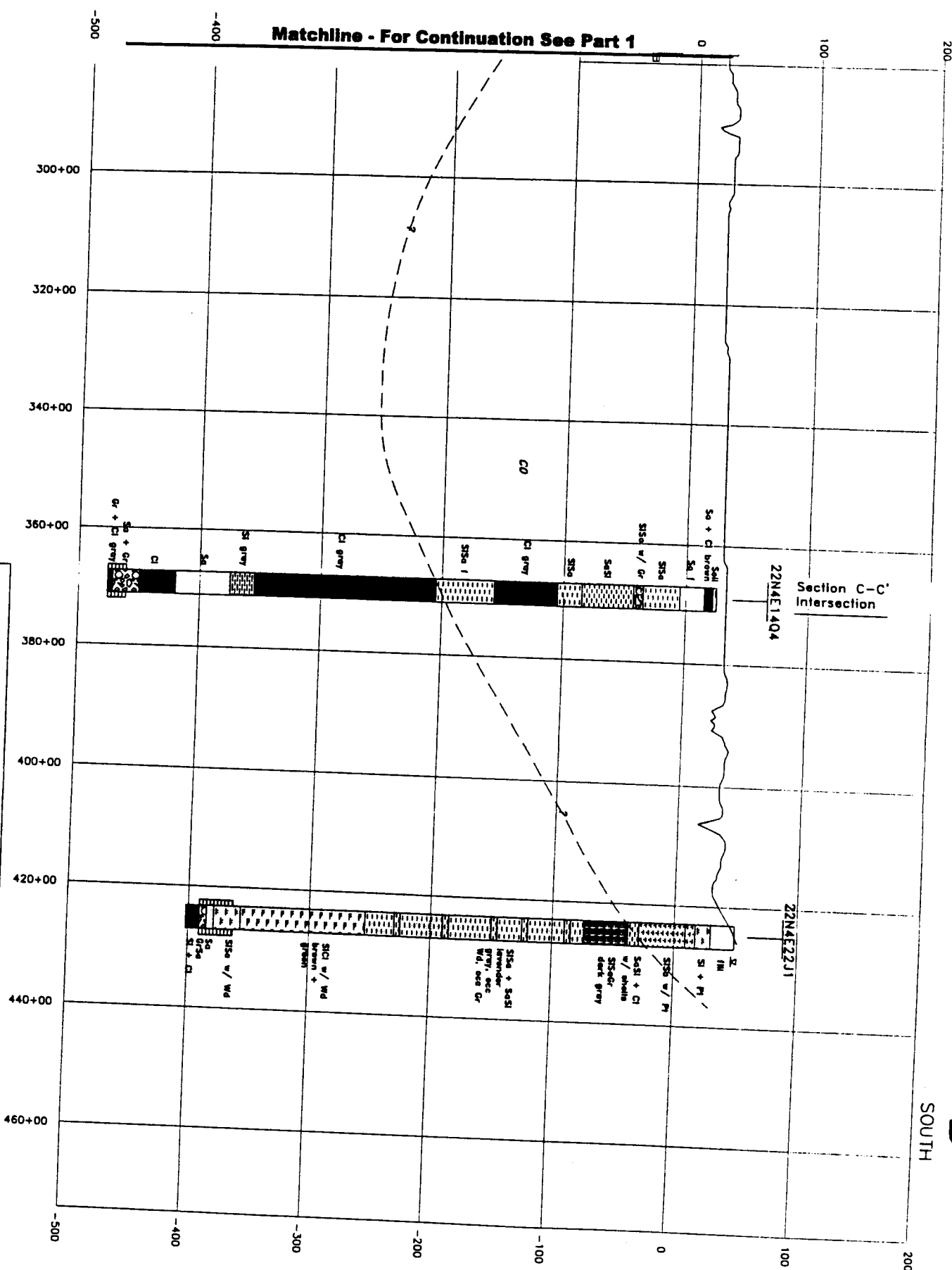
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 DESIGNED/DWG: DHM/TEAM  
 SCALE: Horizontal 1" = 2000', Vertical 1" = 100'

**REGIONAL GEOLOGIC CROSS SECTION D-D' PART 1**  
 Sta 0+00 TO Sta 280+00  
 Seattle - Tacoma International Airport

PROJECT NO: BV97016J  
 FIGURE NO: -

AR 043198





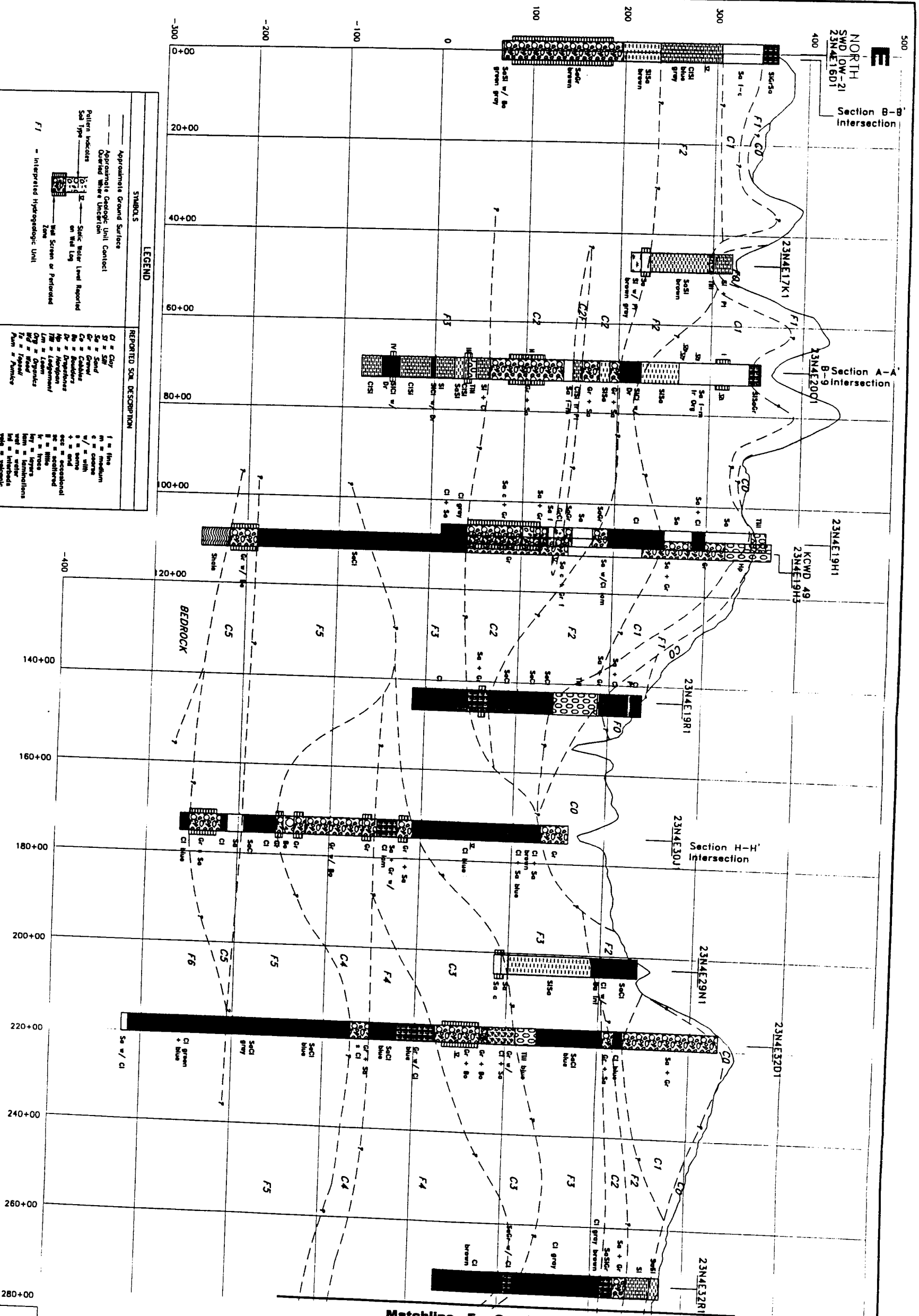
SYMBOLS		LEGEND	
—	Approximate Ground Surface	CI	Clay
—	Approximate Geologic Unit Contact	Si	Silt
- - -	Disputed Where Uncertain	Ss	Sand
○	Static Water Level Reported in Well Log	Gr	Gravel
□	Well Screen or Perforated Zone	Co	Cobbles
△	Interpreted Geologic Unit	Db	Blocky
▽	Interpreted Hydrogeologic Unit	Ap	Angular
		Tm	Thin
		Lm	Long
		Dg	Dark Grey
		Wd	White
		Pa	Pink
		Br	Brown
		Bl	Black
		Vi	Volcanic
		Me	Medium
		Co	Coarse
		F	Fine
		Sc	Scattered
		Occ	Occasional
		Int	Interbedded
		Wt	Water
		Vel	Vegetation
		Volc	Volcanic

Preliminary


SYMBOLS		LEGEND	
Approximate Ground Surface		Approximate Geologic Unit Contact	
Observed Water Underlain		Observed Water Underlain	
Static Water Level Reported on Well Log		Static Water Level Reported on Well Log	
Well Screen or Perforated Zone		Well Screen or Perforated Zone	
F1 = Interpreted Hydrogeologic Unit		F1 = Interpreted Hydrogeologic Unit	

REPORTED SOIL DESCRIPTION	
Cl = Clay	fs = fine
Sl = Silty	ms = medium
Ss = Sandy	cs = coarse
Gr = Gravel	vs = with
Ce = Cobble	ec = occasional
Bo = Boulder	sc = scattered
Dr = Drift	tr = trace
Di = Diatomaceous	h = holes
Ms = Manganese	sh = shells
Lm = Limestone	st = stems
Op = Opaline	ss = stems
Wd = Wood	wt = water
Ls = Lignite	hb = interbeds
Fl = Fluvial	vb = volcanic



Preliminary

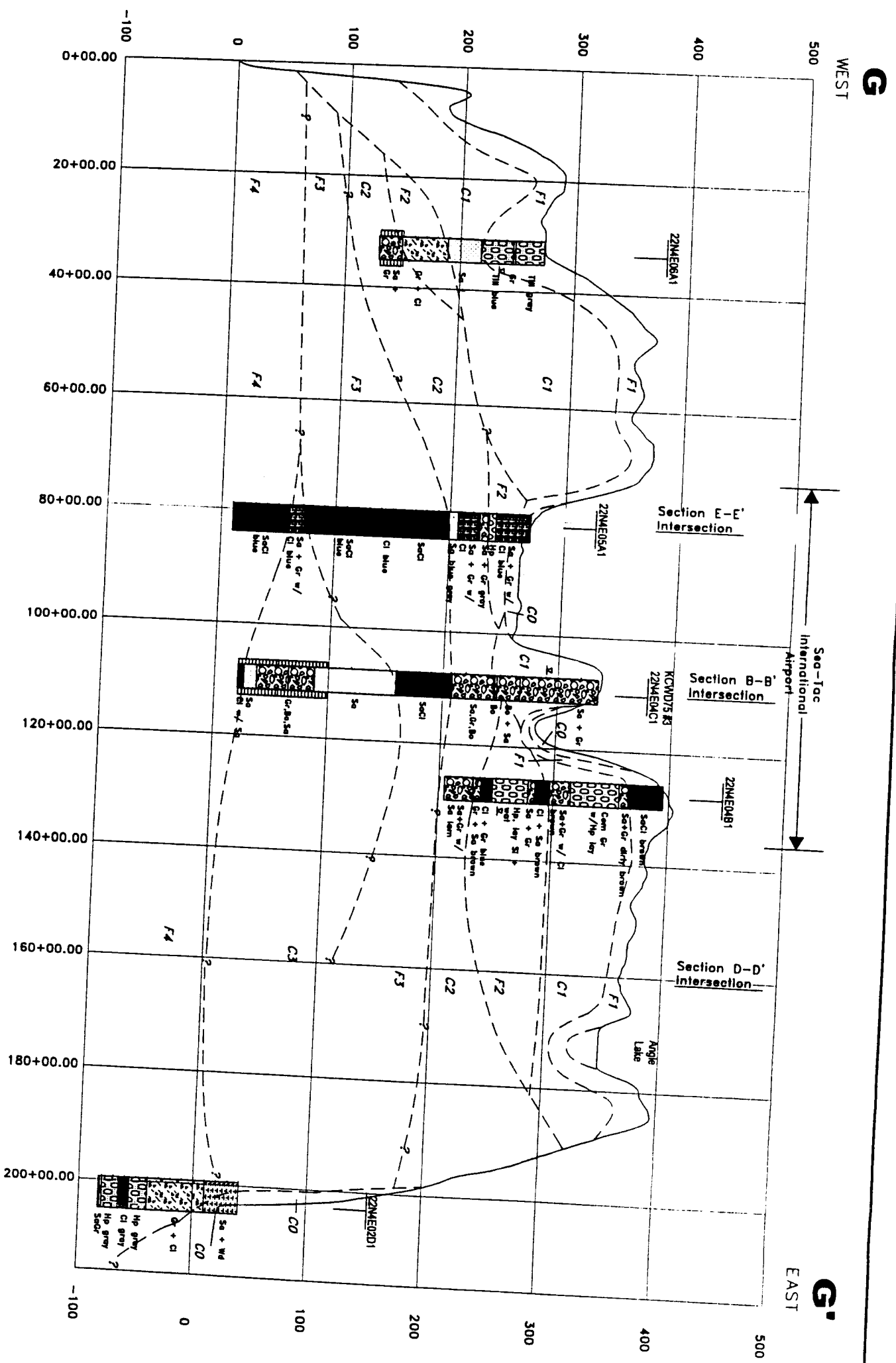
 <b>ASSOCIATED EARTH SCIENCES, INC</b>	DATE: 10/01/99 DESIGNED/DWN: DHM/TEAM	SCALE Horizontal 1" = 2000' Vertical 1" = 100'	<b>REGIONAL GEOLOGIC CROSS SECTION E-E', PART 1</b> Sta 0+00 TO Sta 280+00 Seattle - Tacoma International Airport	PROJECT NO: BV97016J FIGURE NO:
---	--	--	---	------------------------------------

AR 043200









LEGEND	
<p>STYMBOLS</p> <p>--- Approximate Ground Surface</p> <p>--- Approximate Geologic Unit Contact</p> <p>--- Observed Water Uncertainty</p> <p>--- Static Water Level Reported on Well Log</p> <p>--- Well Screen or Perforated Zone</p> <p>F1 = Interpreted Hydrogeologic Unit</p>	<p>REPORTED SOIL DESCRIPTION</p> <p>Cl = Clay</p> <p>Sl = Silty</p> <p>Ss = Sand</p> <p>Gr = Gravel</p> <p>Cs = Cobbles</p> <p>Bs = Boulders</p> <p>Dr = Depositional</p> <p>Un = Unconsolidated</p> <p>Org = Organic</p> <p>Wd = Wood</p> <p>Te = Tephra</p> <p>Pum = Pumice</p> <p>t = fine</p> <p>m = medium</p> <p>c = coarse</p> <p>w = with</p> <p>s = some</p> <p>sc = scoriaceous</p> <p>ll = illite</p> <p>h = layers</p> <p>brn = laminations</p> <p>int = interbedded</p> <p>volc = volcanic</p>

Preliminary



DATE: 9/20/99  
 DESIGNED/DWG: DHM/TEAM

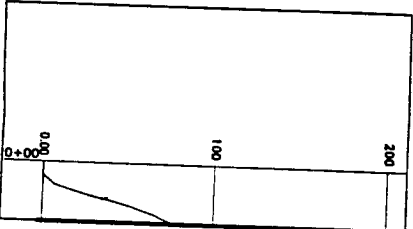
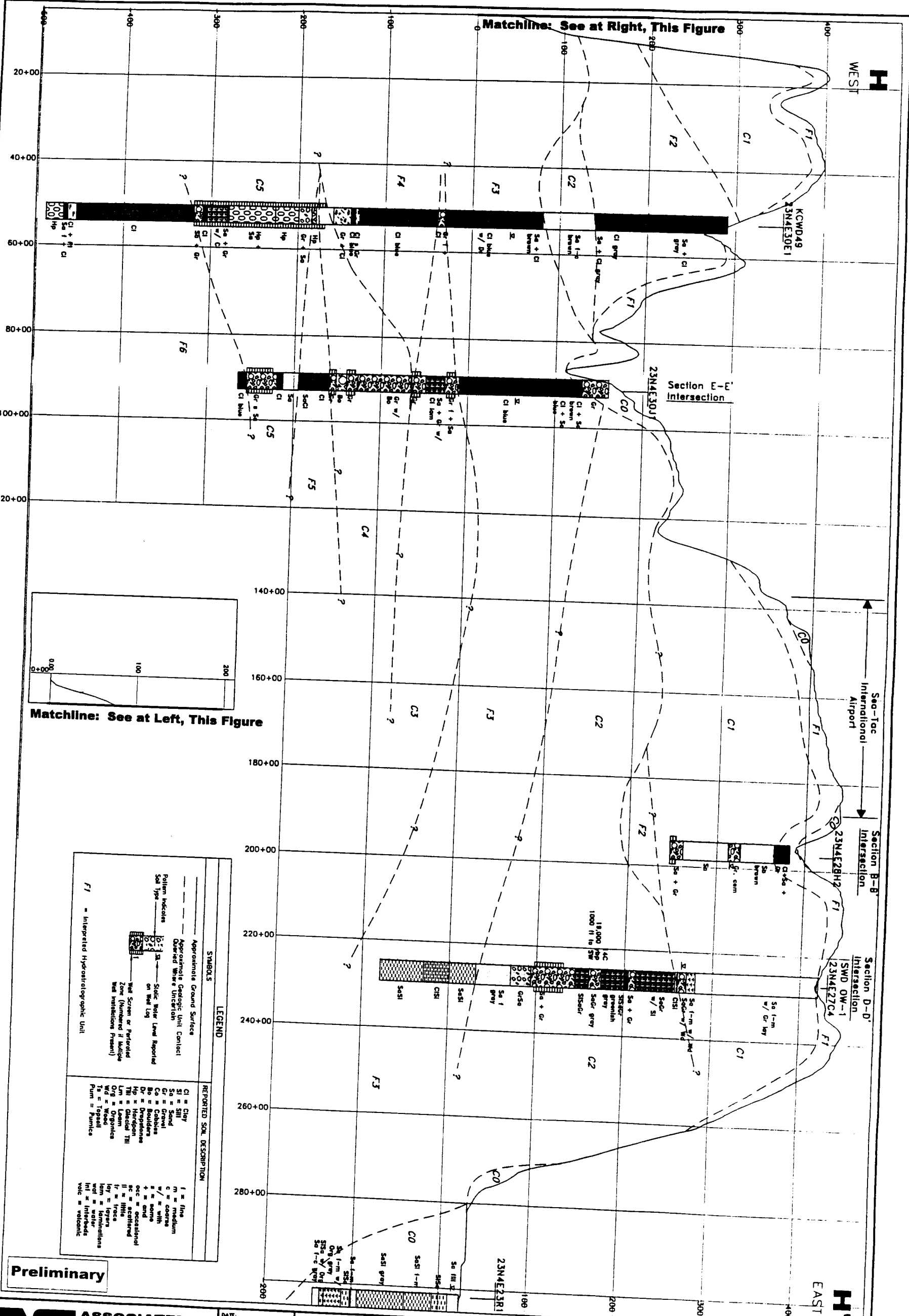
SCALE  
 Horizontal 1" = 2000'  
 Vertical 1" = 100'

**REGIONAL GEOLOGIC CROSS SECTION G-G'**  
 Study Area  
 Seattle - Tacoma International Airport

PROJECT NO: BV97016J  
 FIGURE NO: -

AR 043203





Matchline: See at Left, This Figure

SYMBOLS	
—	Approximate Ground Surface
- - -	Approximate Geologic Unit Contact
- · - · -	Approximate Where Uncertain
—	Water Table
—	Static Water Level Reported
—	Well Screen or Perforated Zone (Numbered if Multiple)
—	Well (Numbered if Multiple)
—	Pump
—	Interpreted Hydrostratigraphic Unit

REPORTED SOIL DESCRIPTION	LEGEND
Cl = Clay	l = fine
Sl = Silt	m = medium
Gr = Gravel	c = coarse
Co = Cobble	w/ = with
Bo = Boulder	s = some
Dr = Drift	sc = sand
Hp = Hardpan	cc = calcareous
Ln = Lenticular	if = trace
Org = Organic	ly = layers
Wd = Wood	ter = terraces
Pum = Pumice	int = interbedded
	vic = vicinities

Preliminary



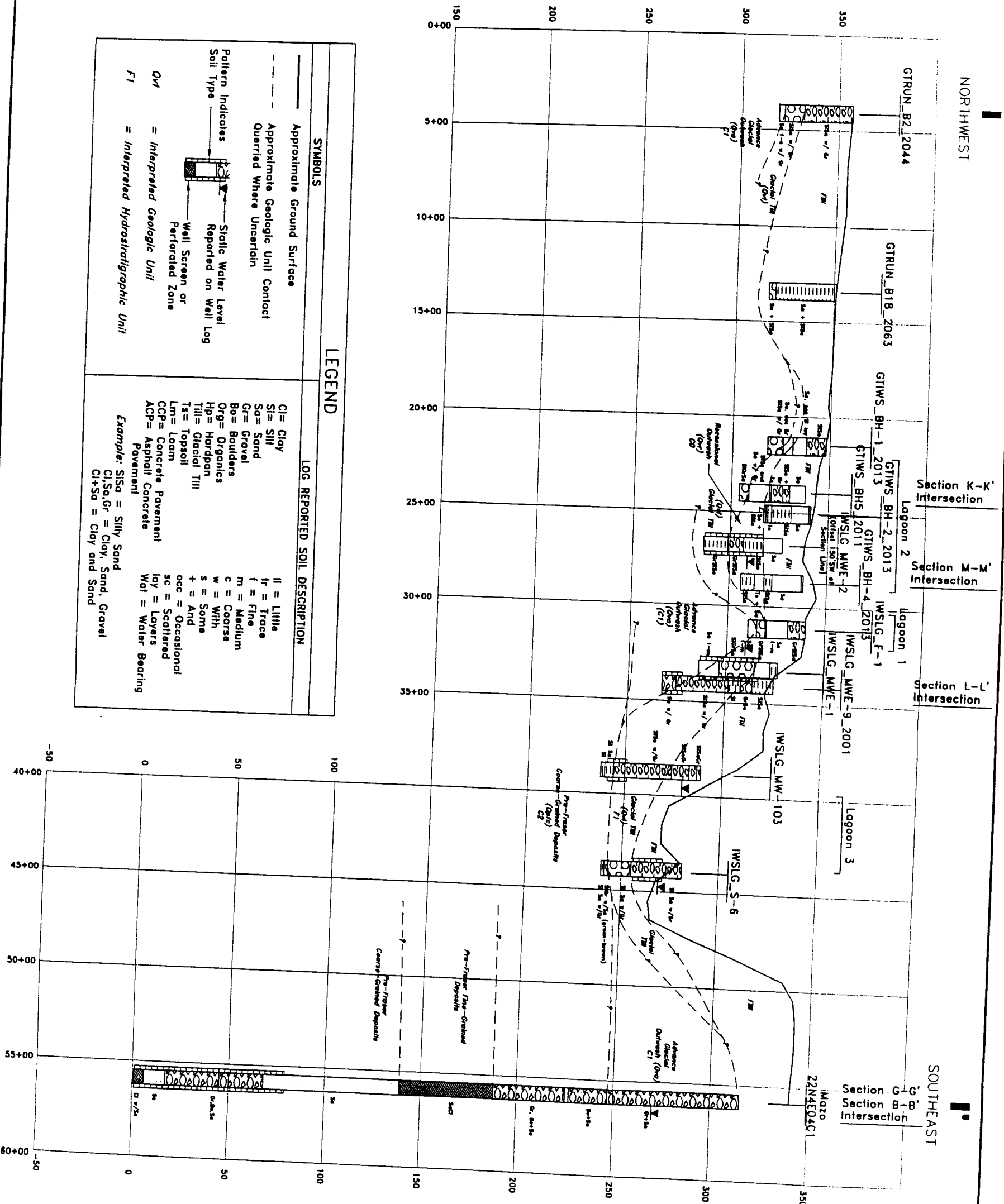
DATE: 9/29/99  
DESIGNED BY: DHM/TEAM

SCALE  
Horizontal 1" = 2000'  
Vertical 1" = 100'

REGIONAL GEOLOGIC CROSS SECTION H-H'  
Study Area  
Seattle - Tacoma International Airport

PROJECT NO: BV97016J  
FIGURE NO: 1

AR 043204



SYMBOLS	
	Approximate Ground Surface
	Approximate Geologic Unit Contact Querried Where Uncertain
	Static Water Level Reported on Well Log
	Well Screen or Perforated Zone
	Pattern Indicates Soil Type
	Ov = Interpreted Geologic Unit
	F1 = Interpreted Hydrostratigraphic Unit

LEGEND	
LOG REPORTED SOIL DESCRIPTION	
Cl = Clay	ll = Little
Si = Silt	lr = Trace
Ss = Sand	f = Fine
Gr = Gravel	m = Medium
Bo = Boulders	c = Coarse
Org = Organics	w = With
Till = Glacial Till	s = Some
Lm = Loam	+ = And
CCP = Concrete Pavement	occ = Occasional
ACP = Asphalt Concrete	sc = Scattered
Pav = Pavement	ly = Layers
	Wal = Water Bearing
Example: SiSa = Silty Sand	
ClSaGr = Clay, Sand, Gravel	
Cl+Sa = Clay and Sand	

Preliminary

**GEOLOGIC CROSS SECTION I-I'**  
 IWS P/L Area Hydrogeologic Study Area  
 Seattle - Tacoma International Airport

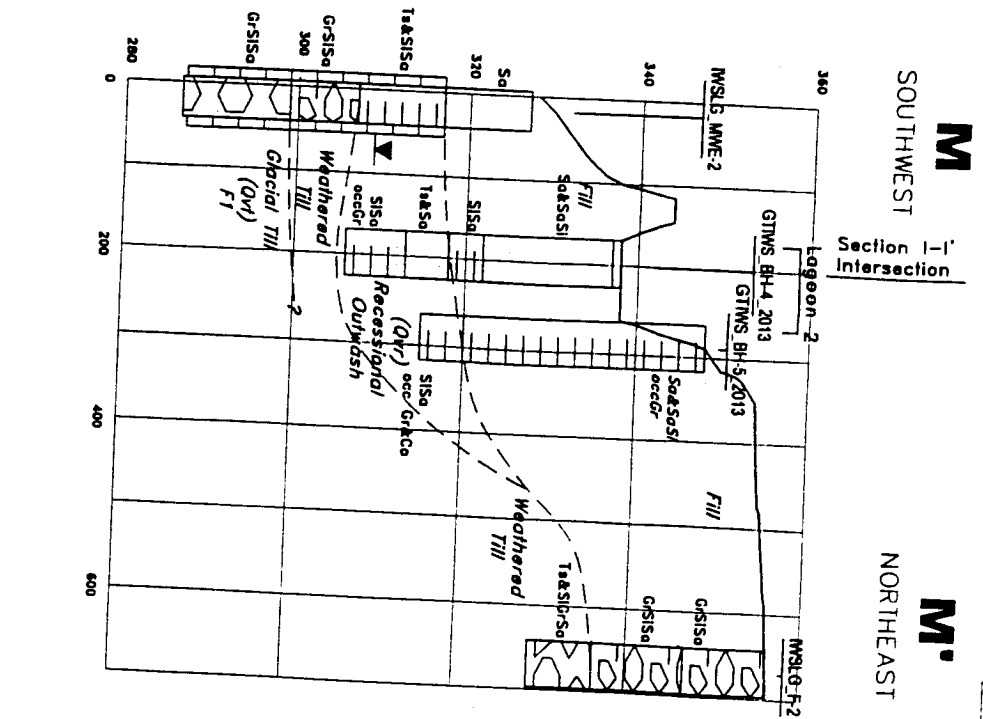
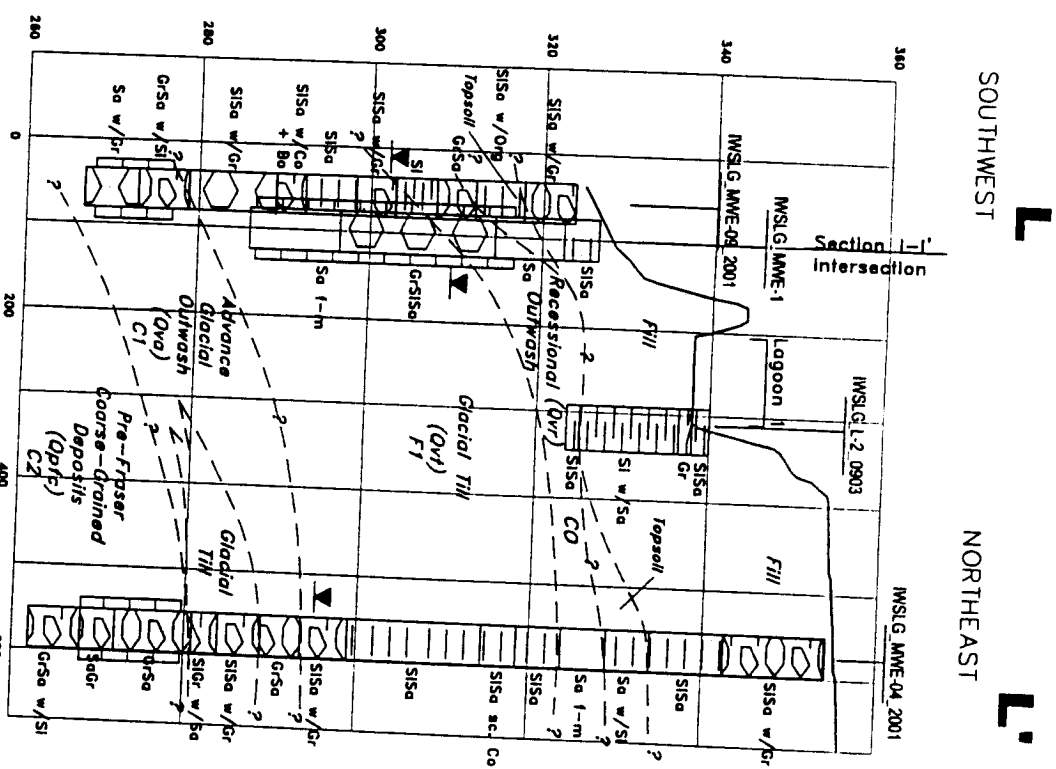
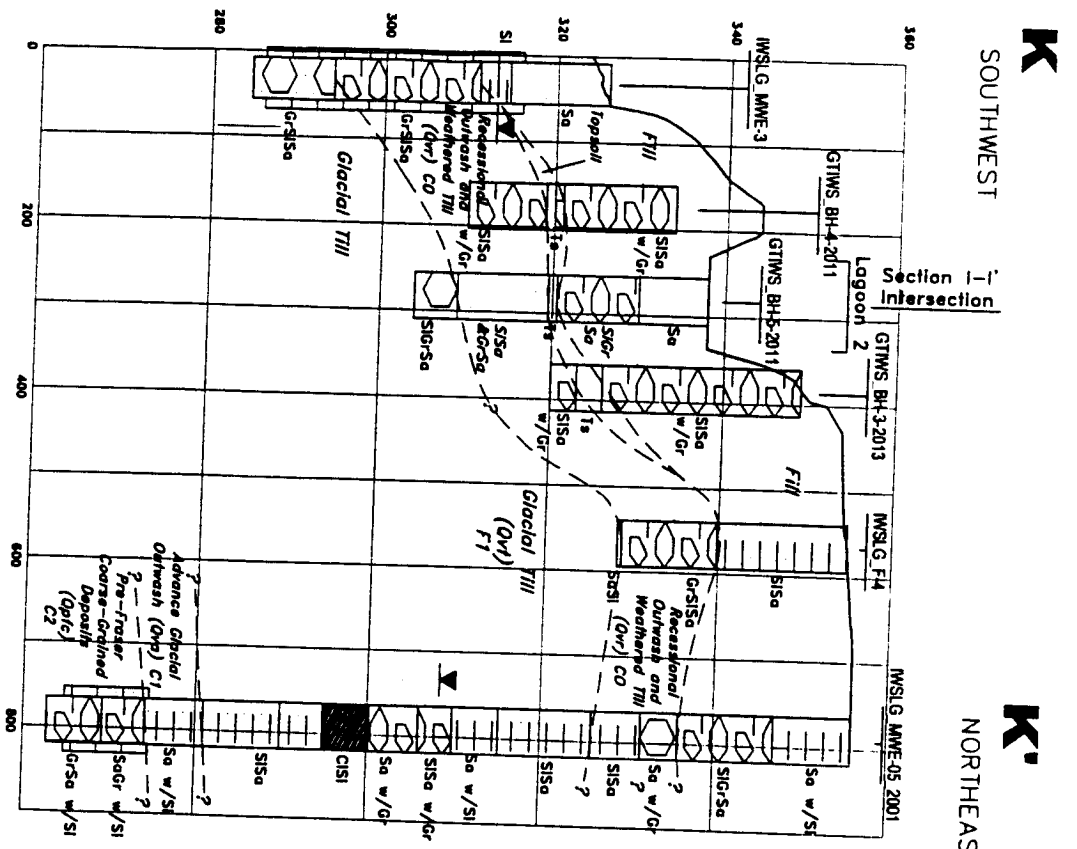
PROJECT NO  
BV98112  
 FIGURE NO  
**3.2**

DATE: 10/18/99  
 DESIGNED/DRAWN: DHM/BLB  
 APPROXIMATE SCALE  
 Horizontal 1" = 500'  
 Vertical 1" = 50'









SYMBOLS	
—	Approximate Ground Surface
- - -	Approximate Geologic Unit Contact
---	Querried Where Uncertain
LEGEND	
LOG-REPORTED SOIL DESCRIPTION	
Cl = Clay	f = Fine
Sl = Silt	m = Medium
So = Sand	c = Coarse
Gr = Gravel	lr = Trace
Co = Cobbles	ll = Little
Bo = Boulders	w/ = With
Org = Organics	3 = Some
Hp = Hardpan	+ = And
Tll = Glacial Till	occ = Occasional
Ts = Topsoil	sc = Scattered
Lm = Loam	ly = Layers
CCP = Concrete Pavement	Wol = Water Bearing
ACP = Asphalt Concrete Pavement	
Example: S1Sa = Silty Sand	
Cl, Sa, Gr = Clay, Sand, Gravel	
Cl+Sa = Clay and Sand	

Preliminary

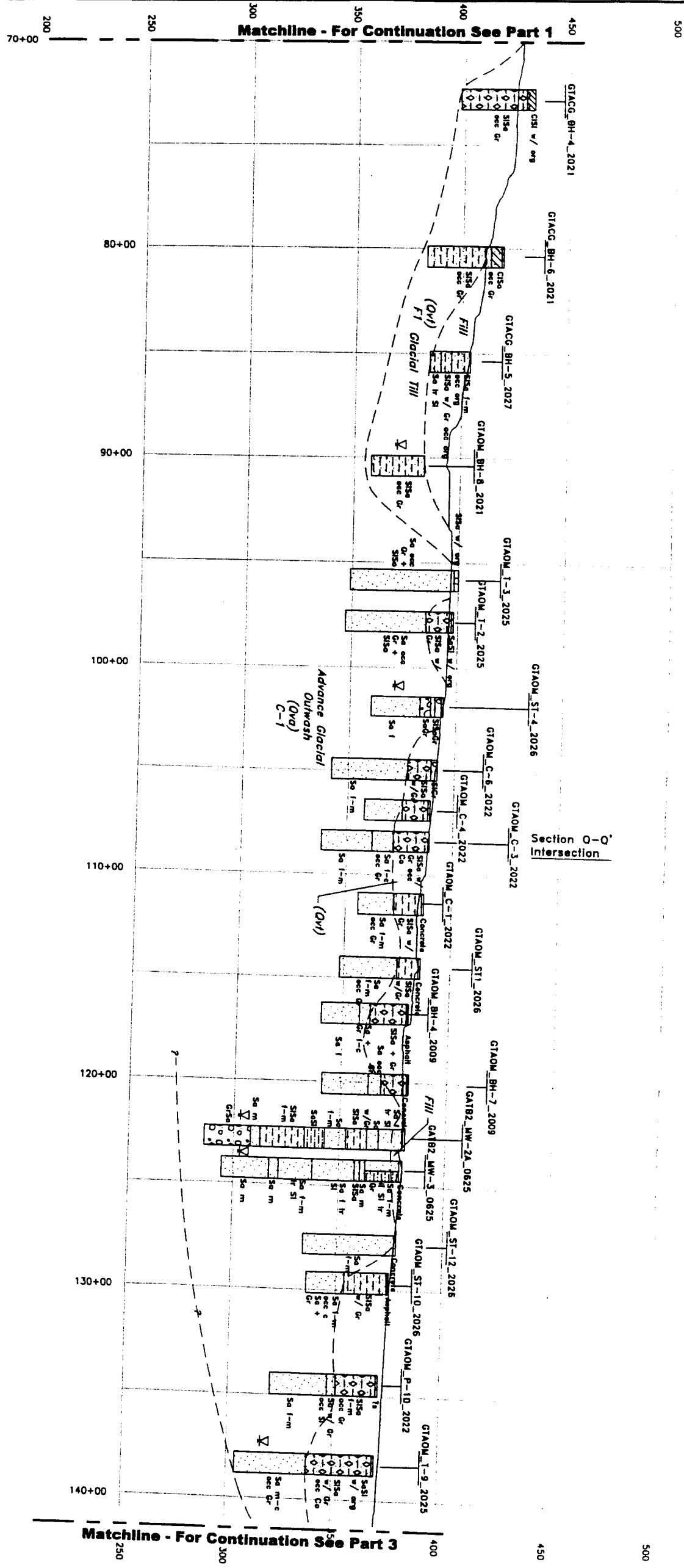


DATE: 10/18/99  
 DESIGNED/DWG: JJS/BLB  
 APPROXIMATE SCALE  
 Horizontal 1" = 200'  
 Vertical 1" = 20'

**GEOLOGIC CROSS SECTION K-K', L-L', and M-M'**  
 IWS P/L Area Hydrogeologic Study Area  
 Seattle - Tacoma International Airport

PROJECT NO: BV980112  
 FIGURE NO: 3.4





LEGEND	
<b>SYMBOLS</b>	<b>REPORTED SOIL DESCRIPTION</b>
Approximate Ground Surface Approximate Geologic Unit Contact Observed Where Uncertain Pattern Indicates Soil Type Static Water Level Reported on Well Log Well Screen or Perforated Zone (Numbered if Multiple Well Installations Present)	Cl = Clay Sl = Silty Sd = Sand Gr = Gravel Sc = Cobbles Dr = Drift Hp = Hardpan Tll = Glacial Till Org = Organic Tr = Trace Pm = Pumice Vlc = Volcanic f = fine m = medium c = coarse w/ = with s = some + = and ecc = occasional D = drift lr = layers lam = laminations int = interbeds vlc = volcanic
OM = Interpreted Geologic Unit FI = Interpreted Hydrostratigraphic Unit	

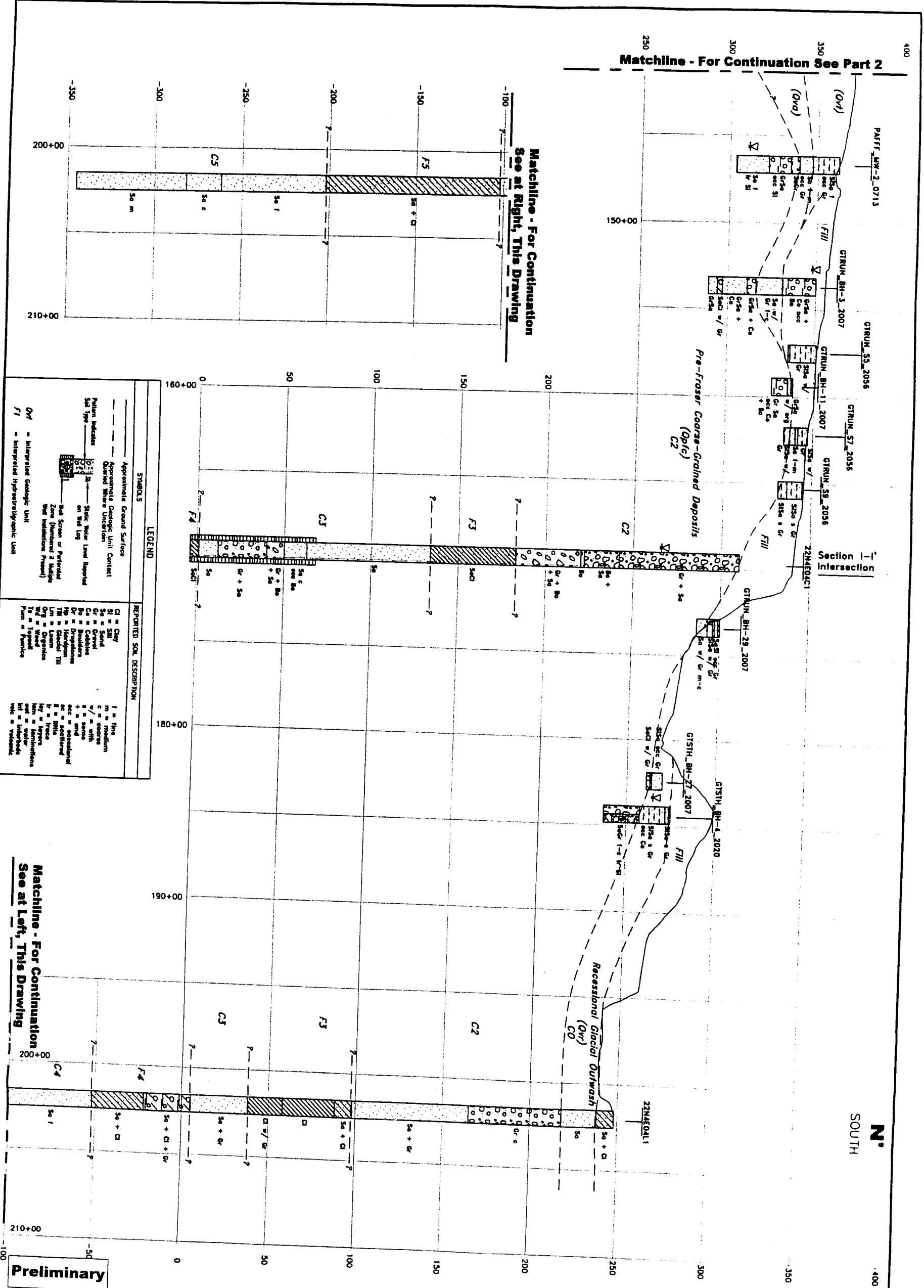
Preliminary

	DATE: 10/18/99	Approximate Scale Horizontal 1" = 500' Vertical 1" = 50'	PROJECT NO. BV97016J
	DESIGNED/DRAWN: DHM/TEAM		FIGURE NO. -

**Terminal Area Geologic Cross Section N-N' Part 2**  
 Study Area  
 Seattle - Tacoma International Airport

AR 043209





**LEGEND**

SYMBOLS	REPORTED SOIL DESCRIPTION
—	Approximate Ground Surface
---	Approximate Geologic Unit Contact
---	Approximate Water Underlain
—	Static Water Level Reported on Well Log
—	Well Screen or Perforated Zone (Numbered if Multiple and Indentations Present)
—	Interpreted Geologic Unit
—	Interpreted Hydrostratigraphic Unit

REPORTED SOIL DESCRIPTION
Cl = Clay
SI = Silt
Sa = Sand
Gr = Gravel
Ca = Cobble
Dr = Drift
Hs = Hardpan
Ln = Loam
Om = Organic Matter
Op = Organic Peat
Tr = Till
Un = Undersize
Wk = Volcanic

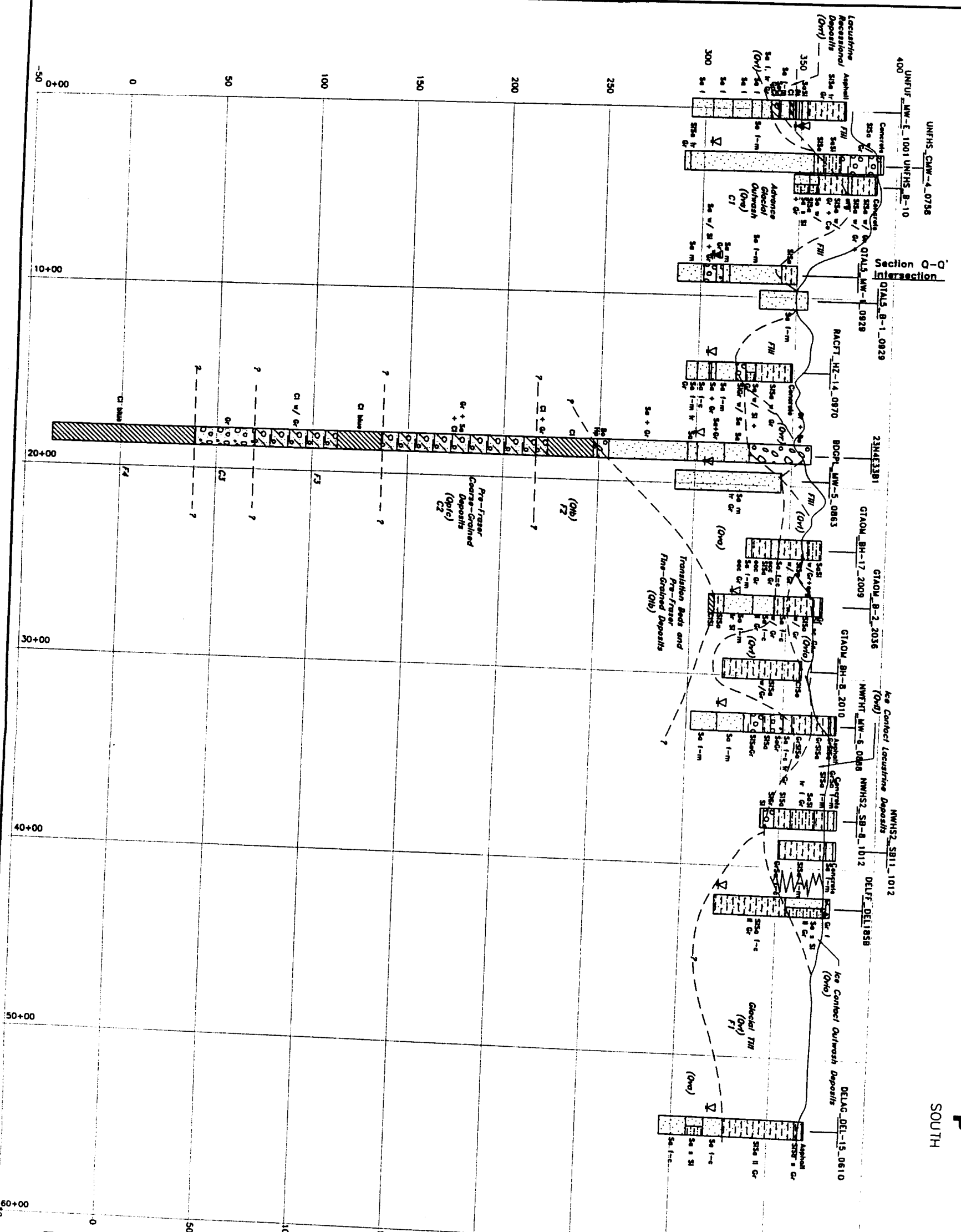
SYMBOLS	REPORTED SOIL DESCRIPTION
1 = fine	
m = medium	
c = coarse	
w/ = with	
s = some	
and = and	
ecc = eccreted	
acc = accreted	
fr = friable	
ltn = lumpy	
lsh = lenticular	
int = interbedded	
vac = volcanic	

	DATE: 10/18/99	Approximate Scale Horizontal 1" = 500' Vertical 1" = 50'	<b>Terminal Area Geologic Cross Section N-N' Part 3</b> Study Area Seattle - Tacoma International Airport
	DESIGNED BY: DHM/TEAM		PROJECT NO: BV97016J

AR 043210

**P**  
NORTH

**P'**  
SOUTH



SYMBOLS		REPORTED SOIL DESCRIPTION	
	Approximate Ground Surface	Cl = Clay	f = fine
	Approximate Geologic Unit Contact Queried Where Uncertain	SI = Silty	m = medium
	Static Water Level Reported on Well Log	Sa = Sand	c = coarse
	Well Screen or Perforated Zone (Numbered if Multiple Well Installations Present)	Gr = Gravel	w/ = with
		Co = Cobbles	s = some
		Be = Boulders	+ = and
		Dr = Dropstones	occ = occasional
		Hp = Hardpan	sc = scattered
		Till = Glacial Till	ll = little
		Lm = Loam	tr = trace
		Org = Organics	lay = layers
		Wd = Wood	lam = laminations
		Te = Tephall	wat = water
		Pum = Pumice	int = interbeds
			volc = volcanic

Preliminary



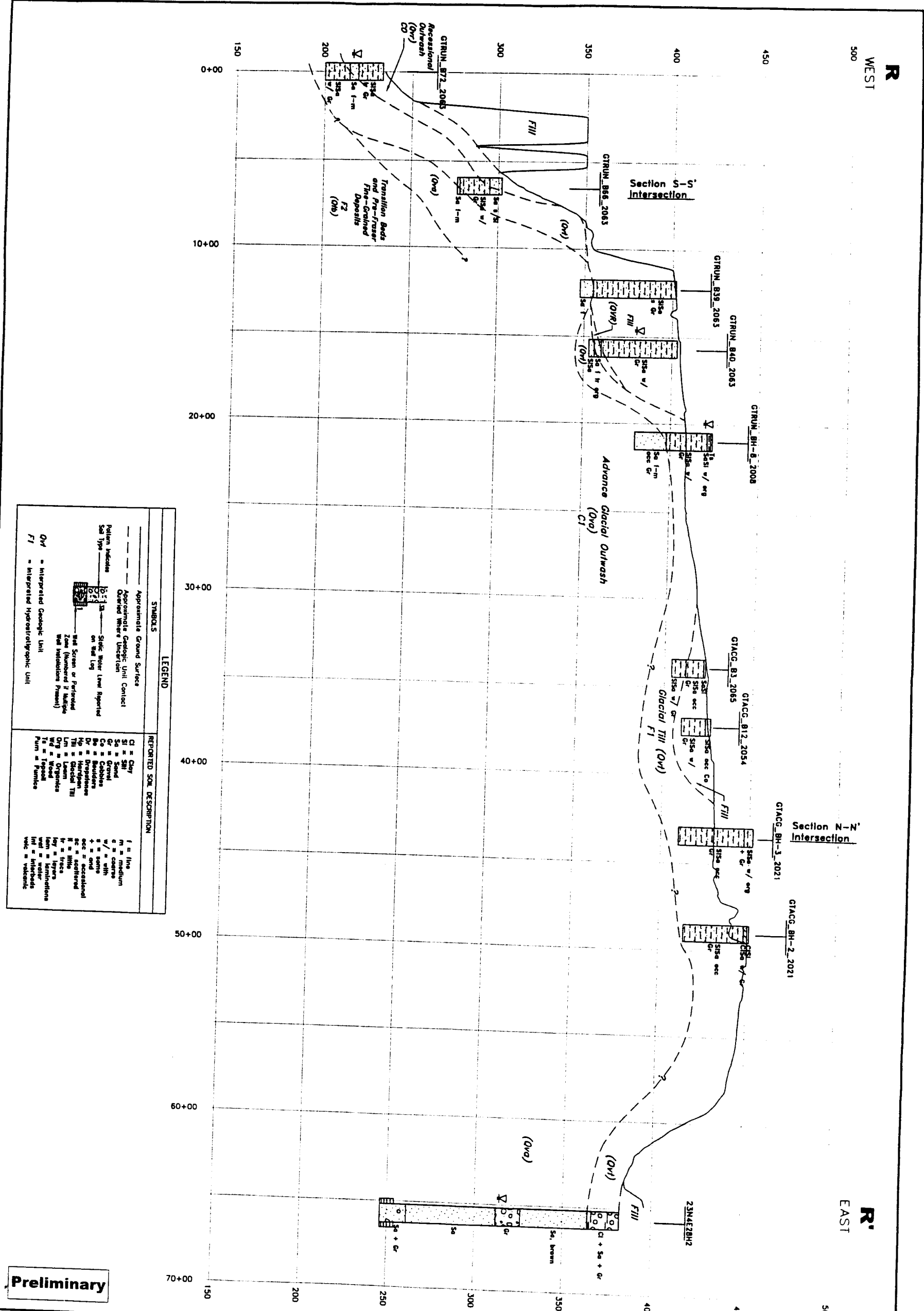
DATE: 10/18/99  
 DESIGNED/CHK: DHM/TEAM  
 Approximate Scale  
 Horizontal 1" = 500'  
 Vertical 1" = 50'

**TERMINAL AREA GEOLOGIC CROSS SECTION P-P'**  
 Study Area  
 Seattle - Tacoma International Airport

PROJECT NO: BV97016J  
 FIGURE NO: 1

AR 043211



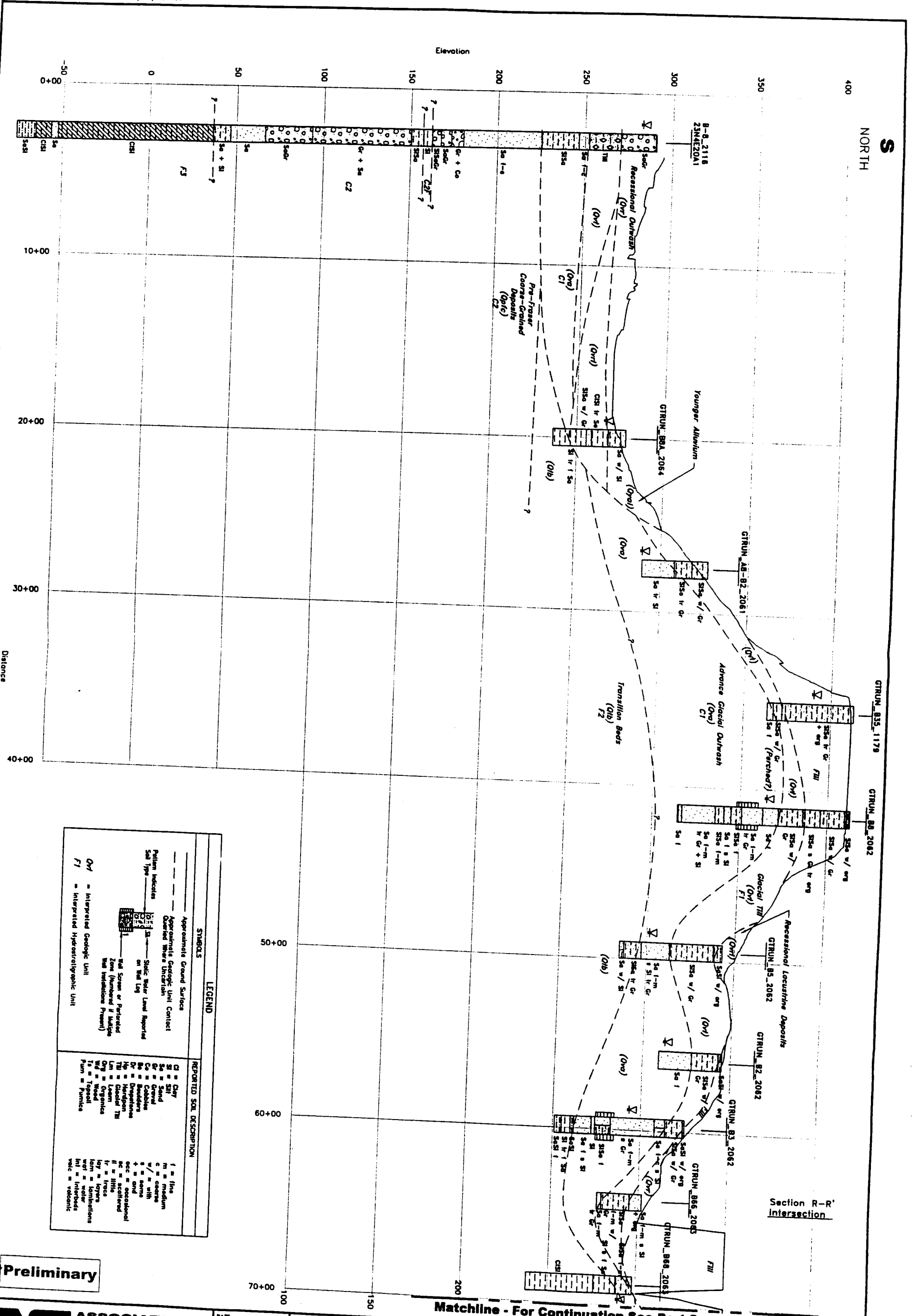


LEGEND	
<b>SYMBOLS</b>	<b>REPORTED SOIL DESCRIPTION</b>
Approximate Ground Surface Approximate Geologic Unit Contact Quaternary Where Uncertain Pollen Indicator Soil Type	Cl = Clay Ss = Sand Gr = Gravel Cc = Cobble Br = Boulder Dr = Drift Tr = Till Lm = Laminar Ogr = Organic Wd = Wood Fm = Fossil Vc = Volcanic
Static Water Level Reported on Well Log Well Screen or Perforated Zone (Number of Multiple Well Intervals Present) OVI = Interpretive Geologic Unit F1 = Interpretive Hydrostratigraphic Unit	f = fine m = medium c = coarse w = with ec = occasional ac = scattered R = trace Tr = trace Int = Interbedded Int = Interbedded Vc = Volcanic

Preliminary

	DATE: 10/05/99 DESIGNED/OWN: DHM/TEAM	SCALE Horizontal 1" = 500' Vertical 1" = 50'	<b>TERMINAL AREA GEOLOGIC CROSS SECTION R-R'</b> Study Area Seattle - Tacoma International Airport	PROJECT NO: BV97016J FIGURE NO:
--	--	--	--	------------------------------------





LEGEND	
<b>SYMBOLS</b>	<b>REPORTED SOIL DESCRIPTION</b>
--- Approximate Ground Surface --- Approximate Geologic Unit Contact --- Contact Where Uncertain --- Sodic Water Level Reported on Well Log --- Well Screen or Perforated Zone (Numbered if Multiple Well Intervals Present) --- <i>Oh</i> = Interpreted Geologic Unit --- <i>FI</i> = Interpreted Hydrogeologic Unit	Cl = Clay Silt = Silt Sand = Sand Gr = Gravel C = Cobble D = Boulder H = Hardpan Lm = Lamin Qg = Organic T = Till Fm = Fines m = fine c = coarse w = with s = some + = and oc = occasional h = little tr = trace fr = fragments int = interbedded vol = volcanic

Preliminary



DATE: 10/18/99  
 DESIGNED/DWG: DHM/TEAM

APPROXIMATE SCALE  
 Horizontal 1" = 500'  
 Vertical 1" = 50'

**Terminal Area Geologic Cross Section S-S' Part 1**  
 Study Area  
 Seattle - Tacoma International Airport

PROJECT NO: BV97016J  
 DRAWING NO:

Geologic Group	Proposed Seattle Map Unit	Geologic Unit Name	Schematic Geologic Column	Hydro-Stratigraphic Unit	South King Co. Ground Water Mgmt. Plan Unit	Modal Condition
Post Glacial Deposits	mi7	Fill		C0 and F0 (Mixed Order)	Del and Qvr	Perched Water Bearing Zones and Aquitards
	Qvt Qvt Qvr	Recent Alluvium (fine and coarse grained) Recessional Outwash (fine and coarse grained)				
Pre-Pressur Glacial Deposits	Qvs Qvs Qvg	Vashon Glacial Till		F1	Qvt	Aquitard
	Qvt	Vashon Glacial Till				
Pre-Pressur Glacial and Non-Glacial Deposits	Qts	Advance Outwash "Esperance Sand"		F2	Qvt and Q(1)	Aquitard
	Qpfc	Transition Beds "Lawton Clay"				
	Qpff	Olympic Massif, Puget Sound, and Whidbey Non-glacial Deposits				
	Qpfc	Older Pre-Pressur Deposits (fine grained)				
	Qpff	Older Pre-Pressur Deposits (coarse grained)				
	Qpfc	Older Pre-Pressur Deposits (fine grained)				
	Qpff	Older Pre-Pressur Deposits (coarse grained)				
	Qpfc	Older Pre-Pressur Deposits (fine grained)				
	Qpff	Older Pre-Pressur Deposits (coarse grained)				
	Qpfc	Older Pre-Pressur Deposits (fine grained)				
Bedrock	Qpfc and Qpff	Additional Coarse Grained units and Fine Grained units	7	C5, F5, C6	Tbr	Aquitard
	Yu	Tertiary Bedrock				

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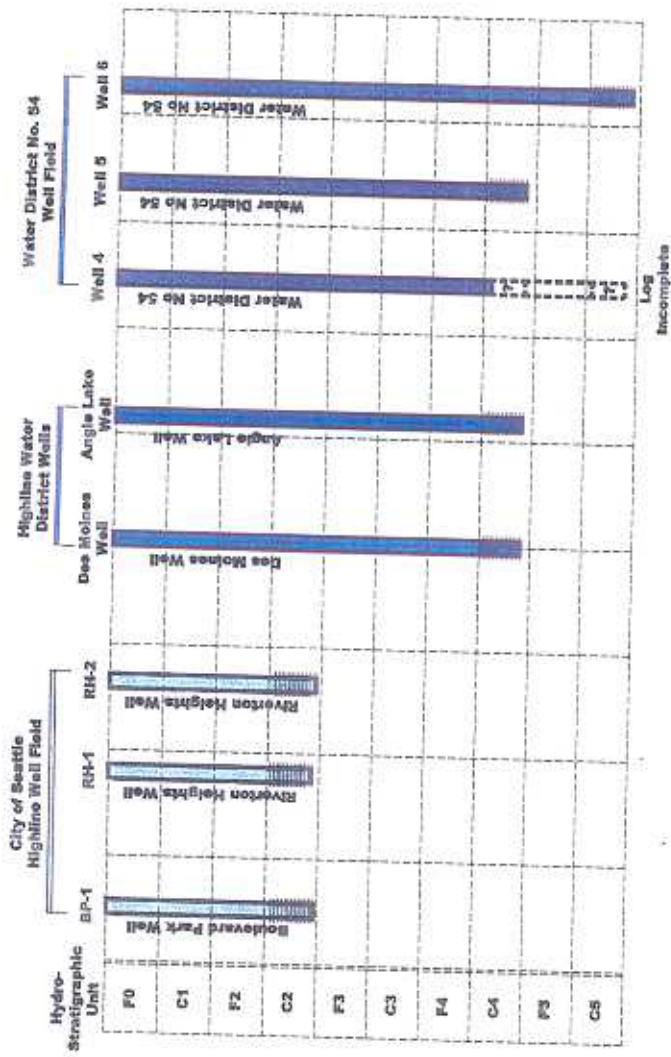
DATE: 02/07/16  
 PREPARED BY: JLS/SLA  
 PROJECT NO: 143216  
 DRAWING NO: 5

**Conceptual Hydrostratigraphic Framework**  
 Ground Water Study  
 Seattle - Tacoma International Airport

AR 043215







### Pumping Summaries

#### City of Seattle Highline Well Field

Well	Pumping Rate	Pumping Duration
Riverton No. 1	3200 gpm	3mos./yr, no recharge
Riverton No. 2	1800 gpm	3mos./yr, no recharge
Boulevard Park No. 1	2000 gpm	3mos./yr, no recharge

- Second well at Boulevard Park proposed  
 - Aquifer Storage and Recovery (ASR) program - injection water to intermediate aquifer if water levels do not return to static or pre-pumping levels by May of any year.

#### Highline Water District

Well	Pumping Rate	Pumping Duration
Des Moines Well	1200 gpm	5 days/wk, 8 hrs/day
Angle Lake Well	1200 gpm	5 days/wk, 8 hrs/day

District may increase pumping duration to 24 hours per day seasonally, pending sustainability testing.

#### Water District No. 54

Well	Pumping Rate	Pumping Duration
Well No. 4	3200 gpm	25 millions gallons
Well No. 5	1800 gpm	90 millions gallons
Well No. 6	2000 gpm	32 millions gallons



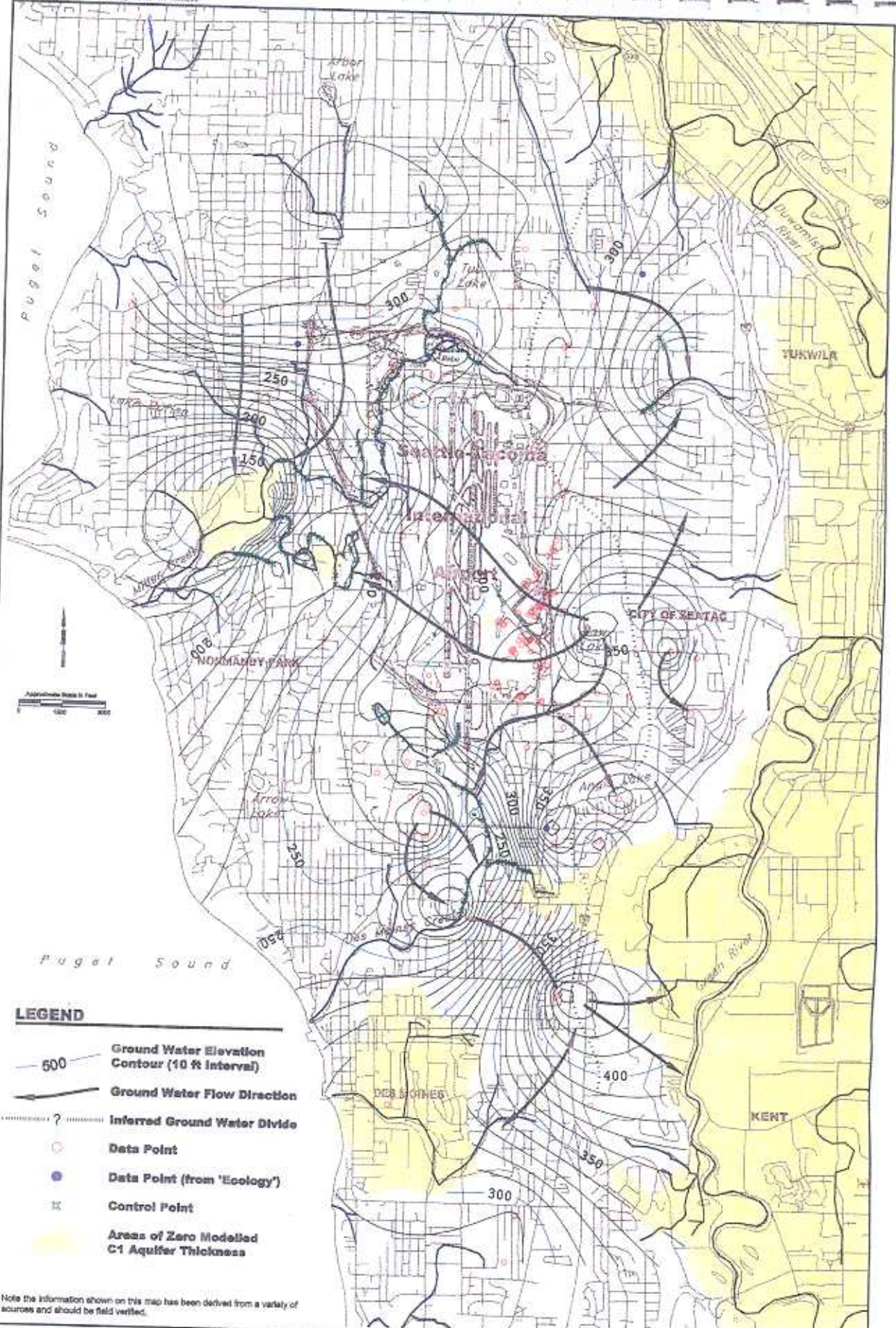
DATE: 08/01/76  
 REVISION: JAY/PLJ

Summary of Public Water Supply Wells  
 Ground Water Study  
 Seattle - Tacoma International Airport

PROJECT NO. 820016  
 DRAW NO. 7

AR 043217



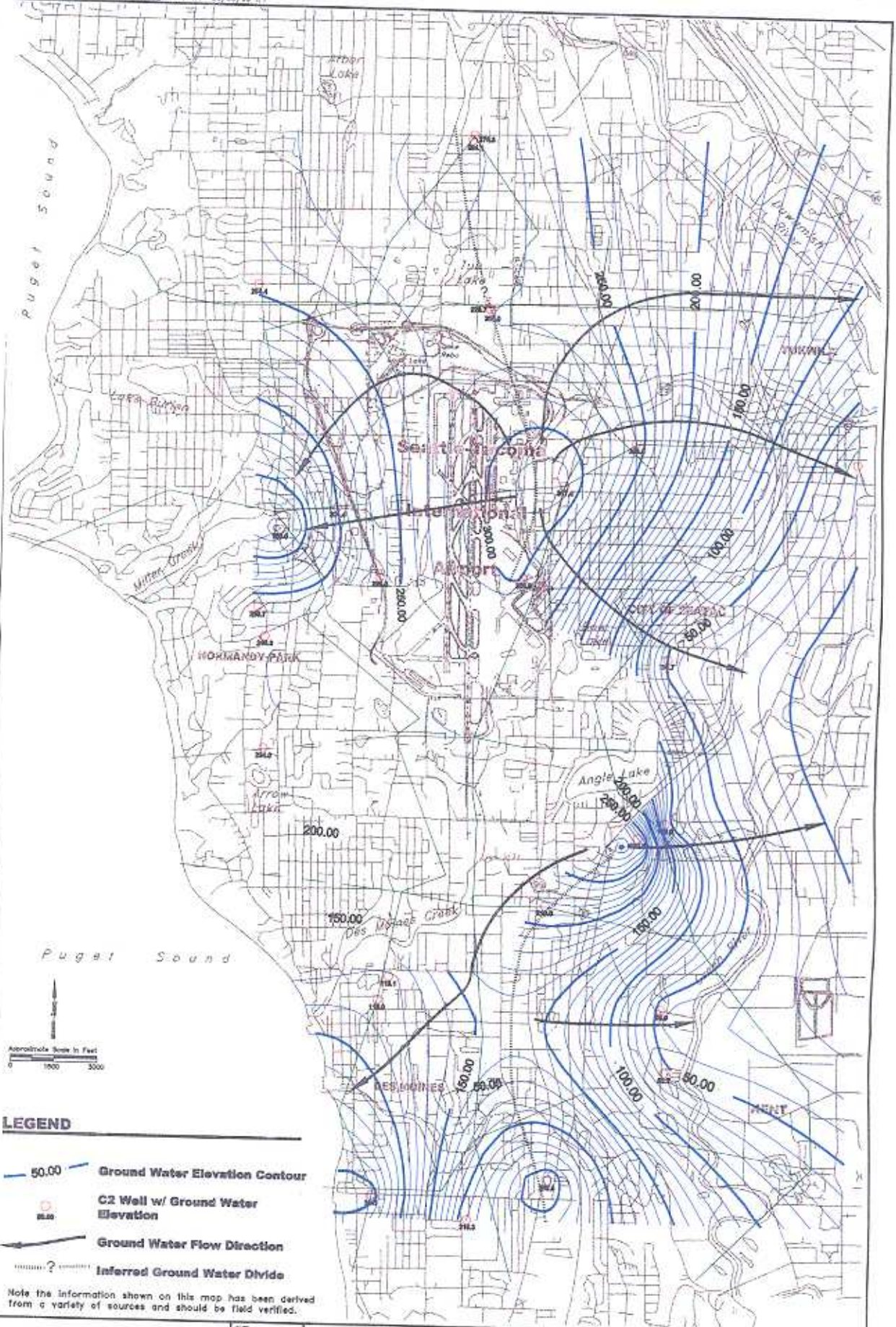


- LEGEND**
- 500 Ground Water Elevation Contour (10 ft Interval)
  - Ground Water Flow Direction
  - Inferred Ground Water Divide
  - Data Point
  - Data Point (from 'Ecology')
  - Control Point
  - Areas of Zero Modelled C1 Aquifer Thickness

Note the information shown on this map has been derived from a variety of sources and should be field verified.

AR 043218





**LEGEND**

- 50.00 Ground Water Elevation Contour
- 15.00 C2 Well w/ Ground Water Elevation
- Ground Water Flow Direction
- Inferred Ground Water Divide

Note the information shown on this map has been derived from a variety of sources and should be field verified.

AR 043219

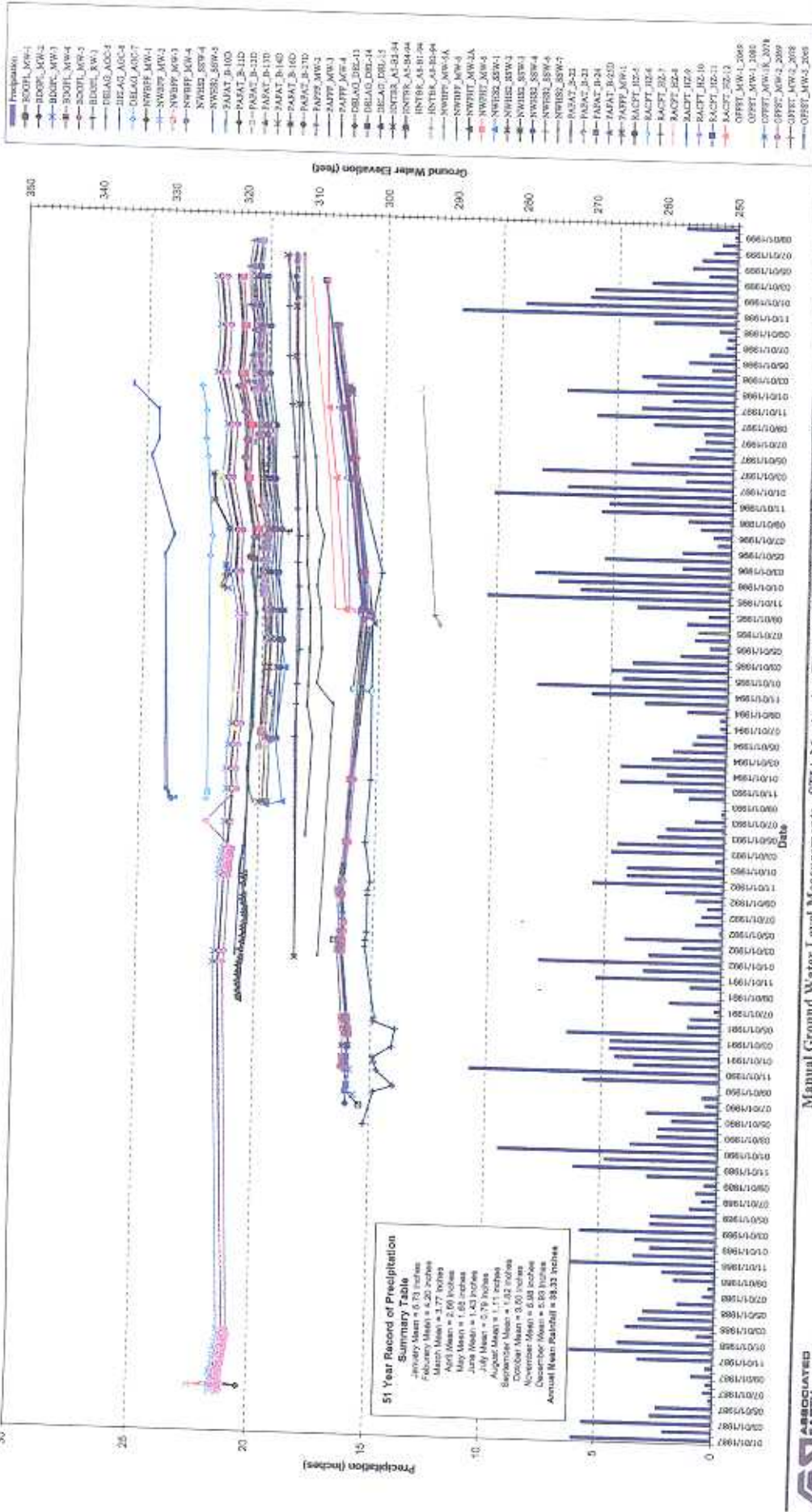


DATE: 05/06/99  
 DRAWN BY: [illegible]  
 CHECKED BY: [illegible]

**Ground Water Flow Map - C2 Aquifer**  
 Ground Water Study  
 Seattle - Tacoma International Airport

PROJECT NO: 8997516  
 SHEET NO: 8b





Manual Ground Water Level Measurements - STIA Monitoring Wells Completed in 'CI' (Qva) Aquifer  
 Ground Water Study  
 Seattle - Tacoma International Airport

Figure 9

File: \\slayer\NRP1\swat\slayer\slayer\CI.sta - Figure 10 (11 x 17 plot).d

AR 043220



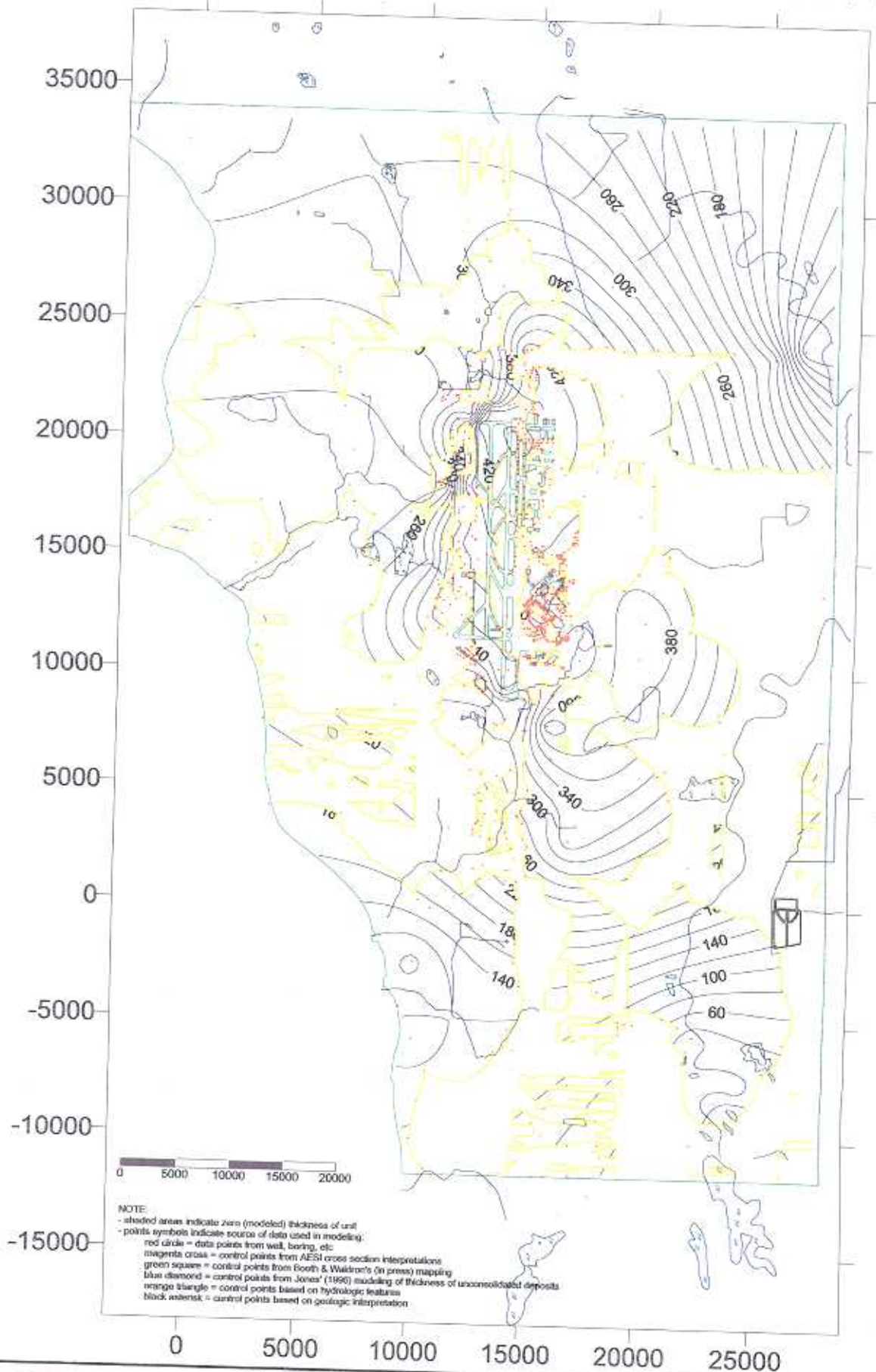
12/07/99

**Figure 10**  
**Summary of Aquifer Parameters**

**Ground Water Study**  
**Seattle-Tacoma International Airport**


<b>Aquifer</b>		<b>Specific Capacity (gpm/ft)</b>	<b>Transmissivity (ft<sup>2</sup>/d)</b>	<b>Hydraulic Conductivity (ft/d)</b>	<b>Storativity</b>
<b>C1 (Qva)</b>	Min	4	1686	5.90E-02	9.00E-02
	Average	NA	NA	38.7	NA
	Max	4	1686	113.4	9.00E-02
	Number	1	1	17	1
<b>C2 (Qc(3))</b>	Min	1	45	2.15E-01	2.00E-05
	Average	23	15203	71.1	8.14E-04
	Max	105	66850	141.9	5.10E-03
	Number	13	22	2	14
<b>C3 (Qc(4))</b>	Min	4	254	NA	NA
	Average	14	2779	NA	NA
	Max	34	4479	NA	NA
	Number	5	4	0	0

NA: Not applicable. Number of values less than or equal to 1.

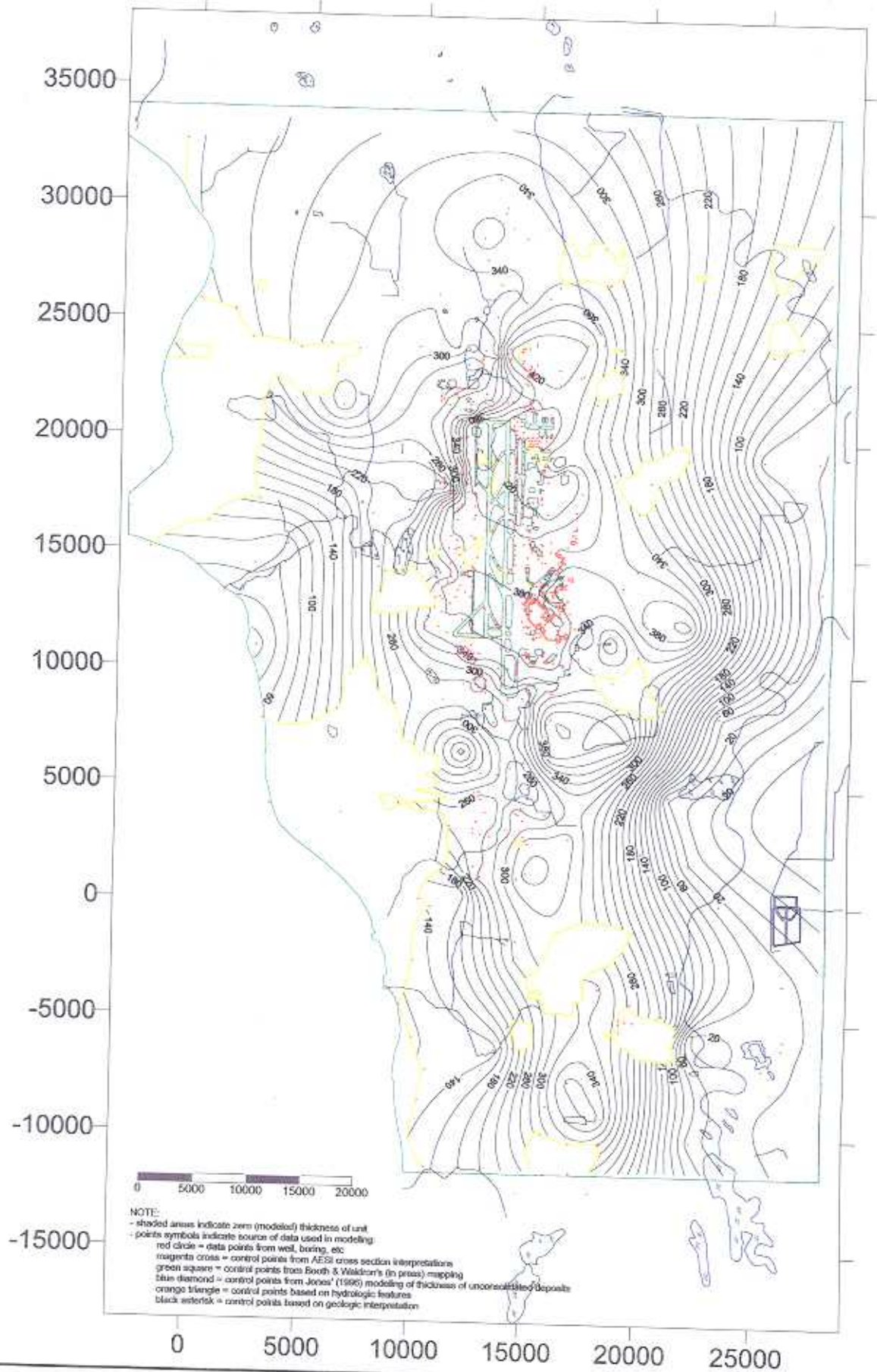


NOTE:  
 - shaded areas indicate zero (modeled) thickness of soil  
 - points symbols indicate source of data used in modeling:  
 red circle = data points from well, boring, etc.  
 magenta cross = control points from AESI cross section interpretations  
 green square = control points from Booth & Waldron's (in press) mapping  
 blue diamond = control points from Jones' (1996) modeling of thickness of unconsolidated deposits  
 orange triangle = control points based on hydrologic features  
 black asterisk = control points based on geologic interpretation

AR 043222

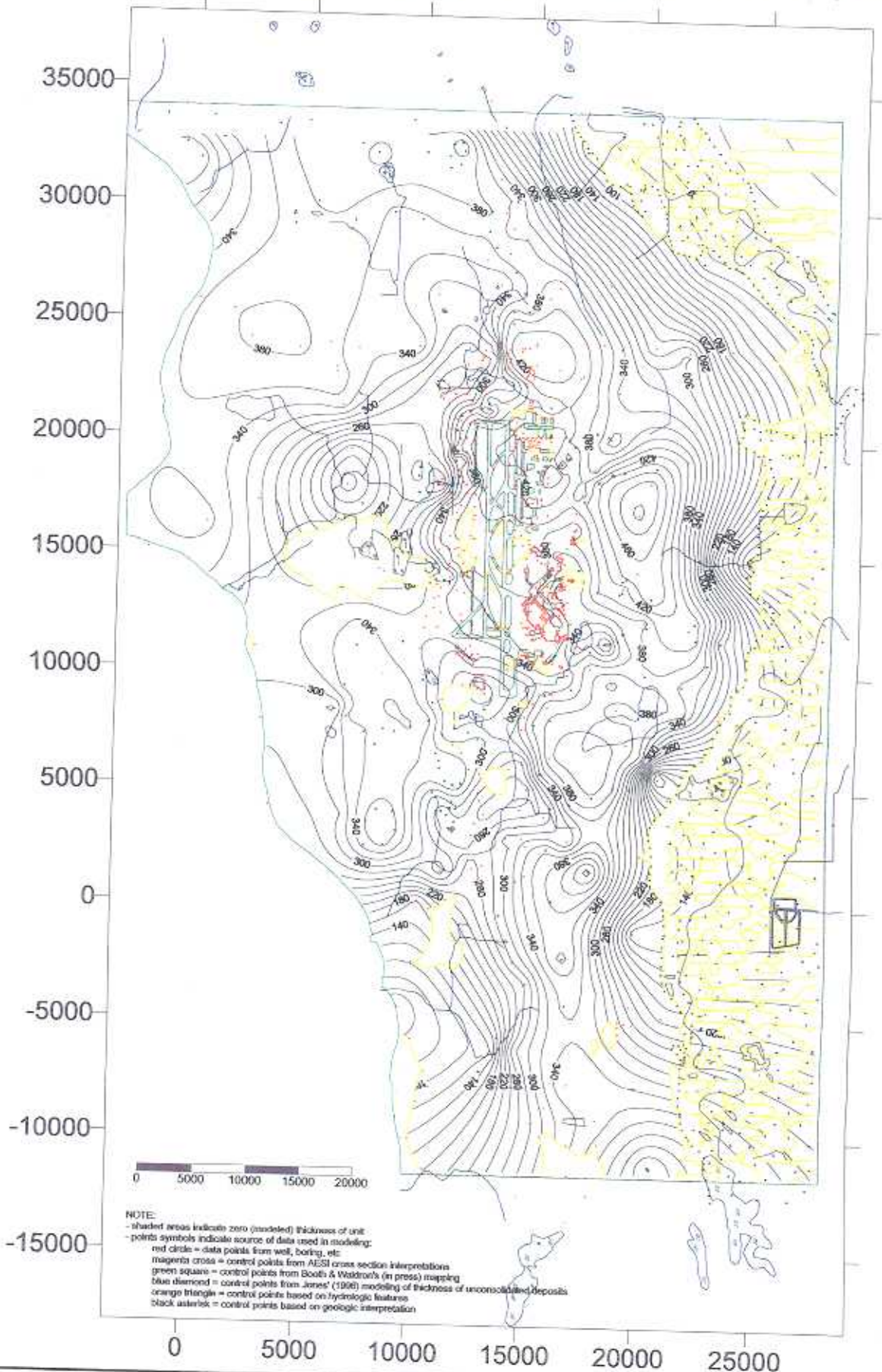

 Elevation of Top of Hydrostratigraphic Unit F0  
 Stratigraphic Modelling, STIA Groundwater Study Figure 11



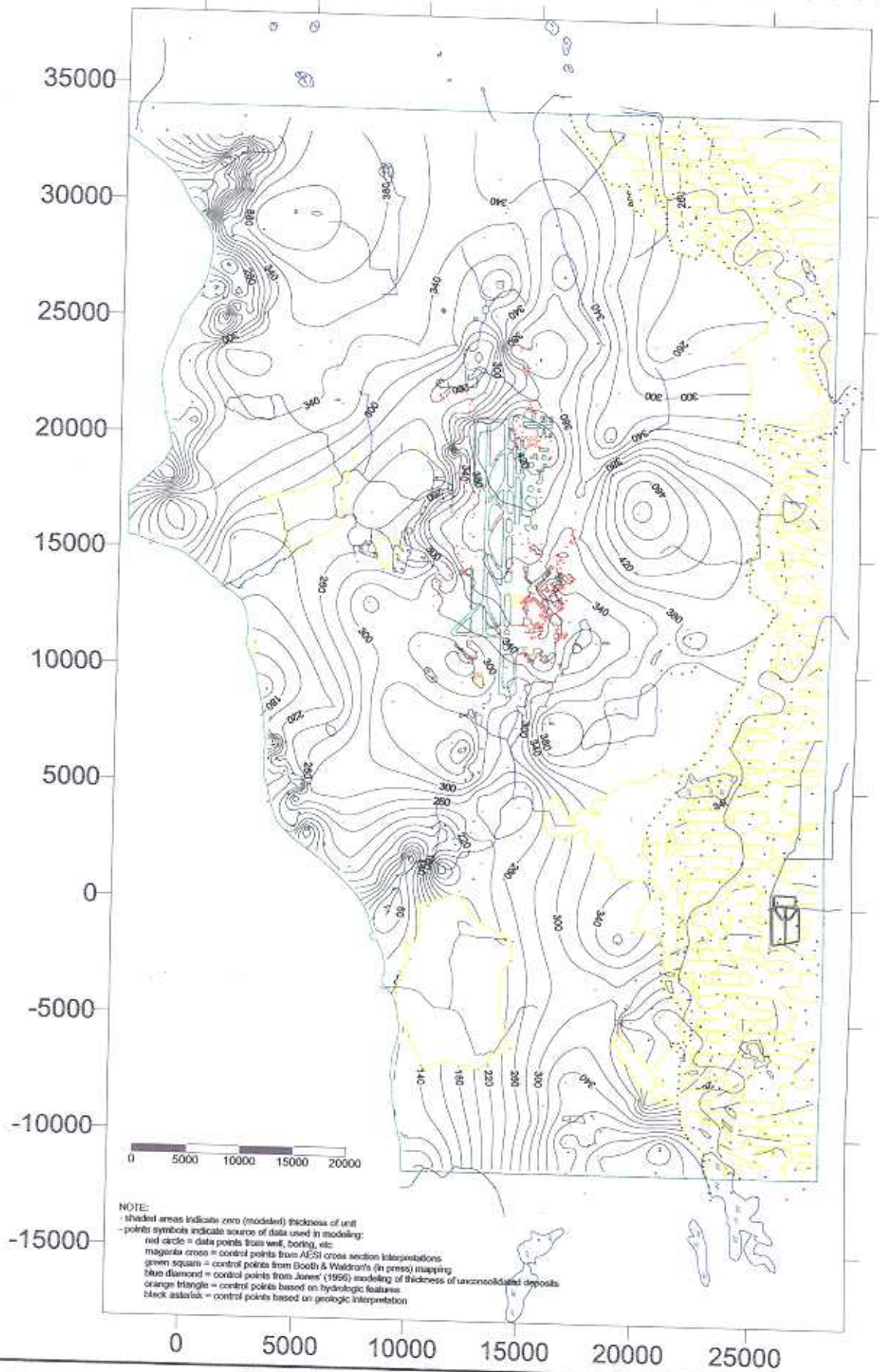


AR 043223



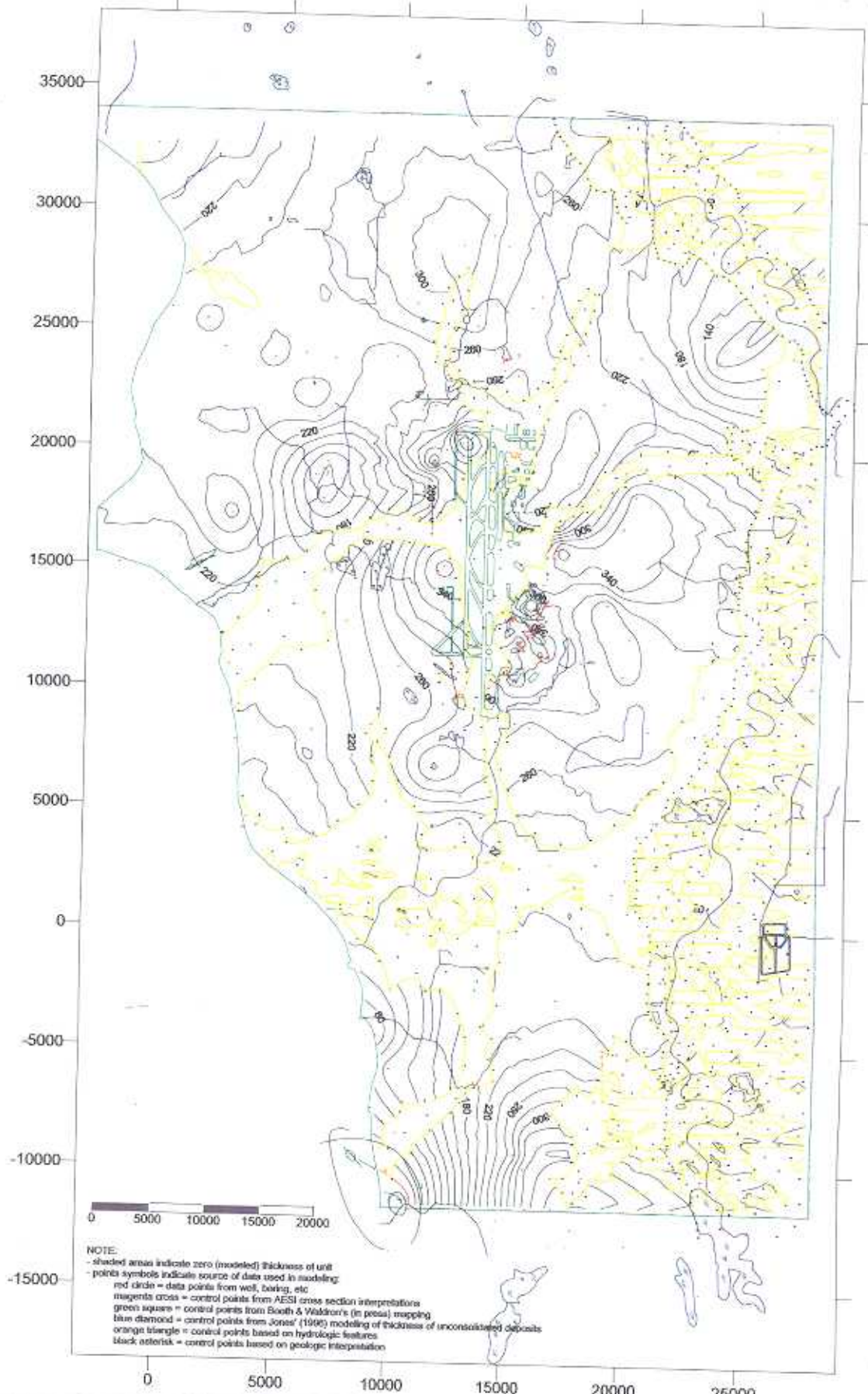


AR 043224

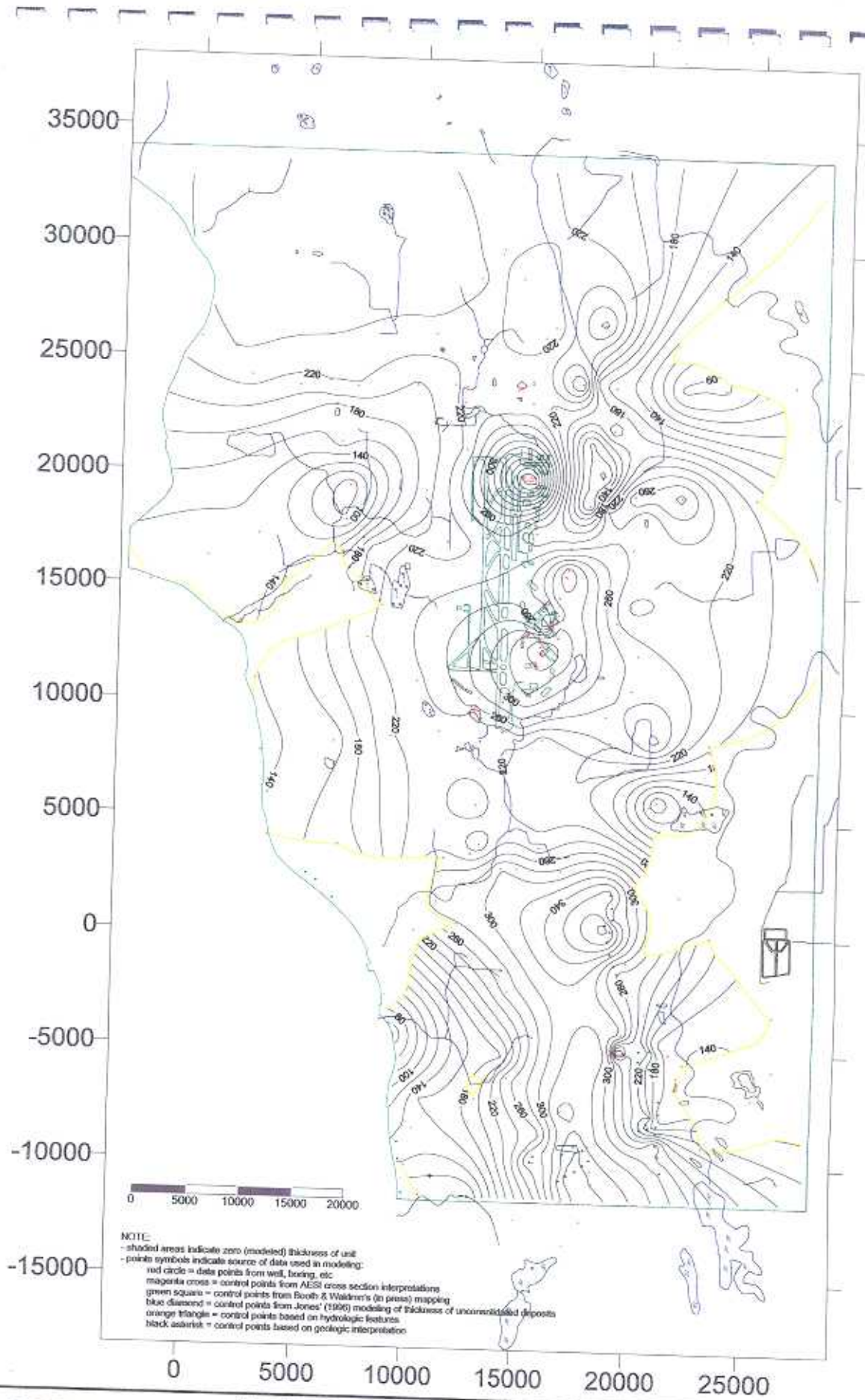


AR 043325





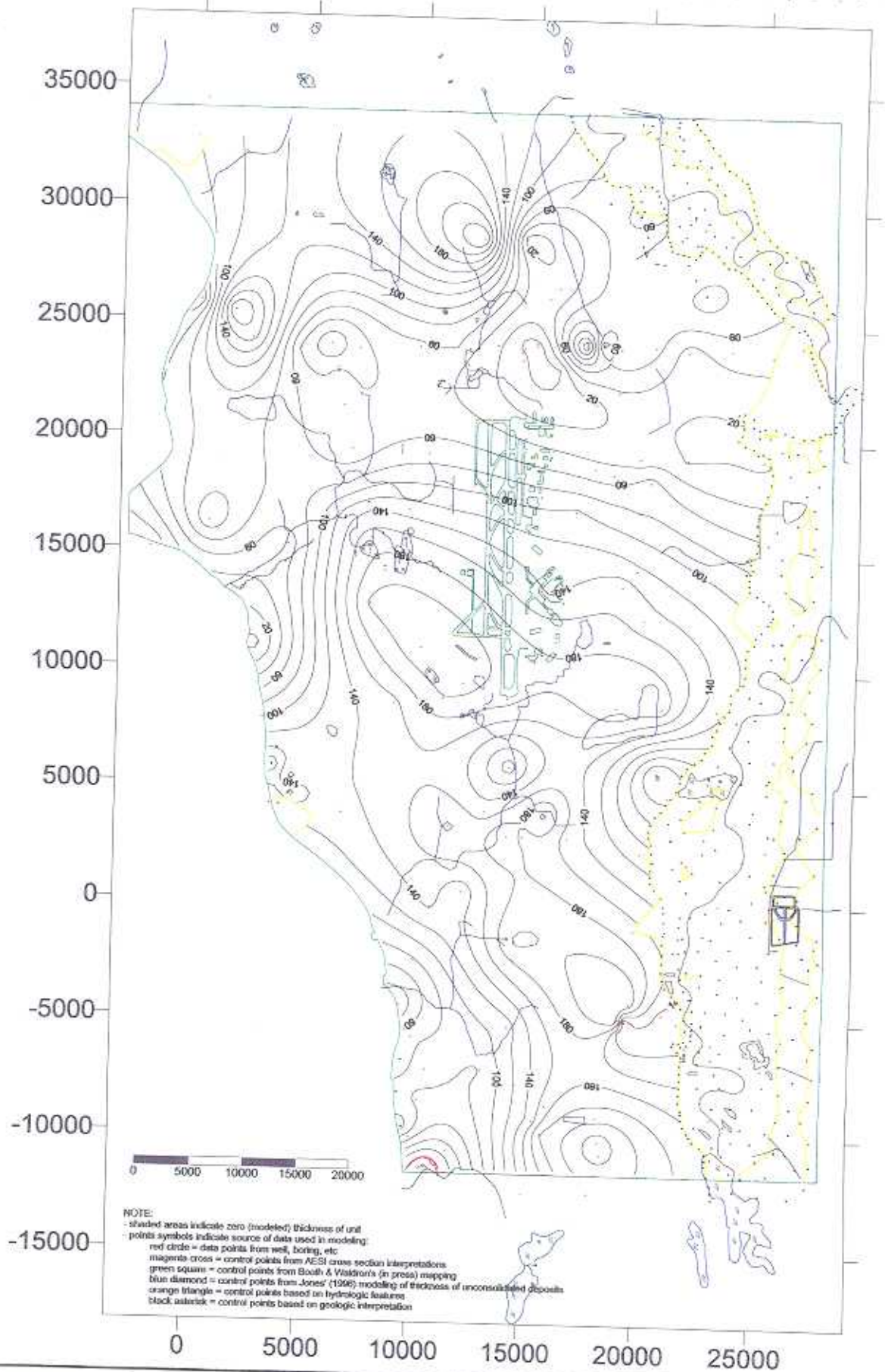
AR 043226



NOTE:  
 - shaded areas indicate zero (modeled) thickness of unit  
 - points symbols indicate source of data used in modeling:  
 red circle = data points from well, boring, etc.  
 magenta cross = control points from AESI cross section interpretations  
 green square = control points from Booth & Waldner's (in areas) mapping  
 blue diamond = control points from Jones' (1990) modeling of thickness of unconsolidated deposits  
 orange triangle = control points based on hydrologic features  
 black asterisk = control points based on geologic interpretation

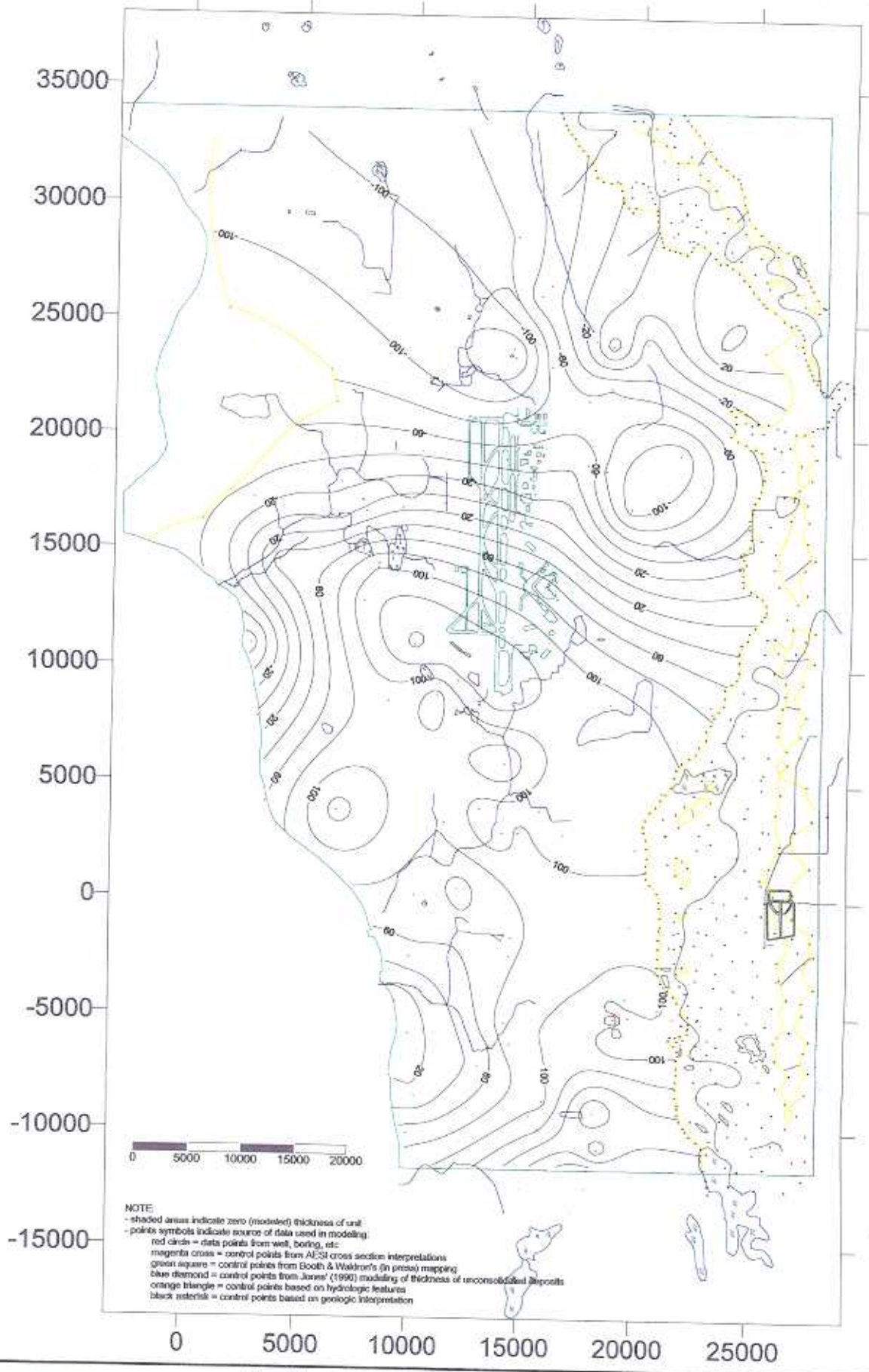
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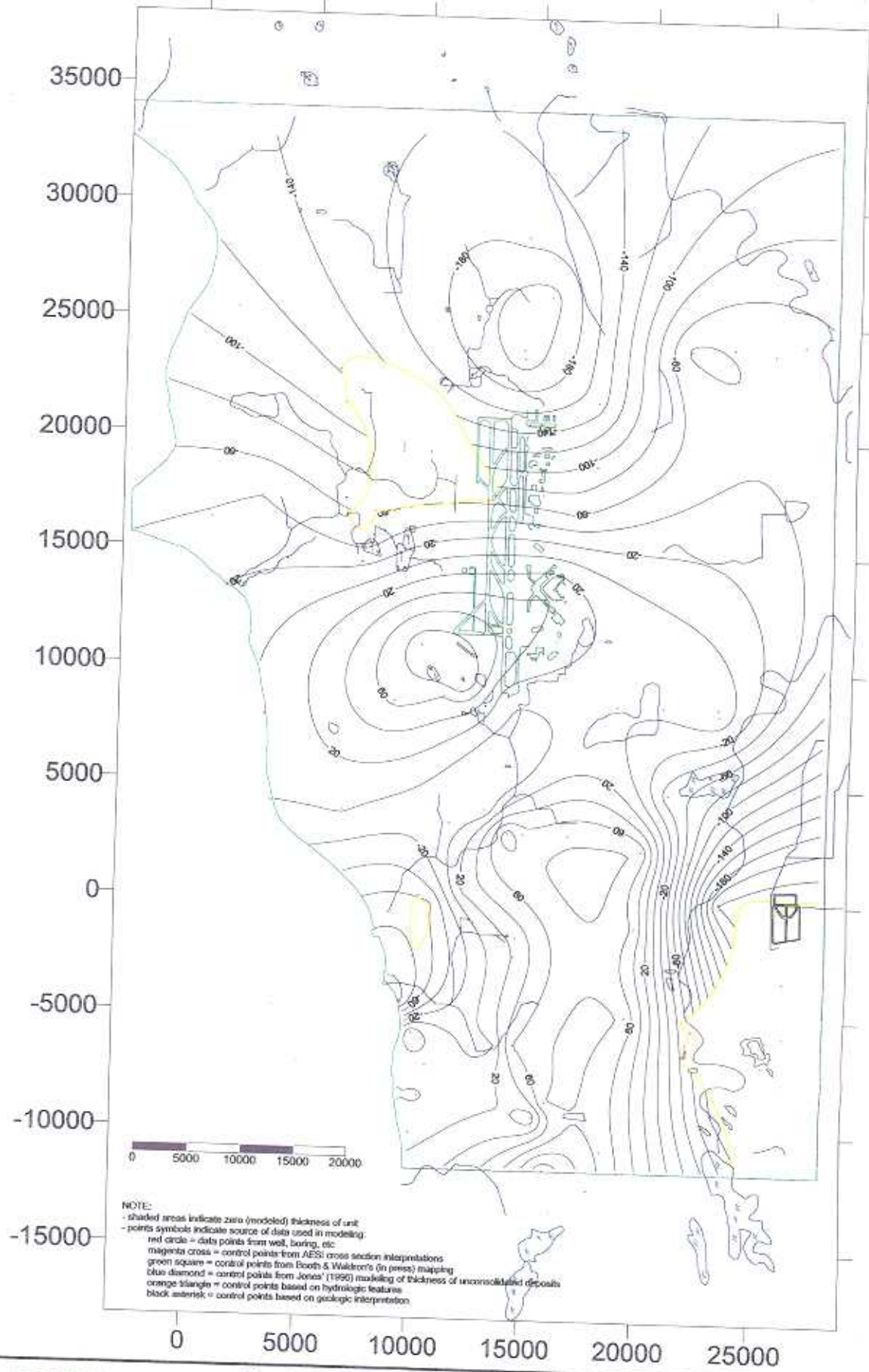


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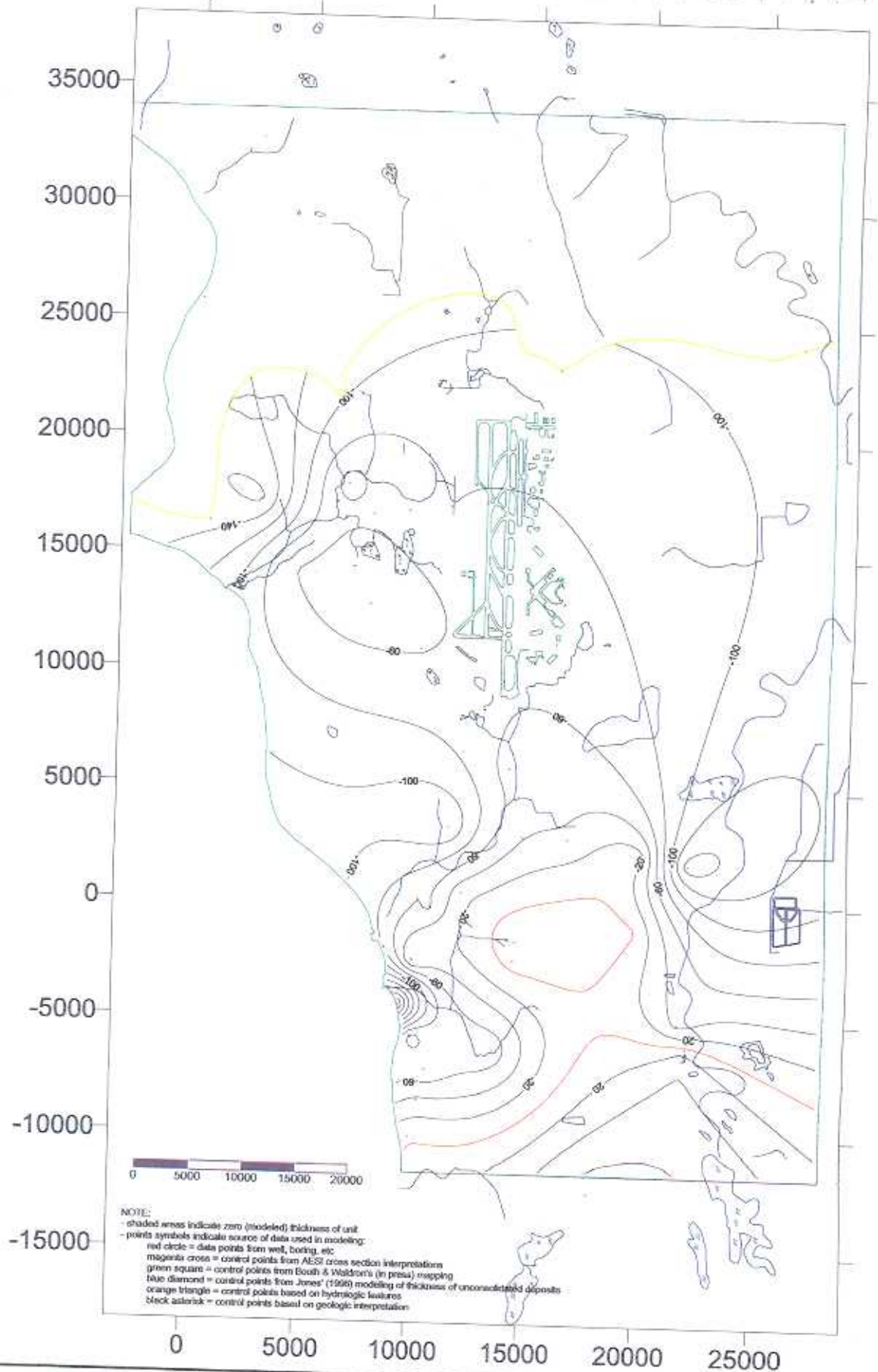


AR 043229




NOTE:  
 - shaded areas indicate zero (modeled) thickness of unit  
 - points symbols indicate source of data used in modeling:  
 red circle = data points from well, boring, etc.  
 magenta cross = control points from AESI cross section interpolations  
 green square = control points from Booth & Waldron's (in press) mapping  
 blue diamond = control points from Jones' (1990) mapping of thickness of unconsolidated deposits  
 orange triangle = control points based on hydrologic features  
 black asterisk = control points based on geologic interpretation

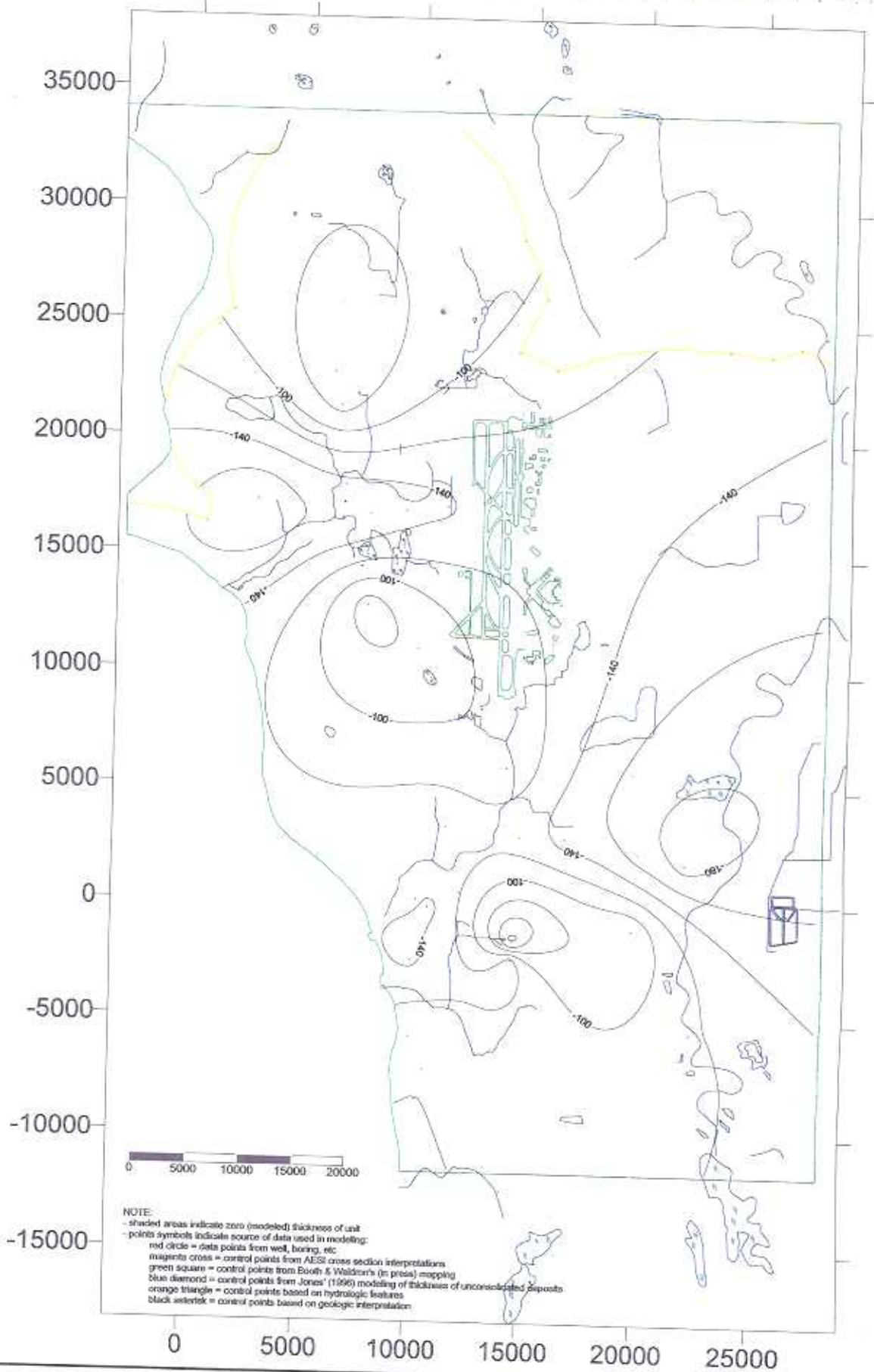
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AR 043231

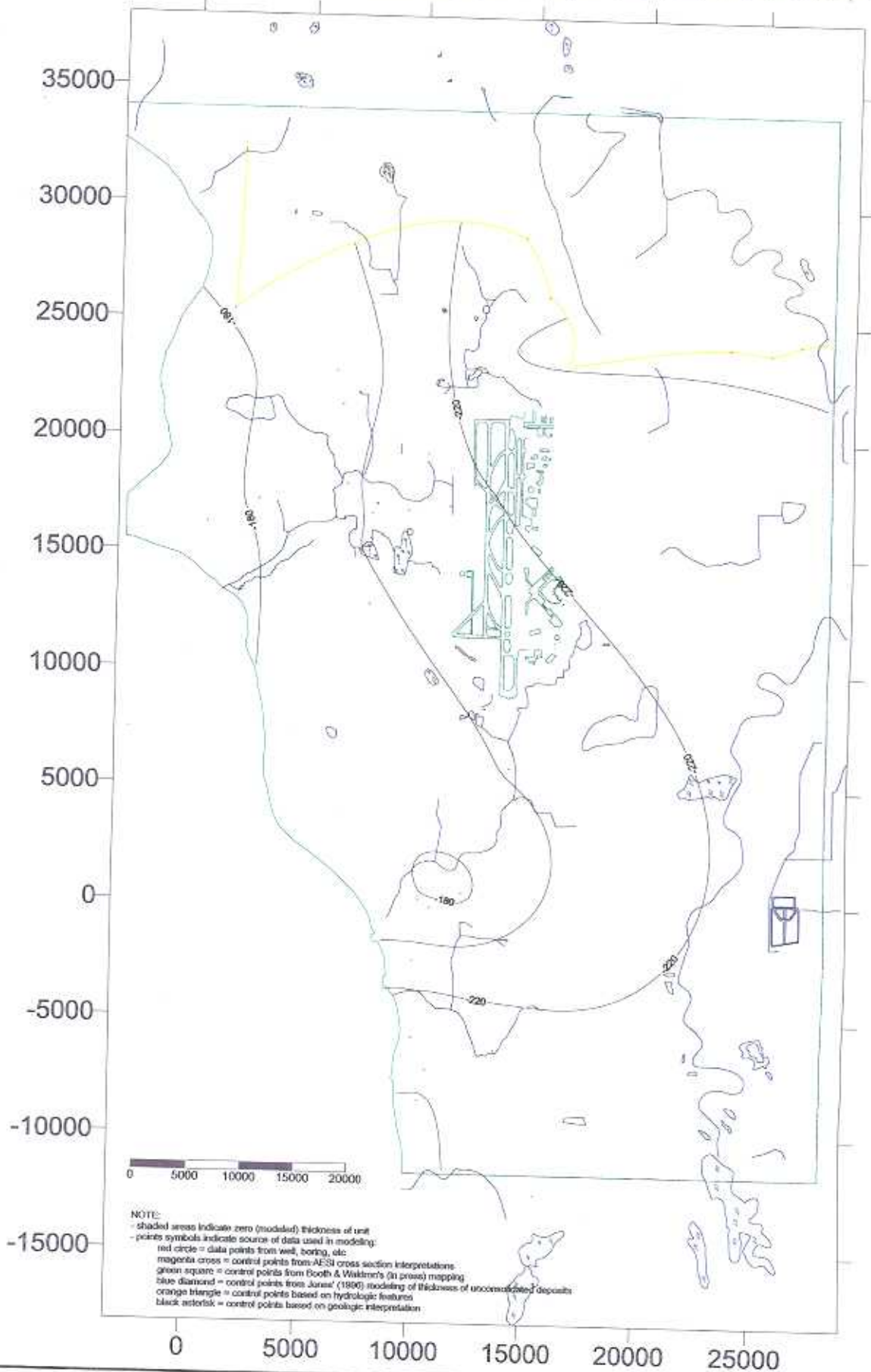

**Elevation of Top of Hydrostratigraphic Unit C4**  
**Stratigraphic Modelling, STIA Groundwater Study**
Figure 20






AR 043232



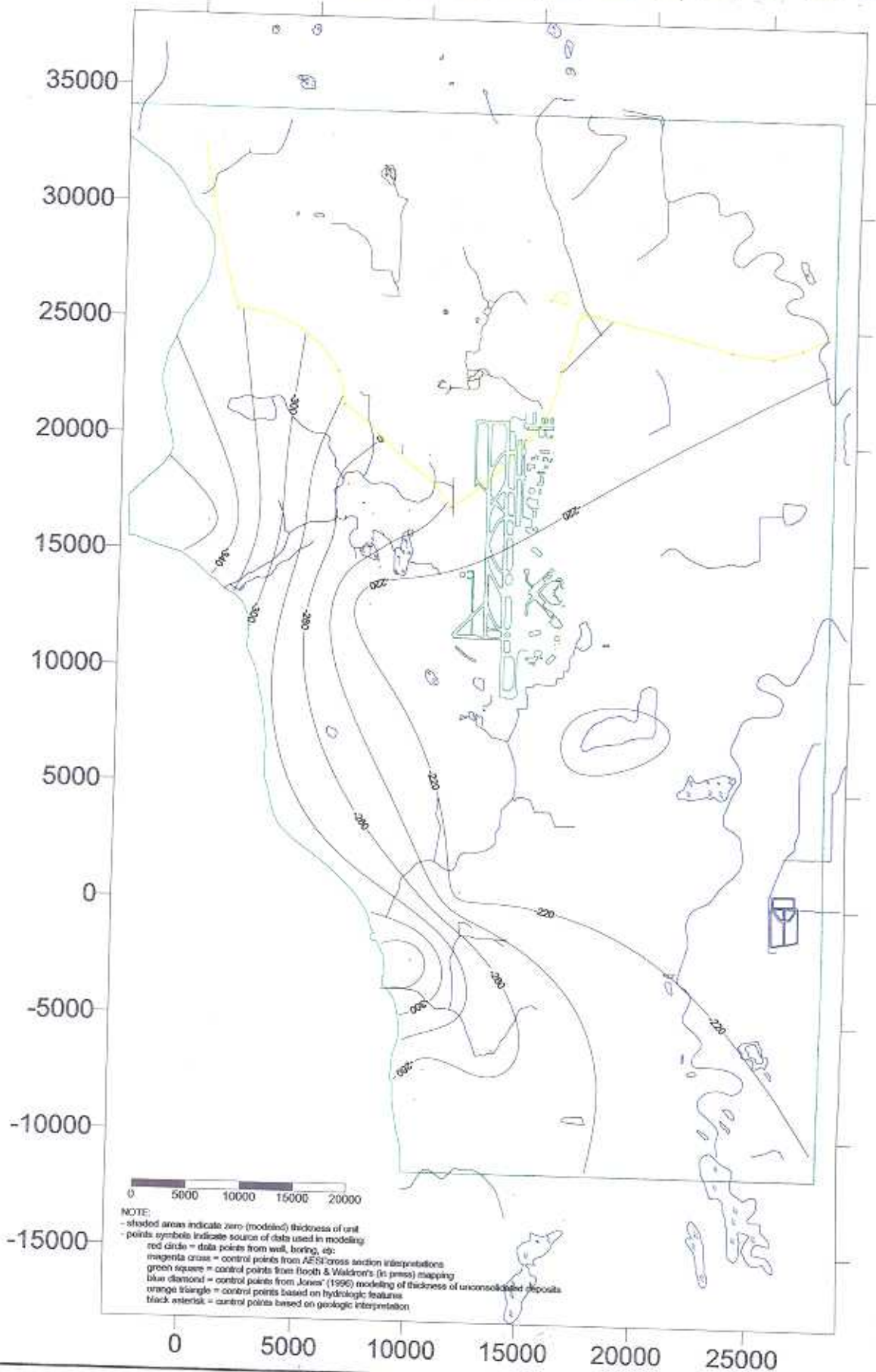


AR 043233

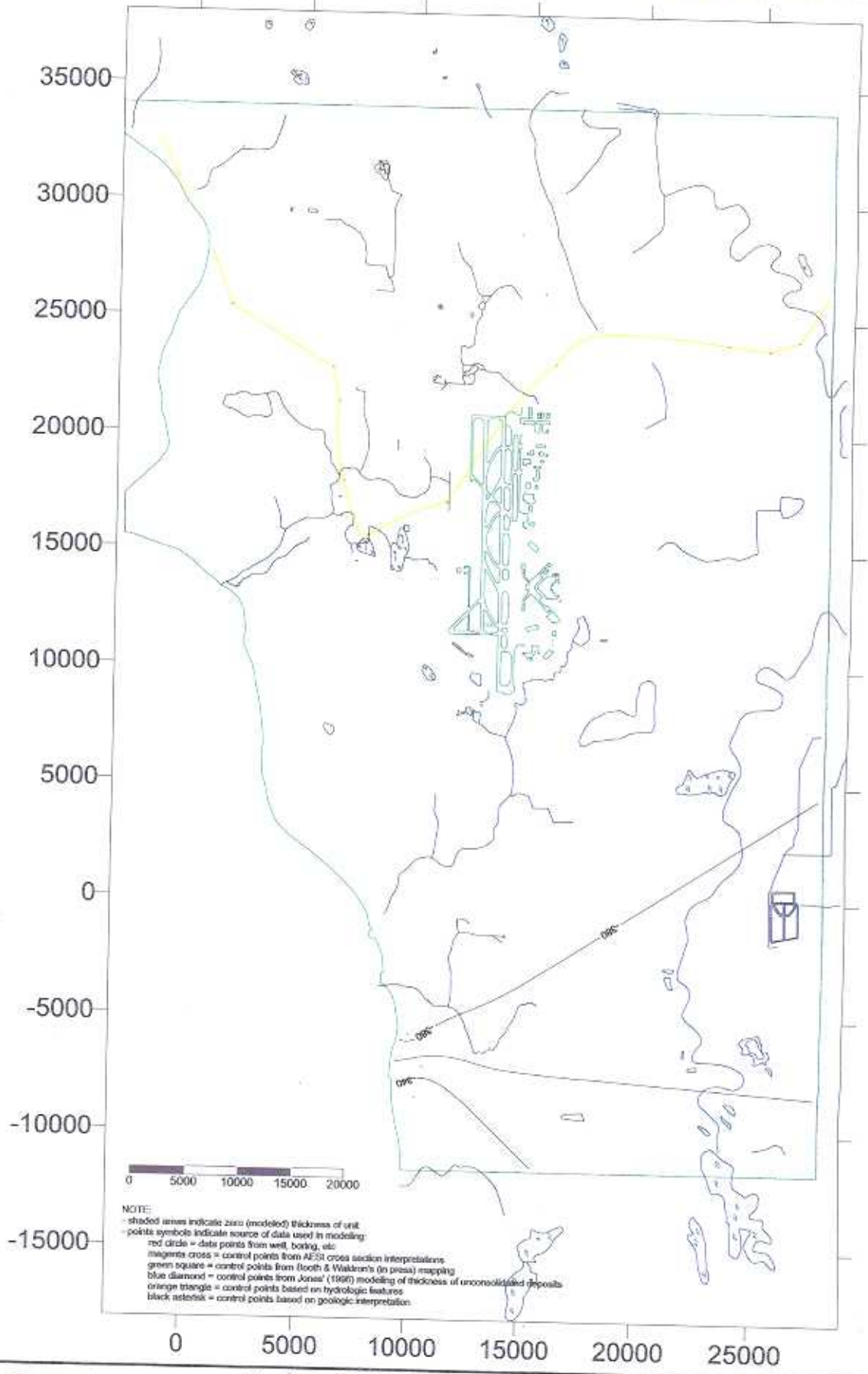

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**Elevation of Top of Hydrostratigraphic Unit C5  
 Stratigraphic Modelling, STIA Groundwater Study**

**Figure 22**

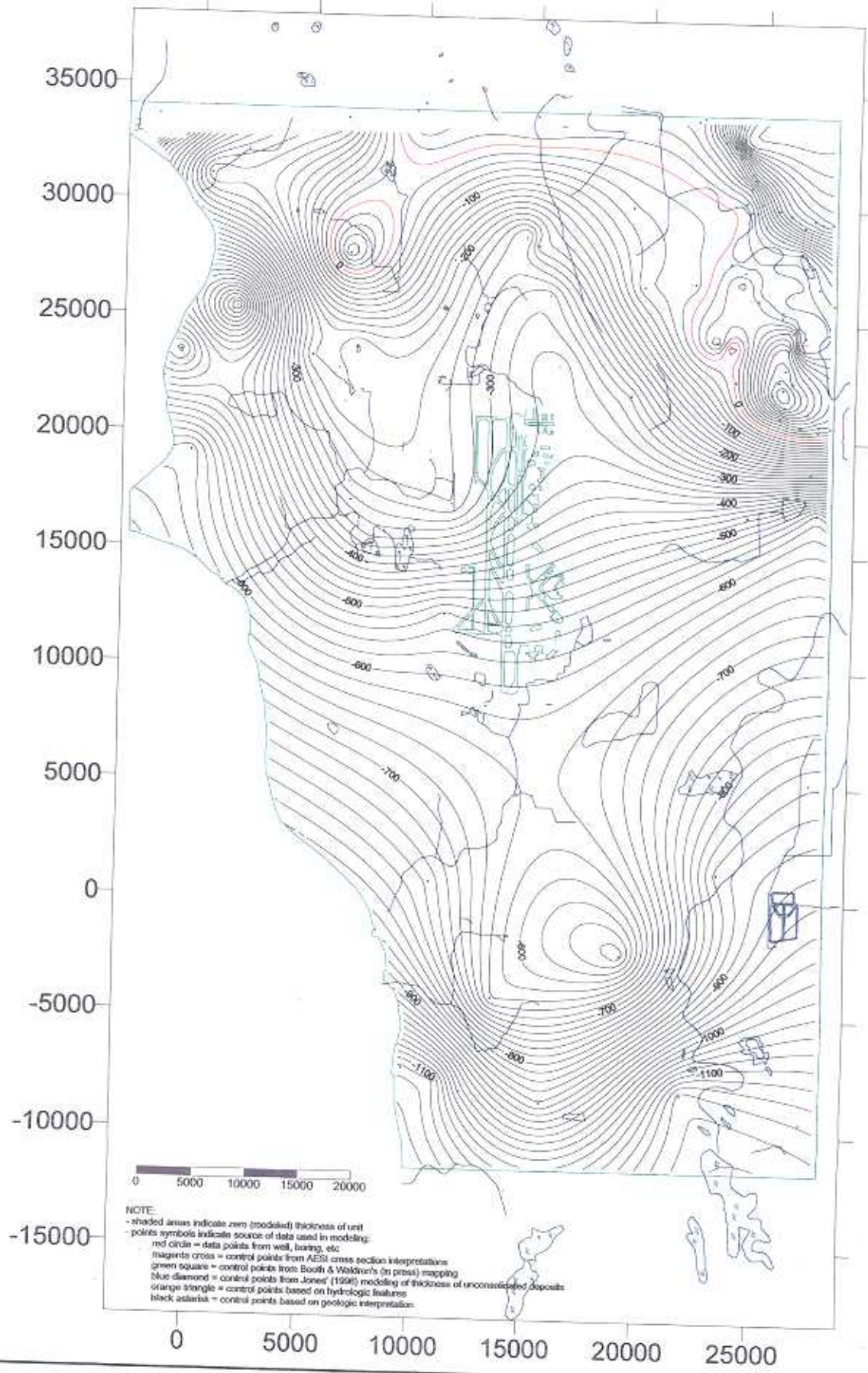


AR 043234



AR 043235





NOTE:  
 - shaded areas indicate zero (modeled) thickness of unit  
 - points symbols indicate source of data used in modeling:  
 - red circle = data points from well, boring, etc.  
 - magenta cross = control points from AESI cross section interpretations  
 - green square = control points from Booth & Waldner's (in press) mapping  
 - blue diamond = control points from Jones' (1996) modeling of thickness of unconformable deposits  
 - orange triangle = control points based on hydrologic features  
 - black asterisk = control points based on geologic interpretation

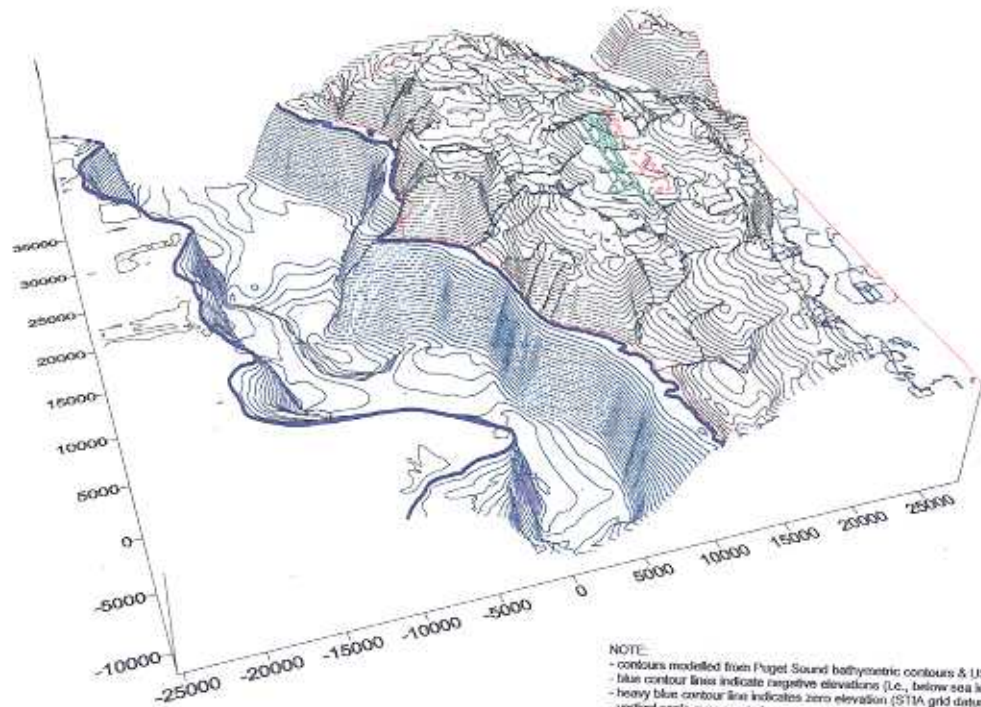
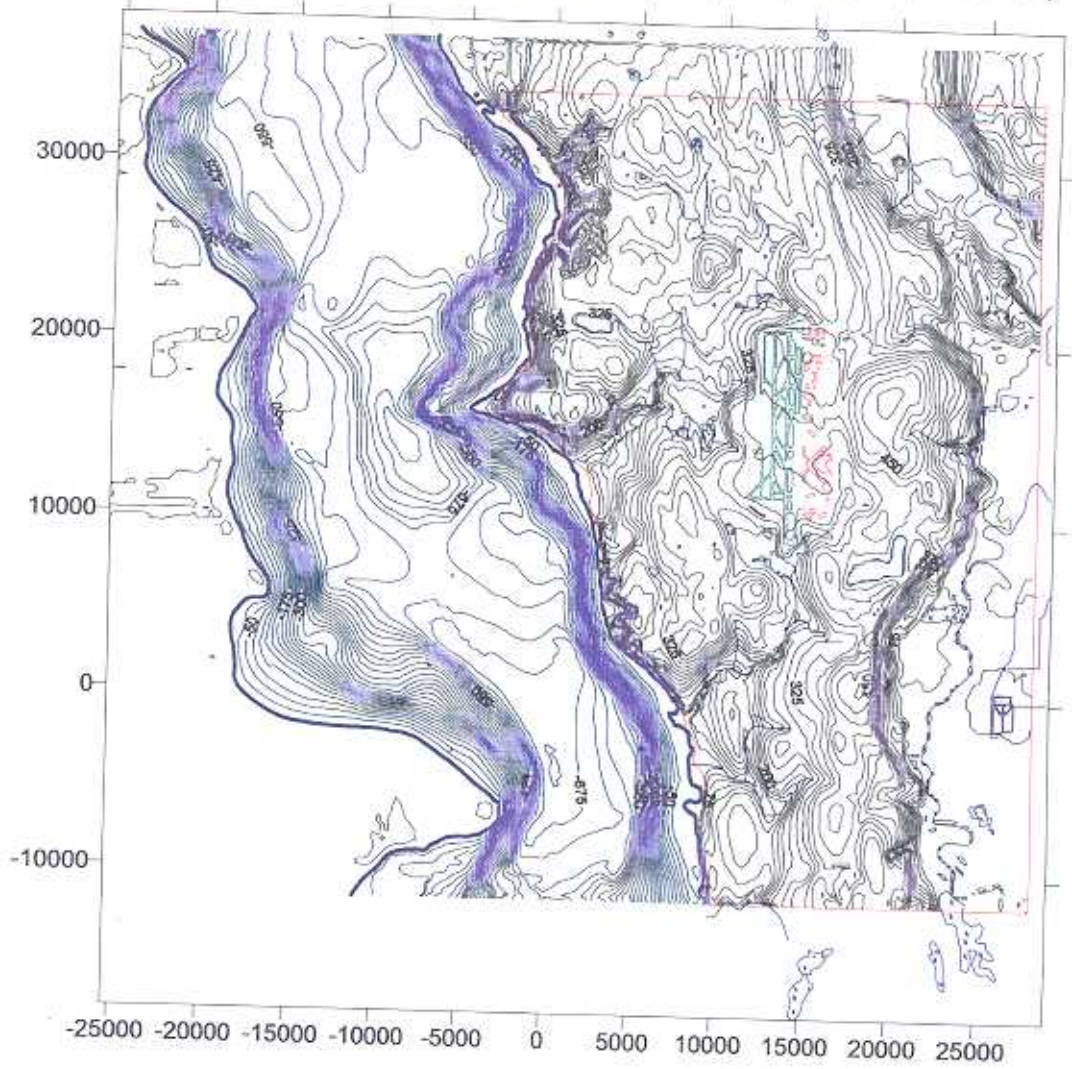
AR 043236



Elevation of Top of Bedrock (BR)  
 Stratigraphic Modelling, STIA Groundwater Study

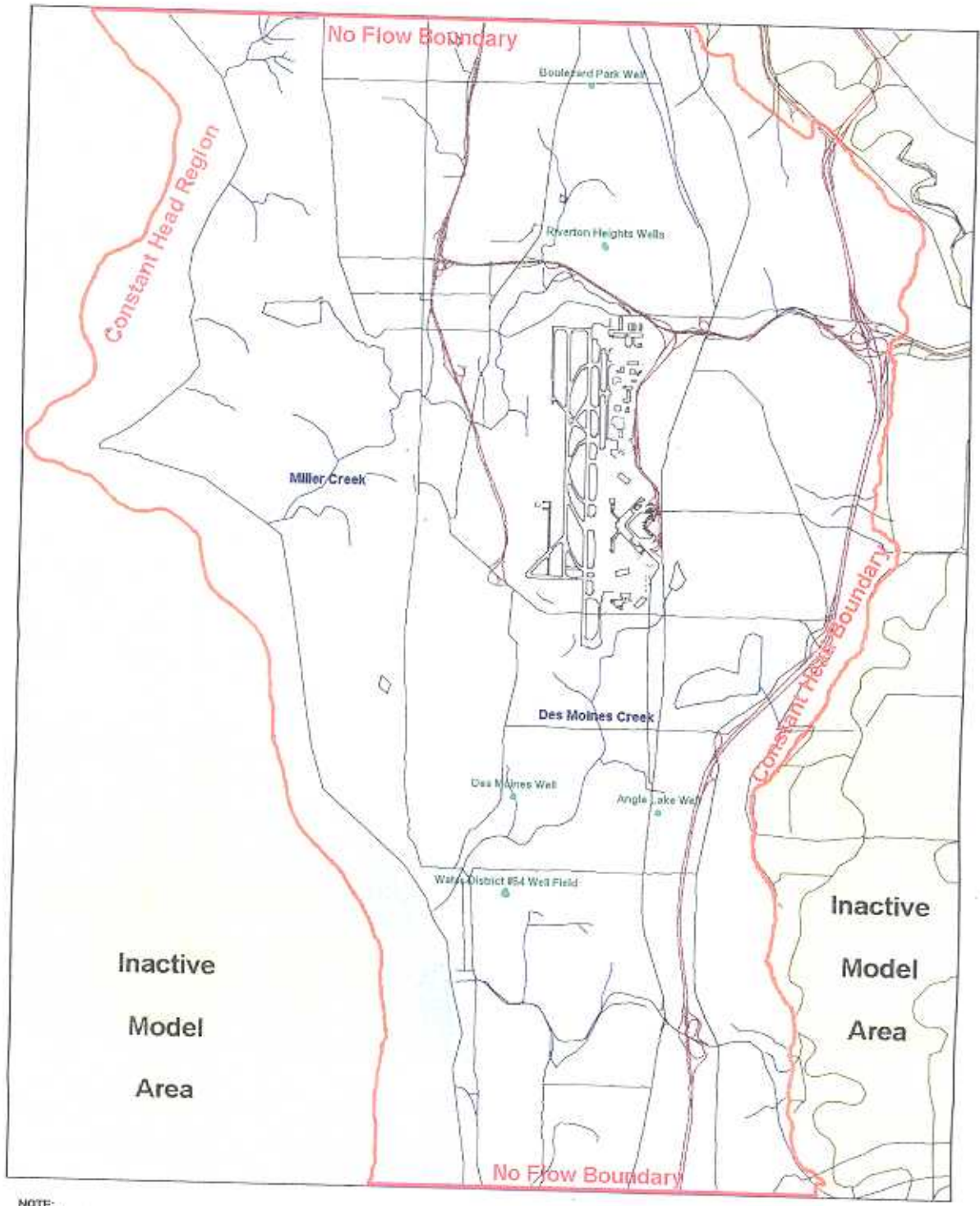
Figure 25





NOTE:  
 - contours modelled from Puget Sound bathymetric contours & USGS DEM data  
 - blue contour lines indicate negative elevations (i.e., below sea level)  
 - heavy blue contour line indicates zero elevation (STIA grid datum)  
 - vertical scale exaggerated

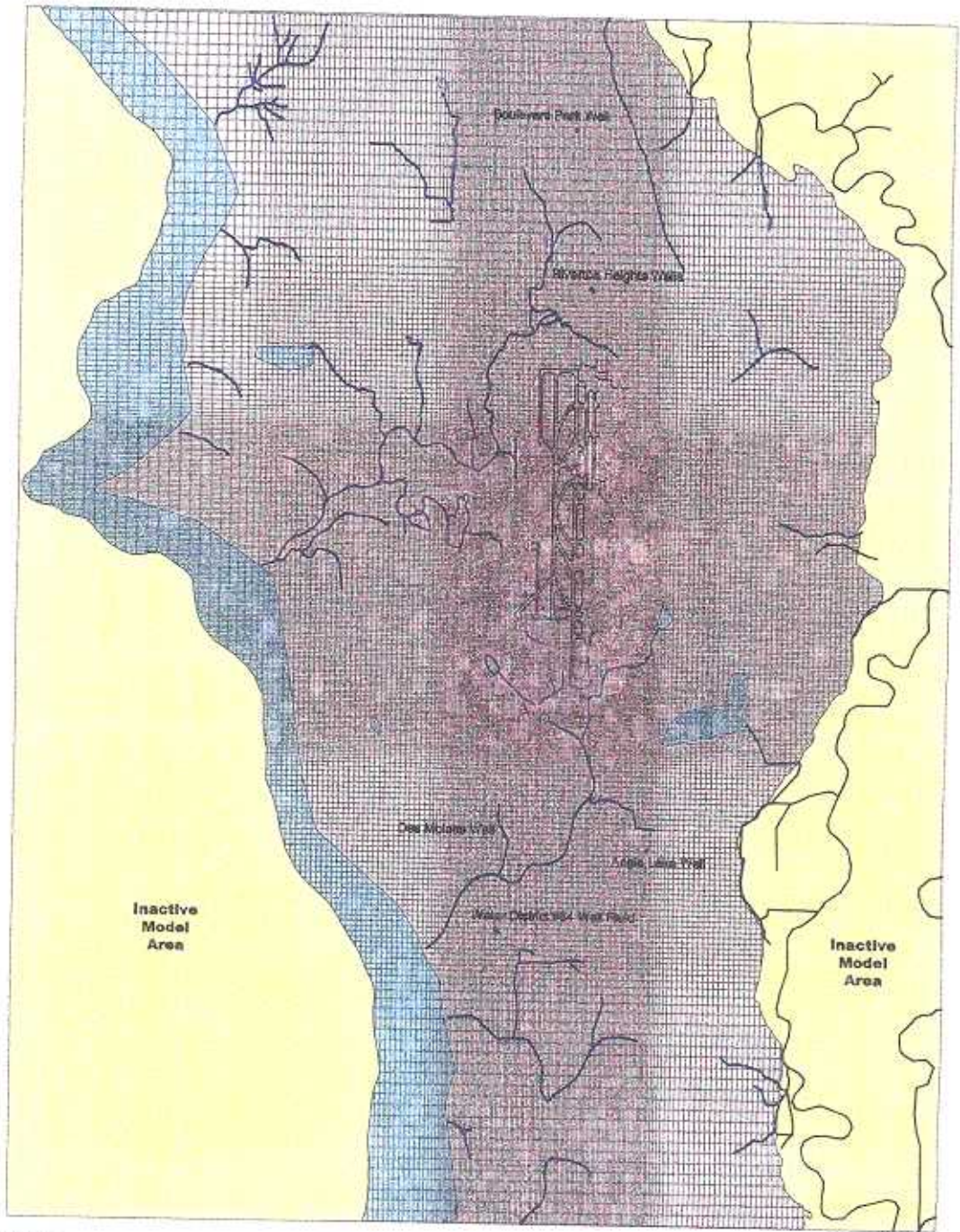
AR 043237



NOTE:  
 - public water supply wells are in green  
 - constant head boundaries are in red  
 - no flow boundaries are in magenta  
 - inactive model areas are shaded yellow

AR 043238

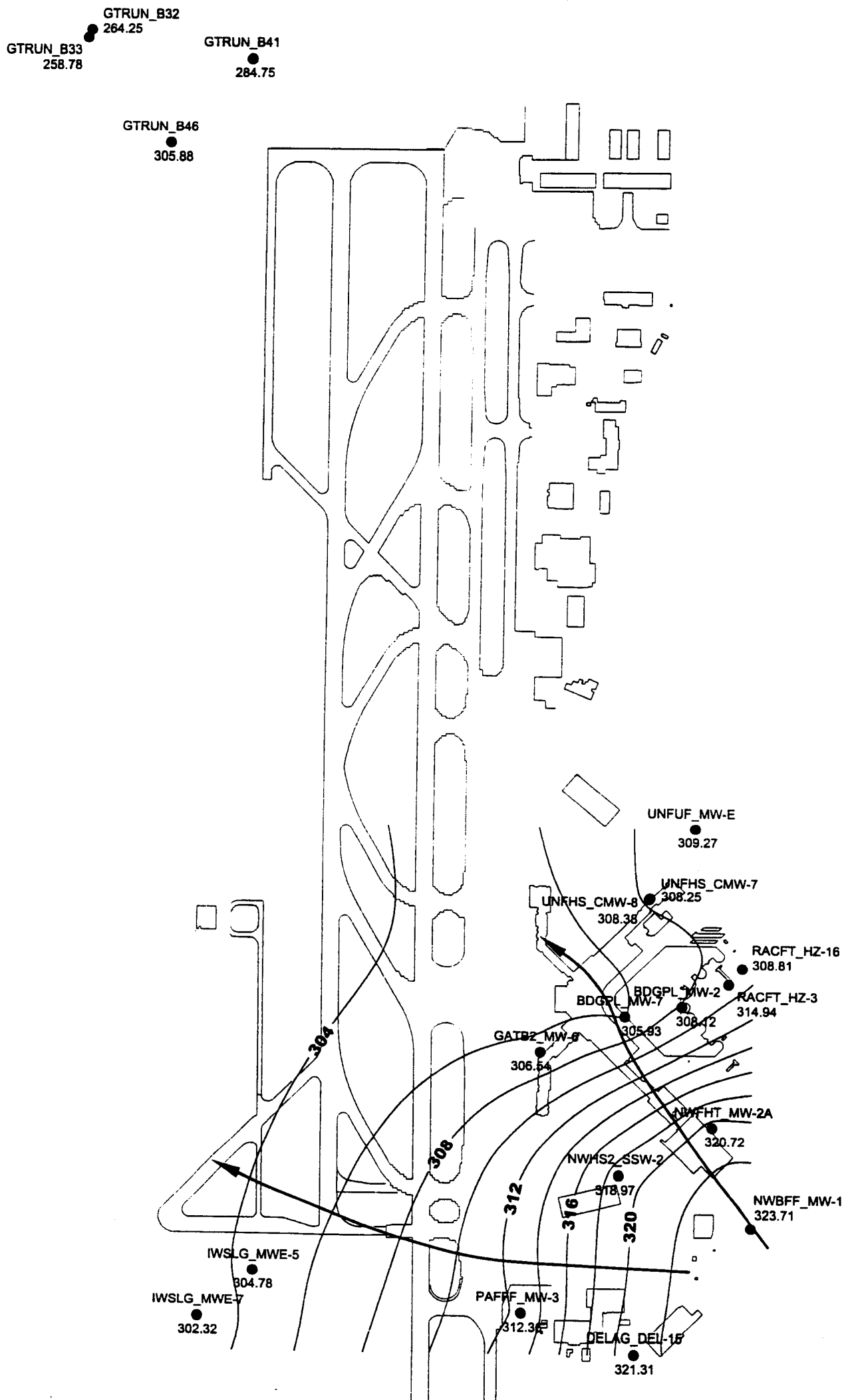






**NOTE:**  
 - public water supply wells are in green  
 - inactive model areas are shaded yellow

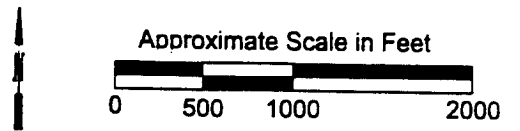
AR 043239





**LEGEND**

- 
**JWSLG-MWE-5**  
 304.78 Groundwater Elevation (feet, STIA Datum) measured on 9/23/99
- 
 Groundwater Flow Directions



AR 043240

**AS** ASSOCIATED EARTH SCIENCES, INC

DATE: 12/07/99  
 DESIGNED BY: JJS/HXT

**Groundwater Flow Direction - C1 Well Network @ 9/23/99**  
 STIA Groundwater Study

PROJECT NO: BV97016  
 FIGURE NO: 29

