CORRESPONDENCE/MEMORANDUM _____ State of Wisconsin

DATE: March 28, 1989

TO: Fred R. Ross, P.E., Director
Transportation District #6
ATTN: John Biles, District Soils Engineer

FROM: Gary C. Whited, P.E.
State Materials Engineer for Hwys.

SUBJECT: Project ID 1530-00-00
USH 10 over St. Croix River - Prescott to Hastings, MN Road
Structure B47-30
Pierce County

As you requested, we have reviewed both our original analyses and resulting report of 11/12/85 and the recent plotting of settlement data sent over from the Minnesota DOT. From our evaluation of this information, we are of the opinion that construction of the West Abutment can be started now with no undue risks from drag loads. This opinion is predicated on these facts - some unloading will occur for the abutment work and the steel sections driven to rock at 9,000 psi have reserve capacity even on shaky bedrock.

We have no reservations on driving piles at this time for this unit.

By:

Clyde N. Laughter

Clyde N. Laughter, P.E.
Chief Soils Engineer

GCW:CNL:m10672
cc: District 6 (Original plus 3)
Bridge (2)
GCW
C.O. File
✓Soils File

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: November 12, 1985 File Ref:

To: Mr. Thomas R. Clark, District Director

Attention: Mr. Bruce Eastenson, District Materials Engineer

From: Mr. G. H. Zuehlke, State Materials Engineer for Highways

Subject: MATERIALS
SOILS
SITE INVESTIGATION REPORT
Project ID 1530-00-00
USH 10 over St. Croix River
St. Croix to Hastings Road
Structure B-47-40
Pierce County

We are attaching copies of a Site Investigation Report for the project noted above. Three additional copies are included for your consultants' information. It is recognized that the statements in our report are in no way binding on the consultants.

CH Zuehlke

CNL:lcr

cc: District 6 (Original + 7)
Bridge
GHZ
DLS
MOF
Soils File

SITE INVESTIGATION REPORT
Project ID 1530-00-00
USH 10 over St. Croix River
St. Croix to Hastings Road
Structure B-47-40
Pierce County

1. General

This is a report of subsurface conditions for the proposed replacement structure carrying STH 10 over the St. Croix River at Prescott. This new bridge will be immediately downstream from the old existing span and a short distance upstream from the new Burlington Northern Railroad crossing. The borings for this bridge were laid out by district personnel with a reference line along the existing bridge. There are minor problems in positioning a barge with a mounted drill rig on a precise point, but all borings are within a five-foot tolerance from the designated stationings.

This proposed work has had a continuing study for over 12 years. Not only are the current borings considered, but these additional data have been reviewed and incorporated into this report.

Geology reports of the area are included with a final geology report by R. F. Robinson (Appendix A). Upriver borings made in studies for a 12-year period at other crossings were considered. Boring and pile driving information for the new nearby Burlington Northern bridge are also included.

A test pile program was made earlier near the proposed east bascule span location (Appendix B). Local reports from residents of the area were noted.

In the ensuing analysis some anomalies and contradictions have been noted. These are to a degree reconciled in this study.

2. Subsurface Conditions

Eighteen borings have been made on the site. Several borings had Standard Penetration Tests, AASHTO T-206, performed throughout drilled depths. Others had the STP tests made only at shallower depths for guidance in footing and cofferdam design and/or construction. Other borings were made to only locate bedrock. The boring plan was largely guided by an early, even predrilling, assumption that piles would be driven to bedrock. This assumption was predicated on the experience of the Burlington Northern construction and the Wisconsin Department of Transportation 13 3/8-inch pipe test pile that offered neither driving resistance or load capacity when checked with the Pile Dynamic Analyzer.

It should be noted that the east area has borings plotted on two sheets that somewhat overlap in stationing at the east bridge end. This was to reduce clutter.

The general geology in the east abutment area is Prairie du Chien limestone, temporary stationing 99 + 25±. The limestone exists down to elevation 610± with Jordan sandstone then down to elevation 510±. Below this the St. Lawrence shale is noted to elevation 465 with Franconia Formation down to elevation 315±.

There is an abrupt, almost vertical, drop in the rock from east to west just offshore at the east bridge end. Bedrock was logged at elevation 665± at station 99 + 15 and at 575± at station 98 + 99, a drop of 90 feet in 16 feet. Then from station 99± to 98 + 50±, the face slopes more gently or about 20 feet vertical to 50 feet horizontal. East of station 98 + 50±, the rock surface slopes very gently to the west with rock being near elevation 515. It is recognized that the rock surface is neither smooth nor of even slope.

Above the rock, there is a layer at the river bottom of loose sands or silts. This layer tends to thicken from east to west with 4 to 12 feet near the east shore and up to 80 feet at the west end.

Between the loose zone and the bedrock, a granular material was logged. Most of this gravelly soil logged high blow counts in the STP test indicating a dense to very dense soil. The soils in this zone toward the west end were apparently more dense than at the east. This assumption of denser soil is predicated on both blow count, N-value, in the STP test, and on an observation by the drill crew chief that casing was much more difficult to pull west of the navigation channel.

Boulders were encountered and should be anticipated at all depths, although there appears to be a concentration at shallow depths and over the deeper bedrock surface.

Typed drill logs are attached (Appendix C). All logs read 75.6, etc., and 600 should be added to make 675.6. Soil textures noted are driller's field identification with a subsequent verification in the Central Soils Office. Original field logs are on file in the Central Soils Office.

Two-inch cores were cut in the bedrock and photos of the cores are included (Appendix D).

There was a glaring anomaly in the drill operation. The blow counts indicating dense to very dense material would predict extreme difficulty in pulling a long string of casing. Such was not the case with the drill casing being pulled with little effort. This gives credence to the hypothesis that the split spoon blow count at both this structure and the Burlington Northern sites was abnormally and unreliably high due to large cobble-like gravel being driven ahead in the STP testing.

In the west abutment area there is some 60 to 80 feet of looser soils. A layer of organic soil was noted between elevation 630± and 600±. Two 3-inch shelby tube samples were lifted and tested for settlement characteristics.

At the time of drilling the ground water was near elevation 676, which was river stage. Within these limits the ground water will approximate river datum and fluctuate with river level.

3. Bearing Capacity

Except for the east abutment, competent soil or rock is too deep to be used for non-piled design. At the east abutment, the limestone bedrock could be designed for 20 tsf presumptive bearing with an adequate offset from the steep face.

4. Piles

An anomaly exists for any pile recommendations. The blow counts in the STP test indicate that any pile type would fetch up quickly in the dense to very dense granular soils logged across the site. This was an assumption made for both the Burlington Northern bridge for steel H-piles and for the WDOT 13 3/8-inch pipe pile shell driven about the same time. Neither pile offered measureable resistance until the pile tip reached bedrock. At both locations the lack of load capacity was observed in the Pile Dynamic Analyzer studies and in the EN type formula applied to the driving hammer. With this background, steel H-piles driven to or into rock appear to be the suitable foundation type for this structure.

5. Alternate Foundation Types

Neither dynamic consolidation (dynamic compaction, ground pounding, etc.) or vibratory techniques such as Vibroflotation or Terra Probe would offer any engineering or economic benefit.

Drilled caissons or shafts socketed into the bedrock could be used. The cost for deep work in caving granular soils and boulders coupled with a high hydrostatic head tend to detract from the attractiveness of drilled-in work unless the caisson shaft can become a cost-saving feature in the super structure.

6. Settlement

High quality undisturbed samples were procurred in Boring 2M using an Osterberg sampler. It was not felt that lateral stability was a problem so only consolidation characteristics were studied. The consolidation curve, the wn/wl ratio, and the breaks in the c_v curve strongly indicate a normally consolidated soil at say 1½ to 2 tsf preconsolidation pressure (Appendix E). Assuming that these samples represent 30 feet of compressible soils, each 5-foot layer of fill should cause about 0.6 to 0.8 feet of settlement. Fortunately, the rate of settlement will be rather rapid and lesser long-term settlements are projected.

7. Lateral Earth Pressures

Granular soils which are readily available locally would create on backwalls or other earth retaining structures an active lateral earth pressure (equivalent fluid) of 30-33 psf if used in a well-compacted, say 95% AASHTO T-99 maximum density, and thoroughly drained state. A silt with similar placement and service condition would give a pressure of 50-55 psf and a clay would produce 80-85 psf.

8. Construction Problems

The normal on-water problems will exist. Slight differences in pile seating into the bedrock can be expected due to unequal surface and differential weathering. Boulders may cause problems in seating sheet pile for cofferdams and in the service pile driving.

9. Recommendations

Steel H-piles driven to bedrock appears to be the logical foundation choice. Heavier sections, say 14BP73 or heavier, would tend to drive better for the lengths required here. Pile loads for piles driven to a sandstone or shaley bedrock should have a limiting load of 9,000 psi in the steel section. At least one pile in each bent should be tested with a Pile Dynamic Analyzer. If a disagreement arises over a broken pile, a not too uncommon occurrence in long sticks, the suspect pile should be checked with the PDA.

Cofferdams can be proportioned with the data shown on the boring logs. The responsibility of adequacy should be the contractor's, but a check and approval should be made by the owner before work proceeds. A blown seal or overturned cofferdam can cause horrendous repair problems.

No borings have been made specifically for the bumper wall along the navigation channel. Seemingly adequate input exists for this design.

There may be some question on the use of pile points, say the typical APF tips. There are arguments to be made for and against these devices. At this structure, points could be considered at the first piled bent at the east bridge end to attain a better bite of the point on a possibly sloping rock surface. Also, points would gain greater penetration and a lesser possibility of crippled piles at the price for the bascule lifts.

Ordinarily the substitution of oil industry pipe can be accepted in lieu of a rolled H-shape. At this site, the use of H-piles appears to offer enough advantages to preclude use of the oil pipe.

Settlement is anticipated at the west abutment area. While this settlement may be somewhat rapid, these things are suggested:

1. Early construction of the fill to full height. This lessens later in-service road settlement.

2. If possible, place a surcharge on the abutment fill area. The height of surcharge can be worked out after time to remain in place, construction options or other facets of the work are more clearly defined.

3. Settlement gauges should be placed to assist in reaching a decision on pavement type and any delay or sequence of paving.

4. If settlement occurs, negative skin friction will occur. For pile in the fill soil, a drag of 1800± psf for each foot of fill soil against the pile should be provided for. If there is 10 feet of fill soil below the abutment, 9 tons of drag should be provided in the total pile loading.

APPENDIX A

GEOLOGY REPORT

GENERAL GEOLOGY-PRESCOTT AREA

The Prescott area is underlain by Cambrian sandstone formations at some elevation slightly below the water level of the St. Croix River. Above this level is the Prairie du Chien dolomite formation which is covered by various thicknesses of outwash or till deposits in areas as shown on the sketch map.

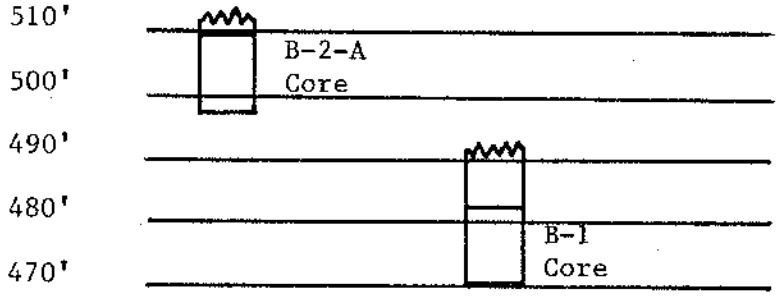
In pre-glacial times the channels of the Mississippi River and the St. Croix River were more deeply entrenched than now and were perhaps 200 or 300 feet deeper than today. In glacial times when meltwater poured down the Mississippi River carrying outwash sand deposits, the sediments filled the river channel and in effect dammed the St. Croix channel. This created a lake basin which since has been filled with considerable depths of organic and alluvial sediments of low bearing value.

In most approaches to the river, cuts can be expected to be in bedrock.

APPROXIMATE ROCK DATA FOR THE MINNESOTA SIDE
Prescott Area

Formation	Thickness	Contact Elevation
Prairie du Chien	200'± (if not eroded)	610±
Jordan	100'±	510±
St. Lawrence	45'±	465±
Franconia	150'±	315±

The MGS thinks there may be a narrow deep channel (possibly as deep as Elevation 300-400) running somewhere down the St. Croix Valley.



Relationship of Cores taken

1-14-81
G R Ford

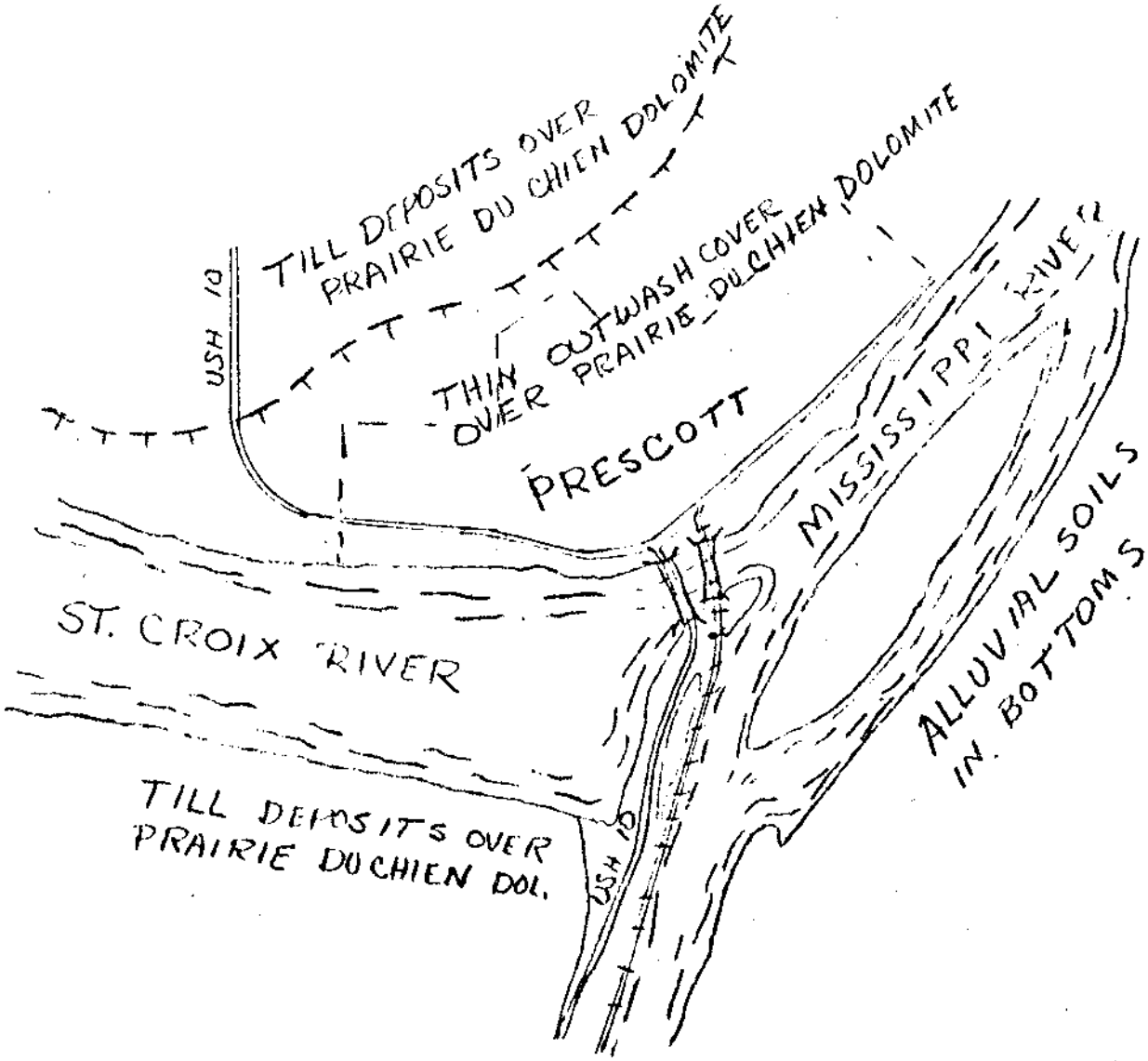
Cores - Upper Jordan - Sunset Pt. - Van Osen

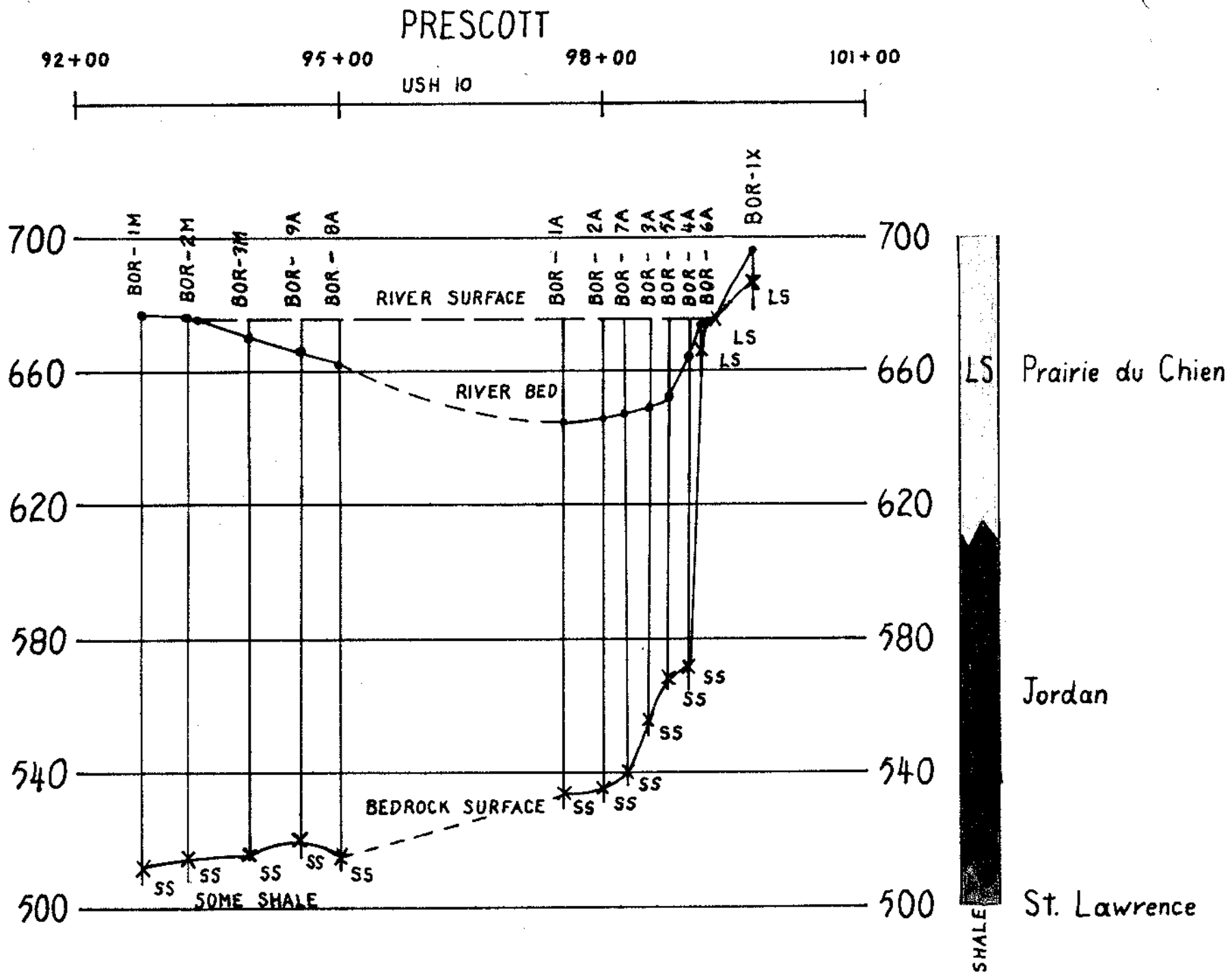
B-1 ±490 - 470 - A little low but possible.

B-2-A ±510 - 495 - Checks closely with above contact.
(Cores are fine ss, dolo., dolo. sand, few blue-greem shale layers.)

GENERAL GEOLOGY
PRESCOTT AREA

N




PRESCOTT
92+00
95+00
98+00
101+00
USH 10
BOR-1M
BOR-2M
BOR-3M
BOR-9A
BOR-8A
BOR-1A
BOR-2A
BOR-7A
BOR-3A
BOR-5A
BOR-4A
BOR-6A
BOR-1X
700
660
620
580
540
500
RIVER SURFACE
RIVER BED
BEDROCK SURFACE
SOME SHALE
SS
LS
LS
Prairie du Chien
Jordan
St. Lawrence
SHALE

APPENDIX B

TEST PILE PROGRAM

DAD-751

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: March 1, 1984 *File Ref:*

To: Mr. Tom Clark, District Director
Mr. Louie Schmidt, District Construction Engineer

From: Mr. G.H. Zuehlke, Chief Materials Engineer

Subject: MATERIALS
SOILS
TEST PILE DRIVING PROGRAM
Prescott Bridge
U.S.H. 10 over St. Croix River
Project I.D. 1530-00-00
Pierce County

Attached is the report covering the test pile driving program conducted for the Prescott Bridge. The assistance of Project Engineer Don Ingalls in the running of the test and in the preparation of this report is greatly appreciated. While the conclusions drawn from this test did not result in a less costly foundation alternative, it did provide valuable data and insight into pile driving conditions at the site. Knowledge gained in the driveability of the CIP pile will result in a sounder approach to the final foundation design.

We feel a final subsurface investigation is warranted and will submit our normal Site Investigation Report upon its completion.

By

Gary C. Whited
Geotechnical Engineer

C.N. Laughter
Chief Soils Engineer

GCW:CNL:dk
cc: Dist. 6(3)
SWW(2)
GHZ
DLS
MOF
Soils(2)

TEST PILE DRIVING PROGRAM
PRESCOTT BRIDGE
U.S.H. 10 over St. Croix River
Project I.D. 1530-00-00
Pierce County

1. General

This report presents the results of the test pile driving program conducted for the proposed structure which will carry U.S.H. 10 over the St. Croix River in the city of Prescott. Design plans call for the structure to be located adjacent to the existing highway bridge, just upstream from the Burlington-Northern Railroad bridge presently under construction. A preliminary subsurface investigation was conducted in 1972 at this site, and showed the foundation soils to be loose sands over dense to very dense sands and gravel. Results of this early investigation indicated that piles founded in the dense sand and gravels were a logical foundation choice for the structure.

Construction plans for the railroad bridge, prepared by Howard Needles Tammen and Bergendoff, also called for pile foundations. A 14X117 H-pile was specified, with design loadings of 100 tons per pile. This design was based upon results of a subsurface investigation which also showed very dense sand and gravel with depth. It was anticipated that the piles would achieve bearing in the dense sand and gravel. During production driving, however, it was found that the piles drove through the dense sand and gravels with little appreciable increase in bearing until bedrock was reached. Construction plans for the railroad bridge were subsequently modified, with the 14X117 H-pile driven to bedrock and the design loading increased to 150 tons per pile. This design load was verified during construction by dynamic testing with the Pile Driving Analyzer and the Case-Goble method of analysis. Results of this testing, performed by Soil Exploration Company, showed ultimate design capacities of 300, 400, and 425 tons for three piles tested.

Based upon the driving results of foundation piles at the railroad bridge, it was decided to initiate a test pile driving program at the proposed highway bridge site. Re-evaluation of the subsurface investigation data indicated that a large diameter cast-in-place pile (CIP) driven closed end, should develop significant capacity in the dense sand and gravels. If sufficient capacity could be developed at a shallow depth, the CIP pile would be an economical alternative to the long H-piles founded on bedrock.

2. Test Pile Driving Program

The test pile was driven at a site 40' east and 50' south of the existing highway bridge East Lift Span Pier. This location was some 400' north of the new railroad bridge Pier 3, and thought to be the approximate location of a future highway bridge pier. The pile selected for testing was a 13 3/8" O.D. pipe pile, with a 3/8" shell thickness. The pile was driven closed end with a Delmag D-30-22 single acting diesel hammer. This driver has a ram weight of 6600 pounds and a maximum rated energy of 62,900 ft-lbs.

Soils at the test site location were estimated to consist of approximately 20' of loose sands over very dense sand and gravel, based upon borings made during the preliminary investigation in 1972. At that time nearly 25' of water was noted. The borings were not extended to rock, but bedrock was estimated to be at a depth of 140' below water surface, based upon driven pile lengths at the railroad bridge.

Blow counts for each foot of driving were recorded and the pile capacity calculated using the WisDOT Standard Driving Formula as shown in Table 1. In addition, the pile was monitored during driving with the Pile Driving Analyzer (PDA) to determine capacity. Testing with the PDA involves attaching reuseable strain transducers and accelerometers directly on the pile close to the pile driver. Dynamic output from the gauges is fed into a small field computer to measure force and velocity in the pile for each hammer blow. This data is also fed simultaneously into an oscilloscope to observe the dynamic response of the pile to driving, and recorded on a magnetic tape for later retrieval. Dynamic input from the gauges, and physical properties of the hammer-pile-soil system, allows the determination of maximum stresses in the pile, energy being transmitted to the pile, and a prediction of the ultimate pile bearing capacity for each hammer impact. Monitoring of the force and velocity wave traces with the oscilloscope during driving also makes it possible to detect if pile damage has occurred. Energy measured by the PDA is the energy transferred to the pile, or the energy that is actually available to drive the pile. This measurement, thus, takes into account the losses that have occurred within the hammer and cushioning system. Hammer efficiency can be evaluated by comparing the measured energy to that energy calculated from ram weight times its height of fall. Pile capacities predicted by the PDA are <u>ultimate</u> static bearing capacities and must be divided by a safety factor of 2 to obtain the working or design pile capacity.

Pile driving began on January 24, 1984, with the pile driven to a depth of 40 feet below water, or approximately 10 feet into the river bottom. The PDA was not used during this initial drive. Pile driving was resumed on the 25th, with the PDA used to monitor the remainder of the drive. A throttle setting of 3 was used on the hammer throughout the test, resulting in approximately a 2/3 reduction in maximum energy according to the manufacturers literature, giving a maximum energy of 42, 143 ft-lbs.

3. Test Results

Results of the test pile driving program are shown in Figure 1. Examination of Figure 1 shows the following:

Figure 1(a): Blow counts for the test pile were very low, generally less than 15 blows per foot. As with the H-piles on the railroad bridge, these blow counts are unexpectedly low compared to the high relative densities indicated by Standard Penetration Tests run during the subsurface investigation.

Figure 1(b): Bearing capacities computed from the WisDOT Standard Driving Formula are very low, as would be expected from the driving record. Except for the start of driving after the overnight delay, capacities were less than 30 tons.

Figure 1(c): Ultimate bearing capacities determined by the PDA were also much lower than anticipated. Throughout most of the driven length capacities ranged between 80 and 130 tons (40 and 65 tons design). At the end of driving the ultimate capacity did increase to around 150 tons (75 tons design).

Comparison of Figures 1(c) and 1(b) shows very similar trends, but a much lower capacity results from using the WisDOT formula. The formula appears to be under predicting the design (working) load carrying capability of the pile by approximately a factor of 2 1/2.

Figure 1(d): Energies being delivered to the pile were somewhat erratic, with a definite drop in energy after the splicing operation. This was also observed in a lower "height of ram fall", as shown on Table 1. There was no apparent explanation for this, as the soils should have been of similar relative density. The hammer was operating generally in the 35% efficiency range, which is rather low. Higher efficiencies, however, would likely have resulted with harder driving.

Upon completion of the driving operation the test pile was pulled with a vibratory pile extractor. The pile was removed from the ground with very little difficulty, and showed no signs of damage.

4. Discussion

Results of this test pile driving program indicate that use of large diameter CIP piles is not likely to be an economical foundation alternative for the Prescott Bridge. Driving depths required for this type pile to achieve significant capacity would be of such length that high capacity H-piles driven to bedrock are a much more logical choice. Based upon experience at the Burlington-Northern Railroad Bridge, and our experience at the Tower Drive and Arrowhead Bridge, it appears that a 14X73 H-pile with a design load of 150 tons could be used at this site. Use of a 150 ton design load will require verification with the PDA, in lieu of a static load test, and cores of the bedrock at each substructure unit.

There appears to be no explanation for the discrepancy between the high soil densities indicated by SPT results in the investigation and the low pile bearing values achieved during driving. Subsurface investigations performed independently for each structure both showed very dense soils with depth, yet piles drove easily through these same soils.

Bedrock is quite variable across the site, and a final subsurface investigation will be required once final pier locations are established. An extensive geotechnical investigation would be of extreme interest, and possibly beneficial, to explain the anomaly that exists between SPT results and pile driving. However, all that is actually required in a final subsurface investigation would be to determine depth of bedrock and conformation of its competency.

PILE DRIVING DATA

Form 3-79

State of Wisconsin · Department of Transportation

Project No. 1530-00-00

Name of Road U.S.H. 16 over St. Croix River

Name of Structure PRESCOTT BRIDGE

Structure No. _____ County Pierce

U.S. Highway 10 Contract No. _____

Contractor _____

Required Bearing _____ Plan Length _____

Pile No. ____ ____ In (Abt. or Pier No.) _____

Location 40 FT East and 50 FT South of

Footing Elevation Existing East Lift Span Pier

Service Pile ☐ Test Pile ☐

Date Driven 1/25/64 Ordered Length from Test Pile _____

Type: Timber – Untreated _____ Treated _____

Steel – H Beams (Give size and wt.) _____

Concrete – Cast-in-place (Give shell thickness) 3/8" Dia. 13 1/8"

with end plate

Others (Describe fully) _____

Diameter: Butt _____ in. Tip _____ in.

Length _____ ft. _____ in.

Mandrel (if used): Description _____

Length _____ ft. _____ in.

Follower (if used): Description _____

Length _____ ft. _____ in.

Hammer: (Check One) Make and Model Delmag D-30-22

Gravity _____

Single-Acting X (Steam or Air) Diesel

Double-Acting _____ (Steam, Air or Diesel)

For Gravity or Single-Acting Hammer:

Weight of Striking Part of Hammer 6600 pounds.

*Height of fall 10.6 ft. maximum

Test performed at throttle setting #3

For Double-Acting Hammer:

Area of Piston _____ sq. in.

Steam or Air Pressure at Hammer _____ psi

Manufacturers Rated Energy _____ ft. lbs.

Driving Cap, Anvil, Helmet, etc.:

Weight 2400 lb. and/or Description _____

(Make Sketch on back)

Stopped overnight

P.E. [redacted] Donald Ingalls

*Note any falling off in rated speed and height of fall during driving.

This driving record shall be kept for all test piling. It shall be kept for the first service piling in each pier or abutment when there is no test piling item. Show any delays to the driving operation. Show all augering through fills. Show all jetting. The driving record may be continued on the back of this sheet along with any remarks, or on additional sheets.

NOTE:

Submit copies to: District Office
Central Office Bridge Section
Central Office Materials Section (Soils Unit)

DRIVING RECORD

Fall H Feet	Depth Below Water From	To	Penetration Resistance Blows/ft.	Bearing Tons
	0	1		
	1	2		
	2	3		
	3	4		
	4	5		
	5	6		
	6	7		
	7	8		
	8	9		
	9	10		
	10	11		
	11	12		
	12	13		
	13	14		
	14	15		
	15	16		
	16	17	WATER	
	17	18		
	18	19		
	19	20		
	20	21		
	21	22		
	22	23		
	23	24		
	24	25		
	25	26		
	26	27		
	27	28		
	28	29		
	29	30		
	30	31		
	31	32		
	32	33		
	33	34		
	34	35		
6	35	36	11	20.4
6	36	37	11	20.4
6.5	37	38	11	22.1
7.0	38	39	13	28.1
	39	40		
6.5	40	41	18	33.4
	41	42	16	30.2
	42	43	13	25.7
	43	44	14	27.1
	44	45	14	27.1
	45	46	14	27.1
	46	47	16	30.2
	47	48	15	28.7
	48	49	14	27.1
	49	50	15	28.7
	50	51	11	22.8
	51	52	11	22.8
	52	53	12	24.0
6.5	53	54	12	24.0
6	54	55	10	19.0

DRIVING RECORD

Fall H Feet	Depth Below Ftg. Elev. From	To	Penetration Resistance Blows/ft.	Bearing Tons
Splice	55	56	SPLICE	
5.0	56	57	11	17.1
	57	58	11	17.1
	58	59	11	17.1
	59	60	11	17.1
5.0	60	61	12	18.4
5.5	61	62	14	22.9
	62	63	11	18.9
	63	64	10	17.3
	64	65	11	18.9
	65	66	10	17.3
	66	67	10	17.3
	67	68	10	17.3
	68	69	10	17.3
	69	70	11	18.9
	70	71	13	21.7
	71	72	13	21.7
	72	73	13	21.7
	73	74	13	21.7
	74	75	12	20.3
	75	76	11	18.9
	76	77	11	18.9
	77	78	11	18.9
	78	79	11	18.9
	79	80	12	20.3
5.5	80	81	12	20.3
6.0	81	82	14	25.0
	82	83	14	25.0
	83	84	13	22.1
	84	85	12	22.1
	85	86	13	23.7
	86	87	14	25.0
6.0	87	88	13	23.7
6.5	88	89	11	22.3
	89	90	11	22.3
	90	91	11	22.3
	91	92	10	20.5
	92	93	10	20.5
	93	94	11	22.3
	94	95	11	22.3
	95	96	12	23.9
	96	97	12	23.9
	97	98	12	23.9
	98	99	10	20.5
6.5	99	100	10	20.5

TABLE 1

DRIVING RECORD

Fall H Feet	Depth Below Ftg. Elev. From	To	Penetration Resistance Blows/ft.	Bearing Tons
6.5	100	101	10	20.5
	101	102	10	20.5
	102	103	10	20.5
	103	104	10	20.5
	104	105	11	22.3
	105	106	12	23.9
	106	107	11	22.3
	107	108	10	20.5
	108	109	11	22.3
6.5	109	110	11	22.3
7.0	110	111	12	25.0
7.0	111	112	13	27.6
7.0	112	113	13	27.6
	13	14		
	14	15		
	15	16		
	16	17		
	17	18		
	18	19		
	19	20		
	20	21		
	21	22		
	22	23		
	23	24		
	24	25		
	25	26		
	26	27		
	27	28		
	28	29		
	29	30		
	30	31		
	31	32		
	32	33		
	33	34		
	34	35		
	35	36		
	36	37		
	37	38		
	38	39		
	39	40		
	40	41		
	41	42		
	42	43		
	43	44		
	44	45		
	45	46		
	46	47		
	47	48		
	48	49		
	49	50		
	50	51		
	51	52		
	52	53		
	53	54		
	54	55		

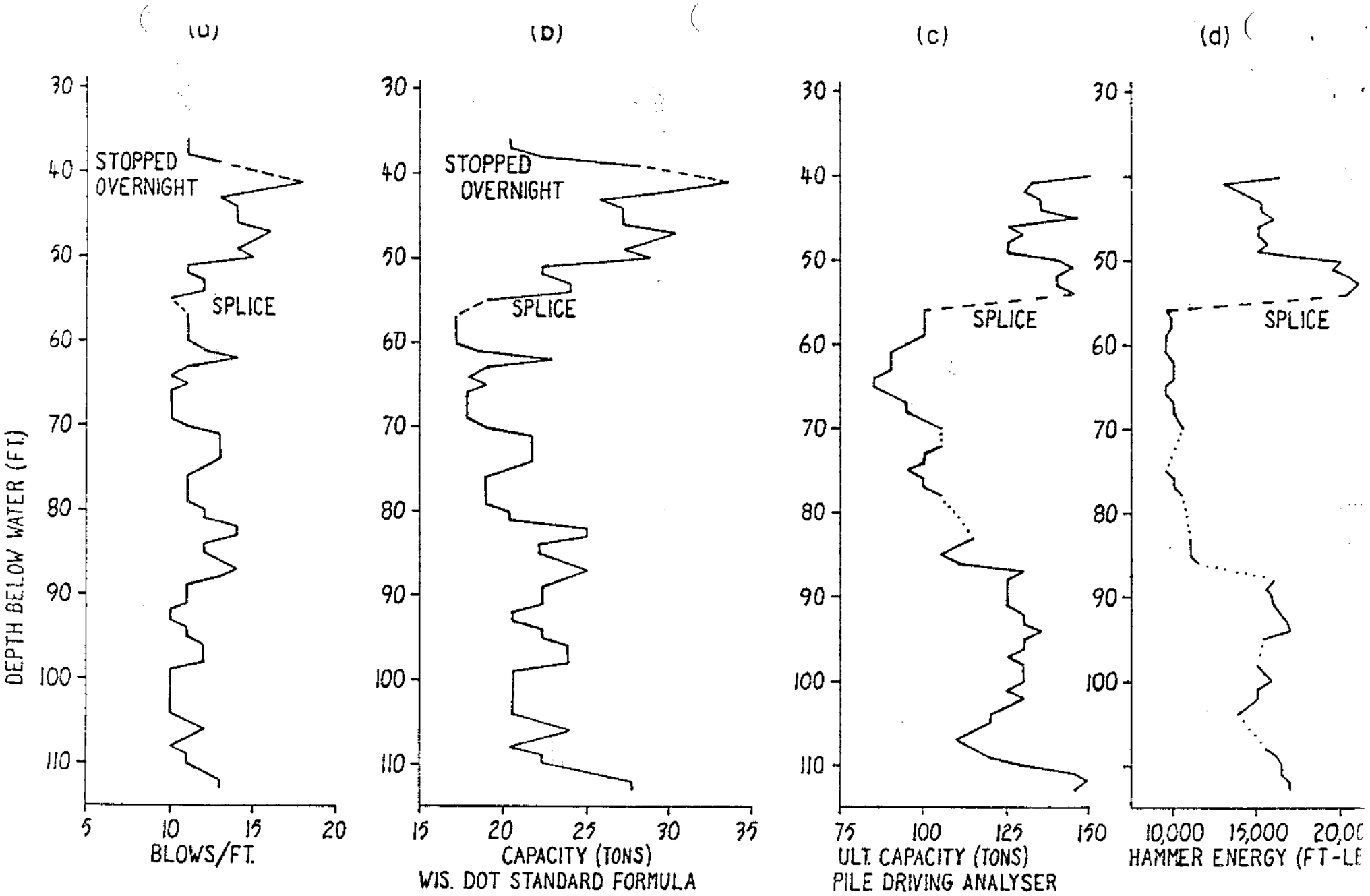

(a)
(b)
(c)
(d)
DEPTH BELOW WATER (FT.)
30
40
50
60
70
80
90
100
110
STOPPED OVERNIGHT
SPLICE
5
10
15
20
BLOWS/FT.
15
20
25
30
35
CAPACITY (TONS)
WIS. DOT STANDARD FORMULA
75
100
125
150
ULT. CAPACITY (TONS)
PILE DRIVING ANALYSER
10,000
15,000
20,00
HAMMER ENERGY (FT-LE

FIGURE - 1

APPENDIX C

DRILL LOGS

FIELD BORING LOG E-L-3(S)-6-76 *State of Wisconsin/Department of Transportation*

Boring No. 1A Structure B-47- County Pierce Sheet 1 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 97 + 55 Offset 8' left of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water 75.37

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave in Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 7-23-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Air			4		
					Water					
					5					
					10					
					15					
					20					
					25					
					30					
					Gray/brown sandy silt			5		
								15		
					Dense brown sandy silt			16		
					Little gravel			30		
								50		
					35					
1	W	22	27					19		WA
		19						14		RB
								32		DM
								25		
			12		Dense brown sand, some gravel			80		
		28	20		40 No recovery, trace of silt					

Checked by Final Boring No. 1A

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin/Department of Transportation*

Boring No. 1A Structure B-47- County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 97 + 55 Offset 8' left of centerline Surface Elevation 75.37'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 7-23-85 Unit 6

Finish _____ Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40	Dense brown sand, some gravel, trace of silt			14		WA
									16		RB
									20		DM
									55		
			14		45				56		
2	W	18	19								WA
											RB
						Firm brown fine to coarse sand, trace of gravel					DM
			8		50						
3	W	8	12								
			17		55	Dense brown sand, some gravel					
4	W	18	13								
		26	22		60						
5	W	16									
6	W	16	16		65						
		13									
		31	19		70	No recovery					
		13									
					75				NW		
7	W	16	8						18		
		10							43		
						Dense brown medium to coarse sand, trace of gravel			26		
									27		
			29		80				40		WA
8	W	31	18								RB
											DM

Checked by _____ Final _____ Boring No. 1A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 1A Structure B-47- County Pierce Sheet 3 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 97 + 55 Offset 8' left of centerline Surface Elevation 75.37'

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washanesd, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 7-23-85 Unit 6 Finish ____ Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Visual Field Classification and Remarks	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					80 Dense brown medium sand, trace of gravel			3		WA
								3		RB
								8		DM
								31		
			25		85 Dense brown sand, some gravel			33		
9	W	21	23					4		WA
								6		RB
								16		DM
								42		
			26		90			62		
10	W	13	14		Firm brown sand, little gravel, trace silt			5		WA
								23		RB
								12		DM
								12		
			8		95			15		WA
11	W	9	13					6		RB
								6		DM
								8		
								14		
			11		100			12		
12	W	23	24					14		WA
								72		
								49		
								45		
			11		105			25		
13	W	8	11					6		WA
								10		
								17		
					Dense brown sand, some gravel			24		
			19		110			21		
14	W	16	14					8		WA
								12		
								33		
								44		
			22		115			40		
15		22	26					19		WA
								9		
								15		
								35		
			78		120 No recovery			45		
		66	46							

Checked by ____ Final ____ Boring No. 1A

FIELD BORING LOG E-L-3(S)- 9-76 *State of Wisconsin Department of Transportation*

Boring No. 1A Structure B-47- County Pierce Sheet 4 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 97 + 55 Offset 8' left of centerline Surface Elevation 75.37

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave in _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 7-23-85 Unit 6

Finish _____ Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					120	Dense brown sand, some gravel			48		
									85		
									143		
									154		
					125				161		
		8/4"				No recovery			16		WA
									13		RM
									17		DM
									28		
			31		130				51		
16	W	41	35						18		
									19		
									26		
									32		
		55	62		135				46		
17	W	61							13		
									72		
									54		
18	W		66			Water elevation 74.9, 8-5-85			36		
		100/5"			140				45		
									48		
						Very dense brown weathered sand stone			100/3"		
19	W	100/3"			145						
						NQ core 144.5 - 150.5					
						Recovered 30% - gray					
					150						
						End of boring #1A 150.5					

Checked by _____ Final _____ Boring No. 1A

FIELD BORING LOG

E-L-3(5)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 2A Structure B-47- County Pierce Sheet 1 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 00 Offset 6 feet right of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water 74.8

While drilling — Time after drilling

Before casing removal — Depth to water

After Boring Completed — Depth to cave-in

Cave In — Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-7-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Air			4"		
						Water					
					5						
					10						
					15						
					20						
					25						
						Gray silt					
			7		30				9		
1	W	6	4			Loose gray medium to coarse sand, trace of silt, gravel, & shells			15		
		3							24		
									60		
						Firm brown sand, some gravel.			125		W
			4						115		RB
2	W	11	19		35				38		DM
									52		
									48		
									48		
									82		
					40						WA
3	W	40	13								RB
											DM

Checked by 20 Final Boring No. 2A

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin/Department of Transportation*

Boring No. 2A Structure B-47- County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 00 Offset 6 feet right of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water 74.8

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

WA=Washahead, FT = Fish tail, RB = Rock bit

DRILLING METHOD: ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-7-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40	Firm brown sand, some gravel					WA
											RB
									3"		DM
									NW		WA
			6		45						
4	W	12	16						20		
									41		
									69		
									65		
					50				68		WA
5	W	10	15						3		RB
		16							2		DM
									4		
									4		
			14		55				3		
6	W	19	15						4		
									6		
					60						
									7		
									9		
									19		
									29		
					65				29		
									26		
									21		
									25		
									26		
					70				28		
									38		
									35		
									41		
									40		
					75				33		
									30		
									30		
									32		
									29		
					80				27		

Checked by Final Boring No. 2A

FIELD BORING LOG E-L-3(S)-8-76 *State of Wisconsin Department of Transportation*

Boring No. 2A Structure B-47- County Pierce Sheet 3 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 00 Offset 6 feet right of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water 74.8

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-7-85 Unit 6 Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					80	Firm/dense brown sand, some gravel			26		
									27		
									31		
									35		
					85				33		
									32		
									32		
									32		
									36		
					90				36		
									33		
									46		
									49		
									49		
					95				40		
									45		
									53		
									56		
									48		
					100				32		
									29		
									38		
									44		
									43		
					105				55		
									84		
									63		
									50		
									48		
					110				58		
									69		
									70		
									92		
									105		
					115				105		WA
									28		RB
									68		DM
									70		
									55		
					120				113		

Checked by Final Boring No. 2A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 2A Structure B-47- County Pierce Sheet 4 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 00 Offset 6 feet right of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water 74.8

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-7-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					120	Firm/dense brown sand, some gravel			61		
									66		
									90		
									90		
					125				73		
									80		
									100		
									147		
						Very dense brown sand & gravel			105		
					130				180		WA
									75		RB
									50		DM
									38		
									32		
					135				55		
7	W	36	46						50		
		46							100		
			40						155		
8	W	30	33						150		
					140				250/6"		
						Wash sample					
						NQ core, brown sandstone					
						141 to 147', no recovery					
					145						
						End of boring #2A					
					150	147.0'					

Checked by Final Boring No. 2A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 3A Structure B-47- County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 50 Offset 2 feet right of centerline Surface Elevation 756'

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-13-85 Unit 6

Finish Chief A.F.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Air			4"		
					5					
					10					
					Water					
					15					
					20					
					25					
					Gray sand					
		8	16					27		
1	W	23	23		Dense brown sand, little gravel			39		
								42		
					30			55		
								42		
								45		
								51		
								62		
								32		
					35					
			8		Firm brown sand & gravel					
2	W	12	15							
		19	28							
					40					
3	W	16								

Checked by ____ Final ____ Boring No. 3A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 3A Structure B-47- County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 50 Offset 2 feet right of centerline Surface Elevation 75.6'

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washhead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-13-85 Unit 6

Finish ____ Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Station	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40	Firm brown sand & gravel			NB		RB
									27		DM
									31		WA
									66		SS
	W	18	20		45	(Dense)			59		
4		21							16		
									21		
									24		
									27		
					50				31		
		40	40						24		
5		50							28		
									24		
									26		
					55				38		
									78/7		
									7		
									7		
									7		
					60				5		
									2/6		
									8		
									7		
									7		
					65				7		
									5/11		
									5		
									14		
									17		
									20		
					70				16/7		
									6		
									7		
									16		
					75						
					80				11		
									3/		

Checked by ____ Final ____ Boring No. 3A

FIELD BORING LOG E-L-3(S)-8-76 *State of Wisconsin/Department of Transportation*

Boring No. 3A Structure B-47- County Pierce Sheet 3 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 50 Offset 2 feet right of centerline Surface Elevation 75.6'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-13-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elev.	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					80	Firm brown sand & gravel			8/7		
									9		
									10		
									9		
					85				14		
									10		
									10		
									20		
									19		
					90	8-14-85 water elevation 75.6			15		
									7/2		
									48		
									64		
									75		
					95				82		
									42/40		
									107		
									74		
									62		
					100				62		
									63		
									126		
									145		
									137		
					105	Brown medium sand			60		WA
									11		RB
									16		DM
									17		
									0		
					110				45		
									120		
									100/23		WA
									23		RB
									37		DM
					115				150/		WA
											RB
											DM
					120	Very dense brown sandstone					
6	W	100/5"									

Checked by _____ Final _____ Boring No. 3A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 3A Structure B-47- County Pierce Sheet 4 of 4

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 50 Offset 2 feet right of centerline Surface Elevation 75.6'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-13-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					120					
					Very dense brown sandstone					
										C
					Ax core 121.5 to 126.0', no recovery					M-H
					125					
										E
					End of boring #3A 126.0'					

Checked by _____ Final _____ Boring No. 3A

FIELD BORING LOG E-L-3(5)-8-76 *State of Wisconsin/Department of Transportation*

Boring No. 4A Structure B-47- County Pierce Sheet 1 of 3

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 99 Offset On centerline Surface Elevation 755.6'

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-14-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Visual Field Classification and Remarks	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Air			4"	3"	
									ny	
									push	
					Water					
		0	1					1		
1	W	1	1		Loose brown-gray sand, some gravel			5		
		1	1		Trace of silt & wood			7		
								13		
								13		
								8		
								13		
								18		
2	W	20	26		Very dense brown sand & gravel					
		90/4"								
			11							
3		12	16		(Firm)				33	
									24	
									26	
									24	
			40		Dense coarse sand				19	
4		40	42						12	
									31	
									41	
									53	
									52	
		5	5						10/2	
5		8							16	
									23	
									27	
									59	
		26	16		(Stone in shoe; no recovery)					
		10								

Checked by ____ Final ____ Boring No. 4A

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 4A Structure B-47- County Pierce Sheet 2 of 3

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 99 Offset On centerline Surface Elevation 75.6

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave in _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

WA=Washahead, FT = Fish tail, RB = Rock bit

DRILLING METHOD: ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-14-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elev.	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing	Casing Size	Probe Size	Drilling Method
					40	Firm medium-coarse sand and gravel			20			
									33			
									21			
									27			
					45				28			
									16/15			
									23			
									23			
									17			
					50				16			
									7/14			
									30			
									36			
									28			
					55				31			
						Stop			4/19			
									27			
									29			
					60				36			
									23			
									8/19			
									25			
									26			
					65				26			
									27			
									13/19			
									27			
									24			
									36			
					70				33			
									9/27			
									39			
6	W	31	58			Brown, very dense, medium to coarse sand & gravel (from sample)			37/100	1"		
		62							113			
					75				93			WA
									56			RB
									39			DM
									43			
					80				39			
									54			

Checked by _____ Final _____ Boring No. 4A

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 4A Structure B-47- County Pierce Sheet 3 of 3

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 99 Offset On centerline Surface Elevation 75.6

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-14-85 Unit 6

Finish Chief A.K.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					80				48		
									88		
									114		
									70		
					85				57		
									41		
									58		
									55		
									62		
					90				62		
									40		
									37		
									60		
									98		
					95				76		
									56		
									50/3"		C
						NQ core 96.2 to 101.2					H
						Limestone boulder & gravel					
					100						
					105	Very dense brown sandstone					
7	W	115	100/3		110						
						End of boring #4A 109.7					

Checked by _____ Final _____ Boring No. 4A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin/Department of Transportation*

Boring No. 5A Structure B-47- County Pierce Sheet 1 of 3

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 75 Offset On centerline Surface Elevation 75.5'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-16-85 Unit 6

Finish 8-17-85 Chief B.P.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					5						
					10	Water					
					15						
					20						
									7/x		
						Firm med. course sand & gravel			17		
									18		
					25				4/7		
									12		
									18		
									22		
					30				28		
									12/34		
									122		
									93		
									130		
					35	(Very dense)			86		
									14/10		
									117		
									79		
									53		
					40				46		

Checked by _____ Final _____ Boring No. 5A

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 5A Structure B-47- County Pierce Sheet 2 of 3

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 75 Offset On centerline Surface Elevation 755

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8-16-85 Unit 6

Finish 8-17-85 Chief B.P.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40	Medium coarse sand & gravel			39		NA
									53		
									69		
									52		
					45				42		
									12/37		
									38		
									28		
									27		
					50				25		
									6/17		
									18		
									26		
									28		
					55				28		
									6/26		
									34		
									29		
									34		
					60				46		
									7/46		
									54		
									76		
									68		
					65				70		
									16/47		W
									62		
									56		
									71		
					70				64		
									20/49		
									77		
									68		
									79		
					75				82		
									20/57		
									80		
									117		
									128		
					80				125		
									32/		

Checked by _____ Final _____ Boring No. 5A

FIELD BORING LOG

E-L-3(5)- 8-76

State of Wisconsin Department of Transportation

Boring No. 5A Structure B-47- County Pierce Sheet 1 of 3

Project 1530-00-00 Road USH 10 - Prescott Bridge

Station 98 + 75 Offset On centerline Surface Elevation 755'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-16-85 Unit 6

Finish 8-17-85 Chief B.P.

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation / Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Uncontined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					80	Medium coarse sand & gravel			32/91		W
									170		
									130		
									125		
					85 (5)				135		
									50/36		WA
									57		RB
									92		DM
									DM		
					90 (10)				102		
									78		
									91		
									73		
									75		
					95 (15)				71		
									76		
									97		
									105		
									09		
					100 (20)				108		
									115		
											WA
											RB
											DM
					105 (25)						
						Very dense brown sandstone					
						No recovery					
		50/3"			110 (30)	End of boring #5A 109.2					
					35						
					40						

Checked by _____ Final _____ Boring No. 5A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 6A Structure B-47 County Pierce Sheet 1 of 1

Project 1530-00-00 Road USH 10

Station 99 + 15 Offset on centerline Surface Elevation

GROUND WATER OBSERVATIONS Water elev. 75.6

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave in ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/19/85 Unit 6

Finish 8/20/85 Chief AK-BP

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Water			4		
									4		
									10		
						Brown sand & gravel			18		
					5				28		
									45		
									66		
									118/73		
	W		40						103/69		
1		85/2"			10	Brown limestone, seam of sands, NQ core 9.5 to 14.5, recovery 50%					
					15	2nd run 14.5, 17:0', 100% recovery					
					20	End of Boring #6A 17.0'					
					25						
					30						
					35						
					40						

Checked by ____ Final ____ Boring No. 6A

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 7A Structure B-47 County Pierce Sheet 1 of 4

Project 1530-00-00 Road USH 10

Station 98 + 25 Offset 5' left Surface Elevation 75.6

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/20/85 Unit 6

Finish _____ Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Uncontrolled Strength	Boulders	Blows on Casing	Casing Size	Probe Size	Drilling Method
					6" air						
					Water						
				5		5					
				10		10					
				15		15					
				20		20					
				25		25					
								/10			
								5			
				30		30		5			
								18			
								70			
								133			
								62			
				35	NOT SAMPLED	35		46			
								33			
								55			
								40			
								37			
				40		40		46			

Checked by _____ Final _____ Boring No. 7A

FIELD BORING LOG E-L-3(5)-8-76 *State of Wisconsin Department of Transportation*

Boring No. 7A Structure B-47 County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10

Station 98 + 25 Offset 5' left Surface Elevation 75.6

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washhead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/20/85 Unit 6

Finish _____ Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40				25		
									18		
									25		
									30		
									26		
									33		
									42		
									60		
									61		
					50				55		
									50		
									56		
									55		
									45		
									41		
									36		
									38		
									33		
									35		
					60	NOT SAMPLED			31		
									41		
									49		
									57		
									46		
									32		
									45		
									51		
									43		
									53		
					70				47		
									46		
									43		
									40		
									43		
									37		
									50		
									47		
									49		
									56		
					80				62		

Checked by _____ Final _____ Boring No. 7A

FIELD BORING LOG E-L-3(S) 8-76 *State of Wisconsin Department of Transportation*

Boring No. 7A Structure B-47 County Pierce Sheet 3 of 4

Project 1530-00-00 Road USH 10

Station 98 + 25 Offset 5' left Surface Elevation 75.6'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/20/85 Unit 6

Finish Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on NW Casing Size	Blows on Probe Size	Drilling Method
					80						
									58		
									59		
									70		
									81		
									80		
									60		
									79		
									70		
									88		
					90				90		WA
									50		RB
									36		
						NOT SAMPLED			31		
									64		
									70		
									86		
									59		
									80		
									108		
					100				85		
									145		
									150		
									175		
									100		
									79		
									73		
									46		
									92		
									127		
					110				78		
									12/100		
									97		
									173		
									107		
									110		
									160		
									142		
									217		
						Brown medium sand			280		
					120				265		

Checked by Final Boring No. 7A

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 7A Structure B-47 County Pierce Sheet 4 of 4

Project 1530-00-00 Road USH 10

Station 98 + 25 Offset 5' left Surface Elevation 75.6

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/20/85 Unit 6

Finish 8/21/85 Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					120						
						Brown medium sand			79		WA
									67		RB
									53		DM
									55		
					125				45		
									37		
									34		
									32		
									45		
					130	Very dense brown sand & gravel			89		
1	w	33	107						100		
		60	60						180		
									330		
									360		
					135	Brown sandstone wash sample					
						End of Boring #7A					
					140	Water elevation 75.6					

Checked by _____ Final _____ Boring No. 7A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 8A Structure B-47 County Pierce Sheet 1 of 5

Project 1530-00-00 Road USH 10

Station 95 + 03 Offset 4' left Surface Elevation 75.2'

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-21-85 Unit 6

Finish ____ Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Air			4"		
					5	Water					
					10						
			0						7		
1	w	0	1		15	Very loose brown gray fine to coarse sand, little gravel, trace of silt.			2		
		1	2						2		
									5		
									6		
									7		
					20				10		
2	w	6	2						2		
		2							2		
									7		
									15		
					25						WA
3	w	6	4								RB
		4									DM
					30						
4	w	2	5			Firm gray fine silty sand, seams to layer of organic silt, trace of wood.					
		6									
					35	Loose.					
5	w	1	2								
			4								
					40	Loose gray silt, little organic, trace of wood.					
6	W	1	1								
			7								

Checked by ____ Final ____ Boring No. 8A

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 8A Structure B-47 County Pierce Sheet 2 of 5

Project 1530-00-00 Road USH 10

Station 95 + 03 Offset 4' left Surface Elevation 752'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-21-85 Unit 6

Finish _____ Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40	Loose gray silt, little organic, trace of wood.			NW		WA
									Push		RB
						Brown sand, some gravel.					DM
					45						
									38		
									55		
									48		
					50				34		
									28		
									26		
									12		
									16		
					55	Dense gray coarse sand & gravel.			24		SS
	W	32	28								
7		41							18		
									36		
									38		
					60				43		
									62		
									64		
									39		
									33		
					65				39		
									55		
									57		
									98		
						Brown medium sand.			122		
									126		
					70				158		
									35		
									20		
									14		
									11		
					75				7		
									20		
									16		
									14		
									12		
					80				13		

Checked by _____ Final _____ Boring No. 8A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 8A Structure B-47 County Pierce Sheet 3 of 5

Project 1530-00-00 Road USH 10

Station 95 + 03 Offset 4' left Surface Elevation 75.2

GROUND WATER OBSERVATIONS 8/22/85 Water 75.2

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-21-85 Unit 6

Finish Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					80	Brown medium sand.			16		WA
									17		RB
									12		DM
									9		
					85				12		
									10		
									10		
									14		
									9		
					90				12		
									16		
									15		
									29		
									140		
					95				110		
									25		
									16		
									14		
									22		
					100				72		
									210		
						Brown sand, some gravel.			500		
									447		
									187		
					105				160		WA
									40		RB
									33		DM
									21		
									16		
					110	Brown medium sand.			16		
									24		
									26		
									25		
									37		
					115				34		
									42		
									54		
									61		
									91		
					120				155		

Checked by Final Boring No. 8A

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 8A Structure B-47 County Pierce Sheet 4 of 5

Project 1530-00-00 Road USH 10

Station 95 + 03 Offset 4' left Surface Elevation 75.2'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-21-85 Unit 6

Finish Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing	Casing Size	Probe Size	Drilling Method
					120	Brown medium sand.			59			WA
									40			RB
									36			DM
									29			
					125				27			
									26			
									26			
									26			
									30			
					130				36			
						Little gravel.			37			
									45			
									48			
									47			
					135				46			
									54			
									56			
									58			
									58			
					140				64			
									61			
									65			
									71			
									71			
					145				92			
									95			
									137			
									122			
									100			
					150				103			
									72			
									54			
									55			
									56			
					155				62			
									80			
									98			
									150			
									184			
					160				232			

Checked by _____ Final _____ Boring No. 8A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 8A Structure B-47 County Pierce Sheet 5 of 5

Project 1530-00-00 Road USH 10

Station 95 + 03 Offset 4' left Surface Elevation

GROUND WATER OBSERVATIONS Water Elev. 75.0 8/23/85

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in 8/26/85 674.8'

Cave In Water Notes

MOISTURE D = Damp M = Moist W = Wet

DRILLING METHOD WA=Washahead FT = Fish tail RB = Rock bit ST = Shelby tube SS = Split spoon DM = Drilling mud A = Auger C= Coring W = Wash E = Easy M = Medium H = Hard

Start 8-21-85 Unit 6

Finish Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing	Size	Probe Size	Drilling Method
					160			100/6"			WA
					NQ core 161.5 to 166.5, gray sandstone with shale layers, 100% recovery.						RB
											DM
					165						
					NQ core 166.5 - 171.5, gray sandstone with shale layers, 80% recovery.						
					170						
					End of Boring 8A @ 171.5'.						
					175						

Checked by Final Boring No. 8A

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 9A Structure B-47 County Pierce Sheet 1 of 4

Project 1530-00-00 Road USH 10

Station 94 + 56 Offset 11' Left of Centerline Surface Elevation 76.3'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-27-85 Unit 6

Finish _____ Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Air				4		
					5	Water	5					
					10		10					
1	w	0	1			Loose gray, fine to coarse sand, trace of silt seams and gravel						
		1	1									
		1										
										8		
					15		15			11		
										13		
										11		
										12		
			2							11		
2	w	3	3		20		20			15		WA
												RB
												DM
		1	3									
3	w	3	3		25		25					
						Loose gray fine sand, little silt						
			2									
4	w	2	2		30		30					
						Loose gray silt seams to layers of sand. Little organic material.						
			1									
5	w	2	1		35		35					
										37		
										7		
					40		40			8		

Checked by _____ Final _____ Boring No. 9A

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 9A Structure B-47 County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10

Station 94 + 56 Offset 11' Left of Centerline Surface Elevation 76.3'

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-27-85 Unit 6

Finish ____ Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40	Loose gray silt seams to layers of sand, little organic material			9		
									9		
									10		
						Very dense brown sand & gravel			53		
									55		WA
					45				13		RB
6	w	4	70/4"						61		DM
									18		
									20		
					50				26		
									40		
									75		
									99		
						Firm brown sand, some gravel			39		
									20		
					55				10		
7	w	10	20						22		
		10							23		
									34		
					60				32		
									44		
									47		
						Firm brown medium sand			38		
									35		
					65				34		W
8	w	9	8						21		
		11							27		
									44		
									39		
					70				56		
									52		
									38		
									38		
						Firm brown medium to coarse sand, little			40		
					75	gravel			42		
9	w	11	10						36		
		15							40		
									59		
									71		
					80				69		

Checked by ____ Final ____ Boring No. 9A

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 9A Structure B-47 County Pierce Sheet 3 of 4

Project 1530-00-00 Road USH 10

Station 94 + 56 Offset 11' Left of Centerline Surface Elevation 76.3'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-27-85 Unit 6

Finish _____ Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Uncontrolled Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					80	Firm brown medium to coarse sand, little gravel			69		WRF
									64		
									80		
						Very dense brown sand, little gravel and seams of silt			79		
					85				80		
10	w	25	35						64		WA
		38							62		RB
									48		DM
									46		
					90				45		
									42		
									47		
									57		
									42		
					95				34		
11	w	40	64			Some gravel			35		
		50							31		
									29		
									24		
					100				30		
									32		
									29		
									58		
									78		
					105				79		
12	w	110							102		
									108		
									88		
									78		
					110				75		
									87		
									95		
									113		
									198		
					115				173		
13	w	41	78						82		
									117		
									142		
									150		
					120				186		
									201		
									240		

Checked by _____ Final _____ Boring No. 9A

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 9A Structure B-47 County Pierce Sheet 4 of 4

Project 1530-00-00 Road USH 10

Station 94 + 56 Offset 11' Left of Centerline Surface Elevation 76.3'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave in _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-27-85 Unit 6

Finish _____ Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					120				261		
									284		
						Very dense fine sand			290		
									286		
					125				306		
14	w	31	34						89		RB
		40							111		Ahead
									119		
									126		
					130	Trace of gravel layers			125		
									132		
									140		
									149		
						Very dense brown fine to coarse sand, little			163		
					135	gravel			189		
15	w	41	63						98		RB
		101							122		Ahead
									130		
									141		
					140				140		
									149		
									158		
									170		
									213		
					145				241		
16	w	38	72						131		RB
		89							148		Ahead
									169		
									172		
					150				180		
									193		
									199		
									241		
									263		
					155	Very dense yellow sandstone			380		
17	w	200/5"									
						Yellow					
						Cored 5', 156' to 161', 100% recovery					
						Gray sandstone					
					160						
						End of Boring 9A, 161'					

Checked by _____ Final _____ Boring No. 9A

Water was at 76.25 at 9/5/85

FIELD BORING LOG E-L-3(S)-8-76 *State of Wisconsin/Department of Transportation*

Boring No. 1M Structure St. Croix River County Pierce Sheet 1 of 5

Project 1530-00-00 Road USH 10

Station 92 + 75 Offset 8' right of centerline Surface Elevation 755.8

Minnesota Side

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/14/85 Unit 1

Finish ____ Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 3"	Blows on Probe Size	Drilling Method
						Black topsoil - silt.			3"		
	W										
						Gray mottled silt, trace of organic, fibrous & sand.					
					5		5				
		3	3						9		W
1	W	5	5			Loose brown fine to medium sand.			18		
									13		
									17		
					10	Loose gray, fine to medium sand, trace of silt.	10		5/6		
2	W	2	1						11		
		2	1						14		
									16		
									17		
					15		15		9/		
3	W	2	2								RB
		2	2							Ahead	
										Revert	
						Firm gray, fine to medium sand.					
					20		20				
4	W	4	5								
		6	7								
					25		25				
5	W	2	3			Loose.					
		4	4								
					30		30				
6	W	6	17			Dense. Gray fine sand.					
		19	13								
					35	Very loose gray alternating layers of fine sand, silt - trace of organic material.	35				
7	W	1	2								
		1	1								
					40		40				
8	W	1	1								
		3									

Checked by ____ Final ____ Boring No. 1M

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin/Department of Transportation*

Boring No. 1M Structure St. Croix River County Pierce Sheet 2 of 5

Project 1530-00-00 Road USH 10

Station 92 + 75 (off old bridge) Offset 8' right of centerline proposed Surface Elevation 758

Minnesota Side

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/14/85 Unit 1

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elev.	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 3 1/8"	Blows on Probe Size	Drilling Method
					40						
8	w	1	1			Very loose gray alternating layers of fine			56		RB
		3				sand and silt, trace of organic material.			52		Ahead
									52		Revert
									56		
					45				60		
9	w	1	1			Loose.			72		
		7							60		
									67		
									72		
					50				73		
10	w	1	1			Very loose gray organic silt			83		
		2							80		
									79		
									64		
					55				74		
11	w	1	2						90		
		2							86		
									84		
									84		
					60				92		
12	w	1	2						93		W
		3							93		
									84		
									88		
					65				91		
13	w	1	2				1.0				RB
		3									Ahead
											Revert
					70						
14	w	1	1				1.0				
		3									
					75						
15	w	1	2				1.0				
		2									
					80						
16	w	2	2				1.0				
		6				Firm to loose brown sand and gravel.					

Checked by ____ Final ____ Boring No. 1M

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin/Department of Transportation*

Boring No. 1M Structure St. Croix River County Pierce Sheet 3 of 5

Project 1530-00-00 Road USH 10

Station 92 + 75 (off old bridge) Offset 8' right of centerline Surface Elevation 75.8

Minnesota Side

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/14/85 Unit 1

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elev.	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing	Blows on Slice	Blows on Probe Size	Drilling Method
					80							
16	w	2	2			Very loose gray organic silt, trace snails.			99			RB
		6				Firm brown sand and gravel.			97			Ahead
									98			Revert
									93			
					85				95			
17	w	18	17						115			
		29				Dense brown fine sand - with layers of gravel and coarse sand.			88			
									112			
									77			
					90				165			
18		13	11						125			
		17							89			
									99			
									105			
					95				143			
19		16	19						149			W
		27							179			
									180			
									183			
					100				180			
						Casing fill in. No sample.			168			
									132			
									175			
									180			
					105				181			
20	w	24	30			Very dense.						RB
		31										Ahead
												Revert
					110							
21	w	23	28									
		29										
					115							
22	w	15	30			Very dense fine sand.						
		45										
					120							
23	w	31	60									
		73										

Checked by _____ Final _____ Boring No. 1M

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 1M Structure St. Croix River County Pierce Sheet 4 of 5

Project 1530-00-00 Road USH 10

Station 92 + 75 (off old bridge) Offset 8' right of centerline Surface Elevation 75.8

Minnesota Side

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/14/85 Unit 1 Finish ____ Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					120						
23	w	31	60			Very dense fine sand.					RB
		73									Ahead
											Revert
						Very dense brown fine to coarse sand.					
					125	Little gravel layers. Trace of silt.					
24	w	27	30								
		31									
					130						
25	w	21	30								
		36									
					136						
26	w	29	48								
		47									
					140						
27	w	63	200/4"			Some gravel.					
					145						
28	w	43	100/3"								
					150						
29	w	47	88								
		120									
					155						
30	w	51	100								
		128									
					160						
31	w	47	91								
		106									

Checked by ____ Final ____ Boring No. 1M

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 1M Structure St. Croix River County Pierce Sheet 5 of 5

Project 1530-00-00 Road USH 10

Station 92 + 75 (off old bridge) Offset 8' right of centerline Surface Elevation 75.8

Minnesota Side

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/14/85 Unit 1

Finish 8/22/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
31	W	47	91			Very dense brown fine to coarse sand. Some					RB
		106				gravel, trace of silt.					Ahead
											Revert
32		300/4"			165	Yellow shale and sandstone. Roller bit into rock drilled. Very hard.					
					170	No Recovery.					
33		200/2"				End of Boring.					

Checked by _____ Final _____ Boring No. 1M

FIELD BORING LOG E-L-3(5)-8-76 *State of Wisconsin Department of Transportation*

Boring No. 2M Structure St. Croix River County Pierce Sheet 1 of 5

Project 1530-00-00 Road USH 10

Station 93 + 25 Offset 22' Right of Centerline Surface Elevation 75.5

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/22/85 Unit J

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4" Size	Blows on Probe Size	Drilling Method
2M					Gray silty fine sand.					A
								2		
								4		
								12		W
								14		
								14		
								20		
								23		
					After taking 3" tubes, put in 3" casing. Push casing to 33 feet.					
					With layers of gray silt.			18		
								21		
								30		
								36		
								35		
								38		
								43		
								40		
								41		

Checked by _____ Final _____ Boring No. 2M

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 2M Structure St. Croix River County Pierce Sheet 2 of 5

Project 1530-00-00 Road USH 10

Station 93 + 25 Offset 22' Right of Centerline Surface Elevation 75.5

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/22/85 Unit 1

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elev.	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3" Size	Probe Size	Drilling Method
					40				40		RB
									41		Ahead
									41		Revert
									43		4"
					45				42		Hole
									45		
									44		
									43		
									39		
					50	Loose gray organic silt; trace of snails.			40		
1	M	3" tube							46		
							1.0		43		
									44		
									47		
					55				51		
									51		
									49		
									47		
									48		
					60				53		
2		3" tube					1.25		50		
									49		
						Lost Revert			43		
									45		
					65				46		
									60		
									78		
						Try to push tube in sand.			95		
						Dense sand.			139		
					70				150		
									148		
									145		
						Dense to very dense. Fine to coarse sand - little gravel.			165		
									168		
					75				172		
											RB
											Ahead
											Revert
					80						

Checked by ____ Final ____ Boring No. 2M

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 2M Structure St. Croix River County Pierce Sheet 1 of 5

Project 1530-00-00 Road USH 10

Station 93 + 25 Offset 22' Right of Centerline Surface Elevation 75.5

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/22/85 Unit I

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					80					RB
										Ahead
										Revert
					85 Very dense, fine to coarse sand, some gravel					
					90 Roller bit very hard					
					95					
					100					
					105					
					Very dense fine sand					
					110					
					115					
					Very dense, fine to coarse sand, some gravel					
					120					

Checked by _____ Final _____ Boring No. 2M

FIELD BORING LOG E-L-3(S) 8-76 *State of Wisconsin/Department of Transportation*

Boring No. 2M Structure St. Croix River County Pierce Sheet 4 of 5

Project 1530-00-00 Road USH 10

Station 93 + 25 Offset 22' Right of Centerline Surface Elevation 75.5

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/22/85 Unit I

Finish ____ Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing	Size	Probe	Size	Drilling Method
					120	Very dense, fine to coarse sand, some gravel							RB
													Ahead
													Revert
					125	Roller bit very hard							
					130								
					135								
					140								
					145								
					150								
					155								
					160								

Checked by ____ Final ____ Boring No. 2M

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 2M Structure St. Croix River County Pierce Sheet 5 of 5

Project 1530-00-00 Road USH 10

Station 93 + 25 Offset 22' Right of Centerline Surface Elevation 675.5

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8/22/85 Unit I

Finish _____ Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation / Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					160	Very dense, fine to coarse sand, some gravel					
						Yellow shale and sandstone					
I						No recovery					
					165 / 5	Drilled very hard					
					170 / 10	End of Boring 2M					
					175 / 15						
					180 / 20						
					185 / 25						
					190 / 30						
					195 / 35						
					200 / 40						

Checked by _____ Final _____ Boring No. 2M

FIELD BORING LOG

E-L-3(5)-8-76

State of Wisconsin Department of Transportation

Boring No. 3M Structure St. Croix River County Pierce Sheet 1 of 4

Project 1530-00-00 Road USH 10

Station 94 + 00 Offset 17.5 inches right of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water elev. 78.5

While drilling — Time after drilling

Before casing removal — Depth to water

After Boring Completed — Depth to cave-in

Cave In — Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/10/85 Unit 1

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing Size 3 in	Blows on Probe Size	Drilling Method
						Barge Deck						W
						Water						
					5		5					
1	w		3							2		
		2	1			Loose gray fine to coarse sand, trace of silt.				4		
										4		
										5		
					10		10			5		
2	w	2	1							3		
		2	3							4		
										4		
										7		
					15		15			11		
3	w	2	2			Trace of wood.				3		
		2	2							3		
										5		
										6		
					20		20			11		
4	w	2	1							4		
		2	2							6		
										7		
										7		
					25		25			8		
5	w	1	2							8		
		5	3							11		
										11		
										14		
					30		30			21		
6	w	3	4							7		
		4	5							12		
										19		
										24		
					35		35			25		
						Water elevation was 79.0 at highest point during boring.				26		
										32		
										40		
										52		
										61		
					40		40			59		
										60		

Checked by Final Boring No. 3M

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 3M Structure St. Croix River County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10

Station 94 + 00 Offset 17.5 inches right of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water elev. 78.5

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/10/85 Unit I

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3"	Blows on Probe Size	Drilling Method
					40	Loose gray fine to coarse sand, trace of silt.			59		W
									60		
									62		
									60		
					45	Loose alternating layers of gray organic silt and sand.			61		
									63		
									61		
									66		
									67		
					50				70		
									74		
									85		
									89		
									97		
					55				99		
									105		
									111		
									126		
					60	Very dense brown fine to coarse sand. Some gravel. Trace of cobbles.			164		
									190		
									86		RB
									84		Ahead
									101		Revert
									120		
					65				119		
									30		
									78		
									71		
									89		
					70				94		
									99		
									105		
									111		
									118		
					75				125		
									128		
									175		
									150		
									125		
					80				150		
									160		
									155		

Checked by Final Boring No. 3M

FIELD BORING LOG E-L-3(S)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 3M Structure St. Croix River County Pierce Sheet 3 of 4

Project 1530-00-00 Road USH 10

Station 94 + 00 Offset 17.5 inches right of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water elev. 78.5

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/10/85 Unit 6

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 4½"	Blows on Probe Size	Drilling Method
					80	Very dense fine-coarse sand, some gravel.			160		RB
						Trace of cobbles, trace of boulders.			155		
									170		
									179		
					85				180		
									86		RB
									72		WA
									70		Revert
									78		
					90				81		
									80		
									83		
									85		
									87		
					95				91		
									103		
									106		
									110		
									112		
					100				116		
									80		RB
									69		Ahead
									72		Revert
									70		
					105				75		
									80		
									83		
									86		
									90		
					110				112		
									93		RB
									116		Ahead
									121		Revert
									120		
					115				132		
									130		
									143		
									148		
									151		
					120				172		
									143		RB
									152		Ahead

Checked by Final Boring No. 3M

FIELD BORING LOG

E-L-3(5)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 3M Structure St. Croix River County Pierce Sheet 4 of 4

Project 1530-00-00 Road USH 10

Station 94 + 00 Offset 17.5 inches right of centerline Surface Elevation

GROUND WATER OBSERVATIONS Water elev. 78.3 9/17/85

While drilling — Time after drilling

Before casing removal — Depth to water

After Boring Completed — Depth to cave-in

Cave In — Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/10/85 Unit 6

Finish 9/17/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 3"	Blows on Probe Size	Drilling Method
					120	Very dense fine to coarse sand, some gravel layers, trace of cobbles.			143		
									152		
									201		
									211		
					125				231		
									101		RB
									121		Ahead
									140		Revert
									153		
					130				172		
									180		
									183		
									200		
									211		
					135				261		
									99		RB
									103		Ahead
									132		Revert
					140	Very dense fine to coarse sand, trace of gravel layers. Trace of cobbles.			150		
									163		
									170		
									180		
									185		
					145				200		
									201		
									210		
									212		
									226		
									230		
					150				281		
											RB
											Ahead
											Revert
					155						
					160						
						Yellow sandy shale.					
7	w		200/3"			Gray sandy shale.					

Checked by Final Boring No. 3M

FIELD BORING LOG E-L-3(S) 8-76 *State of Wisconsin Department of Transportation*

Boring No. 4M Structure St. Croix River County Pierce Sheet 1 of 4

Project 1530-00-00 Road USH 10

Station 95 + 40 Offset 48 feet right of centerline Surface Elevation 77.8

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/18/85 Unit 6

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Barge Deck					
					Water.					
1	w	1	1		Very loose gray fine to coarse sand. Trace of gravel, trace of silt, trace of shells.			2		Use Revert
		1	1					3		
								4		
								4		
								5		
								9		
2	w	2	1					3		
		1	1					5		
								7		
								7		
								8		
3	w	1	1					7		
		1	2					10		
								14		
								16		
								17		
4	w	3	2					6		
		1	4					9		
								14		
					Very loose gray silty sand, trace of snails.			17		
5	w	3						19		
			1					16		
								17		

Checked by ____ Final ____ Boring No. 4M

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 4M Structure St. Croix River County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10

Station 95 + 40 Offset 48 feet right of centerline Surface Elevation 77.5'

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/18/85 Unit 6

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 3"	Probe Size	Drilling Method
5	W	3			40	Very loose gray silty sand, trace of snails.			16		RB
			1						17		Ahead
									17		Revert
									28		
					45	Dense to very dense brown sand and gravel. Trace of silt. With Boulders. (Couldn't sample boulder.)			49		
6		100/4"							83		
									91		
									89		
									85		
					50				73		
7	W	17	19						62		W
		16							60		
									58		
									67		
					55				69		
8	W	14	15						41		W
		14	14						52		
									61		
									69		
					60				73		
9	W	12	14						51		W
		17	13						58		
									63		
									76		
					65				75		
									80		
									80		
									84		
									74		
					70				83		
						Very dense sand and gravel. Trace of silt, trace of cobbles.			98		
									115		
									186		
									231		
					75				203		
									63		RB
									49		Ahead
									58		Revert
									62		
					80				101		
									112		W
									114		

Checked by ____ Final ____ Boring No. 4M

FIELD BORING LOG E-L-3(S)-8-76 *State of Wisconsin Department of Transportation*

Boring No. 4M Structure St. Croix River County Pierce Sheet 3 of 4

Project 1530-00-00 Road USH 10

Station 95 + 40 Offset 48 feet right of centerline Surface Elevation 77.5

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/18/85 Unit 6

Finish _____ Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3½" Size	Blows on Probe Size	Drilling Method
					80	Very dense sand and gravel. Trace of silt			112		W
						and cobbles.			114		
									130		
									112		
					85				100		
									52		
									47		
									53		
									58		
					90				54		
									54		
									57		
									58		
									63		
					95				84		
									41		
									43		
									43		
									53		
					100				55		
									77		
									72		
									48		
									58		
					105				64		
									55		
						Very dense brown sand, trace of silt.			48		
									62		
									65		
					110				63		
									60		
									62		
									63		
									71		
					115				72		
									63		
									65		
									70		
									72		
					120				73		

Checked by _____ Final _____ Boring No. 4M

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 4M Structure St. Croix River County Pierce Sheet 4 of 4

Project 1530-00-00 Road USH 10

Station 95 + 40 Offset 48 feet right of centerline Surface Elevation 77.7

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 9/18/85 Unit 6

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3"	Casing Size	Probe Size	Drilling Method
					120 Very dense brown sand, trace of silt.			68			RB
								72			Ahead
								75			Revert
								74			
					125			88			
								51			RB
								63			Ahead
								81			Revert
								83			
					130			80			
								86			
								91			
								103			
								107			
					135			115			
								60			RB
								68			Ahead
								72			Revert
					140			70			
								76			
								84			
								93			
								104			
					145			106			
								138			
								71			RB
								89			Ahead
								108			Revert
								119			
					150 Gravel and boulders.			143			
					Cored 5 feet.						
					Yellow sandy shale.						
					155 Gray sandy shale. Recovery 20%.						
					End of Boring 4M, 155.5 feet.						
					Water 9/25/85 at elevation 77.7.						
					160						

Checked by _____ Final _____ Boring No. 4M

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 5M Structure St. Croix River County Pierce Sheet 1 of 4

Project 1530-00-00 Road USH 10

Station 97 + 80 Offset 40 feet right of centerline Surface Elevation 77.7

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave in ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/25/85 Unit 6

Finish 10/2/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Blows on 2 3/4" Prog. Size	Drilling Method
					Barge Deck					
					Water					
									4"	
				1				1	1	
1	W	1	2		Loose gray fine to coarse sand, trace of silt with shells.			1	6	
		2			Moved barge 3 feet, put 4" case in.			3	10	
								6	19	
								19	41	
								141	138	
					Dense brown sand and gravel. Trace of boulders and silt. Boulder, so couldn't sample.			162	172	
									108	
									51/61	

Checked by ____ Final ____ Boring No. 5M

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 5M Structure St. Croix River County Pierce Sheet 2 of 4

Project 1530-00-00 Road USH 10

Station 97 + 80 Offset 40 feet right of centerline Surface Elevation 712.0

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After Boring Completed ____ Depth to cave-in ____

Cave In ____ Water Notes ____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washhead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, CB Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/25/85 Unit 6

Finish 10/2/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3" Size	Blows on Probe 2" Size	Drilling Method
						Dense brown sand and gravel. Trace of boulders, trace of silt.				51/61	
									41		RB
2	w	14	19						62		Ahead
		17							60		6"
					45				58		Revert
3	w	19	26						43		RB
		43							51		Ahead
									68		Revert
									71		
					50				83		
4	w	15	19						8		RB
		20	20						34		Ahead
									56		Revert
									61		
					55				68		
5	w	14	28						40		RB
		19	17						48		Ahead
									53		Revert
									58		
					60				60		
6	w	16	17						23		RB
		17	17						38		Ahead
									40		Revert
									40		
					65				42		
7	w	14	15						19		RB
		16	20						28		Ahead
									36		Revert
									40		
					70				46		
		12	14			Firm			19		W
8	w	14	13						29		
									30		
									36		
					75				31		
									33		
									34		
									40		
									42		
					80				46		
									52		
									59		

Checked by ____ Final ____ Boring No. 5M

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 5M Structure St. Croix River County Pierce Sheet 3 of 4

Project 1530-00-00 Road USH 10

Station 97 + 80 Offset 40 feet right of centerline Surface Elevation 73.0

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 9/25/85 Unit 6

Finish 10/2/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery		VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 3½"	Blows on Probe Size	Drilling Method
						Dense brown sand and gravel. Trace of boulders and silt.			52		W
									59		
									60		
									63		
					85				61		
									70		
									59		
									63		
									71		
					90				73		
									76		
									89		
								●	103		
									115		
					95				149		
									31		RB
									42		Ahead
									69		
									73		
					100				86		
									73		
									86		
									102		
									131		
					105				146		
									56		RB
									73		Ahead
									70		
									74		
					110				81		
									83		
								●	91		
									98		
									103		
					115				129		
									61		RB
									65		Ahead
									69		Revert
									74		
					120				79		
									83		
									84		

Checked by _____ Final _____ Boring No. 5M

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 5M Structure St. Croix River County Pierce Sheet 4 of 4

Project 1530-00-00 Road USH 10

Station 97 + 80 Offset 40 feet right of centerline Surface Elevation 77.0

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9/25/85 Unit 6

Finish 10/2/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elevation	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3" Size	Blows on Probe Size	Drilling Method
						Dense brown sand and gravel. Trace of boulders and silt.			83		RB
									84		Ahead
									106		Revert
									128		
					125				152		
									69		RB
									73		Ahead
									86		Revert
									89		
					130				93		
									116		
									148		
									160		
									183		
					135				250		
									101		RB
									93		Ahead
									136		Revert
									149		
					140				162		
						Brown-yellow sandstone.					
9	W	200/4"			145						
						Cored 5 feet. Recovery 18 inches, 27%.					
					150						
						Gray sandy shale. End of boring 5M. Water elevation 78.0.					
					155						
					160						

Checked by _____ Final _____ Boring No. 5M

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 6M Structure St. Croix River County Pierce Sheet 1 of 3

Project 1530-00-00 Road USH 10

Station 99 + 00 Offset 50 Feet Right of Centerline Surface Elevation 79.7

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave in _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 10/3/85 Unit 6

Finish 10/8/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elev.	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3" Size	Blows on Probe Size	Drilling Method
						Barge Deck					
						Water					W
					5						
					10						
					15						
									1		
						Firm sand and gravel.			12		
									23		
					20				42		
									41		
									36		
									31		
					25				29		
									32		
									37		
									41		
									52		
					30				71		
									43		
									23		
									24		
									24		
					35				23		
									31		
									40		
									40		
									42		
					40				43		
									43		
									44		

Checked by _____ Final _____ Boring No. 6M

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin Department of Transportation

Boring No. 6M Structure St. Croix River County Pierce Sheet 2 of 3

Project 1530-00-00 Road USH 10

Station 99 + 00 Offset 50 Feet Right of Centerline Surface Elevation 79.7'

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 10/3/85 Unit 6

Finish 10/8/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elev.	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 3"	Blows on Probe Size	Drilling Method
					40	Firm brown sand and gravel.			43		W
									44		
									44		
									47		
					45				48		
									47		
									49		
									52		
									53		
					50				67		
									67		
									52		
									50		
									48		
					55				47		
									51		
									52		
									53		
									50		
					60				54		
									49		
									46		
									43		
									44		
					65				51		
									51		
									50		
									46		
									48		
					70				53		
									47		
									48		
									48		
									47		
					75				46		
									52		
									56		
									56		
									70		
					80				68		
									61		
									52		

Checked by _____ Final _____ Boring No. 6M

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin/Department of Transportation*

Boring No. 6M Structure St. Croix River County Pierce Sheet 3 of 3

Project 1530-00-00 Road USH 10

Station 99 + 00 Offset 50 Feet Right of Centerline Surface Elevation 79.7

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 10/3/85 Unit 6

Finish 10/8/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 3"	Blows on Probe Size	Drilling Method
					80	Firm brown sand and gravel.			61		W
									52		
									53		
									56		
					85				61		
									63		
									60		
									67		
									72		
					90				71		
									70		
									66		
									71		
									83		
					95				84		
									85		
									80		
									86		
									84		
					100				96		
											RB
						Roller bit hard. Limestone.					Ahead
											Revert
						Cored 5 feet, recovery 40%, 2 feet					
					105	limestone.					
						Sandstone.					
						End of boring 6M. Water Elevation 79.7.					
					110						
					115						
					120						

Checked by _____ Final _____ Boring No. 6M

FIELD BORING LOG E-L-3(5)- 8-76 *State of Wisconsin Department of Transportation*

Boring No. 7M Structure St. Croix River County Pierce Sheet 1 of 1

Project 1530-00-00 Road USH 10

Station 100 + 23 Offset 21 Feet Left of Centerline Surface Elevation 701.2

GROUND WATER OBSERVATIONS

While drilling Dry Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 10/10/85 Unit 2

Finish 10/10/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3" Size	Blows on Probe Size	Drilling Method
					Brown sand and gravel.					A
					Limestone			12		
1	M	100/2"						50/2"		
					First run cored. 5 feet, 4.5 feet recovery, 90%. Very broken.					
					Second run cored 5 feet.					
					4.5 feet recovered, 90% recovery. More massive.					
					End of Boring 7M.					

Checked by Final Boring No. 7M

FIELD BORING LOG

E-L-3(S)-8-76

State of Wisconsin Department of Transportation

Boring No. 8M Structure St. Croix River County Pierce Sheet 1 of 1

Project 1530-00-00 Road USH 10

Station 100 + 50 Offset 3 Feet Right of Centerline Surface Elevation 701.6

GROUND WATER OBSERVATIONS

While drilling Dry Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 10/10/85 Unit 2

Finish 10/10/85 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Phase Size	Drilling Method
					Brown sand and gravel.					A
					Yellow limestone. Augered very hard. 40% auger refusal.					
					End of boring 8M. Last boring and log on site.					

Checked by

Final

Boring No. 8M

FIELD BORING LOG E-L-3(S)-8-76 *State of Wisconsin Department of Transportation*

Boring No. IX Structure B-47 County Pierce Sheet 1 of 1

Project 1530-00-00 Road USH 10

Station 99 + 75 Offset 25' Right Surface Elevation 96.9

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9-11-85 Unit 13

Finish Chief AK

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
IX											A
						Firm Brown silty sand; little gravel (fill)					
					5						
1	D	4	7						15		
		5							14		
									15		
									10		
					10				75		WA
						Brown limestone					RB
						NQ core 10.5 to 12.5; recovery 80%.					DM
						2nd Run: 12.5 to 17.5; recovery 100%.					
					15						
						End of Boring #IX; 17.5					
					20						
					25						
					30						
					35						
					40						

Checked by Final Boring No. IX

APPENDIX E

SETTLEMENT DATA

REPORT ON TESTS ON SOILS

F-L-140(L) 1-78

Wisconsin Department of Transportation
Division of Highway - Materials Laboratory
3502 Kinsman Blvd.
Madison, WI 53704

TEST NUMBER 2-30-903-85

7511	MO.-DAY-YR.	PROJECT ID	TEST CODE	QUANTITY
	9 2 6 8 5	1 5 3 0 0 0 0	1 9 0 2 30	2

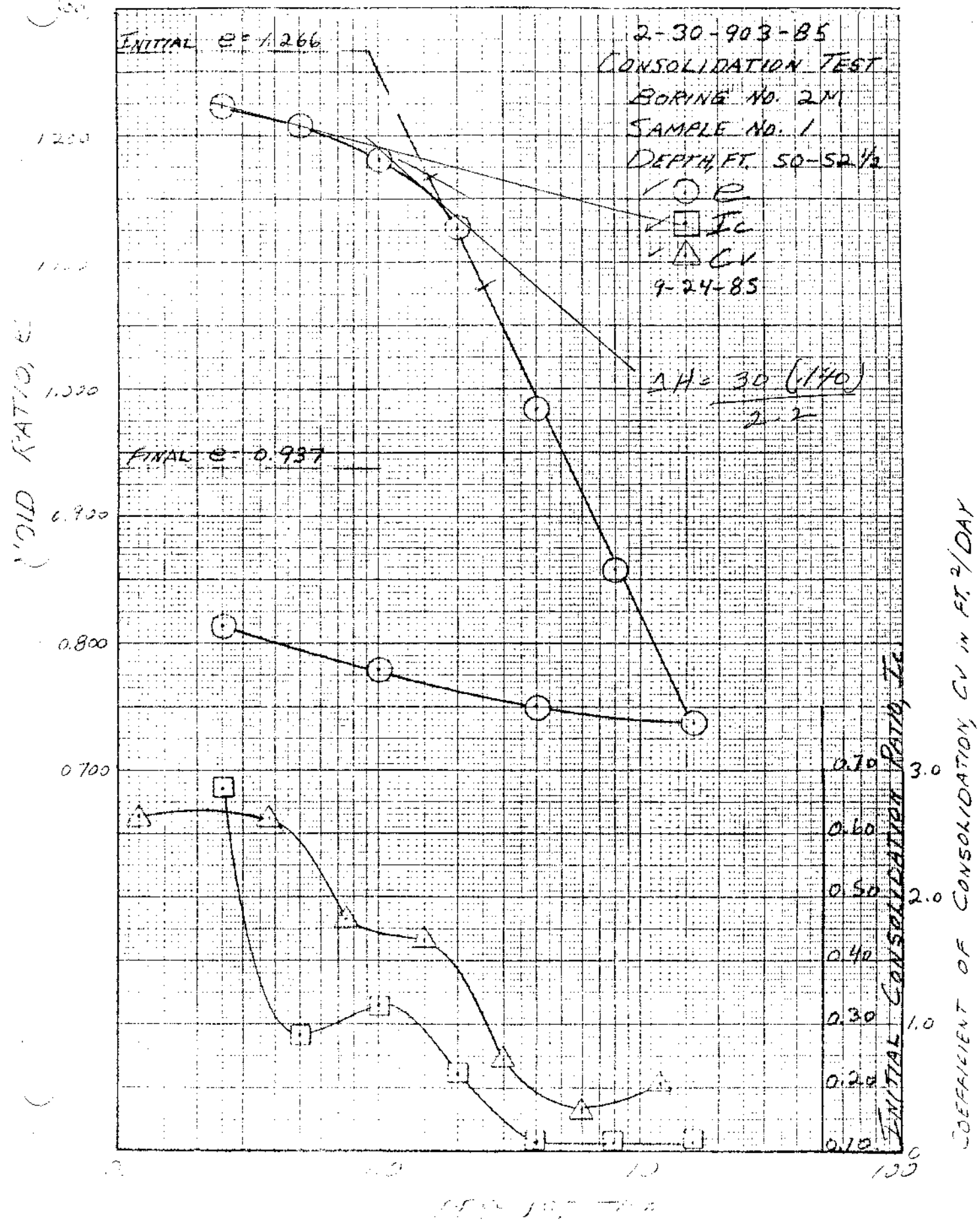
County: Pierce	Project Name: Prescott Bridge (B-47-40) USH 10
Contractor: –	
Material: Soils	
Source: B-47-40	
Tests Requested By: Soils Unit	
Submitted by: Soils Unit	Date: 8/22/85

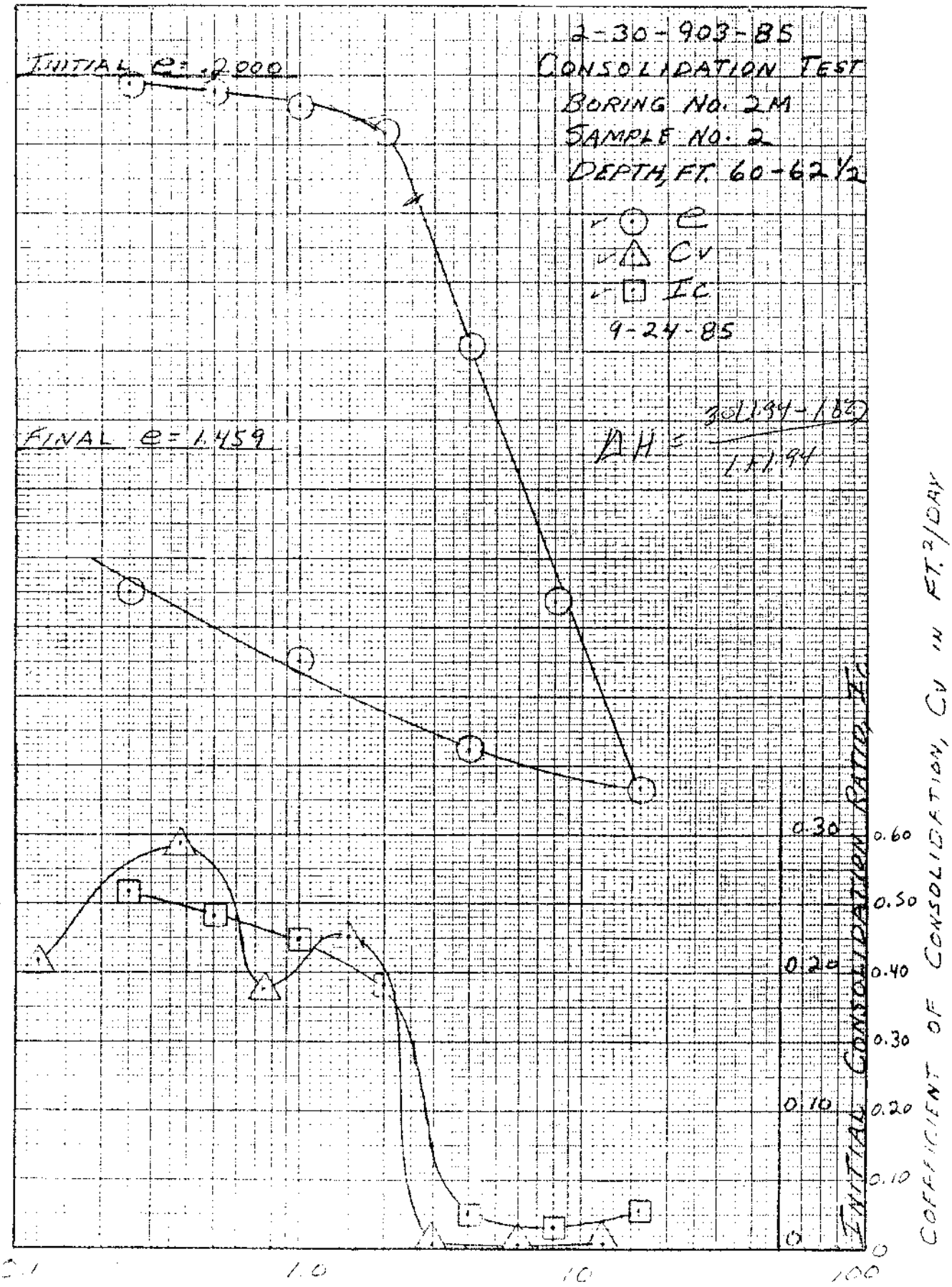
Boring Number	2M	2M				
Sample Number	1	2				
Depth, ft.	50-52½	60-62½				
MECHANICAL ANALYSIS						
Boulders (Ret. 3")						
Gravel (Pass 3" - Ret. #10)						
Coarse Sand (Pass #10 - Ret. #40)						
Fine Sand (Pass #40 - Ret. #200)						
Silt (Pass #200 - Ret. 0.002mm)						
Clay (Pass 0.002mm)						
LIQUID LIMIT	43.7	71.2				
PLASTICITY INDEX	13.1	30.3				
AASHTO CLASSIFICATION						
LOSS ON IGNITION, %	4.7					
UNCONFINED COMPRESSION TEST						
Moisture Content, %	45.2	76.4				
Unit Weight, PCF						
Unconfined Compression, TSF						
CONSOLIDATION TEST						
Moisture Before, %	77.0	77.1				
Moisture After, %	37.1	57.5				
Compression Index	2.431	1.063				
DIRECT SHEAR TEST						
Moisture Content, %						
Angle of Internal Friction, Degrees						
Cohesion, PSF						

Remarks

DISTRIBUTION: Soils Unit (1)
District 6 (2)
Chief Materials Engineer

By K. J. Engelbinger 13
Materials Tests Engineer Supervisor


INITIAL e = 1.266
2-30-903-B5
CONSOLIDATION TEST
BORING NO. 2M
SAMPLE NO. 1
DEPTH FT. 50-52 1/2
e
Ic
Cv
9-24-85
ΔH = 30 (.170) / 2.2
FINAL e = 0.937
VOID RATIO, e
1.200
1.000
0.900
0.800
0.700
INITIAL CONSOLIDATION RATIO, Ic
0.70
0.60
0.50
0.40
0.30
0.20
0.10
COEFFICIENT OF CONSOLIDATION, Cv IN FT²/DAY
3.0
2.0
1.0
0
100


2-30-903-85
CONSOLIDATION TEST
BORING NO. 2M
SAMPLE NO. 2
DEPTH, FT. 60-62 1/2
e
Cv
Ic
9-24-85
INITIAL e = .2000
FINAL e = 1.459
ΔH = 30.194 - 18.2 / 11.94
1.600
1.400
1.200
1.000
0.800
0.30
0.20
0.10
0
0.60
0.50
0.40
0.30
0.20
0.10
0
0.1
1.0
10
100
INITIAL CONSOLIDATION RATIO, Ic
COEFFICIENT OF CONSOLIDATION, Cv IN FT.²/DAY

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: January 8, 1982 *File Ref:*

To: Files

From: C. N. Laughter

Subject: Prescott Bridge

At 10:00 A.M., 1-7-82, Whited and I attended a meeting in the 9th floor conference room at Hill Farm State Office Building on the Prescott Bridge. The meeting was presided over by Schaeffer. Attending were Fiedler, Byrkit, Zuehlke, Strand, Laughter, Whited, Fugere, Woods, Hart, Beekman, Clark and O'Brien. The meeting centered on the adequacy of design proposals to be presented to public and Minnesota Highway Dept. A somewhat brief memo had been given District 6 by the Bridge Section stating estimated cost at $22,000,000 but no design concepts or such. Clark and Schaeffer felt this to be inadequate. Fiedler questioned just how much was needed. There was considerable spirited discussion with a final decision that the bridge office prepare a study similar to the Arrowhead and Tower Drive Bridge studies.

Our contribution was a brief discussion of the memo we had submitted on use of drilled shafts. I see no need for additional input from us at this time.

C. N. Laughter

CNL:dk

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: April 23, 1981 *File Ref:* File

To: Mr. Stanley Woods, Chief Bridge Engineer
ATTN: Mr. Donald Fugere, Preliminary Bridge Design Engineer - Supervisor

From: Mr. G. H. Zuehlke, Chief Materials Engineer

Subject: MATERIALS
SOILS
SITE CONDITION REPORT
USH-10 over St. Croix River at Prescott
Pierce County

We are attaching copies of a preliminary report on the foundation conditions for the proposed structure for USH-10 at Prescott. As requested we are attaching 3 copies of the plot of borings for the most recent work. We are also attaching copies of:

1. A report of April 17, 1975 that considered an under water fill.
2. A report of April 17, 1975 on borings made downstream from near the existing structure to some 4000 feet upstream.which indicates good foundation conditions near the existing bridge that become much worse some 2000 feet upstream.
3. A copy of a letter written July 15, 1971 by Mr. Schaeffer with some study data and copies of early work done by Minnesota on or near the currently proposed alignment.

The most recent study indicates rock or other dense material capable of stopping a hard-driven H-pile from the west abutment, station 947 + 41 out to beyond station 948 + 41. In this area the water deepens to about 48 feet which will present difficult but not impossible conditions for cofferdam and normal pier construction.

At station 952 + 15, the foundation conditions are severe. There is about 45 to 50 feet of water. Below this about 70 feet of very low strength organic muck from elevation 630± down to 570±. Shear strength of this material is extremely low - two things tend to highlight this. First, drill rod would not pick up stream bottom so a bucket on a rope was lowered. Second, at 50 feet below river bottom, drill rod had to be held back to prevent sinking under its own weight. Below this much silty organic material of low shear strength was logged from elevation 570± to 542±. From elevation 542± to 518±, dense sands, gravel, boulders and slabs were logged to bedrock. At elevation 508± NX rock cores gave 60 to 100% recovery in 3 runs.

A boring made at station 962 + 15 logged about 45 feet of water down to elevation 630± with soft organic silt almost devoid of strength being logged to 596±. Below this dense to very dense sands and gravels were noted down to elevation 485. These dense strata contain boulders. Below this limestone bedrock was cored with NX bit with 4 runs exhibiting 10, 100, 50 and 100% recovery - rock of good quality.

Probes were made to the east and it appears the muck decreases in thickness near station 963 + 50± although water depths still exceed 40 feet.

At station 965 + 05, the water is about 20 feet deep with dense granular soil below that would fetch-up H-piles quickly.

At this time various vendors of foundation systems other than our most often used piles under footings for water crossing sites is being pursued. These include caissons, the HW caisson system or any other that appears promising.

By

C. N. Laughter
Chief Soils Engineer

CNL:dk
cc:SWW (3)
GHZ
File

CORRESPONDANCE/MEMORANDUM

STATE OF WISCONSIN

Date: April 17, 1975 *File Ref:*

To: Mr. M. J. Schaeffer, District Engineer
Attn: Mr. Louis Schmidt, District Chief Materials Engineer

From: Mr. G. H. Zuehlke, Chief Materials Engineer

Subject: MATERIALS
SOILS
SITE INVESTIGATION REPORT
U.S.H. 10 over St. Croix River at Prescott
Underwater Fill
Pierce County

We are enclosing copies of the report of our studies on the project noted above.

By:

C. N. Laughter
Soils Engineer

GHZ:CNL:gvf

cc: GHZ
WAK (2)
ICH, Attn: D. Strand
District 6 (3)
M.O.

SITE INVESTIGATION REPORT
Project I.D. 1530-00-00
U.S.H. 10 over St. Croix River at Prescott
Underwater Fill Study
Pierce County

1. Introduction

A study has been made for a proposed underwater fill to facilitate the construction of a bridge over the St. Croix for U.S.H. 10 just up river from Prescott. Basically, the idea was to build a fill of extremely flat slopes on the very poor river bed soils, keep the top of the fill some 20 feet below the river surface to attenuate environmental objections. After settlement was essentially completed, then the bridge would be built using the sand fill for footing support and lateral support for piles. The entire premise was to study an alternate to the seemingly expensive caisson type foundation construction required for the deep water and mucky soils. Earlier borings had fairly well delineated depth of water and muck over fairly competent soils or rock at depths up to 150 feet.

2. Subsurface Conditions

In this study, five borings were made, noted on Figure 1 as Borings 1X through 5X. The boring logs are attached. These borings generally indicate about 45 feet of water, 10 feet of extremely soft watery silt and then soft peaty silts to depths of 110 to 120 feet from water surface or some 55 feet of extremely poor soil. Below 90 feet some noticeable increase in strength was noted.

Three inch Osterberg samples were taken and the tubes were either sealed with wax and taken to the laboratory or were field extruded, inspected, and typical specimens selected, wrapped in foil and transported to the laboratory for test. Some visual inspection of extruded samples was made and a testing program set up primarily to determine strength and compressibility (consolidation) of the river bed soils. In addition, loss on ignition, and natural moisture contents were also determined. Test data is appended.

The soils were predominantly silty with about 65 to 70% being silt size and 95 to 100% passing the 200 mesh sieve. The natural in-place moisture contents ranged from 258 to 43 per cent with the majority of values falling around 120 to 160 per cent. Liquid limits on dried and pulverized samples ranged from 57 to 80 per cent. While one test on soil not allowed to dry was 161 per cent which no doubt reflects the organic influence. This organic influence was also noted in lack of dispersion during efforts to run hydrometer tests to determine particle size.

The unconsolidated strengths (initial construction condition) ranged from less than 100 psf up to 300 to 800 psf and to a degree this reflected depth with stronger soil at greater depths. This parallels moisture content and void ratios. Some laboratory vane shear tests were made and values fall in the same ranges.

In direct shear tests (C-D), these silts gave a consolidated-drained strength of $\phi = 24\pm^{o}$ and and c = 10 to 175 psf. This strength is predicated on complete consolidation. One attempt using direct shear to approximate an unconsolidated-undrained test (U-U) gave $\phi = 6^{o}$ and c = 60 psf. This gave no greater stability on the before consolidation condition. Direct shear, with its inherent disadvantages, was tried due to a lack of triaxial equipment.

Consolidation tests were made to assess potential for amount of settlement and length of time to complete settlement. Void ratios ranged from about 6.0 to about 3.0. The coefficients of consolidation (C_V) varied greatly with load, for example Boring 1X, Sample 7, depth 86-88.5 feet, has a C_V of 1.3 ft.^{2}/ day at a load of 0.1 tsf and .002± ft.^{2}/day at loads of 0.6 to 1.0 tsf. While C_V's are never too consistent, the reduction in permeability with densification is remarkably large here.

Losses on ignition were from 7 to 11% reflecting moderately high organic content.

3. Settlement

There are two concerns in a settlement analysis:

a. Magnitude of settlement

b. Time required to complete settlement. This more often is the crux of the problem and admittedly the more difficult to determine.

With the natural anamolies in soil depositions, unavoidable bias in samples, and testing problems, for depositions of this type, varied computed results are possible and these must then be necessarily considered with applications of judgement.

Using all curves, the settlement magnitudes have been computed to be from 11.5 to 22.4 feet. A weighted value indicates a total settlement of about 15 feet.

The divergence of values for time was even greater. With the most optomistic figures times could range down to 2 years. This indicated C_V = 1.4 ft.^{2}/day and double drainage. The same sample with values of C_V = .002 ft.^{2}/day and single drainage would give values of over 100 years.

All told, it appears that it would not be unduly conservative to estimate settlement times of 40 to 50 years. Of this, if we assume 15 feet of settlement, over 40 years, some 7½ feet would occur in the first 8 years but there is still a formidable problem with an additional 7½ feet to occur in the next 32 years.

4. Stability

Stability studies were made using the Bishop Analysis. These were predicated on filling to within 20 feet of water surface, an 80 foot top width and 8 on 1 side slopes (See Figure 2). Nominal strength values indicated low factors of safety with a shallow failure giving SF = 1.6 which is adequate. However, a deeper failure zone gave a value of SF = 1.0 which is too risky to contemplate using.

5. Drag Loads

With the proposed sand fill, rather high skin friction values would exist in the fill. With large settlements occurring for long periods, there would be disturbingly high drag loads. Assuming a skin friction of 800 psf, a dragged perimeter of 3 feet and thickness of dredge sand fill of 30 feet, drag loads would reach 35 to 40 tons. This additional allowance in unit pile load would make for very small usable pile capacity per pile and enormously large footings.

6. Conclusions

These conclusions can be reached for the proposed plan:

a. The major part of the river bed width in this area is filled with deep silty soils of low strength and high compressibility.

b. Settlements of 10 to 20 feet can be expected with 15 feet being an indicated average value. There would be some difference in magnitude of settlement and this might cause lateral shifting in bridge pier zones.

c. Settlements will occur over a long period of time. Estimates of 40 to 50 years appear plausible. These values are seemingly contradictory with the apparent high silt content.

d. The fill would be of extremely marginal stability against sliding. Worse yet, the most likely failure surface is quite deep (See Figure 2) and if it occurs mud will likely be pushed above the surface of the water. For long periods of time, there would be marginal stability brought on by pile driving vibration and increase in pore pressure.

e. Pile drag loads would use up a major portion of pile capacity. Also, differential settlement could cause rocking of piles after driving.

f. There would be problems in placing the dredge fill uniformly

over the area. With belly-dump barges or hydraulic sluice, it would require a lot of control and maneuvering to place uniform continuous lifts to avoid or reduce local mudwave failures.

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 1 Structure ST Croix River Crossing County Pierce & Polk Sheet 1 of 5

Project 1530-00-00 Road US H 10

Station 962+15 Offset 50' Lt at ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1-27-81 Unit 6

Finish 2-6-81 Chief Stoik-s

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					ICE					
					5					
					Water					
					10					
					15					
					STRUCTURE T 26N R 20W SEC 10					
					20					
					UNIQUE # 1460					
					25					
					30					
					35					
					40					

Checked by Final Boring No.

BORING LOG E-L-3(S)- 8-76 State of Wisconsin Department of Transportation

Boring No. 1 Structure St Croix River Crossing County Pierce-Dakota Sheet 2 of 3

Project 1530-06-00 Road USH 10

Station 962+15 Offset 50' Lt of C/L Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 1-27-81 Finish 2-6-81 Unit 6 Chief Stokes

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40 water					
					5 Very Loose					
					50 organic					
					Silt					
					15					
					60					
					25					
					70					
					35					
					80					
					Very Dense Coarse Sand & Gravel					

Checked by Final Boring No. 1

BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

ng No. 1 Structure St. Croix River Crossing County Pierce - Dakota Sheet 3 of 3

roject 1530-00-00 Road USH 10

Station 962 + 15 Offset 50' Lt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 1/27/81 Unit 6

Finish Chief

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					5						
					10						
					15						
		25	35		20						
1		37				V DENSE BR. COARSE SAND and GRAVEL					
		37	47								
2		57									
					25						
		17	30								
3		54									
					30						
		18	44								
4		36				tr. of silt					
					35						
5		100/5"				REFUSAL tr of silt					
					40						

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Final

Boring No.

BORING LOG E-L-3(S)- 8-76 *State of Wisconsin/Department of Transportation*

Boring No. / Structure St. Croix River Crossing County Pierce - Dakota Sheet 4 of 5

Project 1530-00-00 Road USH 10

Station 962+15 Offset 50' Lt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 4/27/81 Unit 6

Finish Chief Stokes

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
	W				120					WA RB D-M SS
					125 V DENSE BR COARSE SAND and GRAVEL TR of silt					
		39	60							
6		72			130					
					LOST DRILLING MUD					
					135					
					LOST DRILLING MUD					
		38	85							
7		60/2"			REFUSAL					
					140					
					145					
					LOST DRILLING MUD					
8		60/3"			REFUSAL					
					150					
					155					
					LOST DRILLING MUD					
		34	40							
9		52			160 DENSE BR Med SAND some gravel					

Checked by Final Boring No. 1

BORING LOG E-L-3(S)-8-76 *State of Wisconsin/Department of Transportation*

Boring No. 1 Structure St. CROIX RIVER CROSSING County PIERCE and DAKOTA Sheet 5 of 5

Project 1530-00-00 Road US HWY 10

Station 962+15 Offset 50' LT OF CL Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 1-27-81 Finish 2-6-81 Unit 6 Chief STOLTES

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Visual Field Classification and Remarks	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
	W				160 DENSE BR SAND SOME GRAVEL			NW		WA RB DM SS
					165					
					170					
		24	40							
10		24	21		175			17/12		
								53		
								69		
								~~76~~ 45		
					180			31		
								15		
								17		
								16		
								26		
								45		
		47	50		185 V DENSE			26/15		
11		90						53		
								87		
								88		
					190 LIMESTONE - GRAY			251		CH
					STARTED CORING 190.5 NQ DRILL					
					1ST RUN 190.5 - 191 10% RECOVERY					
					2ND RUN 191 - 195.5 100% RECOVERY					
					3RD RUN 195.5 - 197.5 50% RECOVERY					
					195 4th RUN 197.5 - 202 100% Rec					
					EOB 202.0'					

Checked by Final Boring No.

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 1-A Structure St Croix River Crossing County Pierce - Wash. Sheet 1 of 2

Project 1530-00-00 Road USH 10

Station 962 + 15 Offset 50' Rt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/13/81 Unit 1

Finish 2/13/81 Chief Myers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Ice					
						Water					
					5						
					10						
					15						
					20						
					25						
					30						
					35						
					40	PEAT					

STRUCTURE
T 26N
R 20W
SEC 10

UNIQUE # 1459

Checked by

Final

Boring No. 171

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 1-A1 Structure St. Croix River Crossing County Pierce - West Sheet 2 of 2

Project 1530-00-00 Road USH. "10"

Station 962 + 15 Offset 50' Rt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit
ST = Shelby tube, SS = Split spoon, DM = Drilling mud
A = Auger, C= Coring, W = Wash
E = Easy, M = Medium, H = Hard

Start 3/14/81 Unit I

Finish Chief Moyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 4"	Blows on Probe Size	Drilling Method
					40					
					44' F. Shear. Test.					
					45					
					49' F. Shear Test					
					50					
					54' F. Shear. Test					
					55					
					59' F. Shear. Test					
					60					
					64' F. Shear. Test.					
					65					
					69' F. Shear Test.					
					70					
					SAND S					
					75					

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 2 Structure St. Croix River Crossing County Pierce - D Sheet 1 of 4

Project 1530-00-00 Road USH "10"

Station 952+15 Offset 50' Rt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 1/27/81 Unit III

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					18" ice					
					water.					
					5	5				
					STRUCTURE					
					T 26 N					
					R 20 W					
					SEC 10					
					10	10				
					15	15				
					UNIQUE #					
					1462					

BORING LOG E-L-3(S)- 8-76 *State of Wisconsin/Department of Transportation*

No. 2 Structure St. Croix River Crossing County Pierce - Dakota Sheet 2 of 4

ct 1530-00-00 Road USH "10"

ation 952+15 Offset 50' Rt. ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 1/27/81 Unit III

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Blows on Probe Size	Drilling Method
					40'			4"		
					← F. Shear Test					
					45					
					← F. Shear Test					
					50					
					← F. Shear Test					
					55					
					← F. Shear Test					
					60					
					← F. Shear Test					
					65					
					← ~~F. Shear Test~~ Shear Test Osterberg					
1	5' Tube				100% recovery					
					70	.0				
					75 ← F. Shear Test					
					80					
					F. Shear Test					

BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 2 Structure St. Croix River Crossing County Pierce - Dakota Sheet 3 of 4

Project 1530-00-00 Road USH "10"

Station 952+15 Offset 50' Lt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 1/27/81 Unit III

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Blows on Probe Size 2.0"	Drilling Method
					50'					
					← F. Shear Test.					
					85 ← F. Shear Test					
					90 ← F. Shear Test.					
					95					
2					OSTiberg 100% recovery	.5				
					100 ← F. Shear Test					
					105 ← F. Shear Test					
					110 ← F. Shear Test.					
					115 ← F. Shear Test broke F.				9	
									6	
									6	
									6	
					120				7	

D BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

ing No. 2 Structure St. Croix River Crossing County Pierce - Dakota Sheet 4 of 4

roject 1530-00-00 Road ISH "10"

Station 952+15 Offset 50' Lt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead FT = Fish tail RB = Rock bit
ST = Shelby tube SS = Split spoon DM = Drilling mud
A = Auger C= Coring W = Wash
E = Easy M = Medium H = Hard

Start 1/22/81 Unit III

Finish Chief Mayers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Blows on Probe Size 2.0"	Drilling Method
					120				13	P
						✓			8	
									8	
									8	
									8	
					125				8	
									8	
									8	
									4	
									4	
									5	
					130				7	
									6	
									6	
									6	
					135				7	
									7	
									8	
									8	
									50/9"	
					140					
					145					

End of Probe and Bor.

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 2A Structure St Croix River crossing County Pierce Sheet 1 of 5

Project 1530 ~~[illegible]~~-00-00 Road US H 10

Station 952 + 15 Offset 50' Rt of c/l Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
15 A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2-10-81 Unit 6

Finish Chief Robbeits

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					ICE					
					5	5				
					WATER					
					10	10				
					STRUCTURE T 26N R 20W SEC 10					
					15	15				
					UNIQUE # 1461					

LD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

ring No. 2A Structure St Croix River Crossing County Pierce Sheet 2 of 5

Project 1530-00-00 Road US #10

Station 952+15 Offset 50' Rt of C/L Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2-10-81 Unit 6

Finish Chief Kowalski

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40					
					Gray organic Silt					
					50					
					60					
					70					

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 2A Structure St Croix River County Pierce Sheet 3 of 5

Project 1530-00-00 Road USH 10

Station 952+15 Offset 50' Rt of c/L Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2-10-81 Unit 6

Finish Chief Kowalk

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Probe Size	Drilling Method
					0	GRAY ORGANIC SILT			4"		
					5				2		
									4		
									5		
									4		
				90	10				4		
									8		
									7		
									8		
									12		
					15				14		
									15		
				100	20						
		0	0								
1	W	0	1		25						
				100	30						
		2	0								
2	W	0	1								
3		7	3		35	GR. ~~SAND~~ FINE TO MED SAND					
		1	2			GRAY ORGANIC SILT					
		4	1		40	20 GR. FINE TO MED. SAND					
		2	3			LAYERS OF SILT					

Checked by Final Boring No. 2A

LD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 2A Structure ST CROIX RIVER County PIERCE Sheet 4 of 5

Project 1530-00-00 Road USH 10

Station 952+15 Offset 50' RT OF C/L Surface Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2-10-81 Unit 6

Finish _____ Chief KUWALD

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Probe Size	Drilling Method
					120				NW		WA FT RB DM
5	W	2 6	2 5		5	GR ORGANIC SILT LAYERS OF SAND					
6	W	5 3	3 3		10	130 layers of Silt + Sand					
7	W	9 60/3"	60/4"			Silt + Gravel at bottom					
					15	VERY DENSE SAND & GRAVEL					
8	W	40	50/3"		20	140 Sand Gravel & Stones					
					25						
9	W	47 28	32		30	150 VERY DENSE BR. SAND & GRAVEL					
					35						
10	W	86			40	VERY DENSE BR FINE SAND					

Checked by _____ Final _____ Boring No. 2A

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 2A Structure St Croix River County Pierce Sheet 5 of 5

Project 1530-00-00 Road USH 10

Station 952+15 Offset 50' Rt of C/L Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2-10-81 Unit 6

Finish 2-12-81 Chief Lowe

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					160					
					Very Dense Bl. Fine SAND (SANDSTONE)			NW 200 350 400		WA RB DM
					5	5				
					Qn core Gray Lime Stone					
					170 1st Run 170-171.0 Rec 60%	10				C E
					2nd Run 171-176.0' Rec 100%					
					15 3th Run 176-180.0 80% Rec	15				
					180	20				
					EOB # 2A					
					25 Lost Boring on site	25				
					190	30				

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 3 Structure St Croix River Crossing County Pierce + Dakota Sheet 1 of 1

Project 1530-00-00 Road USH 10

Station 947 + 41 Offset ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling in ice Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2-3-81 Unit I

Finish 2/5/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3" Size	Blows on Probe Size	Drilling Method
					Ice					
					Water					
					Boulders + riprap			3		
								14		
								22		
					Could not Sample Boulders			3		
								27		
								28		
								265		
								200/38		RB
					Fractured Limestone.			56		thread
								41		
								63		
					Run #1 1½' Recovery 100%		7R/4"			
					Run #2 1' Recovery 80%					
					Run #3 5" Recovery 50%					
					Run #4 5' Recovery 100%					
					End of Bor.					

STRUCTURE
T26N
R20W
SEC 10

UNIQUE #
1463

Checked by Final Boring No. 3

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. 4 Structure St. Croix River Crossing County Pierce - Dakota Sheet 1 of 2

Project 1530-00-00 Road USH "10"

Station 965+05 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2/5/81 Unit 1

Finish Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 3" Size	Blows on Probe Size	Drilling Method
					Ice					
					water.					
					5					
					STRUCTURE T26N R20W SEC 10					
					10					
					UNIQUE # 1464					
					15					
1	W	1 / 1	1		20 Wash Sample. U. Loose Gray Med. to Coarse SAND			1 / 2 / 2 / 3		
2	W	1			25 Wash Sample. U. Loose alternating Layers of SAND and PEAT			1 / 1 / 1		
3	W	14	19 / 17		30 Firm to Dense Br. Mixture of SAND - GRAVEL and SILT			6 / 19 / 2 / 3		R10. Auger Refusal
					Firm to Dense Br. SAND and GRAVEL Tr. Silt.			6 / 6 / 5 / 7		
4	W	7 / 11	9		35			16 / 12 / 10 / 11		
5	W	19 / 21	24		40			10 / 9 / 15		

Checked by Final Boring No. 4

BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

g No. 4 Structure St. Croix River Crossing County Pierce - Dakota Sheet 2 of 2

oject 1530-00-00 Road USH. "10"

Station 965 + 05" Offset On ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2/5/81 Unit 1

Finish 2/12/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
				40'						
5	W	19	24		Firm to Dense Br. SAND and GRAVEL - Tr. Silt.			9	9	RB
		21						15	Blows	
								40		
					Limestone Boulder.			150		
								19		
				45				31		
			10					20		
6	W	16	18					23		
		14			Some Boulders.			48		
								63		
				50						
7	W		16					42		
		19	21					40		
								41		
								36		
								41		
				55				55		
8	W		16					52		
		20	18					47		
								68		
								44		
				60						
9	W	17	23					38		
		19						40		
								41		
								46		
				65				53		
								60		
								68		
								72		
								79		
				70				42		
10	W	12	19					61		
		20						78		
								83		
								80		
				75						
				80						
11			19							
		23	27							

Checked by

Final End of Bor. 82'

Boring No. 4

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #1 Structure St. Croix River Crossing County Pierce - Sheet 1 of 2

Project 1530-00-00 Road USH "10"

Station 964 +05 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/13/81 Unit 1

Finish 8/13/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 0"	Drilling Method
					Ice					
					water.					
					STRUCTURE T 26 N R 20 W SEC 10					
					UNIQUE # 1452					

5 10 15 20 25 30 35 40

BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #1 Structure St Croix River Crossing County Pierce Sheet 2 of 2

Project 1530-00-00 Road USH "16"

Station 964+05 Offset On ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/13/81 Unit I
Finish 2/13/81 Chief Moyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 2" Size	Drilling Method
					40'				1	
									1	
									2	
									4	
					4 5				10	
									12	
									10	
									13	
									16	
					5 10				15	
									16	
									16	
									19	
									21	
					5 15				36	
									38	
									42	
									67	
									70	
					End of Probe. 6 20				76	

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #2 Structure St. Croix River Crossing County Pierce Sheet 1 of 2

Project 1530-00-00 Road US H. 10

Station 963+05 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit
ST = Shelby tube, SS = Split spoon, DM = Drilling mud
A = Auger, C= Coring, W = Wash
E = Easy, M = Medium, H = Hard

Start 2/16/81 Unit I

Finish 2/16/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Probe Size	Drilling Method
						Ice.					Pr.
						water.					
					5						
					10						
					15	STRUCTURE T26N R20W SEC 10					
					20	UNIQUE # 1453					
					25						
					30						
					35						
					40	PEAT					

RING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Probe #2 Structure St. Croix River Crossing County Pierce Sheet 2 of 2

1530-00-00 Road USH. 10

on 963+05 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2/16/81 Unit 1

Finish 2/16/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 2.0" Size	Drilling Method
				40	PEAT					Pr
				45						
				50						
				55						
				60						
					Rod settled to 64'					
				65				1		
								2		
								2		
								4		
								27		
				70				36		
								37		
								38		
								46		
								57		
				75				62		
								67		
								68		
								90		
								100		
					End of Probe 79'					
				80						

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #3 Structure St Croix River Crossing County Pierce Sheet 1 of 2

Project 1530-00-00 Road U.S. 10

Station 963+55 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/16/81 Unit I

Finish 2/16/81 Chief Moyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Ice.					P.
					water.					
					5					
					10					
					15					
					20					
					25					
					30					
					35					
					40					
					PEAT.					

STRUCTURE
T26N
R20W
SEC 10

UNIQUE #
1454

D BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

ng No. Probe #3 Structure St. Croix River Crossing County Pierce Sheet 2 of 2

oject 1530-00-00 Road U.S.H. 70

Station 963+55 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/16/81 Unit L

Finish 2/16/81 Chief Mayers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					40'					
										P.
					45					
					50					
					Rock Settled to 53'					
								6		
					55			27		
								43		
								130/10"		
					End of Probe 57'					
					60					

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #4 Structure St. Croix River Crossing County Pierce Sheet 1 of 2

Project 1530-00-00 Road USH. "10"

Station 964+55 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2/16/81 Unit I

Finish 2/16/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 2" Size	Drilling Method
						ICE					P
						Water.					
					5						
					10						
					15	STRUCTURE T 26N R 20W SEC 10					
					20	UNIQUE # 1455					
					25						
					30						
						SAND				2	
						PEAT				4	
					35					1	
						SAND				2	
										10	
										12	
										12	
					40					16	
										18	
										18	

Checked by

Final

Boring No. Probe #4

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #4 Structure St. Croix River Crossing County Pierce Sheet 2 of 2

Project 1530-00-00 Road U.S. 10

Station 964+55 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2/16/81 Unit I

Finish 2/16/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 2.0" Size	Drilling Method
					40'					
									18	P.
									18	
									20	
									24	
									24	
					45					
									51	
									84	
					End of Probe 47.5'			72		

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe 5 Structure St. Croix River Crossing County Pierce Sheet 1 of 3

Project 1530-00-00 Road STH. "10"

Station 962+15 Offset 60' Rt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead ST = Shelby tube A = Auger E = Easy
FT = Fish tail SS = Split spoon C= Coring M = Medium
RB = Rock bit DM = Drilling mud W = Wash H = Hard

Start 2/16/81 Unit 1

Finish 2/16/81 Chief Mayers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Rod Size	Drilling Method
					Ice					P
					water.					
					5					
					10					
					STRUCTURE T 26N R 20W SEC 10					
					15					
					20					
					UNIQUE # 1456					
					25					
					30					
					35					
					40					
					PEAT					

Checked by Final Boring No. Probe 5

BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #5 Structure St. Croix River Crossing County Pierce Sheet 2 of 3

Project 1530-00-00 Road 7H:70

Station 762+15 Offset 60' Rt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2/16/81 Unit I

Finish 2/16/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Blows on Probe Size	Drilling Method
					40' water.					
					PEAT					P.
				4 5	4 5					
				5 10	5 10					
				5 15	5 15					
				6 20	6 20					
				6 25	6 25					
				7 30	Rod settles to 70' 7 30				1	
									1	
									4	
									7	
				7 35	7 35				11	
									12	
									12	
									14	
									17	
				8 40	8 40				21	
									22	
									20	

Checked by Final Boring No. Probe #5

BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Pier #5 Structure St Croix River Crossing County Pierce Sheet 3 of 3

Project 1530-00-00 Road STH "70"

Station 962+15 Offset 60' Rt ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/16/81 Unit E

Finish 2/16/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Blows on Probe Size 2.4"	Drilling Method
					80 — 80'					
					Rock Bent Bad.				22	P.
									20	
									39	
									51	
									75	
					85 — End of Probe. 85					

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #6 Structure St. Croix River Crossing County Pierce Sheet 1 of 2

Project 1530-00-00 Road US H. 10

Station 948+41 Offset on ℄ Surface Elevation 674.32

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C= Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/17/81 Unit 2
Finish 2/17/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 2.0" Size	Drilling Method
					Ice.					P.
					water					
					5					
					10					
					15					
					20					
					25					
					30					
					35					
					40					

Checked by _____ Final PEAT Boring No. Probe #6

LD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #6 Structure St Croix River Crossing County Pierce Sheet 1 of 2

Project 1530-00-00 Road US H. "10"

Station 948 + 41 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave In Water Notes

MOISTURE
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2/17/81 Unit F

Finish 2/17/81 Chief Moyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Probe Size	Drilling Method
					40' [redacted] 40'					
					[redacted] Water.					P.
					PEAT					
					45 45					
					50 Rod settled to 51' 50					
									3	
									3	
									6	
					55 55				4	
									16	
									17	
									17	
									18	
					60 60				18	
									63	
					End of Probe.				115	
					62'					
					65 65					

FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Boring No. Probe #7 Structure St. Croix River Crossing County Pierce Sheet 1 of 1

Project 1530-00-00 Road USH. "10"

Station 947+91 Offset on ℄ Surface Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After Boring Completed Depth to cave-in

Cave in Water Notes

MOISTURE: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA=Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C= Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 2/17/81 Unit I

Finish 2/17/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Probe Size	Drilling Method
					Ice.					P
					water.					
					STRUCTURE T26N R20W SEC 10 UNIQUE # 1458					
					PEAT					
					Sand.					
					End of Probe. 41.8'					

Rod Settled to 28'

Probe Size
1
7
15
24
25
26
26
31
30
35
36
34
79
100/.08'

Checked by

Final

Boring No. Probe #7

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 1-"X" **Sheet** 1 **of** 3

Project 1530-00-00 **Road** USH "10"

Structure St. Croix River Crossing **County** Pierce

Station 112+00 **Offset** on line **Elevation**

GROUND WATER OBSERVATIONS

While drilling on ice **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/22/75
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4" Size	Blows on Probe Size	Drilling Method
					Ice					
					water					
					5					
					10					
					15					
					20					
					25					
					30					
					35					
					40					
					45					
					Very Soft Black and Gray Sed. PEAT					
					50					

Checked by **Final** **Boring No.** 1-"X"

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 1-X **Sheet** 2 **of** 3

Project 1530-00-00 **Road** USH "10"

Structure St. Croix River Crossing **County** Pierce

Station 112+00 **Offset** on Line **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/22/75
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4" Size	Blows on Probe Size	Drilling Method
1	Carton				Blessed Peat-Blocky	0				
2	Carton				opened same	0				
3					Same 3" ST	0				
4	Carton				Same (opened)	0				
5	Carton				Same	0				
6	Carton				Same	0				
7					Same 3" ST	0				
8	Carton				Same streaks of ~~lighter~~ gray	0.25				
9	Carton				Same still blocky	0.25				

Checked by **Final** **Boring No.** 1-X

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 1 – X **Sheet** 3 **of** 3

Project 1530-00-00 **Road** USH "10"

Structure St. Croix River Crossing **County** Pierce

Station 112+00 **Offset** on Line **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/22/75
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
10					Some-silt Lowest 3" S.T. higher layer of silt					
11	Cotton				Lt Gray organic silt still blocky No stratification	0.50				
12	Cotton				Stratified, silt-fine sand ~~and~~ tr of clay in silt seams feels greasy.	0.50				
13					Lt Gray silty clay end of tube 3" tube					
14	Cotton				Lt Gray silty-clay. thin layers sand Probe pushed rods					
									31 40	
					1/1 end boring 129.0'					

Checked by **Final** **Boring No.** 1 – X

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 2-X **Sheet** 1 **of** 2

Project 1530-00-00 **Road** USH "10"

Structure St. Croix River Crossing **County** Pierce

Station 108+00 **Offset** on Line **Elevation**

GROUND WATER OBSERVATIONS

While drilling on ice **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 1/24/75
Unit E
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 4"	Blows on Probe Size	Drilling Method
					Ice					W
					Water					
					5					
					10					
					15					
					20					
					25					
					30					
					35					
					40					
									Set casing in 2.46'	
					Black Sed Peat					
					45	O				
1	Carton									
					50					

Checked by **Final** **Boring No.** 2-X

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 2-X **Sheet** 2 **of** 2

Project 1530-00-00 **Road** USH 10

Structure St. Croix River Crossing **County** Pierce

Station 128+00 **Offset** on line **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 1/24/75
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
										Cus Sample
					5					
					Black Sed Peat					
					Blocky. Vertical fault					
2	Carton				10	0.0				
					3" tube same					
					tube may be heavier					
3					15	0.0				
					trace silt and very					
					thin layer fine sand					
4	Carton				20	0.10				
					Blocky Gray Sed peat					
					tr silt - tr wood fiber					
5	Carton				25	0.10				
					stratified					
					Layer fine sand center of tube					
					30					
6	Carton				Gray silt - tr fine sand	0.20				
					3" tube					
					Lt Gray silt tr fi sand					
7					35					
					Stratified					
					40					
					Pushed rods to					
					121.5'					
					45					
					end of boring					
					121.5					
					50					

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FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 3-X **Sheet** 1 **of** 2

Project 1530-00-00 **Road** USH "10"

Structure St Croix River Crossing **County** Pierce

Station 118+00 **Offset** on Line **Elevation**

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 2/7/25
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4" Size	Blows on Probe Size	Drilling Method
					Ice					
					Water					
					5					
					10					
					15					
					20					
					25					
					30					
					35					
					40					
					V. Soft Dark Gray Sed. PEAT					
					45					
1		2" Tube				0.0				
					50					

Checked by _____ **Final** _____ **Boring No.** 3-X

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 3-X **Sheet** 2 **of** 2

Project 1530-00-00 **Road** USH. "10"

Structure St. Croix River Crossing **County** Pierce

Station 118+00 **Offset** on Line **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 8/7/75
Unit 1
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 5" Size	Blows on Probe Size	Drilling Method
2		3" Tube				V. Soft Dark Gray Sed. PEAT	0.0				W
					5						
3		3" Tube					0.0				
					10	(Blocky)					
4		Box Sample					0.0				
					15						
5		Box Sample					0.0				
					20						
6		Box Sample					.10				
					25						
7		Box Sample					.15				
					30	Trace of Fine Sand Seams.					
8		Box Sample					.15				
						hit hard Bottom.					
					35	End of Boring 84.5'					
					40						
					45						
					100						

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FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 4-X **Sheet** 2 **of** 2

Project 153-00-00 **Road** USH. 10

Structure St. Croix River Crossing **County** Pierce

Station 113+00 **Offset** 23.5' Rt of ℄ **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/12/75
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4" Size	Blows on Probe Size	Drilling Method
					Ice 14"					W
					Water					
					V. Soft Sed. PEAT					
					No Recovery					

Checked by **Final** **Boring No.** 4-X

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 4-X **Sheet** 2 **of** 3

Project 1530-00-00 **Road** USH 10

Structure St. Croix River Crossing **County** Pierce

Station 113+00 **Offset** 2375 Rt R **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/12/75
Unit I
Chief Moyaus

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Dark					
1		Tube				V. Soft Gray Sed. PEAT	0.0				W
					5.5						
2		Box Sample					0.0				
					6.10						
3		Tube					0.0				
					6.15						
4		Box Sample					0.0				
					7.20						
5		Box Sample					0.0				
					7.25						
6		Box Sample					0.10				
					8.30						
7		Box Sample					0.10				
					8.35						
8		Box Sample					0.10				
					9.40						
9		Box Sample					0.25				
					9.45						
10		Box Sample				Very soft Dark Gray Sed. PEAT with varing lines of light Gray CLAY	0.25				
					10.00						

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FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 4X **Sheet** 3 **of** 3

Project 1530-00-00 **Road** U.S.H. 40

Structure ST. Croix RIVER **County** Pierce

Station 113+00 **Offset** 2375' RT. of ℄ **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/12/75
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 2nd Size	Drilling Method
						Soft Dark Gray Sed. PEAT					ST
11		Box Samp	le				.25				
					5						
12A	Box	Sample 12-A					.5				
12-B	Box	Sample 12-B				v. Soft Dark Gray Sed. PEAT (Soupy)	0.0				
					10						
13	Box	Sample				v. Soft light Gray Sed. PEAT - with Fine Sand Seams					
					15	Could'nt Push Tube. Gray SAND					
										5	
										6	
										6	
					20					8	
										8	
										8	
										9	
										14	
					25					11	
										10	
										10	
										11	
										17	
					30					14	
										12	
										11	
										10	
										11	
					35					10	
										10	
										9	
										10	
										11	
					40					12	
										12	
										28	
						Refusal 45/1"			82		
						End of Probe 42.5'					
					45						
					50						

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FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 5-X **Sheet** 1 **of** 2

Project 1530-00-00 **Road** U.S.H. "10"

Structure St. Croix River **County** Pierce

Station 121+00 **Offset** 2075 Rt of R **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal on ice **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/12/75
Unit 1
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4" Size	Blows on Probe Size	Drilling Method
						ice					W
						water.					
					5						
					10					Set in casing to 40'	
					15						
					20						
					25						
					30						
					35						
					40						
1		2" Tube.				v. Soft Dark Gray Sed. PEAT	0.0				
					45						
2		Back Sample.					0.0				
					50						

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FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 5-X **Sheet** 2 **of** 2

Project 1530-00-00 **Road** U.S.H. "10"

Structure St. Croix River Crossing **County** Pierce

Station 121+00 **Offset** 2075' Rt. of ℄ **Elevation**

GROUND WATER OBSERVATIONS

While drilling **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/12/75
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
3		Tube			U. Soft Dark Gray Sed PEAT	0.0				Rock Sample
4		Box Sample			55	0.0				
5		Box Sample			60	.10				
6		Box Sample			65	.10				
7		Box Sample			70	.10				
8		Box Sample			75	.10				
9		Box Sample			80	.25				
10		Box Sample			85 Soft Light Gray Sed. PEAT with Fine Sand Seams	.25				
11		Box Sample			90	.25				
					95 couldn't Push Tube. Probed. Refusal 96'	25/6"			41	
					End of Boring 96'					
					100					

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FIELD BORING LOG

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State of Wisconsin / Department of Transportation

Boring No. 1 **Sheet** 1 **of** 3

Project 1530-0-00 **Road** USH. 10

Structure St. Croix River to Prescott **County** Pierce

Station 113+0 **Offset** 011 R **Elevation** 675.00

GROUND WATER OBSERVATIONS

While drilling 998 **Time after drilling**

Before casing removal **Depth to water**

After casing removal **Depth to cave-in**

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/17/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Ice					
					5					
					10					
					Water. 46' Depth					
					15					
					STRUCTURE T 26N R 20W SEC 10					
					20					
					25					
					UNIQUE # 1430					
					30					
					35					
					40					
					45					
									0	
									0	
									0	
					50				0	

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RING LOG

State of Wisconsin / Department of Transportation

No. 1 Sheet 2 of 3

At 1530-0-00 Road USH 10

Structure St. Croix River at Prescott County Pierce

Station 113+0 Offset on R Elevation

GROUND WATER OBSERVATIONS

While drilling on ice Time after drilling

Before casing removal Depth to water

After casing removal Depth to cave-in

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 1/17/72
Unit 1
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing Size 4.5"	Blows on Probe Size	Drilling Method
						Gray Organic Material				0		
										0		
										0		
										0		
					55		55			0		
										0		
										0		
										0		
										0		
					60		60			0		
										0		
										0		
										0		
										0		
					65		65			0		
										0		
										0		
										0		
										0		
					70		70			0		
										0		
										0		
										0		
					75	(Casing might hold over)	75					
										4		
					80		80			4		
										5		
										4		
										4		
					85		85			4		
1	w	Wash Sample								6		
										6		
						Very Soft				6		
										6		
2	w	Weight of Rod			90	Gray Sed PEAT	90	.0		8		
										7		
										6		
										8		
										8		
					95		95			8		
										7		
										8		
										7		
										7		
3	w	Wash Sample			100		100			8		

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BORING LOG

State of Wisconsin / Department of Transportation

No. 1 Sheet 3 of 3

Project 1530-00-00 Road USH. 10

Structure St. Croix River at Prescott County Pierce

Station 1130+0 Offset on ℞ Elevation

GROUND WATER OBSERVATIONS

While drilling Ground ice Time after drilling

Before casing removal Depth to water

After casing removal Depth to cave-in

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/17/72
Unit E
Chief Meyers

Sample No.	Moisture	Blows on Sampler	Samples and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 2.5" Size	Blows on Probe Size	Drilling Method
				Very Soft Gray Sed. PEAT			7		
							8		
							8		
							8		
				10.5			12		
							11		
							11		
							10		
							11		
4	W			10 Trace of Sand Seams	0		12		
							14		
							13		
							9		
							8		
				15			12		
							17		
							11		
							19		
							17		
				20			20		
							28		
							35		
5-A					25"		28		
5B	W	1	30				81		
		61	68	25 Very Dense Br SAND and GRAVEL			121		
				Trace of Silt			132		
							104		
			15				51/47		
6	W	35	88				90		
		87	89	30			304		
							362		
							568		
					800/2"				
				End of Boring					
				35					
				715					
				842-2205					
				40					
				45					
				50					

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FIELD BORING LOG

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State of Wisconsin / Department of Transportation

Boring No. 2 Sheet 1 of 3

Project 1530-00-00 Road USH. 10

Structure St. Croix River at Prescott County Pierce

Station 113+15 Offset on R Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After casing removal Depth to cave-in

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/20/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					ice					
					water					
					5					
					10					
					STRUCTURE T26N R20W SEC 10					
					15					
					20					
					UNIQUE # 1431					
					25					
					30					
					35					
					40					
					45					
					very soft Gray Sed. Peat.		0 0 0 0			
					50					

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ING LOG

State of Wisconsin / Department of Transportation

No. 2 Sheet 2 of 3

oject 1530-00-00 Road USH 10

Structure St. Croix River at Prescott County Pierce

Station 113+15 Offset on ℄ Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After casing removal Depth to cave-in

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead ST = Shelby tube A = Auger E = Easy
FT = Fish tail DM = Drilling mud C = Coring M = Medium
RB = Rock bit SS = Split spoon W = Wash H = Hard

Start 1/30/73
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 2.5" Size	Blows on Probe Size	Drilling Method
					Very Soft Gray Sod. PEAT			0		W
								0		
								0		
								0		
					5		5	0		
								0		
								0		
								0		
								0		
					10		10	0		
								0		
								0		
								0		
								0		
					15		15	0		
								0		
								0		
								0		
								0		
					20		20	0		
								0		
								0		
								0		
					25		25	0		
								0		
								0		
								0		
								0		
					30		30	0		
								1		
								1		
								1		
					35		35	1		
								1		
								1		
					40		40	1		
								2		
								4		
								4		
								6		
					45		45	6		
								7		
								5		
								5		
					50		50	6		

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.ING LOG

State of Wisconsin / Department of Transportation

No. 2 Sheet 3 of 3

oject 1530-0-00 Road USH. 10

Structure St. Croix River at Prescott County Pierce

Station 113+15 Offset on R Elevation

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After casing removal Depth to cave-in

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/20/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 2.5"	Blows on Probe Size	Drilling Method
					Very Soft Gray Soil PEAT			10		W
								7		
								9		
								6		
								8		
					5			11		
								16		
								12		
								14		
								14		
					10			15		
								12		
								12		
								17		
								14		
					15			15		
								20		
								20		
								19		
								14		
					20			12		
								19		
								20		
								26		
					25 Very Dense Brown SAND and GRAVEL			104		
								219		
					Trace of Silt			105		
								115		
								116		
					30			144		
								215		
								421		
								630		
								1000		
1	W	50/2"	26		35			385		FT Ahead
								1000		
								142		
								106		FT Ahead
								96		
2	W	28	12 32		Wash Sample 40			162		
								[illegible]		
								[illegible]		FT Ahead
								[illegible]		
								742		
3	W	42 60	86		45					
					152' with Cont. Bit. Drill Hole					
					50					

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FIELD BORING LOG

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State of Wisconsin / Department of Transportation

Boring No. 3 Sheet 1 of 4

Project 1530-0-00 Road U.S.H. 10

Structure ST. Croix River at Prescot County Pierce

Station 112+50 Offset 1000' LT of R.L. Elevation 675.00

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/2/72
Unit I
Chief LARSON

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					WATER					W
					5	5				
					10	10				
					15	15				
					20	20				
					STRUCTURE T26N R20W SEC 10					
					25	25				
					UNIQUE # 1432					
					30	30				
					35	35				
					40	40				
					45	45				
					Sedimentary & organic material					
					50	50				

Checked by _____ Final _____ Boring No. _____

RING LOG

State of Wisconsin / Department of Transportation

No. 3 Sheet 2 of 4

ject 1530-0-00 Road U.S.H. 10

structure St. Croix River at Prescot County Pierce

Station 112+50 Offset 1000' LT of RL Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 2/2/72
Unit I
Chief LARSON

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 2½"	Blows on Probe Size	Drilling Method
1	W	0	0		(Sampler Free Fell) Very loose - Black Sedimentary Organic Material					
		0	0							
2	W	0	0							
		0	0							
								1		
								1		
								1		
								2		
								2		
3	W	1	1					3		
		1	1					3		
								4		
								4		
								5		
								5		
								6		
								5		
								6		
								6		
4	W	1	1					6		
		1	1							

Checked by _____ Final _____ Boring No. 3

ORING LOG

State of Wisconsin / Department of Transportation

ng No. 3 Sheet 3 of 4

Project 1530-0-00 Road U.S.H. 10

Structure ST. Croix River at Prescot County Pierce

Station 112+50 Offset 1000' LT of RL Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 2/2/72
Unit I
Chief LARSON

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
									6		W
									8		
									6		
									9		
					105		105		10		
									11		
									12		
									13		
									12		
5	W	1	1		110	WASH SAMPLE No recovery	110		10		
		1	1						9		
									13		
									15		
									16		
					115		115		15		
									15		
									13		
									10		
									13		
6	W	1	1		120	Very Loose Gray Silty SAND	20		20		
		1	2						33		
									22		
						Very Loose Gray SILT			18		
									20		
7	W	1	1		125	Very Loose-Gray Sedimentary Organic Material	25		16		RB
		1	1						23		
									33		
									29		
								●	111		
8	W	5	13		130	Dense - Silty SAND & GRAVEL + Boulders	30	●	150		
		70	3"					●	210		
								●	175		
									90		
									58		
9	W	30	14 72		135		35		152		
									405		
									195		
									131		
									92		
			14						106		
10	W	17	18		140		40		114		
		20							123		
									148		
			16			Dense to Very Dense Br. Fine to			76		
11	W	22	22		145	Coarse SAND - Trace of Gravel			93		
									106		
									121		
									152		
			12						118		
12	W	22	31		150		50		150		

Checked by _____ Final _____ Boring No. 3

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Boring No. 3 — Sheet 4 of 4

Project 1530-0-00 — Road USH 10

Structure St Croix River at Prescott — County Pierce

Station 112+50 — Offset 1000 Lt of RL — Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 2/2/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 2.5" Size	Blows on Probe Size	Drilling Method
					Dense to Very Dense Br. Fine to Coarse SAND			243		W
					Trace of Gravel			968		
								312		
13	W		14		Wash			109		
		16	32		Sample			163		
					15	15				
								246		
								269		
								306		
								349		
14	W		17		Wash					
		36	62		Sample. 16	16				
					End of Boring					
					16.5	16.5				

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 4 **Sheet** 1 **of** 3

Project 1530-0-00 **Road** USH "10"

Structure St. Croix River Bridge **County** Pierce

Station 120+00 **Offset** on ℄ **Elevation** 675.0

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 2/11/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 2.5"	Blows on Probe Size	Drilling Method
					Ice					
					5					
					Water.					
					10					
					15					
					20					
					675 / 643 / 632					
					25					
					30					
					35					
					40					
					Sand PLAT			0		
					45			0		
								0		
								0		
								0		
								0		
					50			0		

Checked by _____ **Final** _____ **Boring No.** 4

RING LOG

State of Wisconsin / Department of Transportation

No. 4 Sheet 2 of 3

ct 1530-000 Road USH "10"

ucture St. Croix River Bridge County Pierce

Station 120+00 Offset on R Elevation ~~[illegible]~~ 675.0

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 2/11/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Elev.	VISUAL FIELD CLASSIFICATION AND REMARKS	Elev.	Unconfined Strength	Boulders	Blows on Casing 2½" Size	Blows on Probe Size	Drilling Method
						Sed. PEAT				0		W
										0		
										0		
										0		
					55		55			0		
										0		
										0		
										0		
										0		
					60		60			0		
										0		
										0		
										0		
										0		
					65		65			0		
										0		
										0		
										0		
										0		
					70		70			0		
										0		
										0		
										0		
										0		
					75		75			0		
										1		
										1		
										1		
										1		
					80		80			1		
						Firm Br. SAND and GRAVEL				18		
						Trace of Silt				40		
										55		
										55		
1	W	6	8		85		85			41		
		10								56		
						Dense Br. Fractured, Limestone				105		
			26							13		
2	W	18	13							53		
					90		90			79		
										63		
						Dense Br. SAND and GRAVEL —				79		
						Trace of Silt			52	13		
3	W	14	16							52		
		23			95		95			89		
										92		
										108		
									61	21		
4	W	12	15		100		100			68		
		21			50		50			72		

Checked by _____ Final _____ Boring No. 4

FIELD BORING LOG

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State of Wisconsin / Department of Transportation

Boring No. 4 **Sheet** 3 **of** 3

Project 1530-0-00 **Road** USH 10

Structure St Croix River Bridge **County** Polk

Station 120+00 **Offset** on ℞ **Elevation** 675.0

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 2/11/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						Dense Br SAND and GRAVEL — Trace of Silt				76		W
										86		
										79		
5	W	30	30 / 16		105		105			62		
										101		
										141		
										149		
										186		
6	W	30	21 / 19		110		110			65		
										109		
										106		
										98		
										126		
7	W	80	26 / 50/4"		115		115			100		
										121		
										253		
										112		
8	W	20	14 / 15		120	wash sample	120			100		
										60		
										137		
										125		
										230		
										162		
9	W	11	9 / 22		125		125					
						End of Boring						
					130		130					
					135		135					
					140		140					
					145		145					
					150		150					

~~850' from Stm.~~
~~B.S.~~

Checked by _____ **Final** _____ **Boring No.** 4

FIELD BORING LOG

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Dist

State of Wisconsin / Department of Transportation

Boring No. 5 **Sheet** 1 **of** 2

Project 1530-0-00 **Road** USH 10

Structure St Croix River Bridge **County** Pierce

Station 120 to **Offset** 800 RT **Elevation** 675.00

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 8/16/72
Unit 2
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 2.5" Size	Blows on Probe Size	Drilling Method
					water					W
					STRUCTURE T26N R20W SEC 10 UNIQUE # 1434					
					Sed PEAT					

Checked by _____ Final _____ Boring No. 5

BORING LOG

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State of Wisconsin / Department of Transportation

Boring No. 5 Sheet 2 of 2

Project 1530-0-00 Road USH 10

Structure St. Croix River Bridge County Pierce

Station 120+0 Offset 800' Rt ℄ Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/16/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing Size 2½	Blows on Probe Size	Drilling Method
						Sed. PEAT						
					5		5					
					10		10					
					15		15					
					20	(Free Fall) to 27½	20					
										1		
										1		
										1		
					25		25			1		
										1		
										1		
										1		
					30		30			1		
										26		
										35		
										47		
										78		
										188		
1	W		22		35	Wash sample	35			526/0.7ft		FT. Auger
		53				(Boulder.) Limestone				68		
			29							93		
2	W	21	31		40		40			146		
										86		
										150		
										286		
										190		
										241		
3	W		14		45		45					
		23	29									
						End of Boring						
					100		100					

Checked by _____ Final _____ Boring No. _____

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Probe ~~Boring~~ No. I

Sheet 1 of 3

Project 1530-0-00 Road U.S.H. 10

Structure St. Croix River at Prescott County Pierce

Station 114+00 Offset 500' RT of RL Elevation 675.00

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 1/31/72
Unit I
Chief LARSON

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Probe # 1 WATER					
					5					
					10					
					15					
					20					
					25					
					30					
					35					
					40					
					43.8' OF WATER					
					45 Rid Free Fell To 71'					
					50					

STRUCTURE
T26N
R20W
SEC 10

UNIQUE #
1449

Checked by _____ Final _____ Probe ~~Boring~~ No. 1

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. Probe 1

Sheet 2 of 3

Project 1530-0-00 Road U.S.H. 10

Structure St. Croix River at Prescott County Pierce

Station 114+00 Offset 500' RT of RL Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/31/72
Unit I
Chief LARSON

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Blows on Probe Size 1 1/4	Drilling Method
						Rod Free Fall					
					5						
					10						
					15						
					20						
										1	
										1	
										1	
					25					1	
										1	
										1	
										1	
					30					1	
										2	
										2	
										2	
										2	
					35					2	
										2	
										2	
										3	
										3	
					40					3	
										3	
										3	
										4	
										4	
					45					4	
										5	
										5	
										5	
										3	
					50					3	

Checked by _____ Final _____ Probe Boring No. 1

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

~~Boring~~ Probe No. 1

Sheet 3 of 3

Project 1530-0-00 Road U.S.H. 10

Structure ST. Croix River at Prescot County Pierce

Station 114+00 Offset 500' RT of RL Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 1/31/72
Unit I
Chief LARSON

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 1½"	Drilling Method
									2	
							0		80	
									149	
									50	
					5				128	
					Refusal - End of Probe				165 = 6"	
					10					

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Probe No. 2

Sheet 11 of 3

Project 1530-0-00 Road U.S.H. 10

Structure St. Croix River at Prescott County Pierce

Station 113 + 00 Offset 500' LT of RL Elevation 675.00

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 2/11/72
Unit I
Chief [illegible]

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 1 1/4"	Drilling Method
					Probe #2					
					WATER					
					5					
					10					
					15					
					STRUCTURE T 26N R 20W SEC 10					
					20					
					UNIQUE # 1450					
					25					
					30					
					35					
					40					
					45					
					46.5'					
					Free Fall					
					50					

Checked by _____ Final _____ Boring No. 2

BORING LOG

State of Wisconsin / Department of Transportation

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Probe No. 2 Sheet 2 of 3

Project 1530-0-00 Road U.S.H. 10

Structure St. Croix River at Prescot County Pierce

Station 113+00 Offset 500' LT of RL Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/1/72
Unit I
Chief HARRISON

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Casing Size	Blows on Probe Size 1 1/2	Drilling Method
						Free Fall						
					5		5					
					10		10					
					15		15					
					20		20					
					25		25				1	
											1	
											1	
					30		30				1	
											1	
											1	
											1	
					35		35				2	
											2	
											2	
											2	
											2	
					40		40				2	
											2	
											2	
											3	
											3	
					45		45				3	
											2	
											3	
											3	
											2	
					50		50				3	

Checked by _____ Final _____ Probe No. 2

BORING LOG

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State of Wisconsin / Department of Transportation

Probe No. 2

Sheet 3 of 3

Project 1530-0-00 Road U.S.H. 10

Structure St. Croix River at Prescot County Pierce

Station 113+00 Offset 500' LT OF RL Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/1/72
Unit F
Chief Larson

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 2½"	Drilling Method
									3	
									4	
									3	
									4	
									4	
									5	
									3	
									5	
									5	
									3	
									3	
									4	
									5	
									6	
									6	
									5	
									8	
									5	
									8	
									5	
									6	
									11	
									8	
									8	
									8	
									8	
							0		30	
					Boulders		0		152	
							0		128	
							0		160	
									46	
									39	
									10	
									26	
									30	
									36	
									63	
									87	
									129	
									190	
					Refusal — 48=1"				210	
					End of Probe					

Checked by _____ Final _____ Probe No. 2

FIELD BORING LOG

E-L-5(S)-68

State of Wisconsin / Department of Transportation

~~Boring No.~~ 3 Pier

Sheet 1 of 2

Project 1530-00-00 Road STH 10

Structure St. Croix River Bridge at Prescott County Pierce

Station 120+0 Offset 800' Lt of ℄ Elevation 675.00

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/21/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 2.0"	Drilling Method
						Water						P
					5		5					
					10		10					
					15		15					
					20		20					
						Sod PEAT ↓ Free Fall						
					25		25				1	
						STRUCTURE T26N R20W SEC 10					1	
					30		30				1	
											1	
											4	
											11	
											13	
					35	UNIQUE #	35				13	
											17	
						1451					21	
											23	
											16	
					40		40				15	
											16	
											12	
											10	
											9	
					45		45				14	
											26	
											39	
											42	
											56	
					50		50				57	

Checked by _____ Final _____ Boring No. 3

FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-D3(S)-68

Probe ~~Boring~~ No. 3 Sheet 2 of 2

Project 1530-0-00 Road USH "10"

Structure St. Croix River Bridge at Prescott County Pierce

Station 120 to 0 Offset 800 Lt of ℄ Elevation 675.0

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash

E = Easy; M = Medium; H = Hard

Start 2/21/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 2 3/8	Drilling Method
											19	
											19	
											12	
											18	
					5		5				19	
											18	
											14	
											14	
											16	
					10		10				20	
											23	
											24	
											24	
											21	
					15		15				16	
											14	
											23	
											24	
											20	
					20		20				19	
											16	
											21	
											18	
											42	
					25	End of Probe	25				156	
										60/2"		
					30		30					
					35		35					
					40		40					
					45		45					
					100 50		100 50					

Checked by _____ Final _____ Probe Boring No. 3

FIELD BORING LOG

E-1-3(S)-68

State of Wisconsin / Department of Transportation

Probe ~~Boring~~ No. 4 Sheet 1 of 2

Project 1530-0-00 Road USH "10"

Structure St. Croix River Bridge at Prescott County Pierce

Station 105+0 Offset 800' Rt of ℄ Elevation 675.00

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/21/72
Unit
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 2.0" Size	Drilling Method
										A

Water

STRUCTURE
T26N
R20W
SEC 10

UNIQUE #
1433

Sand PEAT

(Free Fall)

Checked by _____ Final _____ Probe ~~Boring~~ No. 4

FIELD BORING LOG

E-23(S)68

State of Wisconsin | Department of Transportation

Boring No. Probe 4 **Sheet** 2 **of** 2

Project 1530-0-00 **Road** USH "10"

Structure St. Croix River Bridge at Prescott **County** Pierce

Station 105+00 **Offset** 800' Rt of ℄ **Elevation** 675.0

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 2/21/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 2.0" Size	Drilling Method
					Sed. PEAT.					
					5					
					10					
					15					
					20 (Free Fall)					
					(Pushed with weight.)					
					25					
					30					
					35				1	
									1	
									1	
									1	
									1	
									1	
					40				1	
									1	
									12	
									26	
									43	
					45				21	
									46	
									32	
									29	
					End of Probe				116	
					100				203	

Checked by _____ **Final** _____ **Boring No.** Probe 4

FIELD BORING LOG

E-4-3(S)-68

State of Wisconsin / Department of Transportation

Probe Boring No. 5

Sheet 1 of 2

Project 1530-0-00 Road USH 10

Structure St. Croix River Bridge - Prescott County Pierce

Station 105+0 Offset on ℞ Elevation 675.00

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 2/21/72
Unit 2
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe 4.0" Size	Drilling Method
						Water					
					5						
					10						
					15	STRUCTURE T26N R20W SEC 10					
					20	UNIQUE # 1435					
					25						
					30						
					35						
						(Free Fall)					
					40	Pushed with weight.					
					45				1		
									2		
									3		
									2		
					50				2		

Checked by _____ Final _____ Probe Boring No. 5

FIELD BORING LOG

E-0-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. Probe 5

Sheet 2 of 2

Project 1530-0-00 Road USH 10

Structure St. Croix River Bridge - Prescott County Pierce

Station [illegible] Offset on ℄ Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/21/72
Unit I
Chief Magers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 2.0"	Drilling Method
											2	P
											2	
											3	
											3	
					5		5				3	
											3	
											3	
											2	
											2	
					60		60				2	
											2	
											3	
											4	
											6	
					65		65				6	
											6	
											6	
											6	
											9	
					70		70				9	
											5	
											8	
											9	
											11	
					75		75				21	
											46	
											72	
											39	
											76	
					80	End of Probe.	80				101	

FIELD BORING LOG

E-13(S)-68

State of Wisconsin / Department of Transportation

Boring No. 6 **Sheet** 1 **of** 1

Project 1530-0-00 **Road** USH "10"

Structure St. Croix River Bridge at Prescott **County** Pierce

Station 105+0 **Offset** 50' Lt of ℄ **Elevation** 675.00

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 9/22/72
Unit I
Chief Hopkins

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 2 1/2"	Drilling Method
						(ice about 4" thick)					
						Water					
						move hole 100' East					
					5						
					10						
						(Free Fill)					
					15	End of Probe.					
					20	STRUCTURE					
						T 26N					
						R 20W					
					25	SEC 10					
						UNIQUE #					
					30	1436					

FIELD BORING LOG

E-L-S(S)-68

State of Wisconsin / Department of Transportation

Boring No. 7 Sheet 1 of 2

Project 1530-0-00 Road USH "10"

Structure St. Croix River at Prescott County Pierce

Station 160+50 Offset 80' Lt. of ℄ Elevation 675.00

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 2/22/72
Unit 1
Chief Moyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size 9.0"	Drilling Method
					18" of ice					
					water					
					5					
					10					
					15					
					Soil FILL (From Fill)					
					20				10	
									10	
									8	
									4	
									12	
									8	
					25				6	
									6	
									8	
									10	
									16	
					30				10	
									14	
									14	
									16	
									23	
					35				12	
									9	
									15	
									26	
									31	
					40				35	
									19	
									21	
									17	
									16	
					45				16	
									15	
									18	
									31	
									31	
					50				43	

STRUCTURE
T 26N
R 20W
SEC 10

UNIQUE #
1437

Checked by _____ Final _____ Boring No. 7

LD BORING LOG

State of Wisconsin / Department of Transportation

23(S)-68

Boring No. 7

Sheet 2 of 2

Project [illegible] Road USH 10

Structure St Croix River at Prescott County Pierce

Station 106+0 Offset 800' Lt. of ℄ Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/[illegible]/71
Unit E
Chief Mayotis

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Casing Size	Blows on Probe 2.0" Size	Drilling Method
											17	
											19	
											23	
											26	
					5		5				27	
											26	
											26	
											26	
											26	
					10		10				21	
											26	
											26	
											31	
											52	
					15		15				56	
											61	
											42	
											30	
											35	
					20		20				30	
											28	
											30	
											36	
											40	
					25		25				67	
											31	
											41	
											42	
											62	
					30		30				70	
											48	
											40	
											46	
											52	
					35	End of Probe	35				79	
											108	

FIELD BORING LOG

E-L-7(S)-68

State of Wisconsin / Department of Transportation

Dist.

Boring No. 8B-8 **Sheet** 1 **of** 3

Project 1530-00-00 **Road** USH. 10

Structure St. Croix River Crossing at Prescott **County** Pierce

Station 16+06 **Offset** 195' Lt of ℄ **Elevation** 75.4

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 2/19/72
Unit 1
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 2.5" Size	Blows on Probe Size	Drilling Method
					Water 8' STRUCTURE T26N R20W SEC 10					3
1	W	1 2	2 3		Loose Gray Med. SAND - Trace of silt UNIQUE # 1438			1 2 3 3 4		
2	W	1 2	2 2					7 11 14 14 19 21		
3	W	2 3	4 4		Loose Gray [redacted] Fine SAND - Trace of silt & (Clam shells)		14/6	10 24 28 28		
4	W	4 6	3 4		Wash Sample Loose Gray Fine & Coarse SAND		12/14	26 25 24 24		
5	W	4 5	1 5				12/14	24 30 40 42		
6	W	4 5	2 4		Loose Gray Fine SAND - Trace silt		21/17	40 43 44 43		
7	W	3 3	1 3		Loose Gray SILT - Some Small layers of Fine Sand and Trace of organic material.		25/25	51 53 63 66		
8	W	2 2	1 2		Loose Gray Fine Sandy SILT Trace of organic material - Trace of Clam Shells		31/31	67 74 67 60		
9	W	1 5	1 2				53/66			

Checked by _____ **Final** _____ **Boring No.** 1-B

FIELD BORING LOG

State of Wisconsin / Department of Transportation

L-3(S)-68

Boring No. 1-B

Sheet 2 of 3

Project 1530-00-00 Road USH "10"

Structure St. Croix River Crossing at Prescott County Pierce

Station 16+06 Offset 175' Lt of ℄ Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 7/19/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 2½"	Blows on Probe Size	Drilling Method
9	W	1 3	2			Loose Gray Fine Sandy SILT - Trace of organic material - Trace of Clam Shells.			62 68 70 70		W
			1		55			35	55 69		
10	W	2 3	3						10 72 70		
						Loose Gray SILT - Trace of organic Material					
11	W	2	1 2		60		.5	41	35 85 92 102 105		
12	W	2	1 2		65		.5	62	40 60 47 58 56		
13	W	2	1 2		70		.5		26 95 90 82 73		FT. Ahead.
14	W	2	1 2		75		.5		65 82 87 79 55		
15	W	2	1 2		80		.5		63 70 65 61 63		
16					85	Firm Gray Fine SAND - Some silt			66 60 65		
17	W	6 10	9			Firm Br. SAND and GRAVEL - Trace of Silt		36	35 62 70 113 108		
18	W	18 24	21		90				76 72 100		
					95				106 142		
19	W	19 28	11 22			Firm			54 115		
					100				184		

Checked by _____ Final _____ Boring No. 1-B

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 1-B

Sheet 3 of 3

Project 1530-00-00 Road USH. 10

Structure St. Croix River Crossing at Prescott County Pierce

Station 16+06 Offset 175' Lt. of ℄ Elevation

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 7/19/72
Unit 1
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 1-5 Size 3 1/2	Blows on Probe Size	Drilling Method
					V. Dense Fr. Rock and GRAVEL Trace of Silt			3 1/2		
					Fracture Limestone.			1/68		
20	W	14	27							FT. Ahead
		26	34		105					
					Drilled Very Hard.					
21	W	28	18		110					
					End of Boring					
					115					

E-L-3(S)-68

Boring No. 2-3 **Sheet** 1 **of** 3

Project 1530-00-00 **Road** U.S. 10

Structure St. Croix River Crossing at Prescott **County** Pierce

Station 21+47 **Offset** 72' Rt. Rk. **Water Elevation** 682.0

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/2/72
Unit 2
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
										W
					5					
					10					
					Water.					
					STRUCTURE					
					T26N					
					R 20W					
					SEC 10					
					15					
					20					
					UNIQUE #					
					1439					
					25					
							1			
					30		1			
					(Had to move boring west		1			
					in channel for barge)		3			
							8			
					35		1			

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 3-B **Sheet** 1 **of** _____

Project 1530-00-00 **Road** USH "10"

Structure St. Croix River Bridge at Prescott **County** Pierce

Station 23+93 **Offset** 238 Lt ℄ **Elevation** 82.5

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 8/3/72
Unit 1
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Visual Field Classification and Remarks	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Water. STRUCTURE T26N R20W SEC 10 UNIQUE # 1440					W
					Very Loose Sand			1, 1, 3, 7, 6, 4, 2, 11, 8, 7, 6, 4		
1	W	5, 5	3, 5		WASH SAMPLE Loose - Gray Silty Med. SAND Trace shells, and silt			14, 15, 11, 15, 8, 11		
2	W	4, 6	2, 4		WASH SAMPLE			17, 21, 19, 15, 9, 9		
3	W	1, 2	1, 1		wash Sample. Very loose Gray SAND - Trace of Silt Seams - Trace of Wood. Trace of Shells.			11, 14, 14, 12, 14, 16, 19, 51, 20		
4	W	1, 1	1, 1							
5	W	1, 1			Very Loose Gray SILT or Little organic Material - Trace of Fine Sand.			12, 10		

Checked by _____ **Final** _____ **Boring No.** 3-B

BORING LOG

State of Wisconsin / Department of Transportation

Boring No. 3-B

Sheet 2 of 3

Project 1530-00-00 Road U.S. 10

Structure St. Croix River Bridge at Prescott County Pierce

Station 23+93 Offset 238 Lt. of ℄ Elevation 825

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 3/3/72
Unit 2
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing 2.5" Size	Blows on Probe Size	Drilling Method
5	W		1			Very Loose Gray SILT - Little organic Material - Trace of Fine Sand.				26, 25, 26, 26		
6	W	1	1 / 1		55	(5 mm fiber)	55	.25		12, 17, 20, 27, 7, 7, 7		
7	W	1	1 / 1		60		60	.25		17, 21, 26, 15, 17, 20, 20		Flight Auger
8	W	1	1 / 1		65		65	.25		30, 31, 14, 16, 21, 27		
9	W	2	1 / 2		70	Loose Gray SILT - Trace of organic Material	70	.5		26, 31, 27, 28, 30, 31		
10	W	1 / 2	2		75		75	.5		28, 28, 28, 29, 26		
11	W	1 / 2	2		80		80	.75		28, 29, 29, 30		
12	W	1 / 2	2		85		85	.75		32, 29, 29, 33, 33		
13	W	1 / 2	2		90		90	.25		34, 32, 33, 34, 35		
14	W	1 / 3	2		95	Loose Gray Sandy SILT - Some organic Trace Sand.	95			46, 45, 46, 53		
					100		100			23, 29		

Checked by _____ Final _____ Boring No. 3-6

LD BORING LOG

State of Wisconsin / Department of Transportation

*3(S)-68

Boring No. -P

Sheet 3 of 3

Project 1530-00-00 Road U.S. 10

Structure St. Croix River at Prescott County Pierce

Station 234+93 Offset 238' Lt. of ℄ Elevation 822.5

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/5/72
Unit
Chief

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
15	W	2 6	4		Loose Gray Sandy SILT - Some Gray layers of Sand			50 53 56 50 54		FT. Wash
					5 Firm Gray Fine to Coarse SAND 5					
16	W	3 7	5					38 80		W
					10 Dense Gray and Br. SAND and GRAVEL Trace of Silt 10			301 240		
17	W	16 19	15					50 15 15 100 121		
					15					
18	W	17	12 20		Wash Sample			64		
					20 End of Boring 20					

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 4-1 **Sheet** 1 **of** 2

Project 1530-00-00 **Road** USH. 10

Structure St. Croix River at Prescott **County** Pierce

Station 11+21 **Offset** 218' LT. ℄ **Water Elevation** 79.5

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/7/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Water 21'					
					STRUCTURE					
					T26N R20W SEC 10					
					UNIQUE # 1441					
1		2 4	5		Loose Gray SAND - Trace of Silt and shells.					
2		4 11	6		Firm Gray Fine to Course SAND Trace of Silt Trace of shells					
3		6								
4		6	5		Firm Br SILT.					
5			1		Dense SAND and GRAVEL -					

Checked by _____ **Final** _____ **Boring No.** _____

ZED BORING LOG

State of Wisconsin / Department of Transportation

-L-3(S)-68

Boring No. 4-B **Sheet** 2 **of** 2

Project 1530-00-00 **Road** USH. 10

Structure St. Croix River at Prescott **County** Pierce

Station 11+21 **Offset** 218' Lt R **Water Elevation** 74.5

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 8/9/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 4½"	Blows on Probe Size	Drilling Method
5	w	20	16			Dense Br. SAND and GRAVEL - Some Limestone			65		
		19				Boulders			70		
									85		
									80		
6	w		18		55	V. Dense		55	39/33		
		25	36						43		
									84		
									89		
									99		
7	w		21		60	Wash Sample.		60	43/21		
		30	19						74		
									100		
									154		
									140		
			24		65			65	66/40		
8	w	23	19						150		
		25							120		
									152		
									197		
			10		70			70	120		
9	w	21	27								
		24									
						End of Boring					

FIELD BORING LOG

E-L-2(S)-68

State of Wisconsin / Department of Transportation

Boring No. 5-B **Sheet** 1 **of** 2

Project 1530-00-00 **Road** U.S.H. 10

Structure St Croix River at Prescott **County** Pierce

Station 13+41 **Offset** 164 ft of R **Water Elevation** 79.7

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 8/10/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					WATER					
					STRUCTURE					
					T 26 N R 20 W SEC 10					
					UNIQUE # 1442					
					Probe					
					Loose Gray SAND - Trace of Silt and Shells.			1		
								2		
								4		
								4		
								3		
								5		
								8		
								15		
								15		
								15		
					End of Boring			18		
					Start of Probe.				2	
									5	
									7	
									5	
									5	
									4	
									3	
									2	
									4	
									7	
									7	
									8	
									10	
									10	
									10	
									14	
									17	
									16	
									53	
									42	
									61	

Checked by _____ **Final** _____ **Boring No.** 5-B

B-BORING LOG

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State of Wisconsin / Department of Transportation

Boring No. 5-B

Sheet 2 of 2

Project 1530-00-00 Road USH 10"

Structure St. Croix River at Prescott County Pierce

Station 13+41 Offset 164' Lt ℄ Water Elevation 79.7

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/10/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						↓ Refusal 25/½"				125	P
						End of Probe				163	
										100	
					5						
					10						
					15						

FIELD BORING LOG

E-173(S)-68

State of Wisconsin / Department of Transportation

Boring No. 6-B **Sheet** 1 **of** 2

Project 1530-00-00 **Road** USH. "10"

Structure St. Croix River at Prescott **County** Pierce

Station 8+27 **Offset** 216' Lt of ℄ **Elevation** 79.0

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/14/62
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4.5" Size	Blows on Probe Size	Drilling Method
										W
					5 water					
					10 STRUCTURE T26N R20W SEC 10					
					15 UNIQUE # 1443					
					20					
					25			1		
								2		
								3		
								3		
								4		
					30 Loose Gray SAND - Trace of Silt			10		
								14		
								21		
								23		
								26		
1	W	4	6		35 Wash sample.			19/10		
		3						18		
								24		
								25		
								28		
					40 Loose Gray Silty SAND - Trace of Shells			19/10		
2	W	1	2					28		
		2						22		
								22		
					Loose Br. SILT			31		
3	W		7		45			13/10		
		26	23		Dense to Very Dense Br. Sand and GRAVEL - Some Silt			54		
								105		
								81		
								90		
4	W	19	15		50			45/		
			17							

Checked by _____ **Final** _____ **Boring No.** 6-B

FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-L-3(S)-68

Boring No. 6-B **Sheet** 2 **of** 2

Project 1530-00-00 **Road** USH "10"

Structure St. Croix River at Prescott **County** Pierce

Station 8+27 **Offset** 216' Lt. of ℄ **Elevation** 79.0 Water

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/14/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4½" Size	Blows on Probe Size	Drilling Method
4	W	19	17			Dense to Very Dense Br SAND and GRAVEL some Silt			68		W
									75		
									89		
									95		
			15		5	Trace of Silt			95		
5	W	24	24								
		23									
			19		6						
6	W	26	18								
						End of Boring					

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 7-B **Sheet** 1 **of** 1

Project 1530-00-00 **Road** U.S.H. "10"

Structure St. Croix River at Prescott **County** Pierce

Station 749 **Offset** 15' Lt of ℄ **Elevation** 78.6

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/16/72
Unit 2
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Water.					
					STRUCTURE T.26 N R.20 W SEC 10					
					UNIQUE # 1444					
					Loose to Firm Gray SAND - Trace of Gravel and Silt			8		
								12		
								22		
								12		
								20		
								136		
					Dense Br. SAND and GRAVEL Trace of Silt			46		
1	w	14	17	■				121		
		17	19	□				196		
					Limestone	800-3"				FT. Hard
					Cored 5.5' Recovery 35% Limestone					
					End Boring					

Checked by _____ **Final** _____ **Boring No.** 7-B

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 8-B **Sheet** 1 **of** 1

Project 1530-00-00 **Road** USH 10

Structure St. Croix River at Prescott **County** Pierce

Station 11+26 **Offset** 39' Rt ℄ **Elevation** 78.5

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/18/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Water					
					STRUCTURE T26N R20W SEC 10					
					UNIQUE # 1445					
					Loose to Firm Gray SAND	5				
						30				
						35				
						87				
						119				
1	W	51	36		Very Dense Brn SAND and GRAVEL	450				
		20	19		Trace of Silt and Boulders					
					End of Boring					
					Barge moved while Drilling					

Checked by _____ **Final** _____ **Boring No.** 8-B

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 9-B **Sheet** 1 **of** 2

Project 1530-00-00 **Road** USH "10"

Structure St. Croix River at Roscoff **County** Pierce

Station 10+25 **Offset** **Elevation** 78.2

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/21/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 7 5/8" Size	Blows on Probe Size	Drilling Method
						Water					W
					5						
						STRUCTURE					
					10	T 26 N					
						R 20 W					
						SEC 10					
					15	UNIQUE *					
						1446					
					20						
					25						
					30						
					35	Loose to Firm Gray SAND — Trace of Silt and Shells.			2, 8, 20, 26, 37, 74		
1	W	13, 17	15, 19		40	Dense Br. SAND and GRAVEL Trace of Silt			26, 39, 54, 50, 38		
2	W	7, 12	9, 12		45	Firm			18, 14, 29, 26, 40		
3	W	14	9, 19		50	Dense			21/19		

Checked by

Final

Boring No. 9-B

FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-L-3(S)-68

Boring No. 9-B Sheet 2 of 2

Project 1530-00-00 Road USH "10"

Structure St. Croix River at Prescott County Pierce

Station 10+25 Offset 50' R Elevation 78.2

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washhead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/21/72
Unit 5
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
3	W	14	19		Firm to Dense Br. SAND and GRAVEL			13		
		8			Trace of Silt			24		
								44		
								65		
			36					78		
4	W	19	20		5	5		52		
								48		
								100		
								115		
5	W	25	88		6	6				
		56								
					End of Boring					
					6	6				

FIELD BORING LOG

E-L 3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 10-B **Sheet** 1 **of** 2

Project 1530-00-00 **Road** USH 10

Structure St. Croix River at Prescott **County** Pierce

Station 22+12 **Offset** 226' Rt 12 **Elevation** water 78.5

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash

E = Easy; M = Medium; H = Hard

Start 8/22/72
Unit 7
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 2½" Size	Blows on Probe Size	Drilling Method
										W
					STRUCTURE T26N R20W SEC 10 UNIQUE # 1447					
					Water					
								1		
								1		
								3		
								2		
								6		
								7		
								6		
								5		
					Loose Gray SAND - Trace of Silt and Shells.			4		
1	W	1	2					6		
		4	4					13		
								10		
					Loose Gray SAND - some Silt Trace of Organic Material			8		
2	W	2	4					7		
		3						8		
								13		
								12		
								12		
3	W		1					10		
		2	2					8		
								12		
								12		
								13		
4	W	1	2		Loose Br. Layer SILT	.45T		13		
		2						14		
								23		
								32		
					Dense Br. SAND and GRAVEL - Trace of Silt			42		
5	W	16	19					28		
		16								

Checked by _____ **Final** _____ **Boring No.** 10-B

.ELD BORING LOG

State of Wisconsin / Department of Transportation

3-L-3(S)-68

Boring No. 10-B **Sheet** 2 **of** 2

Project 1530-00-00 **Road** USH. 10

Structure St. Croix River at Prescott **County** Pierce

Station 22+12 **Offset** 326 Rt 12 **Water Elevation** 785

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 8/22/72
Unit 5
Chief M. J. [illegible]

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4.5 Size	Blows on Probe Size	Drilling Method
5	W	16			Dense Br SAND and GRAVEL. Trace of Silt			12		W
								40		
								45		
								48		
6	W		44		Very Dense.			69		
		61	40/4"					130		
								360		
								330		
								320		
7	W		32							FT
		78								Hand
8	W	42	36 90							

End of Boring

FIELD BORING LOG

E-L-3(5)-68

State of Wisconsin / Department of Transportation

Boring No. 11 - B **Sheet** 1 **of** 2

Project 1530-00-00 **Road** USH "10"

Structure St. Croix River at Prescott **County** Pierce

Station 26 + 90 **Offset** 475' Rt ℄ **Water Elevation** 28.1

GROUND WATER OBSERVATIONS

While drilling _____ **Time after drilling** _____

Before casing removal _____ **Depth to water** _____

After casing removal _____ **Depth to cave-in** _____

Moisture
D = Damp
M = Moist
W = Wet

DRILLING METHOD
WA = Washahead; FT = Fish tail; RB = Rock bit; ST = Shelby tube; DM = Drilling mud; SS = Split spoon; A = Auger; C = Coring; W = Wash; E = Easy; M = Medium; H = Hard

Start 8/24/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 2.5" Size	Blows on Probe Size	Drilling Method
										W
					STRUCTURE T26N R20W SEC 10					
					UNIQUE # 1448					
					Water.					
1	W	/	/		Very Loose Gray organic SILT Trace of Fine Sand.	.0		5		
								2		
								3		
								2		
								2		
2	W	/	/			.0		5		
								3		
								3		
								2		
								2		
3	W	/	/					1		

Checked by _____ **Final** _____ **Boring No.** 11-B

D BORING LOG

3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 77-B

Sheet 2 of 2

Project 1530-00-00 Road USH "10"

Structure St. Croix River at Prescott County Pierce

Station 26+90 Offset 475' Rt of ℄ Water Elevation 78.1

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After casing removal _____ Depth to cave-in _____

Moisture

D = Damp
M = Moist
W = Wet

DRILLING METHOD

WA = Washahead
FT = Fish tail
RB = Rock bit
ST = Shelby tube
DM = Drilling mud
SS = Split spoon
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start 8/24/72
Unit I
Chief Meyers

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	Depth	VISUAL FIELD CLASSIFICATION AND REMARKS	Depth	Unconfined Strength	Boulders	Blows on Casing 2.5" Size	Blows on Probe Size	Drilling Method
3	W	/				Very Loose Gray organic SILT - Trace of Fine Sand and Shells			/	2		W
										5		
										15		
										7		
			10		5	Firm Gray Fine to Coarse SAND	5			8/3		
4	W	13	9							26		
		16				Firm to Dense Br. SAND and GRAVEL - Trace of Silt				27		
										23		
										41		
					10		10			13/13		
5	W	14	28							59		
		19								168		
										79		
										108		
			10		15		15			57/21		
6	W	23	28							67		
										72		
										72		
										87		
			10		20		20			46/28		
7	W	16	19							62		
		21								98		
										101		
										106		
										112		
			26		25		25					
8	W	52	28									FT. Wheel
9	W	21	46		30		30					

End of Boring