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# Site Investigation

## WBS 2.1 – Site and Buildings

June 5, 2007

S. Dixon



# Site Investigation History

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- Fall 2005 – Environmental Assessment Worksheet (EAW)
- Spring 2006 – Topographic Survey
- Fall/Winter 2006 – Subsurface Investigation
- Summer/Fall 2006 – Wetland Delineation
- Summer/Fall 2006 – Updated EAW



# Site Investigation

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- Preliminary Environmental Assessment Worksheet
  - Fall 2005
  - Short Elliot Hendrickson
  - Included 2 borings at the Ash River Site.
  - NOVA-doc-205-v3



## 1.1.1.1 – Topographic Survey

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- Documented the planimetric location and topographic relief of features of the access road and project site in three dimensions
- Hanson Professional Services
  - Aero-metric for the digital orthophoto work
  - Benchmark Engineering for the ground control
- Field work completed in June 2006
- Topo drawing and backup delivered in August 2006
- NOVA-doc-1450



# 1.1.1.1 – Topographic Survey





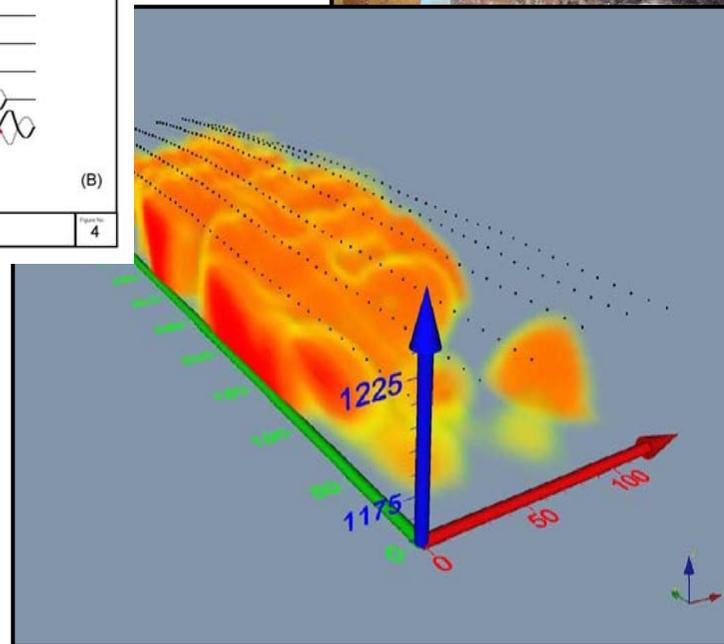
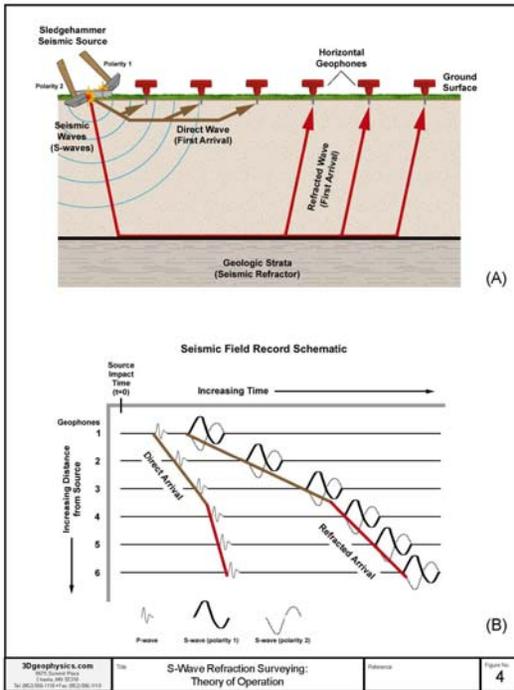
## 1.1.1.2 – Subsurface Investigation

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- Better understand the site subsurface conditions for the development of the design.
- Short Elliot Hendrickson
  - American Engineering Testing for the field work
  - 3Dgeophysics for the rock mapping
- Field work in Fall/Winter 2006
- 21 shallow borings along the road
- 6 borings at the project site
- Packer tests at two borings
- Nested piezometers at three borings
- NOVA-doc-1225



# 1.1.1.2 – Subsurface Investigation



ART JOB NO. 01-03193		LOG OF BORING NO. AR-29 (p. 1 of 1)				
PROJECT: Ash River Trail Site; Northern, MN						
DEPTH FEET	SURFACE ELEVATION 1220.1 MATERIAL DESCRIPTION	GEOLOGY	N MC SAMPLER TYPE REC			
1	SANDY SILT, a little gravel, apparent cobbles, pieces of wood, tract roots, dark brown, from (ML)	TOPSOIL	FIM SU			
2	CLAYEY SAND, a little gravel, possible cobbles, tract roots, light brownish gray, from to about 1.5' (SC)	MIXED ALLUVIUM	13 M SS 18			
3	LEAN CLAY WITH SANDY, fine gravel, trace roots, light brownish gray and brown mottled, (SC)	MIXED ALLUVIUM OR TILL	36 M SS 18			
4	SANDY LEAN CLAY, a little gravel, gray and brown mottled, hard, laminations of fine sand (CL)					
8	CLAYEY SAND, a little gravel, possible cobbles, light brownish gray, hard, laminations of silt (SC-SM)	MIXED ALLUVIUM	31 M SS 18			
9						
10						
11	SILTY SAND, fine to medium grained, light brownish gray, wet, dense, lenses of wet sandy silt (SM)		50.6 M SS 2			
12	GRAVELLY SAND WITH SILT, fine to medium grained, grayish brown, moist, dense (SP-SM)		43 W/M SS 16			
14						
15	SAND WITH SILT AND GRAVEL, fine to medium grained, brown, moist, very dense (SP-SM)	COARSE ALLUVIUM	50.3 M SS 2			
16						
17	SAND WITH SILT, a little gravel, fine to medium grained, light brownish gray, waterbearing, very dense (SP-SM)		50.4 W SS 4			
END OF BORING - Observed to SS at 17.4'						
Note: Picnometer installed. See attached picnometer log.						
DEPTH	DIBLING METHOD	WATER LEVEL MEASUREMENTS				NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
6-17'	425" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL
		12/28/06	4:30	17.4	17.0	16.4
BORING COMPLETED: 12/28/06		DR: LB		LG: BL		SG: ZYC



## 1.1.1.3 – Wetland Delineation

- Identify and investigate mitigation methods for impacted wetlands along the access road and project site.
- Short Elliot Hendrickson
- Field work in Summer 2006
- Preliminary Wetland Permit Application in April 2006
- Preferred mitigation method is wetland banking
- NOVA-doc-1892



## 1.1.1.4 – Update EAW

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- Updated the 2005 EAW with latest information from the site work and incorporated the latest building design.
- Short Elliot Hendrickson
- Field work in Summer 2006
- Working with the University of Minnesota
  - Retained the services of Barr Engineering to review
- Responsible Governmental Unit
  - Likely to be University of Minnesota
- NOVA-doc-205-v5



# What's Next

- Additional field work to verify assumptions and accommodate location changes of building
  - 6-10 shallow borings at building location
  - Title 2 A/E on board
- Resolve the EAW issues
- Complete the wetland mitigation process

