SR60 4/80

#120-2847

During March 10-23, 1978, Soil Exploration of St. Paul sampled six borings along the proposed Louisiana Avenue extension between Lake Street and Oxford Street. Separate boring logs were prepared by Soil Exploration crews and by Health Department hydrologists. Both sets of logs are attached, along with a map showing the locations of the borings. In addition, portions of five borings (1,3,4,5,6) were analyzed for four PAH compounds (Fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene, O-phenylene pyrene). These data are also attached. A summary of the information indicating potential contamination is listed below.

I) MDH logs:

Boring 1	- Strong mothball odor	10-35'
Boring 2	- Petroleum odor	10-15', 45-50'
Boring 3	- Strong odor	40-55'
Borings 4-6	- No odor nor visible detection	

The petroleum odor found at depth 40-50 feet appears to occur at or above a clay layer. Borings 1-3 appear to be contaminated by coal-tar derivatives.

II) Soil Exploration logs:

Boring 1 - Creosote odor - 0-10½', 17½'-18½', 24½'-26', 30'-31', 37'-62'
Visible creosote - 0-10½', 17½'-18½'
Boring 2 - Creosote odor - 12'-23', 46'
Boring 3 - Creosote odor - 15½'-22', 33'-36', 63'-71'(?)
Borings 4-6 - Clean

Borings 1-3 indicate creosote contamination, while borings 4-6 appear to be clean.

III) PAH analyses on selected logs:

	Fluoranthene	Benzo(a)pyrene	Benzo(g,h,i)perylene	O-phenylene pyrene
Boring 1				
12-13½'	190 mg/kg	19.1 mg/kg	-	7.24 mg/kg
Boring 3				
35-36½'	5.83 µg/kg	< 0.93 µg/kg	< 4.03 µg/kg	< 1.34 µg/kg
50-50½'	5.40 µg/kg	0.89 µg/kg	2.00 µg/kg	1.13 µg/kg
65-66½'	5.68 µg/kg	1.35 µg/kg	3.15 µg/kg	3.43 µg/kg
Boring 4				
14½-16'	475 µg/kg	36.4 µg/kg	-	17.3 µg/kg
55-56½'	31.2 µg/kg	< 0.31 µg/kg	-	< 0.44 µg/kg
Boring 5				
5-6½'	<35 µg/kg	< 1.3 µg/kg	< 5.4 µg/kg	< 1.8 µg/kg
14½-16'	< 8.7 µg/kg	< 1.2 µg/kg	10.9 µg/kg	< 3.6 µg/kg
25-26½'	2.96 µg/kg	< 0.66 µg/kg	2.8 µg/kg	< 0.91 µg/kg
30-31½'	2.79 µg/kg	< 0.62 µg/kg	2.6 µg/kg	< 0.86 µg/kg
50-51½'	2.31 µg/kg	< 0.34 µg/kg	1.4 µg/kg	< 0.46 µg/kg
55-56½'	2.21 µg/kg	< 0.33 µg/kg	1.4 µg/kg	0.92 µg/kg
65-66½'	2.96 µg/kg	< 0.33 µg/kg	1.39 µg/kg	< 0.45 µg/kg

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Boring 6				
5-6½'	2.32 µg/kg	< 0.66 µg/kg	< 2.80 µg/kg	< 0.90 µg/kg
14½-16'	1.33 µg/kg	< 0.67 µg/kg	< 2.91 µg/kg	< 0.93 µg/kg
25-26½'	1.97 µg/kg	< 0.67 µg/kg	< 2.85 µg/kg	< 0.91 µg/kg
Peat	7.82 µg/kg	0.66 µg/kg	2.80 µg/kg	0.92 µg/kg

Borings 5 and 6 appear to be clean. In fact, these analyses were used in deciding whether or not construction on the railroad bridges should proceed. Boring 4 indicates significant levels of PAH compounds at a depth of 14½-16 feet.

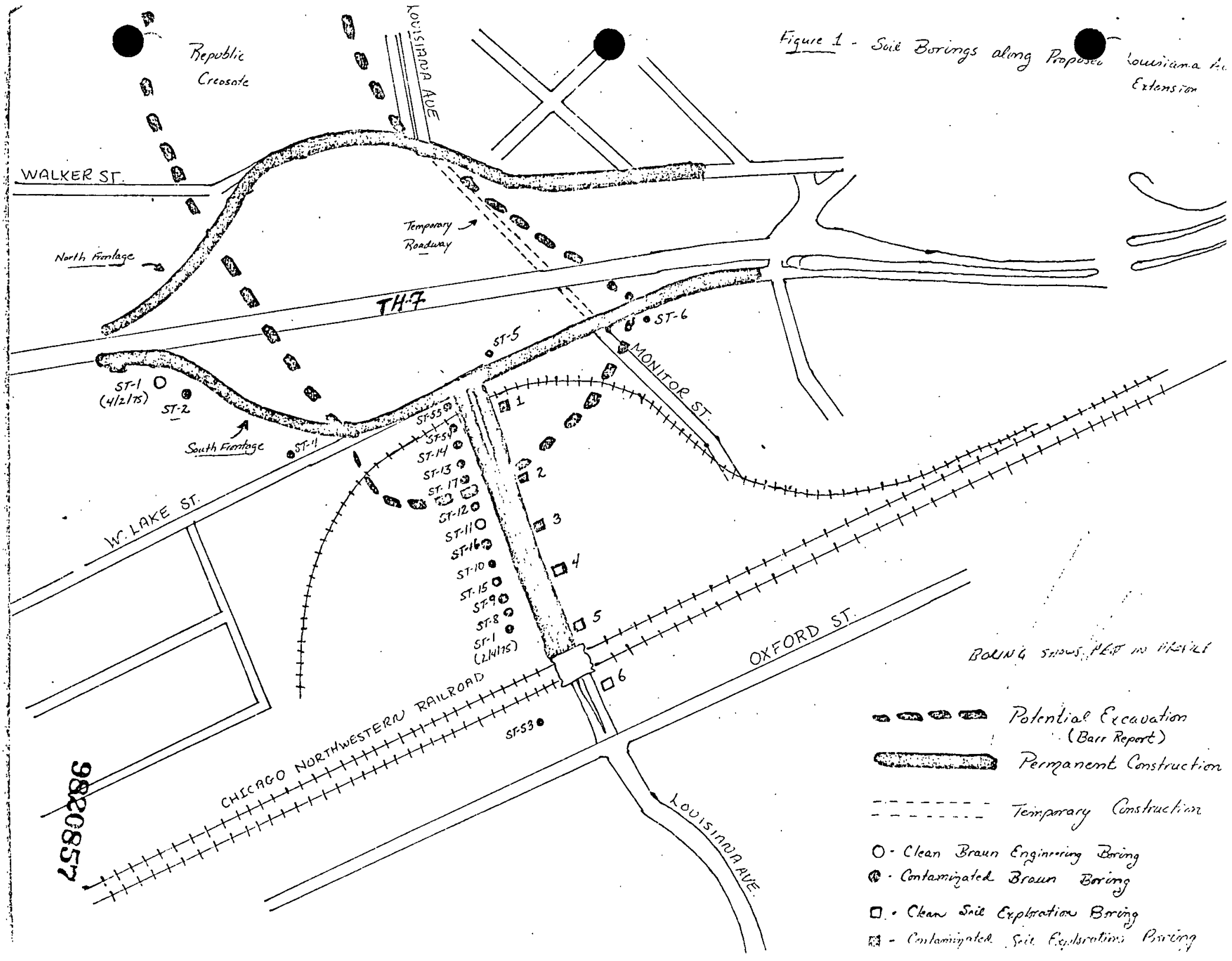
IV) Braun Engineering Testing for Louisiana Avenue Extension (2/4/75-5/15/75): # 71-53 # 71-53A

Braun Engineering made 27 soil borings during the Spring of 1975 along the proposed Louisiana Avenue extension between Lake Street and the railroad tracks and along the bypass routes. Virtually all the borings south of Lake Street indicate some contamination at various depths. The extent of contamination does not quite reach the railroad tracks. The depths at which contamination was found are listed below for the appropriate logs. Please refer to Figure 1 for the location of the logs.

Log Number	Location	Depth (feet)	Description
ST-1(2/4/75)	Louisiana extension	-	Clean
ST-1(4/2/75)	South frontage	-	Clean
ST-2	South frontage	13-15.5	Slight chemical smell
ST-4	South frontage	0-20.5	Strong chemical smell
ST-6	Lake & Monitor	0-20.5	Slight chemical smell
ST-8	Louisiana extension	23-26	Strong chemical odor, visible creosote
ST-9	"	13-16	Slight chemical smell
ST-10	"	11-15	Slight chemical smell
ST-11	"	-	Clean
ST-12	"	4.5-13	Strong chemical smell
		18-30.5	Slight chemical smell
ST-13	"	4.5-6	Strong chemical smell
		12.5-14.5	Slight chemical smell
ST-14	"	18-25.5	Slight chemical smell
ST-15	"	9-28.5	Slight chemical smell
ST-16	"	9-16	Strong chemical smell
		16-22	Slight chemical smell
ST-17	"	4-6	Strong chemical smell
		12-25.5	Slight chemical smell
ST-53	South of tracks	34-50	Slight chemical smell
		60-71	Slight chemical smell
ST-54	Louisiana & Lake	16-33	Strong chemical smell
ST-55		0-11	Strong chemical smell
		11-30.5	Slight chemical smell

9820856

Figure 1 - Soil Borings along Proposed Louisiana Ave Extension



9820857

LOG OF BORING

elev. 885±5

BRAUN ENGINEERING TESTING

89

PROJECT: 71-53 SOIL BORINGS Louisiana Avenue Extension St. Louis Park, MN A10005 UNIQUE NUMBER 7863	BORING: ST-1 LOCATION: 63' North of Northwest Corner of proposed bridge abutment. DATE: 2/4/75 SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Page 1 of 3
		SM-SC	FILL, SILTY CLAYEY SAND, with some concrete chunks, dark brown, frozen to moist, hard to soft	57 2		Penetration resistance at the 3' depth is not representative due to the frozen soil conditi
	6					
		PT	PEAT, organic, fibrous, black to dark brown, moist to wet, (Swamp Deposit)	2 2		
	13			2	▽	
		PT	MUCK, organic, with a trace of shells, dark olive brown, moist to wet, (Swamp Deposit)	2 2 3 2		Sample depth-29'-30' OC = 33.4% MC = 205.5%
	34					
		SP	SAND, with a trace of gravel, gray, waterbearing, loose, (Glacial Outwash)	5		

(Continued on following page)

(See Report and Standard Plates for evaluation and descriptive terminology.)

9601593

LOG OF BORING

BRAUN ENGINEERING TESTING

90

PROJECT: 71-53 SOIL BORINGS Louisiana Avenue Extension St. Louis Park, MN 7863	BORING: ST-1 (continued) LOCATION:	
	DATE: 2/5/75	SCALE: 1"=5'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth 35	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Page 2 of 3
		SP	SAND, with a trace of gravel, gray, waterbearing, loose, (Glacial Outwash)	9 9		
	49	CL	SILTY SANDY CLAY, with some gravel, gray, wet, stiff to very stiff, (Glacial Till)	15 22		
	58	SP	SAND, with some gravel, gray, waterbearing, medium dense, (Glacial Outwash)	14 16		
	70			17		

(continued on following page)

9601594

LOG OF BORING

ENGINEERING TESTING

91

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, MN

7863

BORING: ST-1 (continued)
LOCATION:
DATE: 2/5/75
SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	70					Page 3 of 3
		SP	SAND, with some gravel, gray, waterbearing, medium dense, (Glacial Outwash)	9		
	77					
		SP-SM	SAND, slightly SILTY, fine to medium grained, reddish brown, waterbearing, (Alliuvium)	14		
804.3	84					
			SHALY SANDSTONE, greenish, (Glenwood Formation)	42		
	87					
			SANDSTONE, light brown, (St. Peter Formation)	150		Blows in 5"
83.0 710.3 793.3	95			100		Blows in 2"
			Boring terminated due to refusal in the St. Peter Sandstone Formation. Water level down 13' 15 minutes after completion of boring.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9601595

LOG OF BORING

ENGINEERING TESTING

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, MN

BORING: ST-8
LOCATION:
Station 5 + 00
10' Rt

DATE: 2/13/75 SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
180.6	0					
179.6	1	CL	FILL, SANDY CLAY,*			
		CL	FILL, SILTY CLAY, whitish gray, moist, slightly calcarious, (possibly industrial waste)	1		
				2		
169.6	11					
		PT	PEAT, fibrous, dark brown, moist, (Swamp Deposit)		▽	
165.6	15			3		
		SP	SAND, medium to coarse grained, with some gravel, gray, waterbearing, loose, (Glacial Outwash)	10		
157.6	23					
		SM	SILTY SAND, medium to coarse grained, with gravel, black, strong chemical odor, wet, medium dense, (Glacial Till)	15		
154.6	26					
		SP	SAND, with some gravel, gray, waterbearing, loose, (Glacial Outwash)			
150.1	30.5			10		
			Water level down 14' immediately after withdrawal of auger. *brown, frozen			

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

ENGINEERING TESTING

PROJECT: 71-53 Soil Borings
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-9
LOCATION: Sta. 6+00, centerline

DATE: 2/14/75 SCALE: 1"=5'

Elev. 180.6	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
177.6	3	SM-SC	FILL, SILTY CLAYEY SAND, dark brown to brown, frozen to moist			
176.1	4.5	SC	FILL, CLAYEY SAND, brown, moist, soft, *			
174.1	6.5	PT	PEAT, dark brown, fibrous, moist, (Swamp Deposit)	2		
170.6	10	SM	SILTY SAND, some gravel, greenish brown, moist, very dense, (Glacial Till)			
167.6	13	SC	CLAYEY SAND, with some gravel, gray, moist, very stiff, (Glacial Till)	80		
164.6	16	SM-SC	SILTY CLAYEY SAND, with some gravel, dark gray, slight chemical smell, wet, very stiff, (Glacial Till)	17		
161.6	19	SP	SAND, with a trace of gravel, gray, wet, stiff, (Glacial Outwash)			
155.1	25.5	SC-SM	SILTY CLAYEY SAND, with a trace of gravel, gray, wet, stiff, (Glacial Till)	16 15		
			Water level down 8' 15minutes after completion of boring. *with seam of whitish gray SILTY CLAY at 4.5'.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

PROJECT: 75-53 Soil Borings
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-10
LOCATION: Sta. 7+00, centerline

DATE: 2/14/75 SCALE: 1"=5'

Elev. 181.0	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
		SC-SM	FILL, SILTY CLAYEY SAND, with some gravel, brown, frozen to moist, rather soft	6		Sample Depth, 4-5' MC = 16.5% DD = 103.6 pcf WD = 120.7 pcf
173.0	8					
172.0	9	CL	SANDY SILTY CLAY, non to slightly organic, *			
170.0	11	ML	CLAYEY SILT, gray, moist, rather soft, (Alluvium)	5		
166.0	15	SP	SAND, with a trace of gravel, gray to dark gray, medium-dense, slight chemical smell, wet, (Glacial Outwash)			
160.5	20.5	SC	CLAYEY SAND, with a trace of gravel, gray, wet, rather stiff, (Glacial Till)	20		
			Water level down 10' 15minutes after completion of boring. *black, moist, (Topsoil)	10		

(See Report and Standard Plates for evaluation and descriptive terminology.)

6900352

PROJECT: 71-53 SOIL BORINGS Louisiana Avenue Extension St. Louis Park, MN	BORING: ST-11 LOCATION: Station 8 + 00 6' Left of Centerline DATE: 2/17/75 SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials ASTM D-2488	BPF	WL	Tests, or Notes
181.4	0	SM-SC	FILL, SILTY SAND-CLAYEY SAND, with a trace of gravel, brown, frozen to moist, loose			
176.4	5	PT	PEAT, fibrous, dark brown to black, moist, (Swamp Deposit)	6		
172.4	9	SP-SM	SAND, slightly silty, with a trace of gravel, gray, waterbearing, medium dense, (Glacial Outwash)	14 22		
162.4	19	SP	SAND, with some gravel, dark gray, waterbearing, medium dense, (Glacial Outwash)	22		
156.9	24.5	CL	SANDY CLAY,*	18		
155.9	25.5		Water level down 9' 15 minutes after completion of boring. *with a trace of gravel, gray, very stiff, wet, (Glacial Till)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

00003553

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, MN

BORING: ST-12

LOCATION:
Station 9 + 00
6' Left of Centerline

DATE: 2/17/75 SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials ASTM D-2488	BPF	WL	Tests or Notes
181.9	0	SM-SC	FILL, SILTY SAND-CLAYEY SAND, with a trace of gravel, brown, moist, loose			
177.4	4.5	PT	PEAT-MUCK, slightly fibrous, strong chemical smell, dark brown, moist, (Swamp Deposit)	9		
				4		
168.9	13					
167.4	14.5	PT	BOG LINE, white, wet, (Swamp Deposit)			
		ML	CLAYEY SILT, gray, wet, soft, (Alluvium)	2		
163.9	18					
		SP	SAND, with gravel, slight chemical smell, gray, waterbearing, medium dense, (Glacial Outwash)	13		
				8		
151.4	30.5			6		
			Water level down 9' 15 minutes after completion of boring.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

ENGINEERING TESTING

PROJECT: 71-53 SOIL BORINGS Louisiana Avenue Extension St. Louis Park, MN	BORING: ST-13 LOCATION: Station 10 + 00 4' Left of Centerline DATE: 2/17/75 SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials ASTM D-2488	BPF	WL	Tests or Notes
182.0	0	SM-SC	FILL, SILTY SAND-CLAYEY SAND, brown to olive gray, moist, loose			
177.5	4.5	ML	FILL, CLAYEY SILT, strong chemical smell,*	6		
176.0	6	PT	PEAT-MUCK, fibrous, dark brown, moist, (Swamp Deposit)	3		
169.5	12.5	ML	CLAYEY SILT, slight chemical smell, gray, wet, (Alluvium)			
167.5	14.5	SP	SAND, fine to medium grained, with a trace of gravel, gray, waterbearing, loose to medium dense, (Glacial Outwash)	8 7		
156.5	25.5			19		
			Water level down 9' 15 minutes after completion of boring. Boring immediately backfilled. *with small chips, white, wet			

(See Report and Standard Plates for evaluation and descriptive terminology.)

8800255

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, MN

BORING: ST-14
LOCATION:
Station 11 + 00
5' Left of Centerline

DATE: 2/17/75 SCALE:

Elev.	Depth	ASTM D2487 Symbol	Description of Materials ASTM D-2488	BPF	WL	Tests or Notes
	0	SM-SC	FILL, SILTY SAND-CLAYEY SAND, with a trace of gravel, brown to dark gray, moist,			
	4	ML	SANDY CLAYEY SILT, with a trace of gravel, with a trace of roots, black, moist, rather stiff, (Alluvium)	10		
	7.5	SP	SAND, fine to medium grained, with a trace of gravel, gray, moist, loose, (Glacial Outwash)	10		
	13	SM-SC	SILTY CLAYEY SAND, dark gray to gray, wet, stiff, (Alluvium)	16		
	18	SM	SILTY SAND, fine to medium grained, slight chemical smell, dark gray to black, wet. medium dense to loose (Alluvium)	15		
	25.5			7		
			Water level down 9' 15 minutes after completion of boring. Boring immediately backfilled.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

CA00056

PROJECT: 71-53 Soil Borings
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-15
LOCATION: Sta. 6+50, centerline
DATE: 2/18/75
SCALE: 1"=5'

Elev. 180.5	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
176.5	4	SM-SC	FILL, SILTY CLAYEY SAND, brown to gray, frozen to moist			
174.5	6	CL	FILL, SILTY CLAY, whitish gray, frozen, (possibly industrial waste)			
171.5	9	PT.	PEAT, fibrous, dark brown, moist, (Swamp Deposit)			
166.5	14	SM	SILTY SAND, with some gravel, slight chemical smell, gray to dark gray, waterbearing, medium dense, (Glacial Till)	23 27		
162.5	18	SC	CLAYEY SAND, with some gravel, slight chemical smell, grayish brown, waterbearing, rather stiff, (Glacial Till)	9		
155.0	25.5	SP	SAND, fine to medium grained, with a trace of gravel, slight chemical smell, grayish brown, waterbearing, very loose to loose, (Glacial Outwash)	2 7		
			Water level down 9' 15minutes after completion of boring.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

PROJECT: 71-53 Soil Borings
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-16
LOCATION: Sta. 7+50, centerline
DATE: 2/18/75
SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488	BPF	WL	Tests or Notes
181.4	0					
176.4	5	SM-SC	FILL, SILTY CLAYEY SAND, with a trace of gravel, eith a trace of PEAT, reddish brown, frozen to moist, rather soft	22		Penetration resistance at the 3' depth is not representative due to the frozen soil conditi
173.4	8	SC	FILL, CLAYEY SAND, with a trace of gravel, brown, moist, medium	4		
172.4	9	SC	CLAYEY SAND, dark gray, moist, medium, (Topsoil)	8		
165.4	16	SP-SM	SAND, slightly SILTY, with a trace of gravel, slight strong chemical smell, gray to black, waterbearing, loose to dense, (Glacial Outwash)	7 35 11		
162.4	19	SP	SAND, fine to medium grained, slight chemical smell, dark gray, waterbearing, medium dense, (Glacial Outwash)			
159.4	22	CL	SANDY SILTY CLAY, with a trace of gravel, slight chemical smell, grayish brown, wet stiff, (Glacial Till)	13		
157.4	24	SP	SAND, with a trace of gravel, gray, waterbearing, (Glacial Outwash)			
155.9	25.5	SC	CLAYEY SAND, with a trace of gravel, grayish brown, wet, (Glacial Till)	13		
			Water level down 9' 15minutes after completion of boring.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

6100358

LOG OF BORING

LELAND HEBERG
ENGINEERING TESTING

PROJECT: 71-53 Soil Borings
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-17
LOCATION: Sta. 9+50, 6' Left of centerline

DATE: 2/18/75
SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
181.5	0					
177.5	4	SM-SC	FILL, SILTY CLAYEY SAND, with a trace of gravel, brown to dark gray, frozen to moist,	80		
175.5	6	CL	FILL, SILTY CLAY, strong chemical smell, whitish gray to brown, very moist, rather soft,*	4		
169.5	12	PT	PEAT-MUCK, slight chemical smell, dark brown, wet, (Swamp Deposit)	5		
167.5	14	ML	CLAYEY SILT, slight chemical smell, gray, moist, medium, (Alluvium)	7		
156.0	25.5	SP	SAND, with some gravel, slight chemical smell, gray, waterbearing, loose to medium dense, (Glacial Outwash)	11 14 9		
			Water level down 11' immediately after withdrawal of auger. *(possibly industrial waste)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

65000359

LOG OF BORING

ENGINEERING TESTING

86

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, Minnesota

UNIQUE NUMBER 7864

BORING: ST-53

LOCATION: 30' South of South-east bridge corner stake.

DATE: 3/5/75

SCALE: 1"=5'

Elev.	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
		PT	PEAT and MUCK, dark brown to olive, moist to wet, (Swamp Deposit)		▽	
	30					
			(continued on following page.)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9601590

LOG OF BORING

BRAUN ENGINEERING TESTING

87

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, Minnesota

7864

BORING: ST-53 continued

LOCATION: 30' South of South-east bridge corner stake.

DATE: 3/5/75 SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Page 2 of 3
	34	PT	MUCK, olive, wet, (Swamp Deposit)			
	39	SP	SAND, medium to coarse grained, with some gravel, slight chemical smell, gray, waterbearing, loose, (Glacial Outwash)	8		
	49	SM	SAND mixed with PEAT, with slight chemical smell, dark brown to black, wet, loose	9 7		
	52.5	SC	CLAYEY SAND, slight chemical smell, gray, wet, very stiff, (Alluvium)	25		
	60	SP	SAND, slight chemical smell, gray, waterbearing, loose, (Glacial Outwash)	8		
			(continued on following page)	11		
			Jetting water used to clear the auger below the 35-foot depth.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9601591

LOG OF BORING

ENGINEERING TESTING

88

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, Minnesota

7864

BORING: ST-53 continued

LOCATION:

DATE: 3/5/75

SCALE: 1"=5'

Elev.	Depth 60	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Page 3 of 3
	68	SP	SAND, medium to coarse grained, with some gravel, slightly chemical smell, gray, waterbearing, dense, (Glacial Outwash)	30		
	71	SP	SAND, fine to medium grained, with a little gravel, slight chemical smell, gray, waterbearing, loose, (Glacial Outwash)	5		
	79	ML	CLAYEY SANDY SILT, with a trace of gravel, reddish brown, wet, very stiff, (Glacial Till)	29		
	84	SM	SILTY SAND, with limestone chunks, (Possibly weathered Plattville Formation) gray, waterbearing, very dense	60		
	90		SANDSTONE, light greenish, waterbearing, very dense, (Possibly Glenwood Formation immediately above St. Peter Sandstone Formation)	100		
			Water level down 6' 15minutes after completion of boring. Jetting water used to clear the auger below the 35-foot depth.	200 blows in 6"		

(See Report and Standard Plates for evaluation and descriptive terminology.)

9601592

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-54
LOCATION:
Station 12 + 00
Centerline

DATE: 3/4/75 SCALE: 1"=5'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
181.2	0					
180.2	1		Bituminous Pavement			
177.2	4	SM	FILL, SILTY SAND, with gravel, dark brown, frozen			
175.2	6	SM	SILTY SAND mixed with PEAT, black, moist, dense	34		
165.2	16	PT	PEAT, black, moist to wet, (Swamp Deposit)	8 6		
148.2	33	SM	SILTY SAND, with some gravel, strong chemical smell, dark gray, waterbearing, loose, (Glacial Till)	7 8 5		
145.7	35.5	SP-SM	SAND, slightly silty, dark gray, waterbearing, loose, (Glacial Till)	7		
			Water level down 13' with 35' of hollow-stem auger in ground.			

5300183

PROJECT: 71-53 SOIL BORINGS
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-55
LOCATION: Station 13 + 00 Centerline
DATE: 3/4/75 SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
179.9	0					
		SM	SILTY SAND, with some gravel, slightly strong chemical smell, brown to dark gray, moist, medium dense, 3" Bituminous Pavement at surface.	13		
173.9	6					
		PT	PEAT, strong chemical smell, black, wet, (Swamp Deposit)	4		
168.9	11					
		SM	SILTY SAND, with gravel, slightly chemical smell, gray, waterbearing, medium dense, (Glacial Till)	13		
160.9	19					
		SP	SAND, medium to coarse grained, with gravel, slightly chemical smell, gray, waterbearing, loose, (Glacial Outwash)	5		
155.9	24					
		SP	SAND, with some gravel, with slightly chemical smell, dark gray, waterbearing, loose, (Glacial Outwash)	6		
151.9	28					
		SM	SILTY SAND, with some gravel, slightly chemical smell, gray, waterbearing, medium dense, (Glacial Till)	21		
149.4	30.5					
			Water level down 7.5' 15minutes after completion of boring.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

000264

LOG OF BORING A10099

LANGLEY BUSSOM ENGINEERING TESTING

PROJECT: 71-53 Soil Investigation
Louisiana Avenue Extension
Oxford Road to Walker Street
St. Louis Park, Minnesota

Graphical

UNIQUE NUMBER: 7362

BORING: ST-64 83

LOCATION: Railroad Embankment
Approximate Station 2+95 904
elev

DATE: 5/15/75 SCALE: 1"=5'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
194.5±	0	SP	FILL, SAND, slightly SILTY, fine to medium grained, with a little fine to medium gravel, brown, a trace of cinders at 10', moist to wet at 15', very loose	5 4 4		Gravel 10% Coarse Sand 10% Medium Sand 10% Fine Sand 39% Silty and Clay 9%
175.5	19					
172.5	22	CL	FILL, SANDY CLAY, with a little gravel, brown and gray, very wet, soft	3		MC = 17.0%
155.5	39	SP	SAND, slightly SILTY, medium grained, a little gravel, gray and dark gray, a few lenses of brown clay and black silty clay, waterbearing, loose to medium dense (possibly fill)	9 11 8		Gravel 7% Coarse Sand 11% Medium Sand 33% Fine Sand 37% Silt and Clay 12%

continued on next page

(See Report and Standard Plates for evaluation and descriptive terminology.)

9601587

LOG OF BORING

ENGINEERING TESTING

84

PROJECT: 71-53 Soil Investigation
Louisiana Avenue Extension
Oxford Road to Walker Street
St. Louis Park, Minnesota

7862

BORING: ST-64 (continued)

LOCATION:

DATE: 5/15/75 SCALE: 1"=5'

Elev. 155.5	Depth 39	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
150.0	44.5	SP	SAND, coarse grained, with gravel, gray, waterbearing, medium dense (Coarse Alluvium)	15		Gravel 44% Coarse Sand 27% Medium Sand 22% Fine Sand 6% Silt and Clay 1%
132.5	62	PT	MUCK, olive, a layer of moist gray sand at 60', moist (Swamp Deposit)	16 17 19 32		MC = 142.2% OC = 48.1% DD = 29.8 pcf MC = 154.1% MC = 138.5% OC = 33.1% DD = 28.1 pcf MC = 169.4% MC = 141.8% OC = 65.4% DD = 32.4 pcf MC = 144.8% MC = 126.8% OC = 38.7% DD = 28.5 pcf MC = 161.9%
125.5	69	SP-SM	SAND, slightly silty, fine to coarse grained, some gravel, gray, waterbearing, medium dense	19		Gravel 36% Coarse Sand 17% Medium Sand 30% Fine Sand 12% Silt and Clay 5%
115.5	79	SP-SM	SAND, slightly silty, fine grained, dark gray, waterbearing, medium dense	12 16		Gravel 0% Coarse Sand 4% Medium Sand 38% Fine Sand 46% Silt and Clay 12%

continued on next page

(See Report and Standard Plates for evaluation and descriptive terminology.)

9601588

LOG OF BORING

ENGINEERING TESTING

85

PROJECT: 71-53 Soil Investigation
Louisiana Avenue Extension
Oxford Road to Walker Street
St. Louis Park, Minnesota

7862

BORING: ST-64 (continued)

LOCATION:

elev. 895 ± 5

DATE: 5/15/75 SCALE: 1"=5'

Elev. 115.5	Depth 79	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
111.5	83	SP-SM	SAND, slightly silty, fine grained, gray, waterbearing, medium dense	15		
96.5	98	SC	CLAYEY SAND, a little gravel, gray to reddish brown, moist to wet, very stiff (Glacial Till)	34 42 81		710.3 qu = 2390 psf MC = 11.6%
710.3 ~807 89.7	104.8		SANDSTONE, greenish white, wet, very dense (St. Peter Formation) 7/797	--100 blows to penetrate 3"		
(90.1)			Water level at 12' when measured immediately after completion with hollow-stem auger removed.	--200 blows to penetrate 2"		

795
or
797

(See Report and Standard Plates for evaluation and descriptive terminology.)

9601589

4/80

#120-2847

During March 10-23, 1978, Soil Exploration of St. Paul sampled six borings along the proposed Louisiana Avenue extension between Lake Street and Oxford Street. Separate boring logs were prepared by Soil Exploration crews and by Health Department hydrologists. Both sets of logs are attached, along with a map showing the locations of the borings. In addition, portions of five borings (1,3,4,5,6) were analyzed for four PAH compounds (Fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene, O-phenylene pyrene). These data are also attached. A summary of the information indicating potential contamination is listed below.

I) MDH logs:

Boring 1	- Strong mothball odor	10-35'
Boring 2	- Petroleum odor	10-15', 45-50'
Boring 3	- Strong odor	40-55'
Borings 4-6	- No odor nor visible detection	

The petroleum odor found at depth 40-50 feet appears to occur at or above a clay layer. Borings 1-3 appear to be contaminated by coal-tar derivatives.

II) Soil Exploration logs:

Boring 1 - Creosote odor - 0-10½', 17½'-18½', 24½'-26', 30'-31', 37'-62'
Visible creosote - 0-10½', 17½'-18½'
Boring 2 - Creosote odor - 12'-23', 46'
Boring 3 - Creosote odor - 15½'-22', 33'-36', 63'-71'(?)
Borings 4-6 - Clean

Borings 1-3 indicate creosote contamination, while borings 4-6 appear to be clean.

III) PAH analyses on selected logs:

	Fluoranthene	Benzo(a)pyrene	Benzo(g,h,i)perylene	O-phenylene pyrene
Boring 1				
12-13½'	190 mg/kg	19.1 mg/kg	-	7.24 mg/kg
Boring 3				
35-36½'	5.83 µg/kg	< 0.93 µg/kg	< 4.03 µg/kg	< 1.34 µg/kg
50-50½'	5.40 µg/kg	0.89 µg/kg	2.00 µg/kg	1.13 µg/kg
65-66½'	5.68 µg/kg	1.35 µg/kg	3.15 µg/kg	3.43 µg/kg
Boring 4				
14½-16'	475 µg/kg	36.4 µg/kg	-	17.3 µg/kg
55-56½'	31.2 µg/kg	< 0.31 µg/kg	-	< 0.44 µg/kg
Boring 5				
5-6½'	<35 µg/kg	< 1.3 µg/kg	< 5.4 µg/kg	< 1.8 µg/kg
14½-16'	< 8.7 µg/kg	< 1.2 µg/kg	10.9 µg/kg	< 3.6 µg/kg
25-26½'	2.96 µg/kg	< 0.66 µg/kg	2.8 µg/kg	< 0.91 µg/kg
30-31½'	2.79 µg/kg	< 0.62 µg/kg	2.6 µg/kg	< 0.86 µg/kg
50-51½'	2.31 µg/kg	< 0.34 µg/kg	1.4 µg/kg	< 0.46 µg/kg
55-56½'	2.21 µg/kg	< 0.33 µg/kg	1.4 µg/kg	0.92 µg/kg
65-66½'	2.96 µg/kg	< 0.33 µg/kg	1.39 µg/kg	< 0.45 µg/kg

9820855

Boring 6				
5-6½'	2.32 μg/kg	< 0.66 μg/kg	< 2.80 μg/kg	< 0.90 μg/kg
14½-16'	1.33 μg/kg	< 0.67 μg/kg	< 2.91 μg/kg	< 0.93 μg/kg
25-26½'	1.97 μg/kg	< 0.67 μg/kg	< 2.85 μg/kg	< 0.91 μg/kg
Peat	7.82 μg/kg	0.66 μg/kg	2.80 μg/kg	0.92 μg/kg

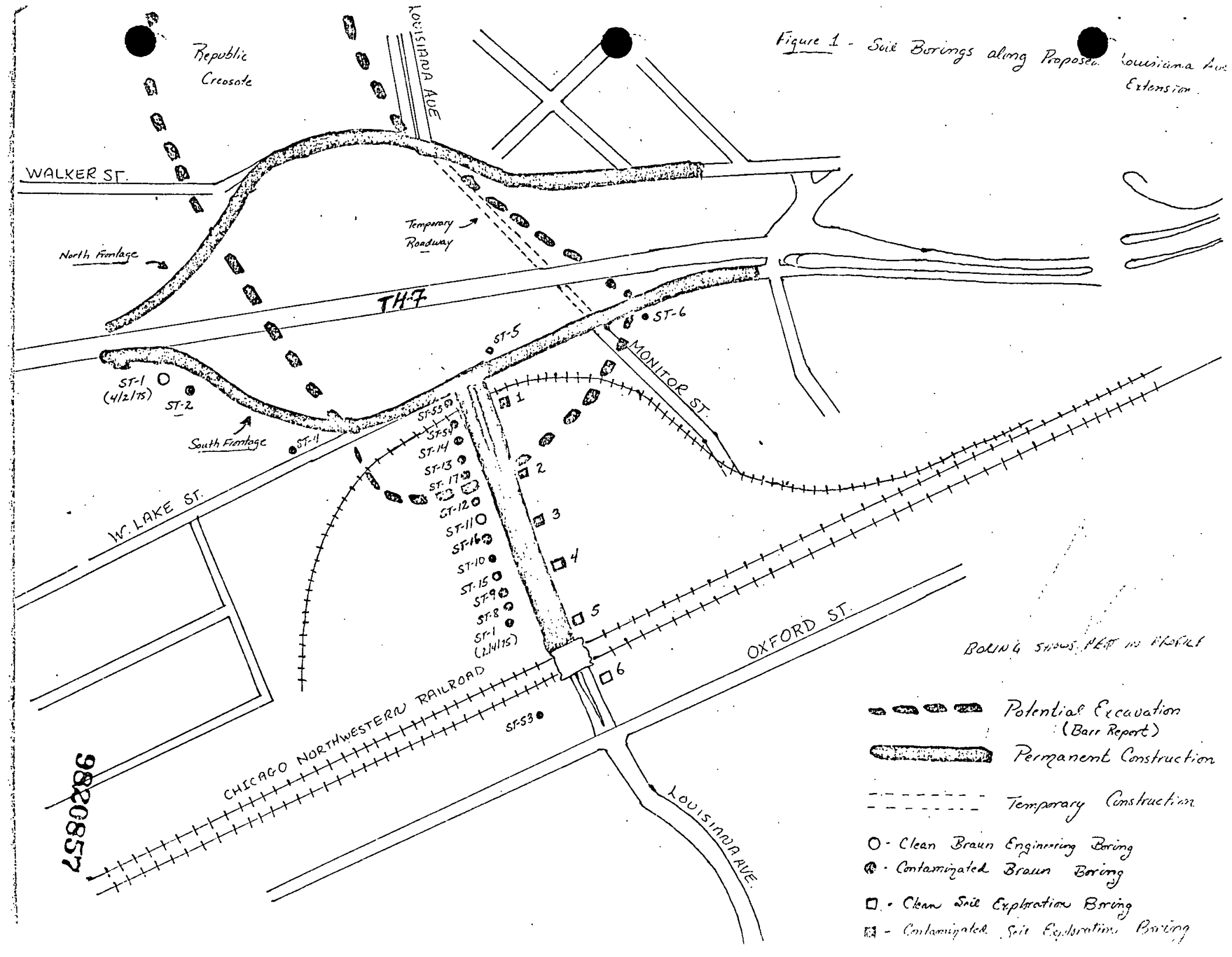
Borings 5 and 6 appear to be clean. In fact, these analyses were used in deciding whether or not construction on the railroad bridges should proceed. Boring 4 indicates significant levels of PAH compounds at a depth of 14½-16 feet.

IV) Braun Engineering Testing for Louisiana Avenue Extension (2/4/75-5/15/75): # 71-53

Braun Engineering made 27 soil borings during the Spring of 1975 along the proposed Louisiana Avenue extension between Lake Street and the railroad tracks and along the bypass routes. Virtually all the borings south of Lake Street indicate some contamination at various depths. The extent of contamination does not quite reach the railroad tracks. The depths at which contamination was found are listed below for the appropriate logs. Please refer to Figure 1 for the location of the logs.

Log Number	Location	Depth (feet)	Description
ST-1(2/4/75)	Louisiana extension	-	Clean
ST-1(4/2/75)	South frontage	-	Clean
ST-2	South frontage	13-15.5	Slight chemical smell
ST-4	South frontage	0-20.5	Strong chemical smell
ST-6	Lake & Monitor	0-20.5	Slight chemical smell
ST-8	Louisiana extension	23-26	Strong chemical odor, visible creosote
ST-9	"	13-16	Slight chemical smell
ST-10	"	11-15	Slight chemical smell
ST-11	"	-	Clean
ST-12	"	4.5-13	Strong chemical smell
		18-30.5	Slight chemical smell
ST-13	"	4.5-6	Strong chemical smell
		12.5-14.5	Slight chemical smell
ST-14	"	18-25.5	Slight chemical smell
ST-15	"	9-28.5	Slight chemical smell
ST-16	"	9-16	Strong chemical smell
		16-22	Slight chemical smell
ST-17	"	4-6	Strong chemical smell
		12-25.5	Slight chemical smell
ST-53	South of tracks	34-50	Slight chemical smell
		60-71	Slight chemical smell
ST-54	Louisiana & Lake	16-33	Strong chemical smell
ST-55		0-11	Strong chemical smell
		11-30.5	Slight chemical smell

Figure 1 - Soil Borings along Proposed Louisiana Ave Extension



9820857

LOG OF BORING

ENGINEERING TESTING

PROJECT: 71-53A SOIL BORINGS
Bypass Routes for the
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-1
LOCATION: Station 23+25, 25' Left of Centerline
DATE: 4/2/75
SCALE: 1"=4'

Elev.	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	4	SM	FILL, SILTY SAND, with a trace of PEAT at 4', with some gravel, dark brown, moist, loose	6		Sample Depth - 3' OC = 4.5% MC = 10.5%
	7	SM-SC	CLAYEY SILTY SAND, with gravel, light brown, moist to waterbearing, medium dense (Glacial Till)	14		
	15.5	SP	SAND, with gravel, light brown, waterbearing, medium dense (Glacial Outwash)	50 16		boulder encountered
			Water level down 8.5' 15 minutes after completion of boring.	12		

(See Report and Standard Plates for evaluation and descriptive terminology.)

000310

ENGINEERING TESTING

PROJECT: 71-53A SOIL BORINGS
Bypass Routes for the
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-2
LOCATION: Station 25+70, 23
Right of Centerline

DATE: 4/2/75 | SCALE: 1"=4'

Elev.	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	3	SM-SC	FILL, CLAYEY SILTY SAND, with gravel, brown to gray, moist			
	7.5	PT	PEAT, fibrous, black to dark brown, moist (Swamp Deposit)	50 5		boulder encountered
	13	SM	SILTY SAND, fine to medium grained, with gravel, gray, moist, loose (Glacial Till)	4 9		
	15.5	SP	SAND, fine to medium grained, with gravel, slight chemical smell, brown, waterbearing, medium dense (Glacial Outwash)	12		
			Water level down 6.5' 10 minutes after completion of boring.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

T900841

LOG OF BORING

ENGINEERING TESTING

PROJECT: 71-53A SOIL BORINGS
Bypass Routes for the
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-4
LOCATION: 470' West of Survey Centerline, Lake Street North Shoulder
DATE: 4/2/75
SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SP-SM	FILL, SAND, slightly silty, with gravel, with bituminous material, with slight chemical smell, dark brown, moist, medium dense			
	3	PT	PEAT, fibrous, strong chemical smell, black, moist (Swamp Deposit)	15 4 3 4		
	11	SM	SILTY SAND, fine to medium grained, with gravel, strong chemical smell, black, moist to waterbearing, loose to medium dense (Glacial Till)	10 17		
	20.5		Water level down 7' 15 minutes after withdrawal of auger.	15		

(See Report and Standard Plates for evaluation and descriptive terminology.)

ENGINEERING TESTING

PROJECT: 71-53A SOIL BORINGS
Bypass Routes for the
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-5
LOCATION: 255' E of Survey centerline, Lake Street - North Shoulder
DATE: 4/2/75
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
		SM	FILL, SILTY SAND, mixed with PEAT, with gravel, slight chemical smell, brown mixed with black, moist, loose			
	3			9		
		PT	PEAT, fibrous, with some MUCK, slight chemical smell, black, moist (Swamp Deposit)	3		
				2		
	11			3		
		SM	SILTY SAND, fine to medium grained, with gravel, gray, waterbearing, loose to medium dense (Glacial Till)	9		
				12		
	20.5			16		
			Water level down 6' 15 minutes after completion of boring.			

0000343

LOG OF BORING

ENGINEERING TESTING

PROJECT: 71-53A SOIL BORINGS
Bypass Routes for the
Louisiana Avenue Extension
St. Louis Park, Minnesota

BORING: ST-6
LOCATION: 665' E of Survey centerline, Lake Street - South Shoulder
DATE: 4/2/75
SCALE: 1"=4'

Elev.	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	2	SP	FILL, SAND, fine to medium grained, with gravel, brown, moist			Sample depth: 3' M.C. = 13.8% D.D. = 116.5pcf W.D. = 132.6pcf
	4	SC	FILL, CLAYEY SAND, with some gravel, slight chemical smell, brown, moist, loose	10		
	9	PT	PEAT and MUCK, fibrous, with seams of SAND, slight chemical smell, black, moist (Swamp Deposit)	8 7		
	13	SC	SILTY CLAYEY SAND with a trace of gravel, slight chemical smell, dark brown, moist to waterbearing, rather soft (Glacial Till)	4		
	20.5	SP	SAND, fine to medium grained, with gravel, slight chemical smell, gray, waterbearing, loose to medium dense (Glacial Outwash)	7 14		
			Water level down 8.5' 15 minutes after completion of boring.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

000544

Field Number	Contractor/Sub-contractor	Date Drilled	Location	Depth of Boring (feet)	Contamination[1,2,3]	Page #
B100	Braun Engineering #79-687	12-17,18-79	(WALKER'S QUEBEC)	67	—	1
P100	—	—	—	—	—	
- B100	Braun Eng	12-17,18-79		69		
B101	Braun Eng	12-20,21-79		103		6
P101	—	—	—	—	—	
B101	Braun Eng	12-18,20-79		103		

*1 type of analyses
- H = HPLC
- G = GC
- GM = GC/MS
- og = oil and grease
- p = phenol
- f = freon extractables
- h = hexane extractables

*2 sample availability
- SP = sample preserved, available
- SA = sample available, not preserved

*3 field description
- t = tar
- c = creosote
- o = odor

*Note: depth of sample can follow identifier: H, SP, C, 2-3.5'

Field Number	Contractor/Sub-contractor	Date Drilled	Location	Depth of Boring (feet)	Contamination[1,2,3]	Page #
B102	Braun Engineering #79-687	12-27-79	117-21-16 DCA	111	—	11
P102	—	—	(36 & NARAMA)	—		
B102	Braun Eng.	2-27-79		111		
B103	Braun Eng.	1-14-80	71 & OREGON	94	—	17
P103	—	—	—	—		
B103	Braun Eng.	1-14~17-80				
ST103	—	—	—	—	—	—
B103	Braun Eng.	1-14-80		94		
B104	—	1-18-80	N. of B103	39		25
B104	Braun Eng.	1-18-80		35		
B105	Braun Eng.	1-18-80	—	61.5	—	28
P105	—	—	N. of B103	—		
B105	Braun Eng.	1-18,21-80		60		
B106	Braun Eng.	1-21-80	E. of B104	69		31
B106	Braun Eng.	1-21-80		70		
B107	—	1-22-80	S. of B106	19		35
B107	Braun Engineering	1-22-80		19.5		
B108	Braun Eng.	1-23-80	OXFORD & EDGEWOOD	67.5		37
B108	Braun Eng.	1.21,22-80		69.5		
B109	—	1-23-80	N. side of OXFORD	44	—	41
P109	—	—	W. of W20	—		
B109	Braun Engineering	1-25-80		44		
B110	—	1-28-80	"	12.5		44
B110	Braun Engineering	1-28-80		12.5		

*1 type of analyses
- H = HPLC
- G = GC
- GM = GC/MS
- og = oil and grease
- p = phenol
- f = freon extractables
- h = hexane extractables

*2 sample availability
- SP = sample preserved, available
- SA = sample available, not preserved

*3 field description
- t = tar
- c = creosote
- o = odor

*Note: depth of sample can follow identifier: H, SP, C, 2-3.5'

Field Number	Contractor/Sub-contractor	Date Drilled	Location	Depth of Boring (feet)	Contamination[1,2,3]	Page #
B111	—	1-28-80	S. of CAMARILLO	79.5	—	46
P111	—		N. of W132			
B111	Braun Engineering #79-687	1-29,30-80		79.5		
B112	—	2-1-80	E. of B111	51	—	50
P112	—					
B112	Braun Eng.	1-31, 2-1-80		51		
B113	—	2-4~12,80	39 ± YOSEMITE	211.7	—	53
P113	—					
B113	Braun Eng.	2-4~11-80		212.5		
B114	—	2-11-80		55		64
B114	Braun Eng.	2-8~11-80	W. of B113	55		
B115	—	2-13-80	39 ± ZARTHAN	104		67
B115	Braun Eng.	2-13,14-80		104		
B116	—	2-15,21-80	36 ± BELT LINE DR.	91.5		73
B116	Braun Eng.	2-15~21-80	E. of W124	91.5		
B117	—	2-21-80		32.5	—	78
P117	—					
B117	Braun Eng.	2-21-80	E. of B116	33		
B118	—	2-22, 3-4-80	LAKE ± HAMPSHIRE	87.5	—	81
P118	—					
B118	Braun Eng	2-22, 3-4-80		87.5		
B119	—	3-5-80	~5' S. of B119 (?) should be B118	44		86
B119	Braun Eng	3-4,5-80		44.5		
B120	—	3-5-80	N. of B118	61		89
B120	Braun Eng	3-5-80		62		

*1 type of analyses
- H = HPLC
- G = GC
- GM = GC/MS
- og = oil and grease
- p = phenol
- f = freon extractables
- h = hexane extractables

*2 sample availability
- SP = sample preserved, available
- SA = sample available, not preserved

*3 field description
- t = tar
- c = creosote
- o = odor

*Note: depth of sample can follow identifier: H, SP, C, 2-3.5'

Field Number	Contractor/Sub-contractor	Date Drilled	Location	Depth of Boring (feet)	Contamination[1,2,3]	Page #
B121 P121 B121	— — Braun Eng #79-687	3-6-80 3-6~10-80	ACROSS FROM CARDINAL GLASS —	82.5 82.5	—	92
B122 P122 B122	— — Braun Eng.	3-11-80 3-10-80	E. of B121 —	36 36	—	97
B123 P123 B123	— — Braun Eng.	3-11-80 3-11-80	E. of B122 —	24 24	—	100
B124 P124 B124	— — Braun Eng.	3-11-80 3-11-80	E. of B123 —	61 60	—	102
P128 P125	— — ?	12-8-80 —	E. of W2 —	36.8 —	—	106
B126 126	SOIL TESTING SERVICES " " " #92538	2-3-81 2-3-81	31st & OREGON	17.5 17.0		107
B127 127	SOIL TESTING SERVICE " " " #92538	2-3-81 2-3-81	S. of P.43 EXCELSIOR BLVD	15 15		109
B128 128	SOIL TESTING SERVICE " " " #92538	2-3-81 2-3-81	N. of P.43	5 5		111
B129	SOIL TESTING SERVICE " " "	2-4-81 2-4-81	LAKE & LOUISIANA	7 7		113

*1 type of analyses
- H = HPLC
- G = GC
- GM = GC/MS
- og = oil and grease
- p = phenol
- f = freon extractables
- h = hexane extractables

*2 sample availability
- SP = sample preserved, available
- SA = sample available, not preserved

*3 field description
- t = tar
- c = creosote
- o = odor

*Note: depth of sample can follow identifier: H, SP, C, 2-3.5'

1

12-18-79

Hole no. B100 Date 12-17-79 Project well no. P100 Geologist HULT

QR _____ Site ID _____ MP descr. & elev. _____

Site descr. Walker Park — On west side of Pennsylvania ave (opposite 3537) see back of this form for map

next to P 35 (LSDC P35 - 923.9) Rig CME 75 ; Braun Eng. Dennis Ruchti, DML

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
4-5½	HSA			12"	Top			15"
9-10½	2"			12"	Top			
14-15½	2" SS			No	All			
19-20½				12"	Top			
24-25½				12"	Top			
29-30½				12"	Top			
34-35½				12"	Top			
39-40½				9"	Top			9"
44-45½							See B101 w/ cobble w/ some till	
49-50½							See B101	None
54-55½	3" SS			12"	Slap		Till, grey w/ lge cobble, plastic, clayey @ bottom	
59-60½	2" SS						Sand, fine, well sorted, red	✓
64-65½	1						Do.?	

Took HSA to 68½'. Fine sand heaved; no sample @ 69-70½ screen plugged first two attempts Third try, washed out plug @ bottom of HSA. Packed with washed HSA cuttings. Grout line set to 35' through HSA + About 80 gallons 20% bentonite, 80% Portland

Summary of Geol @ cluster

0-39 ± sand, med. to coarse, w/ cobbles, silty

~~med~~ red/brown when moist

Siltier near bottom

39-52 Till red, grading to

52-57 Till, grey, w/ cobbles, plastic at bottom

57-72 Sand, fine, red, well sorted

72-98.5 Till, grey

98.5- Platteville lms

103

9604791

1¼" black

7x coupling		0.5
6x10.5		
pipe	1x4.5 =	67.5
screen	10 slot, 2'	+2
grvl. pack	✓	stick up
grout	✓	calc. T.D.
		meas. T.D.

861-6287

Slug test development

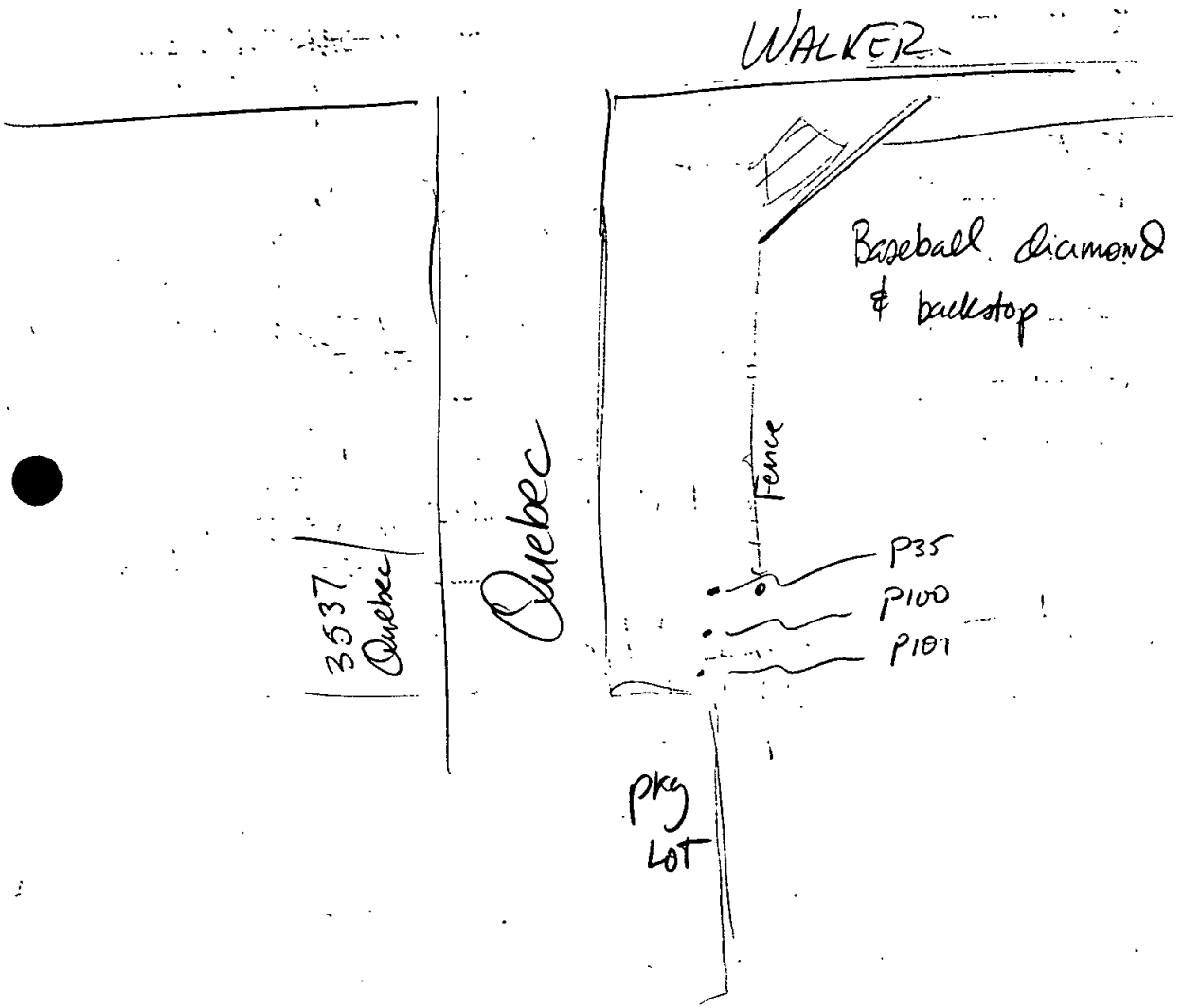
Hold	Cut	W.L.	Date	Hours

B100
12-17,18-79

2

12-17-79
12-18-79

1:30 - 4:30
845 - 11:30, 12:30 - 5:00



9604792

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-100
LOCATION: Walker Park
DATE: 12/17-18/79 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	1	SM-SC	SILTY CLAYEY SAND, fine-grained,*			Sheet 1 of 3 *black, frozen. (Topsoil
		SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, frozen to moist, loose. (Outwash)	4 8 7		
	8					
		SP	SAND, fine-grained, with a trace of fine Gravel, brown, moist, loose to medium dense. (Outwash)	2 6 7 5 9 9 6 17 19		Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	23					
		SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, moist, loose to medium dense. (Outwash)	7 29 44 7 11 14		
	30					
			(continued)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604793

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-100 (continued) LOCATION: DATE: 12/17-18/79 SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
	34	SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, moist, loose to medium dense. (Outwash)			Sheet 2 of 3
	41	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, brown, moist to wet, loose to medium dense. (Outwash)	5 11 23 21 35 55		
	52	SC	SILTY CLAYEY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, wet, loose to medium dense. (Outwash)	44 12 7 4 7 6		
	58	ML	CLAYEY SILT, gray, wet, very soft. (Lacustrine)	2 2 2		
	60	SC	SILTY SAND, very fine to fine-grained, reddish brown, wet to waterbearing, loose to medium *	4 9 9		9604794
			*dense. (continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-100 (continued)
LOCATION:
DATE: 12/17-18/79 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
		SC	SILTY SAND, very fine to fine-grained, reddish brown, wet to waterbearing, loose to medium dense.	20 20 21		Sheet 3 of 3 Well point set at 69' depth.
	70					
			Water level down 38' immediately after withdrawal of auger.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604795

Site Identification Number VP-SR60

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Hole no. B101 Date 12-21-79 / 12-20-79 / 12-19-79 Project well no. P101 Geologist MFHULT

T&R _____ Site ID _____ MP descr. & elev. CSD ~ 923.9

Site descr. At Walker Park, @ P35, P100

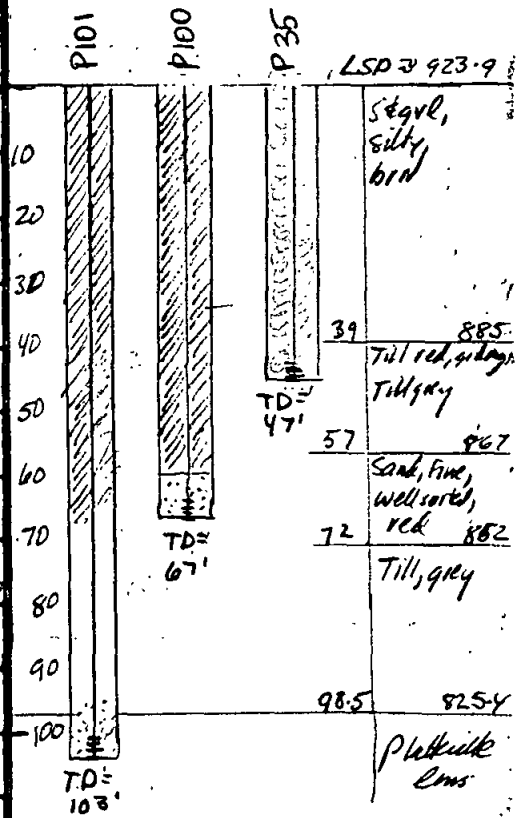
Rig CME 75; Braun Dennis Ruchti & BMC?

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
35-39	HWC		—	None	—		med-crse sand, grey	mud only
39-	HWC		—	None	—		sand, silty, red? ? till as below ?	mud only
48-50	3" SS			2½"	✓		till, rdsh brn w/abund. N.S. volcanics	
75-77	"			2½"	TIP TOP		till, gray, clayey, plastic v. sparse sand, no shale,	gen stn? natural cobble
78-79						✓	lms & granite boulder or lge cobbles	
		Smooth slow				✓	Same? as 75-77'	smooth slow mud
84-87		Smooth FAST				✓	till, gray, sandy, lighter than 75-77; lt clay? buff	white mud
94-95?				✓		✓	Till, ~~and~~ grey, sandy	94
9[illegible]-100						✓	shaley limestone	cuttings only
100-101						✓	do	do
101-102						✓	limestone, dk grey	do
102-103						✓	limestone, dk grey	do
			HWCasing taken to 74'; did not try to get through hardpan @ 78-9					
			Drilled with N rod, 3 7/8" bit to TD					
			Pulled rod, put in pipe					
			(black, thread ends cleaned but					
			not steam-cleaned) flushed some					
			with H_2O (≈ 100 gallons); built					
			up pressure. Sand-packed. Let					
			stand until 12-26-79.					

Summary

See B100 for log

Summary of piezometer installation @ cluster



9604796

9 x 10½ = 91½
+1 x 7'

pipe 1¼" black pipe

screen 2' 10 slot +

grvl. pack 1 bag 100lb gts sand stick up ___

grout _____ calc. T.D. 93.5

meas. T.D. ___

Slug test development

Hold	Cut	W.L.	Date	Hours

LOG OF BORING

BRAUN ENGINEERING TESTING

7

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-101

LOCATION: 6'North of B-100, Walker Park

DATE: 12/18-20/79 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	1	SM-SC	SILTY CLAYEY SAND, fine-grained, *			Sheet 1 of 4
		SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, frozen to moist, loose. (Outwash)			*black, frozen.(Topsoil)
	8					Boring advanced by roller-bit below the 45' depth.
		SP	SAND, fine-grained, with a trace of fine Gravel, brown, moist, loose to medium dense. (Outwash)			Location of boring determined by U.S.G.S.
	23					Surface elevation of boring to be determined by U.S.G.S.
		SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, moist, loose to medium dense. (Outwash)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	30					BPF does not indicate standard penetration test results since special sampling procedures were used.
			(continued)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604797

LOG OF BORING

BRAUN ENGINEERING TESTING

8

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-101 (continued) LOCATION: DATE: 1218-20/79 SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
	34	SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, moist, loose to medium dense. (Outwash)			Sheet 2 of 4
	41	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, brown, moist to wet, loose to medium dense. (Outwash)			
	52	SC	SILTY CLAYEY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, wet, loose to medium dense. (Outwash)	200 240 95 35 43 52		
	58	ML	CLAYEY SILT, gray, wet, very soft. (Lacustrine)			
	60	SC	SILTY SAND, very fine to fine-grained, reddish brown, wet to waterbearing, loose to medium *			9604798
			*dense. (continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-101 (continued) LOCATION: DATE: 12/18-20/79 SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth 60	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
		SC	SILTY SAND, very fine to fine-grained, reddish brown, wet to waterbearing, loose to medium dense.			Sheet 3 of 4
	74					
		CL	SILTY CLAY, with a trace of coarse SAND, gray, wet, medium to stiff.	8 18 50		
	77					
			LIMESTONE CHUNKS			
	79					
		GP	Gravel, medium to coarse-grained, with some boulders. (Outwash)			
	84					
		SM	SILTY CLAYEY SAND, medium to coarse-grained, with some fine to coarse Gravel and boulders, very dense. (Outwash)	212 600		9604799
	90					
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, mN U.S. Geological Survey	BORING: B-101 (continued) LOCATION: DATE: 12/18-20/79 SCALE: 1"=4'

Elev.	Depth 90	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
		SM	SILTY CLAYEY SAND, medium to coarse-grained, with some fine to coarse Gravel and boulders, very dense. (Outwash)			Sheet 4 of 4
	94			200/400		
		SP-SM	SAND TO SILTY SAND, fine-grained, brown, wet, very dense. (Outwash)			
	97.5					
			PLATEVILLE LIMESTONE (WEATHERED)			
	103					Well point set at 103' depth.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604800

Site Identification Number VP-SR60

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Hole no. B102 Date 12-27-79 Project well no. P102 Geologist MF Hult

T&R 17-21-16 DCA Site ID _____ MP descr. & elev. _____ LSD = 916.8

Site descr. 36th & Alabama; Next to P61, W133, W134; ON W end of triangle between RR tracks, Woodale & 36th St.

Rig CME 75 - Braun - Dennis Rutchi

Depth	Tool	Blows or drill action	Sample taken: chem sample	Sample taken: core (sleeved)	Sample taken: core (bagged)	Sample taken: cuttings	Sample description	recovery	Summary
0-5	HSA		None	None	—	—	Dirt, black		0-3 Soil
5-33	HWC 3 3/8"	generally smooth, some gritty zones	"	—	—	✓6 ~20'	see B23	—	3-12 Till, brn,
33-35	3x2½"	cobble partially blocked sampler	"	✓	TOP	—	SSGVX, 2" ⌀ cobble @ sample top	15/24"	12-46 sand & gvl ... very well sorted, brn-buff; 31-34 clayey sand, buff
38-40	3x2½"	—	"	✓	No	—	Sand, w/ buff clayey matrix; sand, med-f, well sorted, brn	10/24"	
43-45	"	—	"	No	ALL	—	Sand, fine, sand, v. well sorted, v. crse	10/24	46-47 Till?, clayey sand, buff
48-49	"	two v. well preserved samples.	None	49.0-49.5; 49.5-50.0	Tip; TOP		Sand, v. w. sorted, fine-med @ bottom, v crse @ top	15/24	47-67 Sand & gvl, v. well sorted, red-blk
45-48	tri-cone	—	"	—	—	—	till? clay, buff. Thickness? ea bit cuttings.	—	67-68½ Boulder, biotite schist?
53-55	3x2½"	—	"	No	All, 2 bags	—	Sand, v. crse, — sand, fine. v. w. sorted, sand, fine-v. fine, v well sorted, red	10/24	68½-80 sand, v.f.-fine, gray-brn; gravel @ 73'?
-60	3x2½"		"	"59.0 to 59.5"	bag	—	Sand & gvl v. crse sand - fine gvl. v. well sorted, blk, abund. N.S.V.	15/24	
63-65	3x2½"	sample taken after spinning HWC	"	"64.5-"65	"64.0-64.5"	—	Sand, v. crse sand - cobbles (2" ⌀ quartzite) abund. N.S.V., qtz. w/ gvl with limes. v. well sorted	10/24	80 — 97
67-68½	3 7/8" TC.	Steady, slow	None	—	—	Observed only	boulder, biotite schist?	—	
68½-70½	3x2½"		Slight chem	69.5-70.0; "70.0-70.5"	TOP; Also log gravel	—	Sand, v.f.-fine, well sorted, grey-brn no medium sand or larger; some silt	16/24	108-108.5 Glenwood Shale
73-75	3x2½"		Slight chem	74.0-74.5; 74.5-75.0	73-74	gvl	gvl, med, v. well sorted log? Sand, v.f.-fine, grey brn, silt	22/24	
78-80	3x2½"		None	79.0-80.0	78.5-79.0	sand	gvl - do - Prob. log - sorted top. sand do	18/24	
83-85	3x2½"		—	All	—	sand	sand, lt grey, med well sorted	10/24	
88-90	Do		None	89.0-89.5; 89.5-90.0	"drags"		Sand, med-fine, lt grey well >70% sorted (bag not representative)	10/24	
92-93½	—	rattles cobbles & boulder	—	—	—	None			
93½-95½	Do		None	94.5-95.0; 95.0-95.5	None	None	As 88-90; w/ some pieces which are clayey & till-like but otherwise similar	10/24	
98-100	Do		Chem; None	99.0-99.5; 99.5-100.0	99.0-100	98.5-99.0 for Φ	Till, sandy, dk brn, abund. N.S.V. cobbles, quartz, lms, silty, very dense; predominantly f-vf sand	18/24	← Φ
101-101.5	3" Φ ST				101-101.5		Sand, med-crse; lots qtz, feldspar — subrounded; also lms, N.S.V. well sorted but penetrated by mud	4/7	

9604801

Slug test development

Hold	Cut	W. L.	Date	Hours

pipe _____

screen _____ + ____

grvl. pack _____ stick up ____

grout _____ calc. T.D. ____

meas. T.D. ____

Page 2 of 2

Hole no. B102 Date _____ Project well no. P102 Geologist MT Hult

R 117-21-16 DCA Site ID _____ MP descr. & elev. LSD=916.8

Site descr. 36th & Alabama, Next to P61, W133, W134, ON West end of triangle

Rig CME-75; Braun- Dennis Richb

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
03.5-105	3x 2½" SS			104.0-104.5 104.5-105	103.5-104 TIP		Till, 00 98-100, silty, no pebbles, trace of sorted sand @ 103.5	
105-107	3½ 3"			105.5-106.0 106.0-107	TIP		Sand, crse-med, well sorted	
107-109	3x 2½"			Top of middle section			Glenwood @ 108.5, grades upward to dark silt, then dark till.	
109-110	3x 2½"							
110-111		Osp sample for perm, ⊕, & x-ray						
							BRAUN ENG ½ lunch	
							Hours: 1-8-80 1030-1515	
							1-9-80 DID NOT SHOW	
							1-10 0900-1130	
							1130-1200 TO SHOP	
							12-2:00	
		DA LUBR. - OLD 12" well					2:00-2:30 LUNCH	
							2:30-4:30	
		1-10-80 @ 1130			HOLD		67.00	
					CUT		2.57	
							64.43 from top of casing extension	
		GROUT 101'-65'						
		GROUT + BENT. 65'-surf.						

Summary

0-3 Soil, blk

3-12 Till, brn

12-68.5 sdgvl, v.w. sorted,
12-47 buff-brn
47-68.5 red to blk

68.5-97 sand, well sorted, vf-f.
-80 gry-brn
-97 lt grey

97-108.5 Till, drk brn, dense, silty, abund. NW.V. intrbdded w/ v. well sorted med-crs sand.

108.5-109 Glenwood shale

BENTONITE FROM 109? - 108

BOTTOM OF POINT @ 105' and GRAVEL PACKED w/ ¾ sack (25#) silica sand

GROUT FROM 101' - 65'

1 x 2.5
10 x 10.5
107.5

9604802

pipe 107

screen 10 slot 2' + 3

grvl. pack 3/4 bag stick up -

grout _____ calc. T.D. 105

meas. T.D. _____

Slug test development

Hold	Cut	W. L.	Date	Hours

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
VARIOUS LOCATIONS
ST LOUIS PARK, MN
U.S. GEOLOGICAL SURVEY

BORING: B-102
LOCATION: 36th and Alabama
DATE: 2/27/80
SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM-SC	SILTY CALYEY SAND, fine grained, black, frozen. (Topsoil)			Sheet 1 of 4
	1	CL	SANDY SILTY CALY, black, moist. (Topsoil)			
	3.5	CL	SANDY CLAY, brown, moist. (Topsoil)			Boring advanced by roller-bit below the 3½' depth.
	5	SP	SAND, fine to coarse-grained, some Gravel, brown, moist, medium dense to dense. (Outwash)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	30		Continued			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604803

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-102 Cont'd LOCATION: 36th and Alabama DATE: 2/27/80 SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP	SAND, fine to coarse-grained, some Gravel, brown, moist, dense to very dense. (Outwash)	80 24 28 31 20 21 25 30 18 13 13 14		Sheet 2 of 4
	47	SP	SAND, fine to medium-grained, some coarse SAND, trace of very fine SAND, brown, wet, very dense. (Outwash)	38 47 51 56		
	53	SP	SAND, fine to coarse-grained, some fine Gravel, brown and brownish gray, wet, medium dense. (Outwash)	11 11 15 15 17 18 20 21		
	60		Continued			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604804

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION Various Locations St Louis Park, MN U.S. Geological Survey	BORING: B-102 Cont'd LOCATION: 36th & Alabama DATE: 2/27/80 SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
		SP	SAND, fine to coarse-grained, some fine Gravel, brown and brownish gray, wet, medium dense.	15 19 18 18		Sheet 3 of 4
	68.5					
		SM	SILTY SAND, fine to medium-grained, grayish brown, wet, very dense. (Glacial Till)	35 47 50 69		
	72					
		SP	SAND, medium to coarse-grained, with some Gravel, layers of fine to medium SAND, grayish brown, wet, very dense. (Outwash)	25 37 41 41		
	77.5					
		SP-SM	SAND SLIGHTLY SILTY, fine and fine to medium-grained, some coarse SAND, layering, grayish brown, wet, very dense. (Outwash)	21 23 23 32 17 20 30 31 26 37 29 29		
	90					
			Continued			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604805

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-102 Cont'd
LOCATION: 36th & Alabama
DATE: 2/27/80
SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	90					Sheet 4 of 4
	92	SP-SM	SAND SLIGHTLY SILTY, fine and fine to medium-grained, some coarse SAND, layering, grayish brown, wet, *			
	94	SP	SAND, medium to coarse-grained, some Gravel and boulders, brown to grayish brown, wet, dense. (Outwash)	26		
	98	SP	SAND, fine to medium-grained, gray-brown, wet, very dense. (Outwash)	40 36 31		
	103	SM	SILTY SAND, fine grained, gray, wet, very dense. (Glacial Till)	57 80 81 81		
	105	SM-SC	SILTY CLAYEY SAND, fine grained, lense of fine SILTY SAND, dark grayish brown, wet, very dense. **	70 110 125 136		Thin wall sample #1
	108	SP	SAND, fine to medium-grained, gray, wet, very dense. (Outwash or Weathered Sandstone)	35 40 42 56 35 52		Well Point sample set at 105' depth, sand back-fill to 102', grouted to 65' depth.
	111		SANDSTONE, olive brown, mottled brown. (St. Peters Formation)	124 200 125 400 135 500		

**(Glacial Till)
*very dense. (Outwash)

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604806

Site Identification Number VP-SR60

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17

Hole no. 8103 Date 1-14-80 Project. well no. P 103 Geologist M.F HULT & R.J. WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. 3/39 - OREGON 60' WEST OF W 100

Rig CME 75; BRAUN

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
0-9	HSA		✓				PEAT - BLACK, SANDY, non-fibrous		0-1 TOPSOIL
9-11	ST			✓			TOP - SANDY DK BR. PEAT BOTTOM - DK-GRAY PEAT CLY non-fibrous	15"	1-20
11-14	HSA		✓				D.D.		20-25.5
14-16	2½	15-16.0		14-15 15.0-15.5			BR.-DK. GRAY BR. PEAT CLAYEY - SOMEWHAT FIBROUS	24"	25.5-
16-19	HSA		✓				D.D.		
19-21	2½ x3			19.0-20.0 20.5-	20.0-21.0 TIP		BOTTOM - SILTY CLAY - OLIVE GR.		
21-24	HSA								
24-26	2½ x3		25.5-26.0	24.0-25.0 25.0-25.5	TIP		TOP - SILTY CLAY - OLIVE GR BOTTOM - GRAY M-CRS. CLEAN SAND		
29-31	2½ x3		29.0-29.5 29.5-30.0 30.0-31.0		TIP				
33-35	3x 3½			33.5-34.0 34.0-35.0	TIP		FN-CRS SAG. GRAY Mottled mud at HW		
31-33			38.5-39.0 39.0-39.5 39.5-40.0	X X X	Excl sample Disaggregated		trace of gray clay on bit 31-33ft		
38-40	3x 3½	distinct sand					well sorted, med CSE gray sand & gravel sand mixed with clay, silty gray		
43-44½			44-44.5		bag CO3 gel		do		
48-50	3x 2½	clay					do.? no recovery	0	
53-55	2½x 3	53.5-54.5	53.0-53.5 54.5-55		TIP		Sand gray, med-coarse well sorted to fine silt, interbedded	24	
58-60	3x 3½			58.5-59 59-60	TOP TIP		SILT, GRAY, FINE, PEATY - FILL?? Sd, gray, fine to med @ bottom, silt @ top Sd, gray, fine to med		
63-64.5	3x 3½						do.? pipe full of water - washed out sample	0	
		Sd, red-brown, fine (washed up when driller was spinning in casing)							
68-70	3x 3½						Cobble caught in tip - was taking casing down with it - some multi colr. of gel in sleeves	0	

9604807

Slug test development

Hold	Cut	W.L	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up - _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B103 Date _____ Project well no. _____ Geologist M.F. HULT & R.J. WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
68.5-72.5	3X 3½						no recovery - driller says drove like sand	0	
72-73.5	3X 3½				Tell from 71?		only 4" recovery - drove very stiff CLAYEY HARD YELLOWISH-BROWN CLAY (WEATHERING MATERIAL ?)	4"	
		Bedrock @ 73' - then quit for day		Set casing - drove (1-15-80 TUESDAY)			to 74' (So casing is 1 foot into bedrock) - Will core below 74'		73
73-74	1-16-80	Cleaned out hole from 73-74' - then began coring							
74-75.5		slow drilling					lost - broken up core	poor	
75.5-77.5		lost circulation @ 77.2					lost - OPENINGS @ 75.8-76 and @ 77-77.1	mostly	
77.5-79		water @ 77.6 - poor hitting no circulation	little fractured solid rock				lime core - not so broken up	mostly	
79-84		fast drilling					lime - solid with very few fractures shale? at 83.5 or so	5'	
84-89		fast drilling (still hard in)					lime - solid core to 88' 88' - shale fracture top of Glenwood?	4'	
89-94							shale, blue-gray (Glenwood) and sandstone, shale, gray	1	
		set 77 feet of 1¼" black casing (open end - NO DRIVE POINT OR SCREEN)							
		with 3½' STICK UP - bottom of casing @ 73½'							
		grouted casing from bottom to top with neat cement							
		hole is open to Platteville lime							

9604808

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up - _____

grout _____ calc. T.D. _____

meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-103

LOCATION: 31st & Oregon

DATE: 1/14-17/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	4	SM	(Fill) SILTY SAND TO SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen to moist.			Sheet 1 of 3
	7	SC	CLAYEY SAND, fine to medium-grained, black to dark brown, non to slightly organic, wet. (Topsoil)			
	11	CL	SANDY SILTY CLAY, black, non to slightly organic, wet.			Boring advanced by roller-bit below the 31' depth.
	18	CL	SILTY CLAY, black, non to slightly organic, wet, soft.	2, 3, 6, 8		Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	25.5	ML	CLAYEY SILT TO SILTY CLAY, dark gray, wet, soft. (Till)	2, 2, 2, 2, 2, 3, 4		BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet to waterbearing, dense. (Outwash)	12, 24, 25, 27, 30		9604809
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-103 (continued)
LOCATION:
DATE: 1/14-17/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 3
	31	SP	SAND, fine to medium-grained, *			*with a trace of fine Gravel, gray, wet to waterbearing, dense. (Outwash)
	33.5	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)	16		
	43	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, gray mottled with brown, wet, dense. (Outwash)	19, 20, 22, 19, 20, 21, 18		
	52	SP	SAND, coarse-grained, with a trace of fine Gravel, gray mottled with brown, waterbearing, dense to very dense. (Outwash)	12, 20, 20, 18, 40, 44, 25		
	57	ML	CLAYEY SILT, gray, with lenses of fine SILTY SAND, wet, very stiff to hard. (Outwash)	20, 26, 32, 44		
	60	SP-SM	SAND TO SILTY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, waterbearing, dense to very dense**	45, 47, 53, 38		
			**(Outwash) (continued)			

9604810

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: ST-103 (continued) LOCATION: DATE: 1/14-17/80 SCALE: 1"=4'

Elev:	Depth 60	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
		SP-Sm	SAND TO SILTY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, water-bearing, dense to very dense. (Outwash)	40 51 60 63		Sheet 3 of 3
	69.5			18 36		
		SP-SM	SAND TO SILTY CLAYEY SAND, fine to medium-grained, brown to reddish brown, waterbearing, very dense. (Outwash)	41 58 186 197 300		
	73.5					
			Rock cored from 74-94' depth.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604811

LOG OF BORING

BRAUN ENGINEERING TESTING

22

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INSTALLATION
St. Louis Park, Minnesota
U.S.G.S. Contract #14-08-0001-18915

BORING: B-103

LOCATION: 31st & Oregon, 60' west of W100.

DATE: 1/14/80 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 1 of 3
	0	SM & SM-SC	Fill; SILTY SAND and SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen to moist.			Samples generally taken by driving a 2½" diameter brass sleve at sampled depth.
	4	SC	Fill; CLAYEY SAND, fine-grained, non to slightly organic, dark brown to black, wet.			
	7	CL-OL	SILTY CLAY, non to SLIGHTLY SANDY, organic to slightly organic, black, wet.			Samples were frozen at the time of examination.
				TW #1		
			(Swamp)			
				2/3		
				6/8		
	20			2/2		
		ML	CLAYEY SILT, slightly organic at 24', gray to black, wet.	2/2		
			(Swamp)			
	25.5			2/3		
		SP	SAND, fine to medium-grained, with a trace of coarse SAND and fine Gravel, with layers of fine to coarse SAND and fine to very fine SAND noted at 31', gray with black and white, waterbearing. (Outwash)	4/12		
				24/25		
	30			27/30		
			(Continued on Sheet 2)			

9604812

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INSTALLATION St. Louis Park, Minnesota U.S.G.S. Contract #14-08-0001-18915	BORING: B-103 (Continued)
	LOCATION:
	DATE: / SCALE: 1"=4'

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 2 of 3
	33	SP	SAND, fine to medium-grained, with a trace of coarse SAND and fine Gravel, with layers of fine to coarse SAND and fine to *			*very fine SAND noted at 31', gray with black and white, waterbearing. (Outwash)
	42	SP-SM	SAND, SLIGHTLY SILTY and SLIGHTLY CLAYEY, fine to coarse-grained, with a trace to some coarse Gravel, gray with black and white, wet. (Outwash)	16/19 20/22 19/20 21/18		
	52	SP	SAND, fine to medium-grained, with a trace of coarse SAND and fine Gravel, gray with black and white, wet to waterbearing. (Outwash)	12/20 20 per 6" 18/40 44/25		
	60	ML	CLAYEY SILT, non to slightly SANDY, with lenses and layers of fine to medium SILTY SAND and SANDY SILT, gray, wet. (Outwash)	20/26 32/44 45/47 53/38		
			(Continued on Sheet 3)			

(See "Report and Standard Plates for evaluation and descriptive terminology.)

9604813

LOG OF BORING

BRAUN ENGINEERING TESTING

24

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INSTALLATION St. Louis Park, Minnesota U.S.G.S. Contract #14-08-0001-18915	BORING: B-103 (Continued)
	LOCATION:
	DATE: / SCALE:

Elev.	Depth 60	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 3 of 3
		SP	SAND, fine and fine to medium-grained, with lenses of SILTY SAND, gray to about 63', reddish-brown to brown below 63', water-bearing. (Outwash)	40/51 60/63		
	66					
		SM	SILTY SAND, fine to medium-grained, cobble noted at 70', brown to dark brown to reddish-brown, waterbearing. (Glacial Till)	* 30/41 *		*18 per 6" *58 per 6"
	71					
		SM-SC	SILTY CLAYEY SAND, with a trace to a little fine to medium Gravel, cobble noted. (Glacial Till)	186/197 300 per 6"		
	74					
			Bedrock encountered at 74', casing set at 74', bedrock cored at 74.0' to 94.0', see attached Log of Coring Sheet.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604814

Hole no. B104 Date 7-18-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc.

Map plotted on Geologist R.T. WOLF

County Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4 2	X 1	1/2	1	4 dry	FILL		Y		0- FILL
9 7	X 2	2	1	4 wet	FILL PEAT, BLK, CRENSHY ODOR	1	Y		PEAT
14 12	X 3	1	1	4 ROTES	do.	1	Y		
19 17	X 4	1	1 1/2	3 1/2	TRIED CHEESE TYPE - DIDN'T WORK CLAYEY SILT, BLK	2	Y		
23 22	X 5	1	1	4	SUFFICIENT TUBE SAMPLE PEAT, DK BROWN, SHEEN	3	Y		SILT WITH SAND AT BOTTOM
29 27	X 6				SAMPLE NONE	3	✓	32-33 — MOSTLY EMPTY (BAGS)	
33 32	X 7				do. SPLIT SPOON 32-34	3	Y	33-37.5 — TIP-SILT, OPA, SHEEN-34.4-37, and 34-37.5 — SILT, GRY, MOD-COARSE TIP - EMPTY	
37	8								
42	9								
47	10								
52	11				(3 lengths 10.5 = 31.5') SOL 31.5 PIPE PLUS 2' DRIVE POINT				
57	12				SCREENED INTERVAL 31 - 33 STICK-UP = 0.5 FOOT				
62	13								
67	14								
72	15								
77	16								
82	17								
87	18								
92	19								
97	20								
102	21								
107	22								

9604815

26

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-104 LOCATION: 15'North of B-103. DATE: 1/18/80 SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	5	SM	(Fill) SILTY SAND, fine to medium-grained, dark brown, frozen to moist.			Sheet 1 of 2
	7	SC	(Fill), CLAYEY SAND, black, with a trace of concrete, slightly organic, moist.			Location of boring determined by U.S.G.S.
	20		SANDY SILTY CLAY, black, slightly organic, wet, soft.			Surface elevation of boring to be determined by U.S.G.S. Soil Clssifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	26	ML	CLAYEY SILT to SILTY CLAY, gray, wet, soft. (Till)			
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)			9604816

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-104 (continued) LOCATION: DATE: 1/18/80 SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
		SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)	19 20 15 16		Sheet 2 of 2 Well point set at 33' depth.
	35					Boring grouted to the 5' depth.
			Water level down 7' immediately after withdrawal of auger.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604817

Hole no. B105 Date 1-18-80 Project well no. P105 Geologist R.J. WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. 31st St. and OREGON

Rig CME - BRAUN ENG.

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
0-4							FILL		
4-9							PEAT, BLACK, SILTY, CLAYEY		
9-11				9-11 SHELBY			PEAT, BLACK, SILTY, CLAYEY	100%	
11-14							do.		
14-19							do.		
19-24							do		
24-29							do		
29-34							do		
34							Sandy silty silt, black		
39-44									
44-49							sandy silt, black		
49-54									
54-55	2 & x 3				✓		54.4-55 (NOT FULL) SILT, SD, GRAY, SILTY; 55-55.5 - TOP - SILTY SD, V. FINE, GRAY; BOTTOM - SD, GRAY, M-CSE		
	SPLIT SPOON			✓			55.5-56 - SD, GR, SILTY, V. FINE; TIP - SD, GR, SILTY, V. FINE		
54-59									
59-61					59-60		SD, GRAY, FINE-MED, SILTY, TRACE GVL	45%	
					60-60.5		SD, GRAY, F-MED (MOSTLY EMPTY)		
					60.5-61		SD - GRY, FINE-MED		
							TIP - EMPTY		
59-61.5									

9604818

Slug test development

Hold	Cut	W.L.	Date	Hours

TOT → 1 length 7.0' } 7 MEA
pipe 5 lengths 10.5' } = 59.5
SCREENED INTERVAL
screen 2' x 1¼" DRIVE POINT + 2.0
grvl. pack NATURAL stick up − 0.5
grout CEMENT calc. T.D. 59.0
meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-105

LOCATION: 4'North of B-103.

DATE: 1/18-21/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 2
	4	SM	(Fill) SILTY SAND TO SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen to moist.			
	7	SC	CLAYEY SAND, fine to medium-grained, black to dark brown, non to slightly organic, wet. (Topsoil)			Location of boring determined by U.S.G.S.
	11	CL	SANDY SILTY CLAY, black, non to slightly organic, wet.			Surface elevation of boring to be determined by U.S.G.S.
	18	CL	SILTY CLAY, black, non to slightly organic, wet, soft.			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	25.5	ML	CLAYEY SILT TO SILTY CLAY, dark gray, wet, soft. (Till)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet to waterbearing, dense. (Outwash)			9604819
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-105 (continued)
LOCATION:
DATE: 1/18-21/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
	31	SP	SAND, fine to medium-grained, *			Sheet 2 of 2
	33.5	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)			*with a trace of fine Gravel, gray, wet to waterbearing, dense. (Outwash)
	43	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, gray mottled with brown, wet, dense. (Outwash)			
	52	SP	SAND, coarse-grained, with a trace of fine Gravel, gray mottled with brown, waterbearing, dense to very dense. (Outwash)			
	57	ML	CLAYEY SILT, gray, with lenses of fine SILTY SAND, wet, very stiff to hard. (Outwash)	11 15 15 21		
	60	SP-SM	SAND TO SILTY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, waterbearing, dense to very dense. (Outwash)	15 16 22 35		9604820 Well point set at 61' depth. Boring grouted to the surface.

Hole no. B106 Date 1-21-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. 31st St. and Oregon, St Louis Park

Map plotted on Geologist R.J. Wolf

County Hennepin Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight
4 2	1	1	1	4 DRY	FILL - Sd + GVL	1	Y	
9 7	2	1	1	4 MOIST	BEAT, DARK	1	Y	
14 12	3	1	1	3 do	SHELBY TUBE SAMPLE FOR REMOLDABILITY	1	Y	
19 17	4	1	1	2 SOFT	SILT, GRAY,	2	Y	
24 22	5	1	1	2 SOFT	SHELBY TUBE 21-23 SAND, GRAY, FINE-MED	2	Y	
29 27	6	1	1	1 LOOSE	SOFT Sd, GRAY, f-med	4	Y	
34 32	7	1	1	2 WET	Sd, m-cse, brown to multi-colored, w f GVL	3	Y	
39	8	1	1	2 wet	Sd, med-cse, brown, with f. GVL	4	Y	
44 42	9	1	1	2 wet	do	4	Y	
49 47	10	1	1	2 wet	Sd f-cse, BROWN with f-cse GVL	4	Y	
54 52	11	1	1	2 wet	do	4	Y	
59 57	12	1	1	2 wet	do	4	Y	
64 62	13				59-61 SPLIT SPOON			57-60 — CSE Sd, MULTI-COLORED, MOSTLY EMPTY; 60-60.5 — CSE Sd, MULTI-COLORED; 60.5-61 — TOP — CSE Sd, MULTI-COLORED; BOTTOM — ROTTEN; TOP — RED TILL
69 67	14				62-65 SPLIT SPOON			63-64 — (SOME, RED, FINE WITH SOME CSE GVL & Sd, OR); 64-65 — MOSTLY EMPTY BUT FINE Sd WITH SOME CSE; TOP EMPTY
72	15							
77	16							
82	17				SET 5 LENGTHS OF 1¼" x 10.5 = 52.5; and 1 LENGTH OF 1¼" x 7.0 = 7.0			
87	18				and 1 LENGTH OF 1¼" x 3.5 = 3.5; TOTAL PIPE EQUALS 63.0			
92	19				PLUS 2' x 1¼" DRIVE POINT 2.0; TOTAL PIPE & SCREEN 65.0			
97	20				STICK-UP = 0.5			
102	21				SCREENED INTERVAL	62.5 - 65.5		
107	22							

Summary

0-1 TOP SOIL
1-7 FILL
7-18.5
PEAT, DARK, SANDY, SILTY NON-FIBROUS
18.5-20.5 SILT, GRAY
20.5-33
SAND, GRAY, FINE-MED
33-
Sd, BROWN, fine-COARSE, with fine to cse GRAVEL

9604821

LOG OF BORING

BRAUN ENGINEERING TESTING

32

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-106

LOCATION: 60'East of B-104.

DATE: 1/21/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 3
	2	SM	(Fill SILTY SAND TO SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			
	3	SM	(Fill) CLAYEY SAND, fine to *			*medium-grained, with a trace of fine Gravel, black, moist.
	5	SM	(Fill) SILTY SAND, fine to medium-grianed, with a trace of fine Gravel, brown, moist.			
	7	SP	(Fill) SAND, fine to medium-grained, moist.			Location of boring determined by U.S.G.S.
	18.5	CL	SANDY SILTY CLAY, black, non to slightly organic, moist to wet, soft.			Surface elevation of boring to be determined by U.S.G.S.
	22	ML	CLAYEY SILT to SILTY CLAY, gray, wet, soft. (Till)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	28	SP	SAND, fine to medium-grained, with a trace of fine Gravel, wet, dense. (Outwash)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)			
			(continued)			

9604822

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-106 (continued)
LOCATION:
DATE: 1/21/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
	32	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)			Sheet 2 of 3
	58	SP	SAND, medium to coarse-grained, with a trace of fine Gravel, wet, dense to very dense. (Outwash)			
	60	ML	CLAYEY SILT, gray, wet, very stiff to hard. (Outwash)	41 37 35 21		
			(continued)			

9604823

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-106 (continued) LOCATION: DATE: 1/21/80 SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	61	ML	CLAYEY SILT, gray, wet, very *			Sheet 3 of 3
		SP-SM	SAND TO SILTY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, wet to waterbearing, medium dense to dense.			*stiff to hard. (Outwash) Well point set at 64' depth. Boring grouted to the surface.
	70					

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604824

Hole no. B107 Date 1-22-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. About 3 feet south of W2

Map plotted on Geologist R. J. Wolf

County Lat.–long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4	X 1	1	1	4					0-4 Fill - Dirty Sd & Gvl
9	X 2	1	1	4					
14	X 3	1	1	3					
19	X 4	1	1		Shelby tube ~ 19-21 feet				Φ, X-ray
22	5								
27	6								
32	7								
37	8								
42	9								
47	10								
52	11								
57	12								
62	13								
67	14								
72	15								
77	16								
82	17								
87	18								
92	19								
97	20								
102	21								
107	22								

9604825

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-107

LOCATION: 8'South of B-106.

DATE: 1/22/80 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	2	SM	(Fill) SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen			
	3	SM	(Fill) CLAYEY SAND, fine to *			*medium-grained, with a trace of fine Gravel black, moist.
	5	SM	(Fill) SILTY SAND, fine to medium-grained, with a trace of fine Gravel, brown, moist.			
	7	SP	(Fill) SAND, fine to medium-grained, with a trace of fine Gravel, moist.			Location of boring determined by U.S.G.S.
	19	CL	SANDY SILTY CLAY, black, non to slightly organic, moist to wet, soft. layer of fine to medium SAND at 18.5'.			Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen sample returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	19.5	ML	CLAYEY SILT TO SILTY CLAY, gray,**			
			**wet, soft. (Till) Water level down 7' with 19' of hollow-stem auger in ground.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604826

Hole no. B108 Date 1-23-80 Project well no. ~~P100~~ Geologist MFH & RJW

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. N. of Orland, ~10 ft west of W20

Rig CME 75 D. Brown R. Rucht

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
4-6	3x 2½ SS		–	12"	–	–	Sand, f-med, silty, dk brn, well sorted, wet	~12"	0-1 Soil
9-11	do		–	12"	–	–	do	~12"	1-18 Sand, f-med, silty, brn
13-15	do		–	–	–	–	basalt cobble in tip	0	18-20 till, clayey w/sand, gray
18-20	do			19.5-20	Tip 18.0-19.5		sand, med, well sorted (lag?) Till, gray, plastic, clayey	12"	20-47 Sand, gray fine to coarse, mostly medium, fairly well sorted
20-22	3"S	Petroleum odor		20-22			Sand, med-crse, grey well sorted		
23-25	3X 2½			–	Tip 24-25		Sd, f-med, some crse, gray well sorted	10"	
28-30	3X 2½			–	29-30		Sd, gray, mostly med with some crse	11"	
33-35	do.			–	Tip 34-35		Sd gray, f-med with some crse	9"	
38-40	do			39-39.5	39.5-40		Sd gray, f-med, some crse	11"	
43-45	do.			–	43-45		do ½ sandy – ran out	8"	
48-50	do	RED TILL @ 47' (approx) BRS wet		47-49.5	Tip – 49.5-50 48-49	Sd + TILL	RED TILL & FINE SAND & some (approx 6")	18"	47-50 Red Till, sandy, with Sd, red fine.
53-55	do				53-55		Sd, gray, fine, with some med.	RUNNY ⅓ full	50-58.5 Sd, gray brown, fine, some medium
58-60	do			58-59 59-60			Sd-gray, fine TILL, SANDY Sd gray fine	20"	58.5-59.5 – TILL, sandy 59.5-63 Sand, gray, fine
63-65	do			63-64 64-65			TILL, SANDY	23"	63-66 TILL, sandy 66-67 WEATHERED LIMESTONE
67.5	SIDE	LMS.				65-67.5	LMS.		67-67.5 LIMESTONE

(NO PIEZOMETER SET HERE)

9604827

Slug test development

Hold	Cat	W.L.	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up – _____

grout BOTTOM TO L.S. calc. T.D. _____

meas. T.D. _____

38

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-108
LOCATION: North Side of Oxford and West of Edgewood
DATE: 1/21 - 1/22/88
SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill) SILTY SAND, fine to medium-grained, dark brown, frozen.			Sheet 1 of 3
	1	SP-SM	(Fill) SAND TO SILTY SAND, fine to medium-grained, with a trace of fine Gravel, brown to dark brown, moist.			Boring advanced by roller-bit below the 16' depth.
	4.5	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, brown, moist to wet, medium dense to dense. (Outwash)	14, 9, 10, 9		Location of boring determined by U.S.G.S.
	7	SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, wet, medium dense to dense. (Outwash)	3, 10, 10, 10, 15, 7, 7, 7, 18, 17, 17		Surface elevation of boring to be determined by U.S.G.S.
	19.5	SP	SAND, fine to medium-grained, gray to brown with depth, wet, medium dense to dense. (Outwash)	21, 17, 18, 19, 23, 8, 11		Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	30					BPF does not indicate standard penetration test results since special sampling procedures were used.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604828

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-108 Cont'd
LOCATION:
DATE: 1/21 - 1/22/80
SCALE: 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP	SAND, fine to medium-grained, gray to brown with depth, wet, medium dense to dense. (Outwash)	11, 11, 29, 18, 17, 11, 8, 8, 13, 13, 18, 10, 11, 11		Sheet 2 of 3
	47	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, dense to very dense. (Outwash)	51, 46, 36, 25		
	51	SP	SAND, fine to medium-grained, with a trace of Gravel, gray to brown, wet, dense to very dense. (Outwash)	32, 32, 34, 26, 92, 85, 58, 56		9604829
	60					

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-108 Cont'd LOCATION: DATE: 1/21 - 1/22/8 SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60		SAND, fine to medium-grained, with a trace of Gravel, gray to brown, wet, dense to very dense. (Outwash)	85 176 180 220		Sheet 3 of 3
	66.5		PLATVILLE LIMESTONE - WEATHERED			
	68		[illegible] LIMESTONE			
	69.5		PLATVILLE LIMESTONE			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604830

*41

Hole no. B109 Date 1-23-80 Loc./Well no. P109

Relation to general land level At Gen. Land Surface Alt. _____ Soil _____

Local site desc. N side of Oxford, ~6 ft west of W20

Map plotted on _____ Geologist RON WOLF

County _____ Lat.—long. _____

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4	X 1	1	1	4 dry	FILL Sand, brown, med	1	Y		0-2 FILL 2-18 SAND, BROWN, FINE TO MEDIUM, SILTY
9	X 2	1	1	4/4 dry/moist	Sand, brown, med w/ some gvl	1	Y		
14	X 3	1	1	3 wet	Sand, gray-brown f-med	1	Y		
19	X 4	1	1	3 wet	do Shelby tube sample 18.5-20.5	2	N	Q, x-ray @ 19' & 20'	18-20 TILL, GRAY, CLAYEY, SANDY
24	X 5	1	1	3 "	Sd, gray, f-med	2	N		20-44 SAND, GRAY, medium, with some coarse sand
29	X 6	1	1	3 "	Sd, gray, f-cse	3	N		
34	X 7	1	1	3 "	Sd gray, med	4	N		
39	X 8	1	1	3 "	do.	4	N		
44	X 9	1	1	3 "	do.	4	N		
47	10								
52	11								
57	12								
62	13								
67	14				SET 4 lengths of 10.5' galv. pipe (1¼") (tot=42')				
72	15				plus 2' x 1¼ x 10 SLOT DRIVE point				
77	16				SCREENED INTERVAL				
82	17				STICK-UP =				
87	18								
92	19								
	20								
102	21								
107	22								

9604831

42

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-109 LOCATION:
	DATE: 1/25/80 SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	1	SP	(Fill) SILTY SAND, fine to medium-grained, dark brown, frozen.			Sheet 1 of 2
	4.5	SP	(Fill) SAND TO SILTY SAND, fine to medium-grained, with a trace of fine Gravel, brown to dark brown, moist.			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S.
	7	SP	SAND, SLIGHTLY SILTY, fine to medium-grained, brown, moist to wet, medium dense to dense. (Outwash)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	19.5	SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, wet, medium dense to dense. (Outwash)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP	SAND, fine to medium-grained, gray to brown, wet, medium dense to dense. (Outwash)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604832

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park , MN
U.S. Geological Survey

BORING: B-109 Cont'd

LOCATION:

DATE: 1/25/80

SCALE: 1" = 4'

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
			SAND, fine to medium-grained, gray to brown with depth, wet, medium dense to dense. (Outwash)			Sheet 2 of 2
	44		Well point set at 44'			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604833

Hole no. B110 Date 1-28-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. N. SIDE OF OXFORD ~ ft east of W20

Map plotted on Geologist RON WOLF

County Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4½	1	1	1	4 DRY	FILL Sd, BRN, med	1	Y		0-2 FILL
9 7	2	1	1	4 DRY MOIST	Sd, BRN, med w/ some GVL	1	Y		2-12½ SAND, BROWN, medium with some gravel
12½ 12	3	1	1	3 WET	do.	1	Y		
17	4								
22	5								
27	6								
32	7								
37	8								
42	9								
47	10								
52	11				SET 1 LENGTH OF 1¼" X 10½' CASING				
57	12				PLUS 2' X 1¼" X 10 SLOT DRIVE POINT				
62	13				STICK-UP = AT LAND SURFACE				
67	14								
72	15								
77	16								
82	17								
87	18								
92	19								
97	20								
102	21								
107	22								

9604834

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-110
LOCATION: 6' East of B-108
DATE: 1/28/80
SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	1	SM	(Fill) SILTY SAND, fine to medium-grained, dark brown, frozen.			
	4.5	SP-SM	(Fill) SAND TO SILTY SAND, fine to medim-grained, with a trace of fine Gravel, brown to dark brown, moist.			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	7	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, brown, moist to wet, medium dense to dense. (Outwash)			
	12.5	SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, wet, medium dense to dense. (Outwash) Well point set at 12.5'.			
			Boring grouted to surface.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604835

Hole no. B111 Date 1-28-80 Project well no. P111 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. S. side of Cambridge ~4 feet north of W132

Rig CME — DENNIS

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
4-6	8¼ 2½						FILL - Sd & GVL	22"
9-11	7¾ 2½			10-10.5	10.5-11		CLAY, BROWN	16"
14-16	do			15-15.5	15.5-16		Sd, BROWN, DIRTY	14"
19-21	do			—	20.5-21		Sd & GVL - Sd BROWN, f-CSE GVL - f-CSE	11"
23-25	do		N & H CASING	—	24-25		Sd & GVL - BROKEN COBBLES w/some CSE Sd, BRN & COLORED	6"
28-30	do			—	28-30		do GRAY & COLORED	10"
33-35	do			34.5-35	TIP 34-34.5		Sd & GVL - GRAY, f-CSE TIP - TILL, GRAY CLAYEY & Sd	9"
38-40	do	Very scratchy - casing		—	38-40		GRAVEL & CSE Sd Sd WASHED OUT	8"
4[illegible]-45	do	DRILLER SAYS CLAY @ 42'		44.5-45	44-44.5		Sd, GRAY fine-med - some CSE @ BOTTOM; 1 COBBLE NOW	13"
48-50	do	DRILLER SAYS SOME HERE, OFF @ 47'		—	48-50		GVL + CSE Sd. - MOSTLY WASHED OUT	2"
53-55	do			—	53-55		MOSTLY WASHED OUT - (BALL IN CHECK VALVE MELTED) some Sd, GRAY & GVL	1"
58-60	do			—	59-59.5 59.5-60		Sd, GRAY & MULTI-COLORED, f-CSE RED CLAY @ BOTTOM (TIP)	9"
63-65	do			64.5-65	64-64.5		Sd, gray (red water), f-med w/some CSE, ~~CLAYEY~~ ~~COBBLE above~~	12"
68-70	do			69-69.5 69.5-70	68-69		Sd, red-brown, f-med w/some CSE sd.	15"
73-75	do			74.5-75	74-74.5		TILL, SANDY GVL ABOVE - LAG?	10"
78-79.5	do	Driller Estimates drill @ 77.5 300 blows - last 4 feet	79.5	—	78-79.5		ROCKS - SOME SAND LAG?	3"
			SET	7 LENGTHS	1¼" GALV X 10.5 ft (TOTAL			
				1 LENGTH	1¼" GALV x 3.5 ft (TOTAL PIPE 77 feet)			
			plus	2 ft x 1¼" x	10 SLOT DRIVE POINT			
			STICK UP	= 0.9				

Summary

0-6 FILL - Sand and GRAVEL

6-10 CLAY, BROWN, DARK

10-27? SAND, BROWN, f-CSE; GVL, f-CSE WITH SOME COBBLES NEAR BOTTOM

27?-34 SAND AND GRAVEL, GRAY

34-36? TILL, GRAY, CLAYEY-SILTY

36?-42 SAND AND GRAVEL

42-59 SAND, GRAY, FINE TO MEDIUM ABOVE, WITH GRAVEL, FINE TO COARSE BELOW

59-79½ TILL, REDDISH-BROWN, SANDY WITH VERY SMALL CLAY CONTENT

79½- BEDROCK (PRESUMED TO BE PLATTVILLE LIMESTONE)

9604836

pipe (1 LENGTH 1¼" x 3.5' GALV. / 7 LENGTHS 1¼" x 10.5' GALV.) 77.0

screen 2 ft x 1¼" x 10 SLOT + 2.0

grvl. pack SILICA SAND stick up — ____

grout YES calc. T.D. ____

meas. T.D. ____

Slug test development

Hold	Cut	W.L.	Date	Hours

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-111

LOCATION: On Cambridge across from 6318 Cambridge.

DATE: 1/29-31/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill) SILTY SAND, fine to coarse-grained, dark brown, frozen to moist, loose to medium dense.	5, 5, 5, 10		Sheet 1 of 3
	7	SC	CLAYEY SAND, dark brown to black, moist.			Boring advanced by roller-bit below the 22' depth.
	9	CL	SILTY SANDY CLAY, with some fine to medium SAND, brown, moist, soft. (Till)	3, 3, 7, 8		Location of boring determined by U.S.G.S.
	13.5	SM	SILTY SAND, fine to coarse-grained, with a trace of fine Gravel, moist to wet, loose to medium dense.	11, 17, 19, 21, 10, 7		Surface elevation of boring to be determined by U.S.G.S.
	20	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel, brown to light brown, wet, medium dense to dense. (Outwash)	8, 8, 8, 31, 11, 13, 12, 20, 13, 13, 14		Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	30		(continued)			

9604837

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-111 (continued)
LOCATION:
DATE: 1/29-31/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 3
	33	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel, brown to light brown, wet, medium dense to dense. (Outwash)			
	36	SC	CLAYEY SAND, fine to medium-grained, gray, with lenses of medium to coarse SAND, wet, loose to medium dense. (Outwash)	12 13 15 15		
	60	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel, gray, wet, loose to medium dense. (Outwash)	23 23 13 11 12 9 8 10 8 8 8 9 6 6 6 6 17 26 26 17		9604838
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-111 (continued)
LOCATION:
DATE: 1/29-31/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	62	SC	CLAYEY SAND-SILTY CLAYEY SAND, fine to medium-grained, reddish brown, wet.			Sheet 3 of 3
	67	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, medium dense to dense. (Outwash)	16 21 26 21		
		SC	CLAYEY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, dense to very dense. (Outwash)	36 21 26 50 60 62 63 45		
	79.5		Plateville Limestone(Weathered)	75 51 200		Well point set at 79' depth.

9604839

BRAUN ENGINEERING TESTING

P112

Hole no. B112 Date 2-1-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. SOUTH SIDE OF CAMBRIDGE ~ 4 feet EAST OF P111

Map plotted on Geologist RON WOLF

County Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4	1	1	1	4	FILL - SAND & GVL, BRN	1	Y		0-6 FILL, SAND AND GRAVEL, BROWN, DIRTY
9	2	1	1	4	FILL - SD & GVL CLAY, DARK BROWN	1	Y		6-14 CLAY, DARK BROWN
14	3	1	1	4	CLAY, DARK BROWN	1	Y		
19	4	X	1		NO RETURN	4	N		14-34 SAND, BROWN, fine to coarse, with some GRAVEL, fine to coarse
24	5	1	1		do	4	N		
29	6	1	1		do	4	N		
34	7	1	1		do	4	N		
39	8	1	1		do	4	N		34-36? TILL, GRAY
44	9	1	1		SPLIT SPOON — 39-41	1	N	BAGGED 39-40; CORE (SLEEVED) 40-40.5; CORE (BAGGED) 40.5-41	36?-51 SAND, GRAY, medium to coarse and GRAVEL, fine to coarse
49	10	1	1		NO RETURN	4	N		
-51	11				SPLIT SPOON 49-51			MOSTLY WASHED OUT Sd & GVL PIECE OF GRAY TILL	
52	12	G							
57	13								
62	14								
67	15				SET 4 LENGTHS OF 1¼" GALV X 10.5 ft				
72	16				AND 2 LENGTHS OF 1¼" GALV X 3.5 ft			TOTAL PIPE = 49'	
77	17				PLUS 2.5 ft (2 ft OPENING) X 1¼" X 10 SLOT			DRIVE POINT	
82	18				STICKUP = 1.7				
87	19								
92	20								
97	21								
102	22								
107									

0604840

LOG OF BORING

BRAUN ENGINEERING TESTING

51

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-112

LOCATION: 4'East of B-111

DATE: 1/31-2/1/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill), SILTY SAND, fine to coarse-grained, dark brown, frozen to moist, loose to medium dense.			Sheet 1 of 2
	7	SC	CLAYEY SAND, dark brown to black, moist.			Location of boring determined by U.S.G.S.
	9	CL	SILTY SANDY CLAY, with some fine to medium SAND, brown, moist, soft. (Till)			Surface elevation of boring to be determined by U.S.G.S.
	13.5	SM	SILTY SAND, fine to coarse-grained, with a trace of fine Gravel, moist to wet, loose to medium dense.			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	20	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel, brown to light brown, wet, medium dense to dense. (Outwash)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30					
			(continued)			

9604841

BRAUN ENGINEERING TESTING

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LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-112 (continued)
LOCATION:
DATE: 1/31-2/1/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 2
	33	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel brown to light brown, wet, medium dense to dense. (Outwash)			
	36	SC	CLAYEY SAND, fine to medium-grained, gray, with lenses of medium to coarse SAND, wet, loose to medium dense. (Outwash)			
		SP	SAND, fine to coarse-grained, with some fineto coarse Gravel, gray, wet, loose to medium dense. (Outwash)	39 18 21 21		
	51			9 14 15 18		Well point set at 50' depth.

9604842

BRAUN ENGINEERING TESTING

Hole no. B113 Date 2-4-80 Project well no. P113 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. NEW SIDE 39th & YOSEMITE ; NEXT TO W122 & W135

Rig CME DENNIS

Depth	Tool	Blows or drill action	Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
	3X 2¼	HOLLOW STEM AUGER						
4-6	3X 2¼			5-5.5 5.5-6	4-5		Sd, BRN, med, clean w/ GVL, f-CSE	23"
9-11	do.			10-10.5	9-10 10.5-11		do. some fine	18"
14-16	do			15-15.5	14-15 15.5-16		do	18"
19-21	do			20-20.5	19-20 20.5-21		do	18"
24-26	do.			25-25.5 25.5-26	24-25		do @25.5 Sd, BRN, fine	14"
29-31	do			30-30.5	29-30 30.5-31		Sd BRN fine 30.5 Sd, BRN, f-CSE w/ GVL	19"
34-36	do			35-35.5	34-35 35.5-36		Sd, BRN f @ top, GRY SD TILL BOTTOM TILL, GRAY, SANDY do.	24"
39-41	do			40-40.5	39-40 40.5-41		SILT, SANDY, BROWN — TILL ? w/ some WOOTHOLE FOSSILS GRANITE SILT, SANDY, BROWN	20"
44-46	do 46' TOTAL			45-45.5	44-45 45.5-46		44.2 - do Sd, BROWN, fine, CLEAN	22"
ET 16' CASING TO, 48' 48-50	do	NEW CASING		49-49.5	48-49 49-49.5 49.5-50		SILT, GRAY, SANDY, UNIFORM	15"
53-55	do			54.5-55	~~53-54~~ 54-54.5 ~~54.5-55~~		SAND, BRN, med-CSE, CLEAN	12"
58-60	do			—	—		MOSTLY EMPTY — some v. fine brown sand.	1/2"
63-65	do	"OLD PLASTIC BAG TRICK"		—	63-64 64-64.5 64.5-65		SAND, BROWN, med-CSE, CLEAN	14"
68-70	do	do		69-69.5 69.5-70	68-69		SAND, GRAY, V. fine to med, mostly fine, w/ some silt	13"
73-75	do	do		74-74.5	73-74 74.5-75		PIECES of V. CSE GVL @ TOP TILL, GRAY, V SANDY w/ WHITE LME PEBBLES	16"
78-80	do	do.		79.5-80	78-79 79-79.5		PIECES OF V. CSE GVL @ TOP TILL, GRAY, V SANDY, w/ REDDISH PEBBLES & WHITE LMS PEBBLES	15"
83-85	do	do		84.5-85	83-84 84-84½		do	16"
88-90	do	do v. scratchy @ 86-88		—	88-89 89-89½ 89½-90		do WOOD PIECE @ TIP	13"
93-95	do	do			94-94½ 94½-95		TILL, GRAY, V. SANDY w/ CSE GVL	12"

Summary

0-1 SOIL, DARK BROWN

1-25 SAND, BROWN, MEDIUM, WELL SORTED WITH SOME GRAVEL, FINE TO COARSE

25-35 SAND, BROWN, FINE

35-44 TILL, GRAY ABOVE, BROWN BELOW, SANDY, SILTY AND SILT, BROWN, SANDY

44-71 SAND AND GRAVEL, WITH SOME SILT BEDS,

71-114½ TILL, GRAY, SANDY WITH ANGULAR PIECES OF WHITE LIMESTONE ; ALSO MANY RED PEBBLES

9604843

Slug test development

Hold	Cut	W. L	Date	Hours

pipe (see page 3)

screen _____ + _____

grvl. pack _____ stick up⁻ _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B113 Date _____ Project well no. P113 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. 39th (NORTH SIDE) AND YOSEMITE ; NEXT TO W122 AND W135

Rig CME DENNIS

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
98-100	3V 2½	N EH CASING ↓		—	99-99½ 99½-100	NONE	TILL, GRAY	13"
FEB 8, 1980 103-105	do.	PLASTIC BAG		104-104½	103-104 104½-105	do.	PIECES OF GVL @ TOP TILL, GRAY, W/WHITE LMS PEBBLES, VERY SANDY	15"
108-110	do.	do.		109½-110	109-109½	do.	do	10"
113-115	do	MED. BLOW COUNT 114½ HIGH BLOWCOUNT		114½-115	113-114 114-114½ TIP	do.	do SANDSTONE, WEATHERED, YELLOWISH-WHITE	11"
118-119½	do	V. HIGH COUNT		—	118-119 (LAG?) 119-119½	do	SOME GRAY TILL ABOVE (LAG?) SANDSTONE, WEATHERED, YELLOWISH-WHITE	5"
123'-123' 7 in	do	V. HIGH COUNT		—	LOOSE SAND	SIEVE SAMPLES	SAND, GRAY-WHITE, UNIFORM, FINE V. LITTLE RETURN (WASHED OUT)	0"
123-127	—	ROLLER BIT ↓		—	—	do	SAND, WHITISH, GRAY, UNIFORM V. LITTLE RETURN	
127-131	—	do		—	—	do	SAND WHITISH-GRAY, UNIFORM, FINE	
13[illegible]-[illegible]	—	do		—	—	do	do w/some shale	
136-141	—	do		—	—	do	do w/some V. WHITE SS CHIPS	
141-146	—	do.	BOTTLES 3	—	—	do	SAND, WHITE, UNIFORM, V. FINE	
146-151	—	do	2	—	—	do.	do	
151-156	—	do	2	—	—	do	do w/ 1/2 lin ~~black~~ dark colored specks	
156-161	—	do	2	—	—	do	do	
161-166	—	do	2	—	—	do	do	
166-170	—	do	2	—	—	do	do	
NOTE:							pumped some mud into hole in anticipation of setting pipe.	
		TRIED TO SPLIT SP. SAMPLE PENETRATED 6" /700 BLOWS				FROM	170 - 170.5 RECOVERED 2'	
	→	BOTTOM ½ ft WAS WHITE Ss. Nearly 100% - SAMPLE BAG Next ½ ft was Ss dark sand intermixed with white Ss - sample bag						
170.5-176	—	Roller bit	2 bottles	—	—	—	Oppeared same as before when drlg.	

NOTE: 7'

170-176 TIGHTER DRILLING

Summary

71 - 114½ TILL, GRAY, SANDY, WITH WHITE LIMESTONE PEBBLES AND SOME RED-COLORED PEBBLES

114½ - 211.7 St. Peter Sandstone

9604844

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B113 Date Feb 12, 1980 Project well no. P113 Geologist GREG JUSTIN

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
176-181		ROLLER BIT	BOTTLES 2	-	-	✓	V. fine white Ss with dark brown oorange specks		
181-186 800#	→	" DRIVEN 184.5 TO 186.5	2				do.		
186-191		ROLLER BIT	2				do		
191-196		D.O.	2				do same drlg action		
196-201		D.O.	2	-	-	-	do		
201-206		D.O.	2	-	-	—	do. - w/s Ss in white matrix - soft (limy?)		
206-210		D.O.	3				do.		
210-211		SOFTER					BROUGHT UP CHIPPY LIGHT ORANGE Ss. about this size		
211-211.5 600#		→ HARDER					hard - gray silty Ss.		
FEB 8 - 211.5 - 211.7		caved settled in 5' overnight					SPLIT SPOON SAMPLES 300 Blows w/2½" PENETR. AVERAGE 200 BLOWS w/ 2 WATER NEXT		
							BOTTOM ½' Ss, orange, v.fine fine wrapped up for one lusie		
							NEXT ½' in sampler was white, Ss as below w/s black specks		

9604845

Hold	Cut	W.L.	Date	Hours

Slug test development

pipe 1 LENGTH 3.5' x 1¼" GALV (ON TOP) 19 LENGTHS OF 10.5' x 1¼" GALV } 203.0

screen 6' x 1¼" GALV X 10 SLOT TBE 3' x 1¼" GALV PIPE ON BOTTOM (WITH CAP ON END) + 9.5

grvl. pack 2 BAGS ~~BOTTOM SAND~~ stick up - ____

grout YES, BOTTOM TO TOP ____ calc. T.D. 2

meas. T.D. ____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 8
	1	CL	SILTY SANDY CLAY, dark brown, *			
	2.5	CL	SANDY CLAY, brown, moist. (Topsoil)			Location of boring determined by U.S.G.S.
		SP	SAND, fine to medium and fine to coarse-grained, with fine to medium Gravel, some layering, brown, moist, medium dense to dense. (Outwash)	12, 14, 14, 16		Surface elevation of boring to be determined by U.S.G.S.
				12, 18, 20, 18		Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing laboratory.
				36, 28, 35, 39		BPF does not indicate standard penetration test results since special sampling procedures were used.
				18, 36, 34, 30		*frozen. (Topsoil)
				18, 50, 76, 92		
	26	SP	SAND, fine to medium-grained, light brown, moist, medium dense to dense. (Outwash)	19, 24, 36		
	30.5		Continued			

9604846

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30.5	SP	SAND, fine to medium-grained, *	36		Sheet 2 of 8
		SP	SAND, fine to coarse-grained, some fine to medium Gravel, brown, moist, medium dense. (Outwash)	24		
	34.5			11		
		SC	CLAYEY SAND, fine grained, with a trace of fine to medium Gravel, gray, moist, medium dense to dense. (Glacial Till)	14 14 17		
	37.5					
		SM-SC	SILTY CLAYEY SAND, fine grained, with a trace of fine to medium Gravel, brown, moist, medium dense. (Glacial Till)	11 12 14 13		
	45			8 11		
		SP	SAND, fine grained, brown to light brown, wet, medium dense. (Outwash)	14 16		
	48					
		SM-SC	SILTY CLAYEY SAND, fine and very fine-grained, gray to grayish brown, wet, medium dense to dense. (Glacial Till)	6 11 18 15		
	52					
		SP	SAND, fine to medium-grained, some coarse grained SAND, brown, wet, medium dense. (Outwash)	11 10 12 13		
	58					
		SM	SAND, fine grained, some medium-grained, brown, wet, medium dense. (Outwash)	10 6 6 7		
	60					
			Continued			

9604847

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 41

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	61	SP	SAND, fine grained, some medium-grained, brown, wet, medium dense.*			Sheet 3 of 8
		SP	SAND, fine to medium-grained, brown, wet, medium dense to dense. (Outwash)	12, 14, 19, 22		*(Outwash)
	67					
		SP	SAND, fine to medium-grained, gray, wet, dense. (Outwash)	25, 31, 32, 40		
	71					
		SM-SC	SILTY CLAYEY SAND, fine grained, with a trace to some Gravel, grayish brown, wet, dense to very dense. (Glacial Till)	71, 150, 198, 200, 100, 124, 200, 225, 176, 155, 165, 140, 57, 62, 48, 45		
	90					
			Continued			

9604848

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6
DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	90	SM-SC	SILTY CLAYEY SAND, fine grained, with a trace to some Gravel, grayish brown, wet, dense to very dense.			Sheet 4 of 8
			(Glacial Till)	125		
				110		
				60		
				50		
				47		
				65		
				85		
				75		
				49		
				78		
				65		
				72		
				70		
				103		
				100		
				84		
				240		
				170		
	114.5			174		
			St. Peter Sandstone, yellow, lensed with greenish yellow.	500		9604849
				250		
	119			500		
	120		St. Peter Sandstone, medium-grained, white.	500/3"		
			Continued			

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	120		St. Peter Sandstone, medium-grained, white to yellowish white.			Sheet 5 of 8
				530 500/1"		
						Boring advanced by roller bit below the 124' depth.
	134		St. Peter Sandstone, fine grained, white.			
	150					
			Continued			

9604850

BRAUN ENGINEERING TESTING

61

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION Various Locations St Louis Park, MN U.S. Geological Survey	BORING: B-113 Cont'd LOCATION: 39th & Yosemite Site #6 DATE: 2/4 - 2/11/80 SCALE: 1" =4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	150		St. Peter Sandstone, fine grained, white.			Sheet 6 of 8
				700		
	180					
			Continued			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604851

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

62

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-113 Cont'd LOCATION: 39th & Yosemite Site #6 DATE: 2/4 - 2/11/80 SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	180		St. Peter Sandstone, fine grained, white.			Sheet 7 of 8
	210		Continued			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604852

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

Elev.	Depth 210	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
			SHALEY SANDSTONE, brownish yellow,			Sheet 8 of 8
	212.5		(St. Peter Sandstone)	700/2½"		
						Well Point set at 212' depth.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604853

BRAUN ENGINEERING TESTING

Hole no. B114 Date Feb 11, 1980 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. North side of 29th near YOSEMITE; about 4 feet west of B113, W122, and W135

Map plotted on Geologist RON WOLF

County Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
2	X 1	1	1	4	Sd, brown, f-crse, dirty w/ GVL	1	Y		0-1 SOIL, DARK BROWN
7	X 2	1	1	4	Sand, BROWN, med, clean w/GVL, f-crse	1	Y		1-55 SAND AND GRAVEL, BROWN, MEDIUM TO COARSE (WITH SOME SILT OR TILL BEDS)
12	X 3	1	1	4	do	1	Y		
17	X 4	1	1	4	do	1	Y		
22	X 5	1	1	4	do	1	Y		
27	X 6	1	1	4	do	1	Y		
32	X 7	1	1	4	do	2	Y		
37	X 8	1	1	4	do	2	Y		
42	X 9	1	1	4	do	2	Y		
47	X 10	1	1	~~4~~	do	3	Y		
52	X 11	1	1	3	do	4	Y		
TD 55	12	1	1	3	do	4			
57	13								
62	14								
67	15								
72	16								
77	17				SET 5 LENGTHS OF 1¼" GALV PIPE X 10.5' (TOTAL PIPE 52.5')				
82	18				PLUS 2.5' X 1¼" GALV DRIVEPOINT X 10 SLOT			2.5	
87	19				TOTAL CASING AND DRIVE POINT			55.0	
92	20				MINUS STICK-UP			0.4	
97	21				DEPTH OF BOTTOM OF POINT BELOW L.S.			54.6	
102	22								
107									

9604854

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-114

LOCATION: 5'West of B-113, Site #6

DATE: 2/8-11/80 **SCALE:** 1"=4'

Elev.	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	1	CL	SILTY SAND CLAY, dark brown, *			Sheet 1 of 2
	2.5	CL	SANDY CLAY, brown, moist. (Topsoil)			
	26	SP	SAND, fine to medium and fine to coarse-grained, with fine to medium Gravel, some layering, brown, moist, medium dense to dense. (Outwash)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used. *frozen. (Topsoil)
	30	SP	SAND, fine to medium-grained, light brown, moist, medium dense to dense. (Outwash)			9604855
			(continued)			BRAUN ENGINEERING TESTING

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-114 Cont'd
LOCATION:
DATE: 2/8-11/80
SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
	30.5	SP	~~SAND, fine to medium-grained, *~~			Sheet 2 of 2
	34.5	SP	SAND, fine to coarse-grained, some fine to medium Gravel, brown, moist, medium dense. (Outwash)			*light brown, moist, medium dense to dense. (Outwash)
	37.5	SC	CLAYEY SAND, fine-grained, with a trace of fine to medium Gravel, gray, moist, medium dense to dense. (Glacial Till)			
	45	SM-SC	SILTY CLAYEY SAND, fine-grained, with a trace of fine to medium Gravel, brown, moist, medium dense. (Glacial Till)			
	48	SP	SAND, fine-grained, brown to light brown, wet, medium dense. (Outwash)			
	52	SM-SC	SILTY CLAYEY SAND, fine and very fine-grained, gray to grayish brown, wet, medium dense to dense. (Glacial Till)			
	55	SP	SAND, fine to medium-grained, some coarse-grained SAND, brown, wet, medium dense. (Outwash)			Well point set at 55'.

9604856

BRAUN ENGINEERING TESTING

(See Report and Standard Plates for evaluation and descriptive terminology.)

Hole no. B115 Date 2-13-80 Project well no. _____ Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. ZARTHAN (EAST SIDE) AND 39th (IN FRONT OF HOUSE AT 3901 ZARTHAN)

Rig CME - DENNIS & JEFF

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-4			✓				BLACK SOIL & TREE ROOTS CLAY, BROWN SAND, BROWN	
4-9							SAND, BROWN, f-cse w. GVL, f-cse	
9-14							do	
14-19							do	
19-24			↓		✓	✓	do	
24-26	3X 2½			—	25-25½ 25½-26		CLAY (FROM SURFACE) SAND, BROWN @ BOTTOM W/ CLAY ABOVE SAND, BROWN, ~~med~~ f-med, clean	16"
26-29			↓					
29-34								
39								
39-47		-47 SCRATCHY (IN WATER)						
44-49			↓					
49-51	3X 2½			50½-51	50-50½		SAND, BROWN, f-cse TILL, GRAY, SANDY	15"
51-54			↓					
54-56	3X 2½			—	54-55 55-55½ 55½-56 TIP		SAND - med - BROWN, CLEAN TREE OR GRAVEL do	20"
56-59			↓					
59-64								
64-69		MAYBE TILL @ BOTTOM	↓					
69-71	3X 2½				70-70½ 70½-71		SAND, GRAY, ~~med~~ CSE, CLEAN SAND, GRAY, f-med	13"
71-74			↓					
74-79			↓					

Summary

0-2 DARK SOIL + TREE ROOTS
2-3 CLAY, BROWN.
3-4 SAND, BROWN, CLAYEY
4-19 SAND, BROWN, f-CSE w/ GRAVEL, fine to CSE
19-50½ SAND, BROWN, fine to medium w/ a little gravel
50½-54 - TILL, GRAY, SANDY
54-75? SAND, BROWN ABOVE, GRAY BELOW, medium to coarse, well sorted.
75?-102 TILL, GRAY, SANDY, SILTY (WITH LOT OF "RED" PEBBLES)

9604857

Slug test development

Hold	Cut	W.L	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up - _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B115 (cont.) Date Feb 13, 1982 Project well no. ——— Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. ZARTHAN (EAST SIDE) AND 39th (IN FRONT OF HOUSE AT 3901 ZARTHAN

Rig CME - DENNIS

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
79-81	3X 2½			—	79-80 80-80½ 80½-81		TILL, GRAY, SANDY ↓	16"	75?-102 (CONT) TILL, GRAY, SANDY
79-84		ROLLER BIT		—	—	—	NO RETURN		
84-89	SLEVG					✓	SAND, ANGULAR (FROM SANDY TILL?)		
89-91				—	89-90 90-90½ 90½-91		SAND, GRAY, FINE CSE GVL ANGULAR TILL, GRAY, SANDY	20"	
89-94		@ 92-93 CLAY ON BIT 3 TRIPS WITH ROLLER BIT				✓	SAND, ANGULAR SOME WHITISH-GRAY CLAY, MOSTLY SAND		
94-96	3X 2½			—	95-95½ 95½-96		POSSIBLE TILL, SANDY TILL, GRAY, SANDY SILTY	13"	
96-99		ROLLER BIT ↓				✓	SAND, ANGULAR, (FROM TILL?)		
99-101	3X 2½	SAMPLER DID NOT GO ALL WAY DOWN		100-100½ 100½-101	99-100		GRAVEL, ANGULAR (LAG) TILL, GRAY, SANDY ↓	14"	106 K, ¢, ~~[illegible]~~
101-104		ROLLER BIT -102 LMS ↓				✓✓	do. -102 LMS, WHITISH GRAY, CHIPS		102-104 LIMESTONE, GRAY TO WHITE, DENSE (PLATTVILLE)
D. T.D. 104									

9604858

Slug test development	Hold	Cut	W.L.	Date	Hours

pipe NO PIEZOMETER SET HERE

screen _____ + ____

grvl. pack _____ stick up ____

grout _____ calc. T.D. ____

meas. T.D. ____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORING & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-115
LOCATION: 39th & Zarthan Site #7
DATE: 2/13-14/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 4
	1.5	CL	SANDY SILTY CLAY, black, with a trace of roots, frozen. (Topsoil)			
	3.5	CL	SILTY CLAY, brown, moist. (Glacial Till)			
		SP-SM	SAND, SLIGHTLY SILTY, brown, moist, medium dense. (Outwash)			
	20	SP	SAND, fine to coarse-grained, with some fine to medium Gravel, moist, medium dense to dense. (Outwash)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen sample returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP	SAND, fine to coare-grained, brown, moist, medium dense to dense. (Outwash)	7 21 36 28		9604859
			(continued)			

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

70

PROJECT: 79-687 SOIL BORING & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-115 (continued)
LOCATION:
DATE: 2/14/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 4
	31	SP	SAND, fine to coarse-grained, * *			*brown, moist, medium dense to dense. (Outwash)
	45	SP	SAND, fine to coarse-grained, with a trace of fine Gravel, moist, medium dense to dense. (Outwash)			
	54	SM	CLAYEY SAND, fine to medium-grained, with a trace of fine Gravel, wet, dense to very dense. (Outwash)	21 21 16 21		
	60	SP	SAND, fine to medium-grained, brown, wet, medium dense to dense.	8 8 9 8		
			(continued)			

9604860

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORING & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-115 (continued)
LOCATION:
DATE: 2/13-14/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					Sheet 3 of 4
		SP	SAND, fine to medium-grained, brown, wet, dense to very dense. (Outwash)	21 38 60 59		
	78.5					
		SM-SC	SILTY SAND to CLAYEY SAND, fine to medium-grained, gray to grayish brown, wet, dense to very dense.	20 21 48 46		
	83					
		SP-SM	SAND to SILTY SAND, medium to coarse-grained, with a trace of fine Gravel, brown to gray, wet, dense to very dense. (Outwash)	49 54 68 71		Boring advanced by roller bit below the 81' depth.
	90					
			(continued)			

2604861

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-115 (continued)
LOCATION:
DATE: 2/14/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	90					Sheet 4 of 4
	90.5	SP-SM	SAND to SILTY SAND, medium to *			*coarse-grained, with a trace of fine Gravel, brown to gray, wet, dense to very dense. (Outwash)
		SM	SILTY SAND, medium to coarse-grained, with some medium to coarse Gravel, gray to grayish brown, wet, dense to very dense. (Outwash)	21 100 100 101 26 100 126 139		
	102					
			Plateville Limestone			
	104					

9604862

BRAUN ENGINEERING TESTING

Hole no. B116 Date FEB 15, 1988 Project well no. P116 Geologist RON WOLF

R _____ Site ID _____ MP descr. & elev. _____

Site descr. 36th & BELT LINE BLVD, ~9 feet EAST OF W124

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-4					0-4		GRAVEL - FILL ? CLAY DARK SAND, BROWN f-med	
4-9					4-9		SAND, BROWN, f, med, csc w/ med-csc GVL	
9-14					9-14		SAND, BROWN, med-v. csc w/ GVL, f-vcsc & COBBLES	
14-16	3½ 2½	PLASTIC BAG FROM BASKET		15-15½	14-15 15½-16 TIP		SAND, BROWN, med-v. csc w/ GVL SAND, GRAY-BROWN, fine	15"
18-20		SET H CASING N BOD & HEAVE		—	—		SPLIT-SPOON EMPTY — SOME MED GRAY SAND IN CHECK VALVE	0"
23-25				—	TIP		SLEEVES EMPTY - LARGE COBBLE CAUGHT IN BASKET SAND, BROWN, MED-CSC IN TIP	0"
28-30		HEAVING SANDS, BOULDER @26		—	@30" TIP		BROKEN COBBLES & BOULDER - NO OTHER RETURN	2"
33-35		FINE SAND WASHED OUT		—	34½-35		NOT MUCH RETURN COBBLES, GRAVEL & SOME SAND	2"
38-40				39½-40	34-39½ TIP		SAND, BROWN fine-med mostly fine, uniform	4"
43-45				—	43-44 44-44½ 44½-45		do.	13"
48-50				49-49½	48-49 49½-50 TIP		do	18"
53-55		DRILLER SAYS DIFF CRUM @ 52' FOR PERM →		54½-55	54-54½		TILL, WHITISH-GRAY, SANDY	12"
58-60		1st TRY		—	58-60		1st TRY ONLY COBBLES & GRAVEL; COBBLE IN TIP do	4"
60-60½		2nd TRY		—	59-60 TIP		do.	10"
63-65		NO PLASTIC BAG		64-64½ 64½-65	63-64		do	15"
68-70		do.		—	68-69 69-69½ 69½-70		SAND @ 68-69 WEATHERED LMS + BROKEN PIECES	
68-70		ROLLER BIT		—	68-70		SAND & LMS	
70-72				—	70-72		do LMS w/ WHITISH GRAY CLAY	
72-76				—	72-73 73-74 74-75 75-76	✓ ✓ ✓ ✓	LMS, GRAY	
76-79					76-78 78-79	✓	do. DARK OIL (or CREOSOTE?) FILM ON MUD TANK	

Summary

0-2 FILL - SAND AND GRAVEL
2-3 SOIL, DARK BROWN
3-33 SAND AND GRAVEL
SAND, med.-very coarse
GRAVEL, fine to coarse
with some cobbles

33-52
SAND, BROWN, fine to medium, fairly uniform

52-68 TILL, WHITISH-GRAY

68-69 SAND, GRAY, MEDIUM, CSC AND GRAVEL
69-71 LIMESTONE, WHITISH-GRAY, WEATHERED BROKEN PIECES
71-79 LIMESTONE, GRAY, FAIRLY SOLID

9604863

Slug test development

Hold	Cut	W.L	Date	Hours

pipe _____ (see page 2)

screen _____ + _____

grvl. pack _____ stick up⁻ _____

grout _____ calc. T.D. _____

meas. T.D.

(p 2 of 2)

Hole no. B116 Date 2-15-80 / 2-21-80 Project well no. P116 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. 36th + BELT LINE BLVD

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
79-82		ROLLER BIT			79-79½, 79½-80, 80-80½	✓✓✓	SHALE, GRAY TO BLUE-GREEN TO YELLOWISH-GREEN	
82		↓			80½-82	✓	SANDSTONE, YELLOWISH-BROWN WEATHERED, AND SHALE, LIGHT GREENISH-YELLOW	
82-82½	3 X 2½	SAMPLE	FOR MARC	→	82-82½			7"
82½-91½		ROLLER BIT				✓	SANDSTONE, WHITE, VERY FINE UNIFORM	NONE

Summary

79-80½ SHALE, GRAY ABOVE, TO BLUE GREEN TO YELLOWISH-GREEN BELOW

80½-84 SANDSTONE, YELLOW, WEATHERED WITH LIGHT GREENISH-YELLOW SHALE

84-91½ SANDSTONE, WHITE, VERY FINE, UNIFORM

91.5 BOTTOM OF HOLE

9604864

TOP LENGTH = 5' x 1¼" galv = 5.0
8 LENGTHS of 10.5' x 1¼" galv. = 84.0
2½' x 1¼" x 10 SLOT DRIVE POINT 2.5
TOTAL CASING AND SCREEN = 91.5
STICK-UP = 0.0
DEPTH FROM L.S TO BOTTOM = 91.5

Slug test development

Hold	Cut	W. L	Date	Hours

pipe 1 LENGTH 5' x 1¼" GALV; 8 LENGTHS 10½' x 1¼" GALV } 89.0

screen 2½ ft x 1¼" x 10 SLOT + 2.5

grvl. pack SILICA SAND stick up − 0.0

grout TOP OF GRAVEL PACK TO 10' BELOW LAND SURFACE calc. T.D. 91.5

meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOILS BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-116

LOCATION: 36th E. Beltline Blvd. Site #8

DATE: 2/15-21/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 3
	2	SM	SILTY SAND, fine to medium-grained, dark brown, frozen. (Topsoil)			
		SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, moist, medium dense to dense. (Outwash)			
				12		Location of boring determined by U.S.G.S.
				14		Surface elevation of boring to be determined by U.S.G.S.
				16		
				14		Soil Classifications based on drillers log and visual examination of random frozen sample returned to Braun Engineering Testing Laboratory.
				9		BPF does not indicate standard penetration test results since special sampling procedures were used.
				11		
				10		
				14		
				21		
				18		
				17		
				11		
				10		
				18		
	30			8		
				7		
			(continued)			

9604865

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-116 (continued)
LOCATION:
DATE: 2/15-21/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 3
	33	SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, moist, medium dense to dense.			
	52	SP	SAND, very fine to fine-grained, brown to reddish brown, wet, medium dense. (Outwash)	21, 12, 12, 14, 8, 10, 10, 12, 12, 14, 16, 19, 12, 14, 16, 19		
	60	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, medium dense to dense. (Outwash)	30, 39, 27, 37, 51, 112, 59, 60		
			(continued)			

9604866

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

77

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-116 (continued) LOCATION: DATE: 2/15-21/80 SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth 60	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 3 of 3
		SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, medium dense to dense. (Outwash)	55 60 55 120		
	69			78 157		
	70.5		Plateville Limestone (Weathered)	227 210		
	79		Plateville Limestone			Boring advanced by roller bit below the 70-foot depth.
	79.5		Shale, dark gray.			
	80		Shale, blue gray.			
	80.5		Shale, yellow.			
	85		SANDSTONE, coarse-grained, grayish brown.	500		
	91.5		SANDSTONE, fine to medium-grained, grayish brown. Wellpoint set at 91.5'.			Boring [illegible] at 91.5' depth.

9604867

BRAUN ENGINEERING TESTING

Hole no. B117 Date 2-21-80 Project well no. P117 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. 36th AND BELTLINE BLVD.

Rig CME - DENNIS

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-4		AUGER					SAND	
4-9							SAND AND GRAVEL (NO SAMPLES TAKEN)	
9-14								
14-19								
19-24								
24-26	3 x 2½	PLASTIC BAG	CHEM	25-25½ 25½-26			SAND, BROWN, f-m. CSE w/ f to med GVL	12"
~~24-29~~ 30								
~~29~~-30								
		CASH DOWN						
30-32	3 x 2½	NO PLASTIC BAG	CHEM	31-31½ 31½-32	30-32		SAND, BROWN, cse - v cse, w/ f. GVL	15"
30-32.5		AUGER						

Summary:

0-2 FILL - SAND AND GRAVEL
2-3 SOIL, DARK BROWN
3-33 SAND AND GRAVEL

SET 30 feet CASING PLUS 2½ foot POINT (TOTAL 32.5')

TOP DROPPED AN EXTRA 8" or so BELOW LAND SURFACE,

So ADDED 3 foot EXTENSION ON TOP.

SCREENED INTERVAL = 30.7 - 33.2

9604868

Hold	Cut	W. L	Date	Hours

Slug test development

1¼" x 3.0'
1½" x 2.0
1¼ x 7.0
2 LENGTHS x 10.5' x 1¼" = 21.0
2.5' x 1¼" x 10 SLOT DRIVE POINT 2.5
TOTAL CASING AND SCREEN 35.5
STICK-UP 2.3
DEPTH TO BOTTOM OF POINT 32.8

pipe TOTAL CASING = 33.0

screen 2.5' x 1¼" x 10 SLOT + 2.5

grvl. pack 3 cu ft coarse silica SAND stick up - 2.3

grout FROM JUST ABOVE SCREEN TO TOP calc. T.D. _____

meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

79

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-117

LOCATION: 5'East of B-116.

DATE: 2/21/80 **SCALE:** 1"=4'

Elev.	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	2	SM	SILTY SAND, fine to medium-grained, dark brown, frozen. (Topsoil)			Sheet 1 of 2
		SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, moist, medium dense to dense. (Outwash)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
				20 17 10 10		
	30					
			(continued)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604869

LOG OF BORING

BRAUN ENGINEERING TESTING

80

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-117 (continued)

LOCATION:

DATE: 2/21/80

SCALE: 1"=4'

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 2 of 2
	33	SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, moist, medium dense to dense.	67 146 200 42 34		Well point set at 32' depth.
		SP	Water level down 14' immediately after withdrawal of auger.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604870

81

Hole no. B 118 Date Feb 22, 1980 Project well no. P 118 Geologist RON WOLF

T-R _____ Site ID _____ MP descr. & elev _____

Site descr. HAMPSHIRE (WEST SIDE) ABOUT 300 feet SOUTH OF LAKE ST & ABOUT 40 NORTH OF W 11

Rig CME

Depth	Tool	Blows or drill action	Sample taken: Auger	Sample taken: core (sleeved)	Sample taken: core (bagged)	Sample taken: cuttings	Sample description	recovery
0-4		AUGER	✓				FILL, DARK SOIL, SAND & GRAVEL AND NAILS, LEAD SLAG, ETC	
4-9			✓				ORGANIC CLAY	
9-11	3X 2½			—	10-10½ 10½-11		SILTY SAND, ORGANIC SILT ETC. (NOT BELOW WT)	12"
9-14								
14-16	SHELBY TUBE		✓	(S.T.) 14-16		OFF AUGER	TOP: BLACK PEATY ORGANIC MATERIAL WITH GRAY CLAY BELOW BOTTOM SAND, MED-CSE GRAY-BROWN	18"
16-18	H CASING AND N SPLIT SPOON	ROD WITH						
18-20	3X 2½	↓		—	TIP		LMS, COBBLE WHITISH-GRAY CAUGHT IN BASKET, NO SAMPLE	0"
23-25	do	↓		—	TIP		DARK IGNEOUS COBBLE IN BASKET	0"
25-26	do			—	TIP TUBES		SAND, GRAY, F-med, some CSE (NO ODOR)	2"
28-30	do		CHEM	29½-30	29-29½		SAND, GRAY, CSE AND GRAVEL fine to VCSE	9"
30-33	do	ON ROLLER BIT 32 — ROLLER BIT 33			30-33	✓		
33-35	3X			?	34-34½			?
38-40	do		CHEM	38½-40			SAND, GRAY, MED-CSE W/ GVL	8"
40-42	do		CHEM	41½-42	40-41½		do	8"
42-45	do		CHEM CHEM	44-44½ 44½-45	43-44		SAND, GRAY, MED-FINE SLIGHT ODOR	18"
48-50	do			—	48-50		VERY LITTLE RETURN	1"
53-55	do				TIP		NO RETURN - COBBLE IN TIP 2nd TRY - VERY LITTLE RETURN	½"
58-60	do		CHEM CHEM	59-59½ 59½-60	58-59 TIP		SAND, GRAY, FINE (TOP FAT) SAND, GRAY, MED-CSE (BOTTOM FAT) STRING ORG AT TIP & BOTTOM SLEEVE	21"
63-65	do	RETURN WATER REDDISH @ 63	POLM CHEM	64-64½ 64½-65	63-64 TIP		REDDISH-GRAY TILL & A LITTLE RED SAND (NO ODOR) PLATTVILLE LMS IN TIP	18"
65-66		TOOK CASING TO 65'-LMS			65-66 TIP 65-66		LMS	

Hold	Cut	W.L	Date	Hours

Slug test development

Summary

0-4 FILL, SAND & GRAVEL, NAILS, LEAD SLAG, DARK SOIL

4-12½ ORGANIC MATERIAL, DARK, CLAYEY, SILTY

12½-15½ CLAY, GRAY, LAKE DEPOSIT?

15½-62 SAND, GRAY-BROWN ABOVE, GRAY BELOW Medium to CSE with fines & COARSE GRAVEL

9604871

62-65 TILL, REDDISH-GRAY, CLAYEY

65-85 LIMESTONE, GRAY, (PLATTVILLE) WITH SAND IN CRACKS

pipe _____

screen _____ + _____

grvl. pack _____ stick up _____

grout _____ calc. T.D. _____

meas. T.D. _____

82

Hole no. B118 Date FEB 22 – MARCH 4, 1980 Project well no. P118 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
66-70						✓		
70-71						✓		
71-75½						✓		
75½-79				—	—	✓	DID NOT TAKE SAMPLES	
79-80½					79-80½	✓	LIMESTONE	
80½-81½				—	—	—	NO SAMPLE	
81-85					81-85	✓	LIMESTONE, GRAY, DENSE, (PLATTVILLE)	
85-85½					85-85½	✓	SHALE, BLUE-GREEN SOFT, BUT FIRM	
85½	3X 2I	1st TRY 2nd TRY 3rd TRY					SHALE, BLUE-GREEN IN TIP	

DRILLER TRIED TO WASH MUD FROM OPEN HOLE IN LIMESTONE BUT (WASH WATER WAS RED) SAND, GRAVEL, AND RED TILL PIECES KEPT WASHING IN. SOUNDED DEPTH AT 70 FEET – DROVE AND JETTED SCREEN TO 72.5 FEET AND LET SIT OVER NIGHT. NEXT MORNING SAND AT ABOUT 67'. POURED SILICA SAND IN CASING (H) UP TO 65. GROUTED ABOVE THAT WITH 5 BAGS CEMENT AND 3 BAGS DRILLING MUD. PULLED H CASING.

Summary

65-85 (cont)
LIMESTONE, GRAY (PLATTVILLE) WITH SAND IN CREVICES OF LMS.

85-87½ SHALE, GLENWOOD, BLUE-GREEN

9604872

Hold	Cut	W.L.	Date	Hours

1 length (top) 7 feet x 1¼" gsb (7')
CL[illegible] transfer 10' gsb 63'
TOTAL PIPE 70'
SS 5 x 1¼" x 10 slot drive point 2.5'
STICK-UP 0.0'
TOP OF POINT BELOW LS. 72.5

Slug test
development

pipe TOTAL CASING 70.0
screen 2.5' x 1¼" x 10 slot point 2.5
FROM 65-70
grvl. pack _____ stick up 0.0
5 BAGS CEMENT
grout AND 3 BAGS MUD calc. T.D. 72.5
meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-118

LOCATION: Lake Street Boulevard & Hampshire
Site #9

DATE: 2/22 - 3/4/80 **SCALE:** 1" =4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill) SILTY SAND, fine to medium-grained, with some medium Gravel, dark brown to black with some steel chunks, frozen to moist.			Sheet 1 of 3 Boring advanced by roller-bit below the 66' depth. Location of boring determined by U.S.G.S.
	8	SC	(Fill) SILTY CLAYEY SAND to CLAYEY SAND, fine to coarse-grained, dark brown to black, moist, loose to medium dense.	10 8 8 9		Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and random frozen samples returned to Braun Engineering Testing Laboratory.
	12.5	CL	SANDY CLAY, with trace of fine Gravel, gray to olive gray, moist, medium. (Till)			
	15.5	SP	SAND, fine to medium-grained, with trace of fine Gravel, gray to grayish brown, wet, medium dense to dense (Outwash)	8 6 6 7 23 10 11 10 20 15 26 12 10 11		BPF does not indicate standard penetration test results since special sampling procedures were used.
	30		Continued			

9604873

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-118 (continued)
LOCATION:
DATE: 2/22-3/4/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense. (Outwash)	7, 8, 10, 9		Sheet 2 of 3. Encountered medium boulders at 32' depth.
				21, 14, 11		
				8, 8, 8		
				7, 8		
				21, 12		
				8, 8		
				18, 17		
				17, 16		
				121, 35		
				22, 21		
				21, 20		9604874
	60			12, 12		
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-118 (continued) LOCATION: DATE: 2/22-3/4/80 SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	62	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium *			Sheet 3 of 3
	65	SC	SILTY CLAYEY SAND TO CLAYEY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown mottled with gray**	45 24 24 125		*dense to dense. **wet, dense. (Outwash)
	73		Plateville Limestone (Weathered)			Well point set at 72.5' depth.
	87.5		Plateville Limestone	8 18 23 52		Boring grouted to surface.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604875

Hole no. B119 Date MAR 5, 1980 Project well no. _____ Geologist GREG JUSTIN

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-42							NO SAMPLES	
12-44		1st try	100/4' 40/8'		TIP + 1 tube		DK. MED. GR.	6"
		2nd try	100/4'		—		heaved up 3' and zilch recovery - DROVE ONLY 1'	0
			—				WASHED OUT TO 44.5 AND SET 25' screen a 4" x 10.5' casing 1½ gals.	
							- PULLED BACK AUGER TO ALLOW FORMATION TO COLLAPSE ON IT	
							THEN GROUTED - TOOK A TUB OF GROUT FROM 40-25'	
							ANOTHER TUB 25-10'	

Summary

3-5-80 BY BBJ
DRILLER WASHED OUT 2' OF FN-MED GRAVEL WHICH FELL IN OVERNIGHT.

mixed grout (bentonite + cement)

9604876

pipe 42.5

screen 25 + ____

grvl. pack _____ stick up ____

grout _____ calc. T.D. ____

meas. T.D. ____

Slug test development

Hold	Cut	W.L.	Date	Hours

LOG OF BORING

BRAUN ENGINEERING TESTING

87

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-119

LOCATION: 5'South of B-119, Site #7.

DATE: 3/4-5/80 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	8	SM	(Fill) SILTY SAND, fine to medium-grained, with some medium Gravel, dark brown to black with some steel chunks, frozen to moist.			Sheet 1 of 2
	12.5	SC	(Fill) SILTY CLAYEY SAND to CLAYEY SAND, fine to coarse-grained, dark brown to black, moist, loose to medium dense.			Location of boring determined by U.S.G.S.
	15.5	CL	SANDY CLAY, with a trace of fine Gravel, gray to olive gray, moist, medium. (Till)			Surface elevation of boring to be determined by U.S.G.S.
	30	SP	SAND fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense. (Outwash)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
						BPF does not indicate standard penetration test results since special sampling procedures were used.
			(continued)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604877

88

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-119 (continued) LOCATION: DATE: 3/4-5/80	SCALE: 1"=4'

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
		SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense. (Outwash)			Sheet 2 of 2
	44.5			50 50 20 20		Well point set at 44.5' depth.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604878

Hole no. B120 Date 3-5-80 Project well no. St Louis Park Geologist

T&R Site ID MP descr. & elev.

Site descr. ~5' N. of B118

Rig

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-45							No Sample	
45-54						✓	Sample taken because of creosote smell	
54-59						✓	D.O.	
59-61				1st try			red-gravel.	3"
							Rubbered to 61' and washed out to 61' and to	
							use mud.	
0-61				2 + Tip			60.0-60.5 · clean fn-cr gravel	
0.5-61.0				✓			More sandy w/s fn sand	
T							Inside · sandy gu. Outside - sandy red clay - preserved (frozen) tip	

Summary

Noticed a slight creosote smell @ 40' with increasing odor with depth

Installed 5 10½
1 5
1 2

Pipe 59½

Screen 2½

62.0

Screen 59.5 - 62.0

9604879

Slug test development

Hold	Cut	W.L	Date	Hours

pipe

screen +

grvl pack stick up-

grout calc. T.D.

meas. T.D.

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-120

LOCATION: 5'North of B-118, Site #9.

DATE: 3/5/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill) SILTY SAND, fine to medium-grained, with some medium Gravel, dark brown to black with some steel chunks, frozen to moist. (Outwash)			Sheet 1 of 2
	8	SC	(Fill) SILTY CLAYEY SAND TO CLAYEY SAND, fineto coarse-grained, dark brown to black, moist, loose to medium dense.			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S.
	12.5	CL	SANDY CLAY, with a trace of fine Gravel, gray to olive gray, moist, medium. (Till)			Soil Classifications based on drillers log and visual examination of random forzen samples returned to Braun Engineering Testing Laboratory.
	15.5	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense.			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30					
			(continued)			

9604880

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, vN
U.S. Geological Survey

BORING: B-120 (continued)
LOCATION:
DATE: 3/5/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense. (Outwash)			Sheet 2 of 2
						9604881
						*brown, wet, dense. (Outwash)
						**Water level down 14' immediately after withdrawal of auger. Well point set at 62' depth.
	61			12 8 6 6		
	62	SC	SILTY CLAYEY SAND TO CLAYEY SAND, fine to medium-grained, reddish* **	24 28		

92

Hole no. B121 Date 3-6-80 Project well no. P 121 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. ON FILL IN SWAMPY AREA - NORTH SIDE OF LAKE STREET

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0.4		AUGER				✓	FILL - CLAY + BLACK SOIL (WOOD @ 4 FEET)	
4-6	3 X 2½			—	5-5½ 5½-6 TIP		FILL - CLAY GLASS + WOOD CREOSOTE ODOR AT TIP	9"
6-8						✓	SOUPY CREOSOTE & FINE SAND	
8-9							PEAT	
9-11	3 X 2½			—	10-10½ 10½-11 TIP		PEAT (STRONG ODOR)	12"
14-16	do		PERM CHEM CHEM	14-15 15-15½ 15½-16	~~14-15~~ TIP		PEAT MARL - WHITE STRONG ODOR CLAYEY SILT + FINE SAND, BLUE-GREY	24"
19-21	do	SET W/CASING	PERM CHEM CHEM	19-20 20-20½ 20½-21	BASKET TIP		CLAY - MARL & CLAY CLAY - BLUE-GREEN STRONG ODOR SAND & GVL - WITH CREOSOTE	24"
23-25	do	H CASING + N ROD		—	~~BASKET~~ 24½-25		~~1ST TRY - COBBLE IN BASKET~~ STRONG ODOR ~~STRONG~~ GRAVEL, V. CSE - NEED PLASTIC BAG	3"
30	do	PLASTIC BAG		—	BASKET 29½-30	1ST TRY 2nd TRY	1ST TRY - COBBLE IN BASKET 2nd TRY - SAND, GRAY, f-CSE, MOSTLY medium, STRONG ODOR	1 ft. 4"
28-33	—	BOULDER @ 31 - ROLLER BIT		—	—	✓	BOULDER - PINK CHIPS - GRANITE? ABOUT 8" STRONG ODOR	
33-35	3 X 2½						SAND & GRAVEL V. DIRTY, GRAY TILL ?? (BOULDER CHIPS @ TOP) STRONG ODOR	
38-40	do			—	39½-40		1ST TRY COBBLE IN TIP SAND & GVL, DIRTY WITH STRONG ODOR	4"
40-41	do		CHEM	40-40½	40½-41		~~SAND & GRAVEL - COBBLE~~ ~~STRONG ODOR~~ ~~SAND, GRAY, SILTY f-med~~ STRONG ODOR	12"
43-45	do		CHEM CHEM	44-44½ 44½-45	43-44		SILTY SAND, GRAY (TILL??)	15"
48-50	do			—	49½-50		GRAVEL, BROKEN COBBLES, SAND STRONG ODOR	3"
48-53	—	BOULDER OR BEDROCK @ 52'					NO RETURN - DRILLER SAYS COARSE GRAVEL	
53-55	3 X 2½			54½-55	54-54½		SILTY SAND, GRAY, w/ GRAVEL + BROKEN COBBLES (LAG) TILL ??	11"
58-60	do			—	59-59½ 59½-60		SAND, GRAY, f-med, fairly clean w/ GVL & BROKEN CHIPS & COBBLES OR CONC GVL	9"
63-65	do			—	64½-65		1ST TRY - NOT MUCH RETURN BROKEN COBBLES	3"
63½-65		DRILLER SAYS TILL @ 62 LMS @ 64½		64½-65			2nd TRY - DIRTY SAND & GVL - REDDISH TILL? - WITH RED LMS IN TIP - BROKEN	11"

Summary
0-6 FILL - CLAY, BROWN w/ GLASS, WOOD, ETC.
6-8 SAND, SILTY, FINE; BLACK, LIQUID CREOSOTE
8-15 PEAT, BROWN, FIBEROUS, STRONG CREOSOTE ODOR
15-15½ SILT, WHITE
15½-20 CLAY, BLUE-GREEN (LAKE SEDIMENTS)
20-33 SAND AND GRAVEL SAND, GRAY, fine to coarse GRAVEL, fine to very coarse with cobbles HAS STRONG CREOSOTE ODOR
40-55½ TILL, GRAY, SANDY with large cobbles
55½-62 SAND AND GRAVEL
62-64½ TILL, REDDISH, SANDY
64½-82 LIMESTONE, (PLATTVILLE)

9604882

Slug test development

Hold	Cut	W.L	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B121 (CONT) Date _____ Project well no. P121 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
65-67		ROLLER BIT					LIMESTONE AND SHALE		64½-82 (CONT.) LIMESTONE, GRAY, (PLATTVILLE) WITH SHALE BEDS IN UPPER 2½ feet, AND SOLUTION CHANNELS AT 68 AND 70 feet
67-72	CORE (DIAMOND)		FROZE →	67-72	@ 68		LIMESTONE, GRAY, (PLATTVILLE) WITH SOLUTION CHANNEL @ 68 and 69-70		
72-77	do			72-77			do.		
77-82	do.			77-82			do		
82-82½	do.		FROZE →		82-82½		SHALE, BLUE-GREEN, FIRM		82-82½ SHALE, BLUE-GREEN (GLENWOOD)
		SET CASING, WITH FLOOR FLANGE ATTACHED (NO SCREEN)							
		TO BOTTOM OF PIPE, ON SHELF AT 67 FEET WHICH							
		RESULTED FROM HOLE REDUCTION AT 67 FEET FROM							
		3⅞ TO 3⅛ INCHES. ATTACHED PLASTIC							
		COFFEE CAN LID TO FLOOR FLANGE TO ACT AS							

? × 3 = 3
× 5 = 5
× 7 = 7
× 10½ = 52.5
TOTAL (ALL CASING AND SCREEN) = 67.5
STICK UP = 0.5
67.0

9604883

ET:

LENGTH 3 FEET x 1¼ inch (galv)	=	3.0
LENGTH 5 FEET x 1¼ inch "	=	5.0
LENGTH 7 FEET x 1¼ inch "	=	7.0
LENGTHS 10.5 FEET x 1¼ inch "	=	52.5
TOTAL CASING	=	67.5
STICK-UP		0.4
		67.1
OPEN HOLE		15.4
BOTTOM OF HOLE		82.5

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe _____

screen _____ + _____

grvl. pack NONE FROM 67 feet stick up − _____

grout TO SURFACE calc. T.D. _____

meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B -121

LOCATION: Across from Cardinal Glass
St Louis Park, Site #10

DATE: 3/6 - 3/10/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 3
	2.5	SM-SC	Fill: SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			
	3.5	CL	Fill: SANDY CLAY, brown, moist.			Location of boring determined by U.S.G.S.
	8	CL	Fill: SANDY CLAY, with traces of glass and wood, with a trace to some fine to medium SAND, creosote odor, dark brown to black, wet, medium.	3 3 4 4		Surface elevation of boring to be determined by U.S.G.S.
	15.5	Pt	PEAT, fibrous, creosote odor, layer of bog lime at 15', trace of shells at 15', dark brown, wet. (Swamp)	2 2 2 3 4 6 6		Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	20	ML-CL	CLAYEY SILT-SILTY CLAY, lenses of very fine SAND, creosote odor, gray, wet, stiff to very stiff. (Lacustrine)	8 13 16		
	27	SP-SM	SAND SLIGHTLY SILTY, medium to coarse-grained, some fine to medium Gravel, layer of black fine to medium SAND at 20', creosote odor, gray, wet, dense to very dense. (Outwash)	20 21 25 25 21 18		
	30	SP-SM	SAND SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense to very dense. *	10 10 10 10		9604884
			*(Outwash) Continued			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-121 Cont'd
LOCATION: Across from Cardinal Glass
St. Louis Park, Site #10
DATE: 3/6/ - 3/10/89 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP-SM	SAND SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense. (Outwash)	44, 44, 45, 43, 14, 28, 33, 33		Sheet 2 of 3
	40	SM	SILTY SAND, fine to medium-grained, some coarse SAND, some fine to medium Gravel, grayish brown, wet, dense to very dense. (Glacial Till)	18, 29, 18, 26, 26, 28, 48, 29, 30, 54		
	50	SM	SILTY SAND, fine to coarse grained, some Gravel, grayish brown, wet, very dense. (Glacial Till)	80, 51, 28, 17		
	55.5	SP	SAND, fine to medium-grained, with a trace of coarse SAND, and a trace of fine Gravel, grayish brown, wet, dense. (Outwash)	21, 16, 17, 16		9604885
	60		Continued			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-121 Cont'd
LOCATION: Across from Cardinal Glass
St Louis Park, Site #10
DATE: 3/6 - 3/10/80 **SCALE:** 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	62	SP	SAND, fine to medium-grained, with a trace of coarse SAND, and a trace of fine Gravel, grayish brown, *			Sheet 3 of 3
	64.5	SM	SILTY SAND, fine to coarse-grained, some Gravel, lenses of reddish brown SAND, grayish brown, wet, very dense. (Glacial Till)	40 48 50		
	67		WEATHERED LIMESTONE, lense of SHALE, gray. (Platteville Formation)	150 200		
			Bedrock cored 67' to 82.5' depth. See attached log of rock coring sheet. *wet, dense.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604886

Hole no. B122 Date 3-11-80 Project well no. P122 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	Sample taken: core (sleeved)	Sample taken: core (bagged)	Sample taken: cuttings	Sample description	recovery	Summary
0-4							FILL - CLAY, BROWN		0-6 FILL, MOSTLY CLAY, BROWN
4-9			2 SAMPLES (FROZEN) FOR CHEM			✓	SILTY SAND, BLACK, SOUPY; VERY STRONG ODOR; CRESOTE		6-8 SAND, SILTY, FINE, WITH BLACK, LIQUID CREOSOTE
9-14									8-15 PEAT, BROWN, FIBEROUS, STRONG CRESOTE ODOR
14-19									15-20 CLAYS AND SILTS, BLUE-GREEN, (LAKE SEDIMENTS)
19-24									20-33 SAND AND GRAVEL fine to very coarse, with cobbles; has strong creosote odor
24-29									
29-34									
34-36	3 x 2½		CHEM	35-35½			SILTY SAND, GRAY-BLACK fine-med, (TILL, SANDY ??)		33-36 SAND, SILTY, GRAY, fine-med

x 10.5 = 31.5
3
34.5
2.5
37.0
1.5
35.5

960487

ET: 1 LENGTH (TOP) 3 ft x 1¼ incl gslv. = 3.0
[illegible] 10.5 ft x 1¼ incl = 31.5
TOTAL CASING = 34.5
2.5 ft x 1¼" x 10 SLOT POINT = 2.5
TOTAL LENGTH FROM MP. TO TIP = 37.0
STICK-UP = 1.7
BOTTOM OF SCREEN BELOW L.S. = 35.3

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe TOTAL CASING 34.5

screen 2.5' x 1¼" x 10 SLOT POINT + 2.5

grvl. pack _____ stick up − 1.7

grout _____ calc. T.D. 35.3 (2.5)

meas. T.D. _____

98

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-122

LOCATION: 5'East of B-121, Site #10.

DATE: 3/10/80 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM-SC	Fill, SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			Sheet 1 of 2
	2.5	CL	Fill, SANDY CLAY, brown, moist.			
	3.5	CL	Fill, SANDY CLAY, with traces of glass and wood, with a trace to some fine to medium SAND, creosote odor, dark brown to black, wet, medium.			
	8	Pt	PEAT, fibrous, creosote odor, layer of bog lime at 15', trace of shells at 15', dark brown, wet.			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	15.5	ML-CL	CLAYEY SILT-SILTY CLAY, lness of very fine SAND, creosote odor, gray, wet, stiff to very stiff. (Lacustrine)			
	20	SP-SM	SAND, SLIGHTLY SILTY, medium to coarse-grained, some fine to medium Gravel, layer of black, fine to medium SAND at 20', creosote odor, gray, wet, dense to very dense. (Outwash)			
	27	SP-SM	SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish *			9604888
	30		*brown, wet, medium dense to very dense. (Outwash)			

(continued)

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-122 (continued)
LOCATION:
DATE: 3/10/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 2
		SP-SM	SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense. (Outwash)	12 8 8 9		Well point set at 36' depth.
	36					

9604889

Hole no. B123 Date 3-11-80 Project well no. P123 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
0-4							FILL		0-6 FILL, MOSTLY CLAY, BROWN
4-9							SOUPY SAND - BLACK V. STRONG ODOUR		6-8 SAND, SILTY, FINE, WITH BLACK, LIQUID CREOSOTE
9-14							NOT MUCH RETURN		8-15 PEAT, BROWN, FIBEROUS, STRONG CREOSOTE ODOR
14-19							do		15-20 CLAYS AND SILTS, WHITE ABOVE, BLUE-GREEN BELOW. (LAKE SEDIMENTS)
19-22							do.		
22-24	3X 2½	1ST TRY					MOSTLY PEAT LAG FROM ABOVE - SOME GVL IN TIP	24"	20-24 SAND AND GRAVEL
22-24A	do	WASH OUT TRY AGAIN			22-24		VERY LITTLE RETURN - WASHED OUT END	1"	

K 2.0 = 2.0
10.5 = 21.0
TOTAL
AL PIPE 23.0
CREEN 2.5
P
TO TIP 25.5
TICK
CK-UP 2.
M TO LS
bottom

9604889

Slug test development	Hold	Cut	W.L	Date	Hours

pipe TOTAL CASING 23.0

screen 2.5' x 1¼" x 10 SLOT POINT + 2.5

grvl. pack _____ stick up - 1.5

grout _____ calc. T.D. _____

meas. T.D. _____

101

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-123

LOCATION: 5'East of B-122, Site #10.

DATE: 3/11/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	2.5	SM-SC	Fill, SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			
	3.5	CL	Fill, SANDY CLAY, brown, moist.			
	8	CL	Fill, SANDY CLAY, with traces of glass and wood, with a trace to some fine to medium SAND, creosote odor, dark brown to black, wet, medium.			
	15.5	Pt	PEAT, fibrous, creosote odor, layer of bog lime at 15', trace of shells at 15', dark brown, wet. (Swamp)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	20	ML-CL	CLAYEY SILT-SILTY CLAY, lenses of very fine SAND, creosote odor, gray, wet, stiff to very stiff. (Lacustrine)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	24	SP-SM	SAND, SLIGHTLY SILTY, medium to coarse-grained, some fine to medium Gravel, layer of black fine to medium SAND at 20', creosote odor, gray, wet, dense*	7 6 4 4		Well point set at 24' depth.
			SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense to very dense. (Outwash)			*to very dense. (Outwash)

9604890

Hole no. B124 Date 3-11-80 Project well no. P124 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
0-4			NO SAMPLES TAKEN				FILL		0-6 FILL, MOSTLY CLAY, BROWN
4-9							FINE SOUPY SAND, BLACK, LIQUID, CREOSOTE		6-8 SAND, SILTY, FINE WITH BLACK, LIQUID CREOSOTE
9-20							PEAT, LAKE CLAYS		8-15 PEAT BROWN, FIBEROUS, STRONG CREOSOTE ODOR; 15-20 CLAYS AND SILTS WHITE ABOVE, BLUE-GREEN BELOW (LAKE SEDIMENTS)
20-59							SAND, GRAVEL, TILL?, ETC		20-40 SAND AND GRAVEL; 40-55½ TILL, GRAY, SANDY
59-61	3 X 2½	HEAVED 8 feet HAD TO WASH OUT AUGER					SAND, GRAY, med-V.CSE with fine GVL; STRONG ODOR		55½-61 SAND AND GRAVEL

9604891

1 X 1 = 2.0
5 X 5 = 5.0
10.5 X 10.5 = 52.5
59.5
SCREEN 2.5
62.0

SET:

2 Length 1 FOOT x 1¼ inch (gals) = 2.0
1 Length 5 FEET x 1¼ inch (gals) = 5.0
Length 10.5 FEET x 1¼ inch (gals) = 52.5
TOTAL CASING =
.5 ft x 1¼" x 10 SLOT POINT 2.5
TOTAL LENGTH FROM MP. TO TIP OF POINT =
TOTAL STICK-UP = 2.4
BOTTOM OF SCREEN BELOW L.S. = 59.6

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe TOTAL CASING 57.5

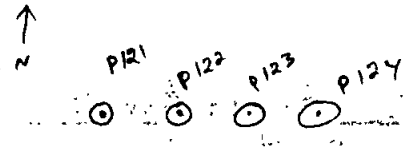
screen 2.5' x 1¼" x 10 SLOT POINT + 2.5

grvl. pack _____ stick up _____

grout _____ calc. T.D. _____

meas. T.D. _____

B124
3-11-80



9604891

LOG OF BORING

BRAUN ENGINEERING TESTING

104

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-124

LOCATION: 5'East of B-123, Site #10

DATE: 3/11/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	2.5	SM-SC	Fill, SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			Sheet 1 of 2
	3.5	CL	Fill, SANDY CLAY, brown, moist.			
	8	CL	Fill, SANDY CLAY, with traces of glass and wood, with a trace to some fine to medium SAND, creosote odor, dark brown, wet.			Location of boring determined by U.S.G.S.
	15.5	Pt	PEAT, fibrous, creosote odor, layer of bog lime at 15', trace of shells at 15', dark brown, wet. (Swamp)			Surface elevation of boring to be determined by U.S.G.S.
	20	ML-CL	CLAYEY SILT-SILTY CLAY, lenses of very fine SAND, creosote odor, gray, wet, stiff to very stiff. (Lacustrine)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	27	SP-SM	SAND, SLIGHTLY SILTY, medium to coarse-grained, some fine to medium Gravel, layer of black fine to medium SAND at 20', creosote odor, gray, wet, dense to very dense. (Outwash)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP-SM	SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30' gray with a trace of reddish *			
			*brown, wet, medium dense to very dense. (Outwash)			

(continued)

9604893

105

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-124 (continued)
LOCATION:
DATE: 3/11/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	40	SP-SM	SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense. (Outwash)			Sheet 2 of 2
	50	SM	SILTY SAND, fine to medium-grained, some coarse SAND, some fine to medium Gravel, grayish brown, wet, dense to very dense. (Glacial Till)			
	55.5	SM	SILTY SAND, fine to coarse-grained, some Gravel, grayish brown, wet, very dense. (Glacial Till)			9604894
	60	SP	SAND, fine to medium-grained, with a trace of coarse SAND, and a trace of fine Gravel, grayish brown, wet, dense.	32 28 29 40		Well point set at 61'.
			Boring grouted to surface.			

Site Identification Number VP-SB60

NOTICE

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- [ ] slide(s)
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P 125

106

Hole no. P128 Date 12-8-80 Loc./Well no. P128

Relation to general land level _____ Alt. _____ Soil _____

Local site desc. 105' E of W2

Map plotted on _____ Geologist MFAUST & G. JUSTIN

County _____ Lat.—long. _____

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
	1								
2	2								
7	3								
12	4								
17	5								
22	6								
27	7								
32	8								
37	9								
42	10								
47	11								
52	12								
57	13								
62	14								
67	15								
72	16								
77	17								
82	18								
87	19								
92	20								
97	21								
102	22								
107									

5x7 = 35
screen 2.5
37.5
sticks -0.7
36.8
screened
34.5
to 36.5

9604895

Site Identification Number VP-SR60

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17

Hole no. 8103 Date 1-14-80 Project. well no. P 103 Geologist M.F HULT & R.J. WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. 3/39 - OREGON 60' WEST OF W 100

Rig CME 75; BRAUN

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
0-9	HSA		✓				PEAT - BLACK, SANDY, non-fibrous		0-1 TOPSOIL
9-11	ST			✓			TOP - SANDY DK BR. PEAT BOTTOM - DK-GRAY PEAT CLY non-fibrous	15"	1-20
11-14	HSA		✓				D.D.		20-25.5
14-16	2½	15-16.0		14-15 15.0-15.5			BR.-DK. GRAY BR. PEAT CLAYEY - SOMEWHAT FIBROUS	24"	25.5-
16-19	HSA		✓				D.D.		
19-21	2½ x3			19.0-20.0 20.5-	20.0-21.0 TIP		BOTTOM - SILTY CLAY - OLIVE GR.		
21-24	HSA								
24-26	2½ x3		25.5-26.0	24.0-25.0 25.0-25.5	TIP		TOP - SILTY CLAY - OLIVE GR BOTTOM - GRAY M-CRS. CLEAN SAND		
29-31	2½ x3		29.0-29.5 29.5-30.0 30.0-31.0		TIP				
33-35	3x 3½			33.5-34.0 34.0-35.0	TIP		FN-CRS SAG. GRAY Mottled mud at HW		
31-33			38.5-39.0 39.0-39.5 39.5-40.0	X X X	Excl sample Disaggregated		trace of gray clay on bit 31-33ft		
38-40	3x 3½	distinct sand					well sorted, med CSE gray sand & gravel sand mixed with clay, silty gray		
43-44½			44-44.5		bag CO3 gel		do		
48-50	3x 2½	clay					do.? no recovery	0	
53-55	2½x 3	53.5-54.5	53.0-53.5 54.5-55		TIP		Sand gray, med-coarse well sorted to fine silt, interbedded	24	
58-60	3x 3½			58.5-59 59-60	TOP TIP		SILT, GRAY, FINE, PEATY - FILL?? Sd, gray, fine to med @ bottom, silt @ top Sd, gray, fine to med		
63-64.5	3x 3½						do.? pipe full of water - washed out sample	0	
		Sd, red-brown, fine (washed up when driller was spinning in casing)							
68-70	3x 3½						Cobble caught in tip - was taking casing down with it - some multi colr. of gel in sleeves	0	

9604807

Slug test development

Hold	Cut	W.L	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up - _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B103 Date _____ Project well no. _____ Geologist M.F. HULT & R.J. WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
68.5-72.5	3X 3½						no recovery - driller says drove like sand	0	
72-73.5	3X 3½				Tell from 71?		only 4" recovery - drove very stiff CLAYEY HARD YELLOWISH-BROWN CLAY (WEATHERING MATERIAL ?)	4"	
		Bedrock @ 73' - then quit for day		Set casing - drove (1-15-80 TUESDAY)			to 74' (So casing is 1 foot into bedrock) - Will core below 74'		73
73-74	1-16-80	Cleaned out hole from 73-74' - then began coring							
74-75.5		slow drilling					lost - broken up core	poor	
75.5-77.5		lost circulation @ 77.2					lost - OPENINGS @ 75.8-76 and @ 77-77.1	mostly	
77.5-79		water @ 77.6 - poor hitting no circulation	little fractured solid rock				lime core - not so broken up	mostly	
79-84		fast drilling					lime - solid with very few fractures shale? at 83.5 or so	5'	
84-89		fast drilling (still hard in)					lime - solid core to 88' 88' - shale fracture top of Glenwood?	4'	
89-94							shale, blue-gray (Glenwood) and sandstone, shale, gray	1	
		set 77 feet of 1¼" black casing (open end - NO DRIVE POINT OR SCREEN)							
		with 3½' STICK UP - bottom of casing @ 73½'							
		grouted casing from bottom to top with neat cement							
		hole is open to Platteville lime							

9604808

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up - _____

grout _____ calc. T.D. _____

meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-103

LOCATION: 31st & Oregon

DATE: 1/14-17/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	4	SM	(Fill) SILTY SAND TO SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen to moist.			Sheet 1 of 3
	7	SC	CLAYEY SAND, fine to medium-grained, black to dark brown, non to slightly organic, wet. (Topsoil)			
	11	CL	SANDY SILTY CLAY, black, non to slightly organic, wet.			Boring advanced by roller-bit below the 31' depth.
	18	CL	SILTY CLAY, black, non to slightly organic, wet, soft.	2, 3, 6, 8		Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	25.5	ML	CLAYEY SILT TO SILTY CLAY, dark gray, wet, soft. (Till)	2, 2, 2, 2, 2, 3, 4		BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet to waterbearing, dense. (Outwash)	12, 24, 25, 27, 30		9604809
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-103 (continued)
LOCATION:
DATE: 1/14-17/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 3
	31	SP	SAND, fine to medium-grained, *			*with a trace of fine Gravel, gray, wet to waterbearing, dense. (Outwash)
	33.5	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)	16		
	43	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, gray mottled with brown, wet, dense. (Outwash)	19, 20, 22, 19, 20, 21, 18		
	52	SP	SAND, coarse-grained, with a trace of fine Gravel, gray mottled with brown, waterbearing, dense to very dense. (Outwash)	12, 20, 20, 18, 40, 44, 25		
	57	ML	CLAYEY SILT, gray, with lenses of fine SILTY SAND, wet, very stiff to hard. (Outwash)	20, 26, 32, 44		
	60	SP-SM	SAND TO SILTY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, waterbearing, dense to very dense**	45, 47, 53, 38		
			**(Outwash) (continued)			

9604810

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: ST-103 (continued) LOCATION: DATE: 1/14-17/80 SCALE: 1"=4'

Elev:	Depth 60	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
		SP-Sm	SAND TO SILTY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, water-bearing, dense to very dense. (Outwash)	40 51 60 63		Sheet 3 of 3
	69.5			18 36		
		SP-SM	SAND TO SILTY CLAYEY SAND, fine to medium-grained, brown to reddish brown, waterbearing, very dense. (Outwash)	41 58 186 197 300		
	73.5					
			Rock cored from 74-94' depth.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604811

LOG OF BORING

BRAUN ENGINEERING TESTING

22

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INSTALLATION
St. Louis Park, Minnesota
U.S.G.S. Contract #14-08-0001-18915

BORING: B-103

LOCATION: 31st & Oregon, 60' west of W100.

DATE: 1/14/80 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 1 of 3
	0	SM & SM-SC	Fill; SILTY SAND and SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen to moist.			Samples generally taken by driving a 2½" diameter brass sleve at sampled depth.
	4	SC	Fill; CLAYEY SAND, fine-grained, non to slightly organic, dark brown to black, wet.			
	7	CL-OL	SILTY CLAY, non to SLIGHTLY SANDY, organic to slightly organic, black, wet.			Samples were frozen at the time of examination.
				TW #1		
			(Swamp)			
				2/3		
				6/8		
	20			2/2		
		ML	CLAYEY SILT, slightly organic at 24', gray to black, wet.	2/2		
			(Swamp)			
	25.5			2/3		
		SP	SAND, fine to medium-grained, with a trace of coarse SAND and fine Gravel, with layers of fine to coarse SAND and fine to very fine SAND noted at 31', gray with black and white, waterbearing. (Outwash)	4/12		
				24/25		
	30			27/30		
			(Continued on Sheet 2)			

9604812

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INSTALLATION St. Louis Park, Minnesota U.S.G.S. Contract #14-08-0001-18915	BORING: B-103 (Continued)
	LOCATION:
	DATE: / SCALE: 1"=4'

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 2 of 3
	33	SP	SAND, fine to medium-grained, with a trace of coarse SAND and fine Gravel, with layers of fine to coarse SAND and fine to *			*very fine SAND noted at 31', gray with black and white, waterbearing. (Outwash)
	42	SP-SM	SAND, SLIGHTLY SILTY and SLIGHTLY CLAYEY, fine to coarse-grained, with a trace to some coarse Gravel, gray with black and white, wet. (Outwash)	16/19 20/22 19/20 21/18		
	52	SP	SAND, fine to medium-grained, with a trace of coarse SAND and fine Gravel, gray with black and white, wet to waterbearing. (Outwash)	12/20 20 per 6" 18/40 44/25		
	60	ML	CLAYEY SILT, non to slightly SANDY, with lenses and layers of fine to medium SILTY SAND and SANDY SILT, gray, wet. (Outwash)	20/26 32/44 45/47 53/38		
			(Continued on Sheet 3)			

(See "Report and Standard Plates for evaluation and descriptive terminology.)

9604813

LOG OF BORING

BRAUN ENGINEERING TESTING

24

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INSTALLATION St. Louis Park, Minnesota U.S.G.S. Contract #14-08-0001-18915	BORING: B-103 (Continued)
	LOCATION:
	DATE: / SCALE:

Elev.	Depth 60	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 3 of 3
		SP	SAND, fine and fine to medium-grained, with lenses of SILTY SAND, gray to about 63', reddish-brown to brown below 63', water-bearing. (Outwash)	40/51 60/63		
	66					
		SM	SILTY SAND, fine to medium-grained, cobble noted at 70', brown to dark brown to reddish-brown, waterbearing. (Glacial Till)	* 30/41 *		*18 per 6" *58 per 6"
	71					
		SM-SC	SILTY CLAYEY SAND, with a trace to a little fine to medium Gravel, cobble noted. (Glacial Till)	186/197 300 per 6"		
	74					
			Bedrock encountered at 74', casing set at 74', bedrock cored at 74.0' to 94.0', see attached Log of Coring Sheet.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604814

Hole no. B104 Date 7-18-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc.

Map plotted on Geologist R.T. WOLF

County Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4 2	X 1	1/2	1	4 dry	FILL		Y		0- FILL
9 7	X 2	2	1	4 wet	FILL PEAT, BLK, CRENSHY ODOR	1	Y		PEAT
14 12	X 3	1	1	4 ROTES	do.	1	Y		
19 17	X 4	1	1 1/2	3 1/2	TRIED CHEESE TYPE - DIDN'T WORK CLAYEY SILT, BLK	2	Y		
23 22	X 5	1	1	4	SUFFICIENT TUBE SAMPLE PEAT, DK BROWN, SHEEN	3	Y		SILT WITH SAND AT BOTTOM
29 27	X 6				SAMPLE NONE	3	✓	32-33 — MOSTLY EMPTY (BAGS)	
33 32	X 7				do. SPLIT SPOON 32-34	3	Y	33-37.5 — TIP-SILT, OPA, SHEEN-34.4-37, and 34-37.5 — SILT, GRY, MOD-COARSE TIP - EMPTY	
37	8								
42	9								
47	10								
52	11				(3 lengths 10.5 = 31.5') SOL 31.5 PIPE PLUS 2' DRIVE POINT				
57	12				SCREENED INTERVAL 31 - 33 STICK-UP = 0.5 FOOT				
62	13								
67	14								
72	15								
77	16								
82	17								
87	18								
92	19								
97	20								
102	21								
107	22								

9604815

26

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-104 LOCATION: 15'North of B-103. DATE: 1/18/80 SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	5	SM	(Fill) SILTY SAND, fine to medium-grained, dark brown, frozen to moist.			Sheet 1 of 2
	7	SC	(Fill), CLAYEY SAND, black, with a trace of concrete, slightly organic, moist.			Location of boring determined by U.S.G.S.
	20		SANDY SILTY CLAY, black, slightly organic, wet, soft.			Surface elevation of boring to be determined by U.S.G.S. Soil Clssifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	26	ML	CLAYEY SILT to SILTY CLAY, gray, wet, soft. (Till)			
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)			9604816

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-104 (continued) LOCATION: DATE: 1/18/80 SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
		SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)	19 20 15 16		Sheet 2 of 2 Well point set at 33' depth.
	35					Boring grouted to the 5' depth.
			Water level down 7' immediately after withdrawal of auger.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604817

Hole no. B105 Date 1-18-80 Project well no. P105 Geologist R.J. WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. 31st St. and OREGON

Rig CME - BRAUN ENG.

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
0-4							FILL		
4-9							PEAT, BLACK, SILTY, CLAYEY		
9-11				9-11 SHELBY			PEAT, BLACK, SILTY, CLAYEY	100%	
11-14							do.		
14-19							do.		
19-24							do		
24-29							do		
29-34							do		
34							Sandy silty silt, black		
39-44									
44-49							sandy silt, black		
49-54									
54-55	2 & x 3				✓		54.4-55 (NOT FULL) SILT, SD, GRAY, SILTY; 55-55.5 - TOP - SILTY SD, V. FINE, GRAY; BOTTOM - SD, GRAY, M-CSE		
	SPLIT SPOON			✓			55.5-56 - SD, GR, SILTY, V. FINE; TIP - SD, GR, SILTY, V. FINE		
54-59									
59-61					59-60		SD, GRAY, FINE-MED, SILTY, TRACE GVL	45%	
					60-60.5		SD, GRAY, F-MED (MOSTLY EMPTY)		
					60.5-61		SD - GRY, FINE-MED		
							TIP - EMPTY		
59-61.5									

9604818

Slug test development

Hold	Cut	W.L.	Date	Hours

TOT → 1 length 7.0' } 7 MEA
pipe 5 lengths 10.5' } = 59.5
SCREENED INTERVAL
screen 2' x 1¼" DRIVE POINT + 2.0
grvl. pack NATURAL stick up − 0.5
grout CEMENT calc. T.D. 59.0
meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-105

LOCATION: 4'North of B-103.

DATE: 1/18-21/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 2
	4	SM	(Fill) SILTY SAND TO SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen to moist.			
	7	SC	CLAYEY SAND, fine to medium-grained, black to dark brown, non to slightly organic, wet. (Topsoil)			Location of boring determined by U.S.G.S.
	11	CL	SANDY SILTY CLAY, black, non to slightly organic, wet.			Surface elevation of boring to be determined by U.S.G.S.
	18	CL	SILTY CLAY, black, non to slightly organic, wet, soft.			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	25.5	ML	CLAYEY SILT TO SILTY CLAY, dark gray, wet, soft. (Till)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet to waterbearing, dense. (Outwash)			9604819
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-105 (continued)
LOCATION:
DATE: 1/18-21/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
	31	SP	SAND, fine to medium-grained, *			Sheet 2 of 2
	33.5	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)			*with a trace of fine Gravel, gray, wet to waterbearing, dense. (Outwash)
	43	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, gray mottled with brown, wet, dense. (Outwash)			
	52	SP	SAND, coarse-grained, with a trace of fine Gravel, gray mottled with brown, waterbearing, dense to very dense. (Outwash)			
	57	ML	CLAYEY SILT, gray, with lenses of fine SILTY SAND, wet, very stiff to hard. (Outwash)	11 15 15 21		
	60	SP-SM	SAND TO SILTY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, waterbearing, dense to very dense. (Outwash)	15 16 22 35		9604820 Well point set at 61' depth. Boring grouted to the surface.

Hole no. B106 Date 1-21-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. 31st St. and Oregon, St Louis Park

Map plotted on Geologist R.J. Wolf

County Hennepin Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight
4 2	1	1	1	4 DRY	FILL - Sd + GVL	1	Y	
9 7	2	1	1	4 MOIST	BEAT, DARK	1	Y	
14 12	3	1	1	3 do	SHELBY TUBE SAMPLE FOR REMOLDABILITY	1	Y	
19 17	4	1	1	2 SOFT	SILT, GRAY,	2	Y	
24 22	5	1	1	2 SOFT	SHELBY TUBE 21-23 SAND, GRAY, FINE-MED	2	Y	
29 27	6	1	1	1 LOOSE	SOFT Sd, GRAY, f-med	4	Y	
34 32	7	1	1	2 WET	Sd, m-cse, brown to multi-colored, w f GVL	3	Y	
39	8	1	1	2 wet	Sd, med-cse, brown, with f. GVL	4	Y	
44 42	9	1	1	2 wet	do	4	Y	
49 47	10	1	1	2 wet	Sd f-cse, BROWN with f-cse GVL	4	Y	
54 52	11	1	1	2 wet	do	4	Y	
59 57	12	1	1	2 wet	do	4	Y	
64 62	13				59-61 SPLIT SPOON			57-60 — CSE Sd, MULTI-COLORED, MOSTLY EMPTY; 60-60.5 — CSE Sd, MULTI-COLORED; 60.5-61 — TOP — CSE Sd, MULTI-COLORED; BOTTOM — ROTTEN; TOP — RED TILL
69 67	14				62-65 SPLIT SPOON			63-64 — (SOME, RED, FINE WITH SOME CSE GVL & Sd, OR); 64-65 — MOSTLY EMPTY BUT FINE Sd WITH SOME CSE; TOP EMPTY
72	15							
77	16							
82	17				SET 5 LENGTHS OF 1¼" x 10.5 = 52.5; and 1 LENGTH OF 1¼" x 7.0 = 7.0			
87	18				and 1 LENGTH OF 1¼" x 3.5 = 3.5; TOTAL PIPE EQUALS 63.0			
92	19				PLUS 2' x 1¼" DRIVE POINT 2.0; TOTAL PIPE & SCREEN 65.0			
97	20				STICK-UP = 0.5			
102	21				SCREENED INTERVAL	62.5 - 65.5		
107	22							

Summary

0-1 TOP SOIL
1-7 FILL
7-18.5
PEAT, DARK, SANDY, SILTY NON-FIBROUS
18.5-20.5 SILT, GRAY
20.5-33
SAND, GRAY, FINE-MED
33-
Sd, BROWN, fine-COARSE, with fine to cse GRAVEL

9604821

LOG OF BORING

BRAUN ENGINEERING TESTING

32

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-106

LOCATION: 60'East of B-104.

DATE: 1/21/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 3
	2	SM	(Fill SILTY SAND TO SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			
	3	SM	(Fill) CLAYEY SAND, fine to *			*medium-grained, with a trace of fine Gravel, black, moist.
	5	SM	(Fill) SILTY SAND, fine to medium-grianed, with a trace of fine Gravel, brown, moist.			
	7	SP	(Fill) SAND, fine to medium-grained, moist.			Location of boring determined by U.S.G.S.
	18.5	CL	SANDY SILTY CLAY, black, non to slightly organic, moist to wet, soft.			Surface elevation of boring to be determined by U.S.G.S.
	22	ML	CLAYEY SILT to SILTY CLAY, gray, wet, soft. (Till)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	28	SP	SAND, fine to medium-grained, with a trace of fine Gravel, wet, dense. (Outwash)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)			
			(continued)			

9604822

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-106 (continued)
LOCATION:
DATE: 1/21/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
	32	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, gray, wet, dense. (Outwash)			Sheet 2 of 3
	58	SP	SAND, medium to coarse-grained, with a trace of fine Gravel, wet, dense to very dense. (Outwash)			
	60	ML	CLAYEY SILT, gray, wet, very stiff to hard. (Outwash)	41 37 35 21		
			(continued)			

9604823

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-106 (continued) LOCATION: DATE: 1/21/80 SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	61	ML	CLAYEY SILT, gray, wet, very *			Sheet 3 of 3
		SP-SM	SAND TO SILTY SAND, fine to medium-grained, with some fine to medium Gravel, reddish brown, wet to waterbearing, medium dense to dense.			*stiff to hard. (Outwash) Well point set at 64' depth. Boring grouted to the surface.
	70					

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604824

Hole no. B107 Date 1-22-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. About 3 feet south of W2

Map plotted on Geologist R. J. Wolf

County Lat.–long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4	X 1	1	1	4					0-4 Fill - Dirty Sd & Gvl
9	X 2	1	1	4					
14	X 3	1	1	3					
19	X 4	1	1		Shelby tube ~ 19-21 feet				Φ, X-ray
22	5								
27	6								
32	7								
37	8								
42	9								
47	10								
52	11								
57	12								
62	13								
67	14								
72	15								
77	16								
82	17								
87	18								
92	19								
97	20								
102	21								
107	22								

9604825

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-107

LOCATION: 8'South of B-106.

DATE: 1/22/80 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	2	SM	(Fill) SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen			
	3	SM	(Fill) CLAYEY SAND, fine to *			*medium-grained, with a trace of fine Gravel black, moist.
	5	SM	(Fill) SILTY SAND, fine to medium-grained, with a trace of fine Gravel, brown, moist.			
	7	SP	(Fill) SAND, fine to medium-grained, with a trace of fine Gravel, moist.			Location of boring determined by U.S.G.S.
	19	CL	SANDY SILTY CLAY, black, non to slightly organic, moist to wet, soft. layer of fine to medium SAND at 18.5'.			Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen sample returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	19.5	ML	CLAYEY SILT TO SILTY CLAY, gray,**			
			**wet, soft. (Till) Water level down 7' with 19' of hollow-stem auger in ground.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604826

Hole no. B108 Date 1-23-80 Project well no. ~~P100~~ Geologist MFH & RJW

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. N. of Orland, ~10 ft west of W20

Rig CME 75 D. Brown R. Rucht

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
4-6	3x 2½ SS		–	12"	–	–	Sand, f-med, silty, dk brn, well sorted, wet	~12"	0-1 Soil
9-11	do		–	12"	–	–	do	~12"	1-18 Sand, f-med, silty, brn
13-15	do		–	–	–	–	basalt cobble in tip	0	18-20 till, clayey w/sand, gray
18-20	do			19.5-20	Tip 18.0-19.5		sand, med, well sorted (lag?) Till, gray, plastic, clayey	12"	20-47 Sand, gray fine to coarse, mostly medium, fairly well sorted
20-22	3"S	Petroleum odor		20-22			Sand, med-crse, grey well sorted		
23-25	3X 2½			–	Tip 24-25		Sd, f-med, some crse, gray well sorted	10"	
28-30	3X 2½			–	29-30		Sd, gray, mostly med with some crse	11"	
33-35	do.			–	Tip 34-35		Sd gray, f-med with some crse	9"	
38-40	do			39-39.5	39.5-40		Sd gray, f-med, some crse	11"	
43-45	do.			–	43-45		do ½ sandy – ran out	8"	
48-50	do	RED TILL @ 47' (approx) BRS wet		47-49.5	Tip – 49.5-50 48-49	Sd + TILL	RED TILL & FINE SAND & some (approx 6")	18"	47-50 Red Till, sandy, with Sd, red fine.
53-55	do				53-55		Sd, gray, fine, with some med.	RUNNY ⅓ full	50-58.5 Sd, gray brown, fine, some medium
58-60	do			58-59 59-60			Sd-gray, fine TILL, SANDY Sd gray fine	20"	58.5-59.5 – TILL, sandy 59.5-63 Sand, gray, fine
63-65	do			63-64 64-65			TILL, SANDY	23"	63-66 TILL, sandy 66-67 WEATHERED LIMESTONE
67.5	SIDE	LMS.				65-67.5	LMS.		67-67.5 LIMESTONE

(NO PIEZOMETER SET HERE)

9604827

Slug test development

Hold	Cat	W.L.	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up – _____

grout BOTTOM TO L.S. calc. T.D. _____

meas. T.D. _____

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LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-108
LOCATION: North Side of Oxford and West of Edgewood
DATE: 1/21 - 1/22/88
SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill) SILTY SAND, fine to medium-grained, dark brown, frozen.			Sheet 1 of 3
	1	SP-SM	(Fill) SAND TO SILTY SAND, fine to medium-grained, with a trace of fine Gravel, brown to dark brown, moist.			Boring advanced by roller-bit below the 16' depth.
	4.5	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, brown, moist to wet, medium dense to dense. (Outwash)	14, 9, 10, 9		Location of boring determined by U.S.G.S.
	7	SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, wet, medium dense to dense. (Outwash)	3, 10, 10, 10, 15, 7, 7, 7, 18, 17, 17		Surface elevation of boring to be determined by U.S.G.S.
	19.5	SP	SAND, fine to medium-grained, gray to brown with depth, wet, medium dense to dense. (Outwash)	21, 17, 18, 19, 23, 8, 11		Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	30					BPF does not indicate standard penetration test results since special sampling procedures were used.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604828

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-108 Cont'd
LOCATION:
DATE: 1/21 - 1/22/80
SCALE: 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP	SAND, fine to medium-grained, gray to brown with depth, wet, medium dense to dense. (Outwash)	11, 11, 29, 18, 17, 11, 8, 8, 13, 13, 18, 10, 11, 11		Sheet 2 of 3
	47	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, dense to very dense. (Outwash)	51, 46, 36, 25		
	51	SP	SAND, fine to medium-grained, with a trace of Gravel, gray to brown, wet, dense to very dense. (Outwash)	32, 32, 34, 26, 92, 85, 58, 56		9604829
	60					

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-108 Cont'd LOCATION: DATE: 1/21 - 1/22/8 SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60		SAND, fine to medium-grained, with a trace of Gravel, gray to brown, wet, dense to very dense. (Outwash)	85 176 180 220		Sheet 3 of 3
	66.5		PLATVILLE LIMESTONE - WEATHERED			
	68		[illegible] LIMESTONE			
	69.5		PLATVILLE LIMESTONE			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604830

*41

Hole no. B109 Date 1-23-80 Loc./Well no. P109

Relation to general land level At Gen. Land Surface Alt. _____ Soil _____

Local site desc. N side of Oxford, ~6 ft west of W20

Map plotted on _____ Geologist RON WOLF

County _____ Lat.—long. _____

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4	X 1	1	1	4 dry	FILL Sand, brown, med	1	Y		0-2 FILL 2-18 SAND, BROWN, FINE TO MEDIUM, SILTY
9	X 2	1	1	4/4 dry/moist	Sand, brown, med w/ some gvl	1	Y		
14	X 3	1	1	3 wet	Sand, gray-brown f-med	1	Y		
19	X 4	1	1	3 wet	do Shelby tube sample 18.5-20.5	2	N	Q, x-ray @ 19' & 20'	18-20 TILL, GRAY, CLAYEY, SANDY
24	X 5	1	1	3 "	Sd, gray, f-med	2	N		20-44 SAND, GRAY, medium, with some coarse sand
29	X 6	1	1	3 "	Sd, gray, f-cse	3	N		
34	X 7	1	1	3 "	Sd gray, med	4	N		
39	X 8	1	1	3 "	do.	4	N		
44	X 9	1	1	3 "	do.	4	N		
47	10								
52	11								
57	12								
62	13								
67	14				SET 4 lengths of 10.5' galv. pipe (1¼") (tot=42')				
72	15				plus 2' x 1¼ x 10 SLOT DRIVE point				
77	16				SCREENED INTERVAL				
82	17				STICK-UP =				
87	18								
92	19								
	20								
102	21								
107	22								

9604831

42

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-109 LOCATION:
	DATE: 1/25/80 SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	1	SP	(Fill) SILTY SAND, fine to medium-grained, dark brown, frozen.			Sheet 1 of 2
	4.5	SP	(Fill) SAND TO SILTY SAND, fine to medium-grained, with a trace of fine Gravel, brown to dark brown, moist.			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S.
	7	SP	SAND, SLIGHTLY SILTY, fine to medium-grained, brown, moist to wet, medium dense to dense. (Outwash)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	19.5	SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, wet, medium dense to dense. (Outwash)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP	SAND, fine to medium-grained, gray to brown, wet, medium dense to dense. (Outwash)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604832

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park , MN
U.S. Geological Survey

BORING: B-109 Cont'd

LOCATION:

DATE: 1/25/80

SCALE: 1" = 4'

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
			SAND, fine to medium-grained, gray to brown with depth, wet, medium dense to dense. (Outwash)			Sheet 2 of 2
	44		Well point set at 44'			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604833

Hole no. B110 Date 1-28-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. N. SIDE OF OXFORD ~ ft east of W20

Map plotted on Geologist RON WOLF

County Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4½	1	1	1	4 DRY	FILL Sd, BRN, med	1	Y		0-2 FILL
9 7	2	1	1	4 DRY MOIST	Sd, BRN, med w/ some GVL	1	Y		2-12½ SAND, BROWN, medium with some gravel
12½ 12	3	1	1	3 WET	do.	1	Y		
17	4								
22	5								
27	6								
32	7								
37	8								
42	9								
47	10								
52	11				SET 1 LENGTH OF 1¼" X 10½' CASING				
57	12				PLUS 2' X 1¼" X 10 SLOT DRIVE POINT				
62	13				STICK-UP = AT LAND SURFACE				
67	14								
72	15								
77	16								
82	17								
87	18								
92	19								
97	20								
102	21								
107	22								

9604834

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-110
LOCATION: 6' East of B-108
DATE: 1/28/80
SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	1	SM	(Fill) SILTY SAND, fine to medium-grained, dark brown, frozen.			
	4.5	SP-SM	(Fill) SAND TO SILTY SAND, fine to medim-grained, with a trace of fine Gravel, brown to dark brown, moist.			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	7	SP-SM	SAND, SLIGHTLY SILTY, fine to medium-grained, brown, moist to wet, medium dense to dense. (Outwash)			
	12.5	SP	SAND, fine to medium-grained, with a trace of fine Gravel, brown, wet, medium dense to dense. (Outwash) Well point set at 12.5'.			
			Boring grouted to surface.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604835

Hole no. B111 Date 1-28-80 Project well no. P111 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. S. side of Cambridge ~4 feet north of W132

Rig CME — DENNIS

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
4-6	8¼ 2½						FILL - Sd & GVL	22"
9-11	7¾ 2½			10-10.5	10.5-11		CLAY, BROWN	16"
14-16	do			15-15.5	15.5-16		Sd, BROWN, DIRTY	14"
19-21	do			—	20.5-21		Sd & GVL - Sd BROWN, f-CSE GVL - f-CSE	11"
23-25	do		N & H CASING	—	24-25		Sd & GVL - BROKEN COBBLES w/some CSE Sd, BRN & COLORED	6"
28-30	do			—	28-30		do GRAY & COLORED	10"
33-35	do			34.5-35	TIP 34-34.5		Sd & GVL - GRAY, f-CSE TIP - TILL, GRAY CLAYEY & Sd	9"
38-40	do	Very scratchy - casing		—	38-40		GRAVEL & CSE Sd Sd WASHED OUT	8"
4[illegible]-45	do	DRILLER SAYS CLAY @ 42'		44.5-45	44-44.5		Sd, GRAY fine-med - some CSE @ BOTTOM; 1 COBBLE NOW	13"
48-50	do	DRILLER SAYS SOME HERE, OFF @ 47'		—	48-50		GVL + CSE Sd. - MOSTLY WASHED OUT	2"
53-55	do			—	53-55		MOSTLY WASHED OUT - (BALL IN CHECK VALVE MELTED) some Sd, GRAY & GVL	1"
58-60	do			—	59-59.5 59.5-60		Sd, GRAY & MULTI-COLORED, f-CSE RED CLAY @ BOTTOM (TIP)	9"
63-65	do			64.5-65	64-64.5		Sd, gray (red water), f-med w/some CSE, ~~CLAYEY~~ ~~COBBLE above~~	12"
68-70	do			69-69.5 69.5-70	68-69		Sd, red-brown, f-med w/some CSE sd.	15"
73-75	do			74.5-75	74-74.5		TILL, SANDY GVL ABOVE - LAG?	10"
78-79.5	do	Driller Estimates drill @ 77.5 300 blows - last 4 feet	79.5	—	78-79.5		ROCKS - SOME SAND LAG?	3"
			SET	7 LENGTHS	1¼" GALV X 10.5 ft (TOTAL			
				1 LENGTH	1¼" GALV x 3.5 ft (TOTAL PIPE 77 feet)			
			plus	2 ft x 1¼" x	10 SLOT DRIVE POINT			
			STICK UP	= 0.9				

Summary

0-6 FILL - Sand and GRAVEL

6-10 CLAY, BROWN, DARK

10-27? SAND, BROWN, f-CSE; GVL, f-CSE WITH SOME COBBLES NEAR BOTTOM

27?-34 SAND AND GRAVEL, GRAY

34-36? TILL, GRAY, CLAYEY-SILTY

36?-42 SAND AND GRAVEL

42-59 SAND, GRAY, FINE TO MEDIUM ABOVE, WITH GRAVEL, FINE TO COARSE BELOW

59-79½ TILL, REDDISH-BROWN, SANDY WITH VERY SMALL CLAY CONTENT

79½- BEDROCK (PRESUMED TO BE PLATTVILLE LIMESTONE)

9604836

pipe (1 LENGTH 1¼" x 3.5' GALV. / 7 LENGTHS 1¼" x 10.5' GALV.) 77.0

screen 2 ft x 1¼" x 10 SLOT + 2.0

grvl. pack SILICA SAND stick up — ____

grout YES calc. T.D. ____

meas. T.D. ____

Slug test development

Hold	Cut	W.L.	Date	Hours

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-111

LOCATION: On Cambridge across from 6318 Cambridge.

DATE: 1/29-31/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill) SILTY SAND, fine to coarse-grained, dark brown, frozen to moist, loose to medium dense.	5, 5, 5, 10		Sheet 1 of 3
	7	SC	CLAYEY SAND, dark brown to black, moist.			Boring advanced by roller-bit below the 22' depth.
	9	CL	SILTY SANDY CLAY, with some fine to medium SAND, brown, moist, soft. (Till)	3, 3, 7, 8		Location of boring determined by U.S.G.S.
	13.5	SM	SILTY SAND, fine to coarse-grained, with a trace of fine Gravel, moist to wet, loose to medium dense.	11, 17, 19, 21, 10, 7		Surface elevation of boring to be determined by U.S.G.S.
	20	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel, brown to light brown, wet, medium dense to dense. (Outwash)	8, 8, 8, 31, 11, 13, 12, 20, 13, 13, 14		Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	30		(continued)			

9604837

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-111 (continued)
LOCATION:
DATE: 1/29-31/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 3
	33	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel, brown to light brown, wet, medium dense to dense. (Outwash)			
	36	SC	CLAYEY SAND, fine to medium-grained, gray, with lenses of medium to coarse SAND, wet, loose to medium dense. (Outwash)	12 13 15 15		
	60	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel, gray, wet, loose to medium dense. (Outwash)	23 23 13 11 12 9 8 10 8 8 8 9 6 6 6 6 17 26 26 17		9604838
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-111 (continued)
LOCATION:
DATE: 1/29-31/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	62	SC	CLAYEY SAND-SILTY CLAYEY SAND, fine to medium-grained, reddish brown, wet.			Sheet 3 of 3
	67	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, medium dense to dense. (Outwash)	16 21 26 21		
		SC	CLAYEY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, dense to very dense. (Outwash)	36 21 26 50 60 62 63 45		
	79.5		Plateville Limestone(Weathered)	75 51 200		Well point set at 79' depth.

9604839

BRAUN ENGINEERING TESTING

P112

Hole no. B112 Date 2-1-80 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. SOUTH SIDE OF CAMBRIDGE ~ 4 feet EAST OF P111

Map plotted on Geologist RON WOLF

County Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
4	1	1	1	4	FILL - SAND & GVL, BRN	1	Y		0-6 FILL, SAND AND GRAVEL, BROWN, DIRTY
9	2	1	1	4	FILL - SD & GVL CLAY, DARK BROWN	1	Y		6-14 CLAY, DARK BROWN
14	3	1	1	4	CLAY, DARK BROWN	1	Y		
19	4	X	1		NO RETURN	4	N		14-34 SAND, BROWN, fine to coarse, with some GRAVEL, fine to coarse
24	5	1	1		do	4	N		
29	6	1	1		do	4	N		
34	7	1	1		do	4	N		
39	8	1	1		do	4	N		34-36? TILL, GRAY
44	9	1	1		SPLIT SPOON — 39-41	1	N	BAGGED 39-40; CORE (SLEEVED) 40-40.5; CORE (BAGGED) 40.5-41	36?-51 SAND, GRAY, medium to coarse and GRAVEL, fine to coarse
49	10	1	1		NO RETURN	4	N		
-51	11				SPLIT SPOON 49-51			MOSTLY WASHED OUT Sd & GVL PIECE OF GRAY TILL	
52	12	G							
57	13								
62	14								
67	15				SET 4 LENGTHS OF 1¼" GALV X 10.5 ft				
72	16				AND 2 LENGTHS OF 1¼" GALV X 3.5 ft			TOTAL PIPE = 49'	
77	17				PLUS 2.5 ft (2 ft OPENING) X 1¼" X 10 SLOT			DRIVE POINT	
82	18				STICKUP = 1.7				
87	19								
92	20								
97	21								
102	22								
107									

0604840

LOG OF BORING

BRAUN ENGINEERING TESTING

51

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-112

LOCATION: 4'East of B-111

DATE: 1/31-2/1/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill), SILTY SAND, fine to coarse-grained, dark brown, frozen to moist, loose to medium dense.			Sheet 1 of 2
	7	SC	CLAYEY SAND, dark brown to black, moist.			Location of boring determined by U.S.G.S.
	9	CL	SILTY SANDY CLAY, with some fine to medium SAND, brown, moist, soft. (Till)			Surface elevation of boring to be determined by U.S.G.S.
	13.5	SM	SILTY SAND, fine to coarse-grained, with a trace of fine Gravel, moist to wet, loose to medium dense.			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	20	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel, brown to light brown, wet, medium dense to dense. (Outwash)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30					
			(continued)			

9604841

BRAUN ENGINEERING TESTING

52

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-112 (continued)
LOCATION:
DATE: 1/31-2/1/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 2
	33	SP	SAND, fine to coarse-grained, with some fine to coarse Gravel brown to light brown, wet, medium dense to dense. (Outwash)			
	36	SC	CLAYEY SAND, fine to medium-grained, gray, with lenses of medium to coarse SAND, wet, loose to medium dense. (Outwash)			
		SP	SAND, fine to coarse-grained, with some fineto coarse Gravel, gray, wet, loose to medium dense. (Outwash)	39 18 21 21		
	51			9 14 15 18		Well point set at 50' depth.

9604842

BRAUN ENGINEERING TESTING

Hole no. B113 Date 2-4-80 Project well no. P113 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. NEW SIDE 39th & YOSEMITE ; NEXT TO W122 & W135

Rig CME DENNIS

Depth	Tool	Blows or drill action	Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
	3X 2¼	HOLLOW STEM AUGER						
4-6	3X 2¼			5-5.5 5.5-6	4-5		Sd, BRN, med, clean w/ GVL, f-CSE	23"
9-11	do.			10-10.5	9-10 10.5-11		do. some fine	18"
14-16	do			15-15.5	14-15 15.5-16		do	18"
19-21	do			20-20.5	19-20 20.5-21		do	18"
24-26	do.			25-25.5 25.5-26	24-25		do @25.5 Sd, BRN, fine	14"
29-31	do			30-30.5	29-30 30.5-31		Sd BRN fine 30.5 Sd, BRN, f-CSE w/ GVL	19"
34-36	do			35-35.5	34-35 35.5-36		Sd, BRN f @ top, GRY SD TILL BOTTOM TILL, GRAY, SANDY do.	24"
39-41	do			40-40.5	39-40 40.5-41		SILT, SANDY, BROWN — TILL ? w/ some WOOTHOLE FOSSILS GRANITE SILT, SANDY, BROWN	20"
44-46	do 46' TOTAL			45-45.5	44-45 45.5-46		44.2 - do Sd, BROWN, fine, CLEAN	22"
ET 16' CASING TO, 48' 48-50	do	NEW CASING		49-49.5	48-49 49-49.5 49.5-50		SILT, GRAY, SANDY, UNIFORM	15"
53-55	do			54.5-55	~~53-54~~ 54-54.5 ~~54.5-55~~		SAND, BRN, med-CSE, CLEAN	12"
58-60	do			—	—		MOSTLY EMPTY — some v. fine brown sand.	1/2"
63-65	do	"OLD PLASTIC BAG TRICK"		—	63-64 64-64.5 64.5-65		SAND, BROWN, med-CSE, CLEAN	14"
68-70	do	do		69-69.5 69.5-70	68-69		SAND, GRAY, V. fine to med, mostly fine, w/ some silt	13"
73-75	do	do		74-74.5	73-74 74.5-75		PIECES of V. CSE GVL @ TOP TILL, GRAY, V SANDY w/ WHITE LME PEBBLES	16"
78-80	do	do.		79.5-80	78-79 79-79.5		PIECES OF V. CSE GVL @ TOP TILL, GRAY, V SANDY, w/ REDDISH PEBBLES & WHITE LMS PEBBLES	15"
83-85	do	do		84.5-85	83-84 84-84½		do	16"
88-90	do	do v. scratchy @ 86-88		—	88-89 89-89½ 89½-90		do WOOD PIECE @ TIP	13"
93-95	do	do			94-94½ 94½-95		TILL, GRAY, V. SANDY w/ CSE GVL	12"

Summary

0-1 SOIL, DARK BROWN

1-25 SAND, BROWN, MEDIUM, WELL SORTED WITH SOME GRAVEL, FINE TO COARSE

25-35 SAND, BROWN, FINE

35-44 TILL, GRAY ABOVE, BROWN BELOW, SANDY, SILTY AND SILT, BROWN, SANDY

44-71 SAND AND GRAVEL, WITH SOME SILT BEDS,

71-114½ TILL, GRAY, SANDY WITH ANGULAR PIECES OF WHITE LIMESTONE ; ALSO MANY RED PEBBLES

9604843

Slug test development

Hold	Cut	W. L	Date	Hours

pipe (see page 3)

screen _____ + _____

grvl. pack _____ stick up⁻ _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B113 Date _____ Project well no. P113 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. 39th (NORTH SIDE) AND YOSEMITE ; NEXT TO W122 AND W135

Rig CME DENNIS

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
98-100	3V 2½	N EH CASING ↓		—	99-99½ 99½-100	NONE	TILL, GRAY	13"
FEB 8, 1980 103-105	do.	PLASTIC BAG		104-104½	103-104 104½-105	do.	PIECES OF GVL @ TOP TILL, GRAY, W/WHITE LMS PEBBLES, VERY SANDY	15"
108-110	do.	do.		109½-110	109-109½	do.	do	10"
113-115	do	MED. BLOW COUNT 114½ HIGH BLOWCOUNT		114½-115	113-114 114-114½ TIP	do.	do SANDSTONE, WEATHERED, YELLOWISH-WHITE	11"
118-119½	do	V. HIGH COUNT		—	118-119 (LAG?) 119-119½	do	SOME GRAY TILL ABOVE (LAG?) SANDSTONE, WEATHERED, YELLOWISH-WHITE	5"
123'-123' 7 in	do	V. HIGH COUNT		—	LOOSE SAND	SIEVE SAMPLES	SAND, GRAY-WHITE, UNIFORM, FINE V. LITTLE RETURN (WASHED OUT)	0"
123-127	—	ROLLER BIT ↓		—	—	do	SAND, WHITISH, GRAY, UNIFORM V. LITTLE RETURN	
127-131	—	do		—	—	do	SAND WHITISH-GRAY, UNIFORM, FINE	
13[illegible]-[illegible]	—	do		—	—	do	do w/some shale	
136-141	—	do		—	—	do	do w/some V. WHITE SS CHIPS	
141-146	—	do.	BOTTLES 3	—	—	do	SAND, WHITE, UNIFORM, V. FINE	
146-151	—	do	2	—	—	do.	do	
151-156	—	do	2	—	—	do	do w/ 1/2 lin ~~black~~ dark colored specks	
156-161	—	do	2	—	—	do	do	
161-166	—	do	2	—	—	do	do	
166-170	—	do	2	—	—	do	do	
NOTE:							pumped some mud into hole in anticipation of setting pipe.	
		TRIED TO SPLIT SP. SAMPLE PENETRATED 6" /700 BLOWS				FROM	170 - 170.5 RECOVERED 2'	
	→	BOTTOM ½ ft WAS WHITE Ss. Nearly 100% - SAMPLE BAG Next ½ ft was Ss dark sand intermixed with white Ss - sample bag						
170.5-176	—	Roller bit	2 bottles	—	—	—	Oppeared same as before when drlg.	

NOTE: 7'

170-176 TIGHTER DRILLING

Summary

71 - 114½ TILL, GRAY, SANDY, WITH WHITE LIMESTONE PEBBLES AND SOME RED-COLORED PEBBLES

114½ - 211.7 St. Peter Sandstone

9604844

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B113 Date Feb 12, 1980 Project well no. P113 Geologist GREG JUSTIN

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
176-181		ROLLER BIT	BOTTLES 2	-	-	✓	V. fine white Ss with dark brown oorange specks		
181-186 800#	→	" DRIVEN 184.5 TO 186.5	2				do.		
186-191		ROLLER BIT	2				do		
191-196		D.O.	2				do same drlg action		
196-201		D.O.	2	-	-	-	do		
201-206		D.O.	2	-	-	—	do. - w/s Ss in white matrix - soft (limy?)		
206-210		D.O.	3				do.		
210-211		SOFTER					BROUGHT UP CHIPPY LIGHT ORANGE Ss. about this size		
211-211.5 600#		→ HARDER					hard - gray silty Ss.		
FEB 8 - 211.5 - 211.7		caved settled in 5' overnight					SPLIT SPOON SAMPLES 300 Blows w/2½" PENETR. AVERAGE 200 BLOWS w/ 2 WATER NEXT		
							BOTTOM ½' Ss, orange, v.fine fine wrapped up for one lusie		
							NEXT ½' in sampler was white, Ss as below w/s black specks		

9604845

Hold	Cut	W.L.	Date	Hours

Slug test development

pipe 1 LENGTH 3.5' x 1¼" GALV (ON TOP) 19 LENGTHS OF 10.5' x 1¼" GALV } 203.0

screen 6' x 1¼" GALV X 10 SLOT TBE 3' x 1¼" GALV PIPE ON BOTTOM (WITH CAP ON END) + 9.5

grvl. pack 2 BAGS ~~BOTTOM SAND~~ stick up - ____

grout YES, BOTTOM TO TOP ____ calc. T.D. 2

meas. T.D. ____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 8
	1	CL	SILTY SANDY CLAY, dark brown, *			
	2.5	CL	SANDY CLAY, brown, moist. (Topsoil)			Location of boring determined by U.S.G.S.
		SP	SAND, fine to medium and fine to coarse-grained, with fine to medium Gravel, some layering, brown, moist, medium dense to dense. (Outwash)	12, 14, 14, 16		Surface elevation of boring to be determined by U.S.G.S.
				12, 18, 20, 18		Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing laboratory.
				36, 28, 35, 39		BPF does not indicate standard penetration test results since special sampling procedures were used.
				18, 36, 34, 30		*frozen. (Topsoil)
				18, 50, 76, 92		
	26	SP	SAND, fine to medium-grained, light brown, moist, medium dense to dense. (Outwash)	19, 24, 36		
	30.5		Continued			

9604846

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30.5	SP	SAND, fine to medium-grained, *	36		Sheet 2 of 8
		SP	SAND, fine to coarse-grained, some fine to medium Gravel, brown, moist, medium dense. (Outwash)	24		
	34.5			11		
		SC	CLAYEY SAND, fine grained, with a trace of fine to medium Gravel, gray, moist, medium dense to dense. (Glacial Till)	14 14 17		
	37.5					
		SM-SC	SILTY CLAYEY SAND, fine grained, with a trace of fine to medium Gravel, brown, moist, medium dense. (Glacial Till)	11 12 14 13		
	45			8 11		
		SP	SAND, fine grained, brown to light brown, wet, medium dense. (Outwash)	14 16		
	48					
		SM-SC	SILTY CLAYEY SAND, fine and very fine-grained, gray to grayish brown, wet, medium dense to dense. (Glacial Till)	6 11 18 15		
	52					
		SP	SAND, fine to medium-grained, some coarse grained SAND, brown, wet, medium dense. (Outwash)	11 10 12 13		
	58					
		SM	SAND, fine grained, some medium-grained, brown, wet, medium dense. (Outwash)	10 6 6 7		
	60					
			Continued			

9604847

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 41

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	61	SP	SAND, fine grained, some medium-grained, brown, wet, medium dense.*			Sheet 3 of 8
		SP	SAND, fine to medium-grained, brown, wet, medium dense to dense. (Outwash)	12, 14, 19, 22		*(Outwash)
	67					
		SP	SAND, fine to medium-grained, gray, wet, dense. (Outwash)	25, 31, 32, 40		
	71					
		SM-SC	SILTY CLAYEY SAND, fine grained, with a trace to some Gravel, grayish brown, wet, dense to very dense. (Glacial Till)	71, 150, 198, 200, 100, 124, 200, 225, 176, 155, 165, 140, 57, 62, 48, 45		
	90					
			Continued			

9604848

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6
DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	90	SM-SC	SILTY CLAYEY SAND, fine grained, with a trace to some Gravel, grayish brown, wet, dense to very dense.			Sheet 4 of 8
			(Glacial Till)	125		
				110		
				60		
				50		
				47		
				65		
				85		
				75		
				49		
				78		
				65		
				72		
				70		
				103		
				100		
				84		
				240		
				170		
	114.5			174		
			St. Peter Sandstone, yellow, lensed with greenish yellow.	500		9604849
				250		
	119			500		
	120		St. Peter Sandstone, medium-grained, white.	500/3"		
			Continued			

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	120		St. Peter Sandstone, medium-grained, white to yellowish white.			Sheet 5 of 8
				530 500/1"		
						Boring advanced by roller bit below the 124' depth.
	134		St. Peter Sandstone, fine grained, white.			
	150					
			Continued			

9604850

BRAUN ENGINEERING TESTING

61

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION Various Locations St Louis Park, MN U.S. Geological Survey	BORING: B-113 Cont'd LOCATION: 39th & Yosemite Site #6 DATE: 2/4 - 2/11/80 SCALE: 1" =4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	150		St. Peter Sandstone, fine grained, white.			Sheet 6 of 8
				700		
	180					
			Continued			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604851

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

62

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-113 Cont'd LOCATION: 39th & Yosemite Site #6 DATE: 2/4 - 2/11/80 SCALE: 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	180		St. Peter Sandstone, fine grained, white.			Sheet 7 of 8
	210		Continued			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604852

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-113 Cont'd
LOCATION: 39th & Yosemite
Site #6

DATE: 2/4 - 2/11/80 **SCALE:** 1" = 4'

Elev.	Depth 210	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
			SHALEY SANDSTONE, brownish yellow,			Sheet 8 of 8
	212.5		(St. Peter Sandstone)	700/2½"		
						Well Point set at 212' depth.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604853

BRAUN ENGINEERING TESTING

Hole no. B114 Date Feb 11, 1980 Loc./Well no.

Relation to general land level Alt. Soil

Local site desc. North side of 29th near YOSEMITE; about 4 feet west of B113, W122, and W135

Map plotted on Geologist RON WOLF

County Lat.—long.

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
2	X 1	1	1	4	Sd, brown, f-crse, dirty w/ GVL	1	Y		0-1 SOIL, DARK BROWN
7	X 2	1	1	4	Sand, BROWN, med, clean w/GVL, f-crse	1	Y		1-55 SAND AND GRAVEL, BROWN, MEDIUM TO COARSE (WITH SOME SILT OR TILL BEDS)
12	X 3	1	1	4	do	1	Y		
17	X 4	1	1	4	do	1	Y		
22	X 5	1	1	4	do	1	Y		
27	X 6	1	1	4	do	1	Y		
32	X 7	1	1	4	do	2	Y		
37	X 8	1	1	4	do	2	Y		
42	X 9	1	1	4	do	2	Y		
47	X 10	1	1	~~4~~	do	3	Y		
52	X 11	1	1	3	do	4	Y		
TD 55	12	1	1	3	do	4			
57	13								
62	14								
67	15								
72	16								
77	17				SET 5 LENGTHS OF 1¼" GALV PIPE X 10.5' (TOTAL PIPE 52.5')				
82	18				PLUS 2.5' X 1¼" GALV DRIVEPOINT X 10 SLOT			2.5	
87	19				TOTAL CASING AND DRIVE POINT			55.0	
92	20				MINUS STICK-UP			0.4	
97	21				DEPTH OF BOTTOM OF POINT BELOW L.S.			54.6	
102	22								
107									

9604854

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-114

LOCATION: 5'West of B-113, Site #6

DATE: 2/8-11/80 **SCALE:** 1"=4'

Elev.	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	1	CL	SILTY SAND CLAY, dark brown, *			Sheet 1 of 2
	2.5	CL	SANDY CLAY, brown, moist. (Topsoil)			
	26	SP	SAND, fine to medium and fine to coarse-grained, with fine to medium Gravel, some layering, brown, moist, medium dense to dense. (Outwash)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used. *frozen. (Topsoil)
	30	SP	SAND, fine to medium-grained, light brown, moist, medium dense to dense. (Outwash)			9604855
			(continued)			BRAUN ENGINEERING TESTING

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-114 Cont'd
LOCATION:
DATE: 2/8-11/80
SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					
	30.5	SP	~~SAND, fine to medium-grained, *~~			Sheet 2 of 2
	34.5	SP	SAND, fine to coarse-grained, some fine to medium Gravel, brown, moist, medium dense. (Outwash)			*light brown, moist, medium dense to dense. (Outwash)
	37.5	SC	CLAYEY SAND, fine-grained, with a trace of fine to medium Gravel, gray, moist, medium dense to dense. (Glacial Till)			
	45	SM-SC	SILTY CLAYEY SAND, fine-grained, with a trace of fine to medium Gravel, brown, moist, medium dense. (Glacial Till)			
	48	SP	SAND, fine-grained, brown to light brown, wet, medium dense. (Outwash)			
	52	SM-SC	SILTY CLAYEY SAND, fine and very fine-grained, gray to grayish brown, wet, medium dense to dense. (Glacial Till)			
	55	SP	SAND, fine to medium-grained, some coarse-grained SAND, brown, wet, medium dense. (Outwash)			Well point set at 55'.

9604856

BRAUN ENGINEERING TESTING

(See Report and Standard Plates for evaluation and descriptive terminology.)

Hole no. B115 Date 2-13-80 Project well no. _____ Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. ZARTHAN (EAST SIDE) AND 39th (IN FRONT OF HOUSE AT 3901 ZARTHAN)

Rig CME - DENNIS & JEFF

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-4			✓				BLACK SOIL & TREE ROOTS CLAY, BROWN SAND, BROWN	
4-9							SAND, BROWN, f-cse w. GVL, f-cse	
9-14							do	
14-19							do	
19-24			↓		✓	✓	do	
24-26	3X 2½			—	25-25½ 25½-26		CLAY (FROM SURFACE) SAND, BROWN @ BOTTOM W/ CLAY ABOVE SAND, BROWN, ~~med~~ f-med, clean	16"
26-29			↓					
29-34								
39								
39-47		-47 SCRATCHY (IN WATER)						
44-49			↓					
49-51	3X 2½			50½-51	50-50½		SAND, BROWN, f-cse TILL, GRAY, SANDY	15"
51-54			↓					
54-56	3X 2½			—	54-55 55-55½ 55½-56 TIP		SAND - med - BROWN, CLEAN TREE OR GRAVEL do	20"
56-59			↓					
59-64								
64-69		MAYBE TILL @ BOTTOM	↓					
69-71	3X 2½				70-70½ 70½-71		SAND, GRAY, ~~med~~ CSE, CLEAN SAND, GRAY, f-med	13"
71-74			↓					
74-79			↓					

Summary

0-2 DARK SOIL + TREE ROOTS
2-3 CLAY, BROWN.
3-4 SAND, BROWN, CLAYEY
4-19 SAND, BROWN, f-CSE w/ GRAVEL, fine to CSE
19-50½ SAND, BROWN, fine to medium w/ a little gravel
50½-54 - TILL, GRAY, SANDY
54-75? SAND, BROWN ABOVE, GRAY BELOW, medium to coarse, well sorted.
75?-102 TILL, GRAY, SANDY, SILTY (WITH LOT OF "RED" PEBBLES)

9604857

Slug test development

Hold	Cut	W.L	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up - _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B115 (cont.) Date Feb 13, 1982 Project well no. ——— Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. ZARTHAN (EAST SIDE) AND 39th (IN FRONT OF HOUSE AT 3901 ZARTHAN

Rig CME - DENNIS

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
79-81	3X 2½			—	79-80 80-80½ 80½-81		TILL, GRAY, SANDY ↓	16"	75?-102 (CONT) TILL, GRAY, SANDY
79-84		ROLLER BIT		—	—	—	NO RETURN		
84-89	SLEVG					✓	SAND, ANGULAR (FROM SANDY TILL?)		
89-91				—	89-90 90-90½ 90½-91		SAND, GRAY, FINE CSE GVL ANGULAR TILL, GRAY, SANDY	20"	
89-94		@ 92-93 CLAY ON BIT 3 TRIPS WITH ROLLER BIT				✓	SAND, ANGULAR SOME WHITISH-GRAY CLAY, MOSTLY SAND		
94-96	3X 2½			—	95-95½ 95½-96		POSSIBLE TILL, SANDY TILL, GRAY, SANDY SILTY	13"	
96-99		ROLLER BIT ↓				✓	SAND, ANGULAR, (FROM TILL?)		
99-101	3X 2½	SAMPLER DID NOT GO ALL WAY DOWN		100-100½ 100½-101	99-100		GRAVEL, ANGULAR (LAG) TILL, GRAY, SANDY ↓	14"	106 K, ¢, ~~[illegible]~~
101-104		ROLLER BIT -102 LMS ↓				✓✓	do. -102 LMS, WHITISH GRAY, CHIPS		102-104 LIMESTONE, GRAY TO WHITE, DENSE (PLATTVILLE)
D. T.D. 104									

9604858

Slug test development	Hold	Cut	W.L.	Date	Hours

pipe NO PIEZOMETER SET HERE

screen _____ + ____

grvl. pack _____ stick up ____

grout _____ calc. T.D. ____

meas. T.D. ____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORING & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-115
LOCATION: 39th & Zarthan Site #7
DATE: 2/13-14/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 4
	1.5	CL	SANDY SILTY CLAY, black, with a trace of roots, frozen. (Topsoil)			
	3.5	CL	SILTY CLAY, brown, moist. (Glacial Till)			
		SP-SM	SAND, SLIGHTLY SILTY, brown, moist, medium dense. (Outwash)			
	20	SP	SAND, fine to coarse-grained, with some fine to medium Gravel, moist, medium dense to dense. (Outwash)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen sample returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP	SAND, fine to coare-grained, brown, moist, medium dense to dense. (Outwash)	7 21 36 28		9604859
			(continued)			

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

70

PROJECT: 79-687 SOIL BORING & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-115 (continued)
LOCATION:
DATE: 2/14/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 4
	31	SP	SAND, fine to coarse-grained, * *			*brown, moist, medium dense to dense. (Outwash)
	45	SP	SAND, fine to coarse-grained, with a trace of fine Gravel, moist, medium dense to dense. (Outwash)			
	54	SM	CLAYEY SAND, fine to medium-grained, with a trace of fine Gravel, wet, dense to very dense. (Outwash)	21 21 16 21		
	60	SP	SAND, fine to medium-grained, brown, wet, medium dense to dense.	8 8 9 8		
			(continued)			

9604860

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORING & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-115 (continued)
LOCATION:
DATE: 2/13-14/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					Sheet 3 of 4
		SP	SAND, fine to medium-grained, brown, wet, dense to very dense. (Outwash)	21 38 60 59		
	78.5					
		SM-SC	SILTY SAND to CLAYEY SAND, fine to medium-grained, gray to grayish brown, wet, dense to very dense.	20 21 48 46		
	83					
		SP-SM	SAND to SILTY SAND, medium to coarse-grained, with a trace of fine Gravel, brown to gray, wet, dense to very dense. (Outwash)	49 54 68 71		Boring advanced by roller bit below the 81' depth.
	90					
			(continued)			

2604861

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-115 (continued)
LOCATION:
DATE: 2/14/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	90					Sheet 4 of 4
	90.5	SP-SM	SAND to SILTY SAND, medium to *			*coarse-grained, with a trace of fine Gravel, brown to gray, wet, dense to very dense. (Outwash)
		SM	SILTY SAND, medium to coarse-grained, with some medium to coarse Gravel, gray to grayish brown, wet, dense to very dense. (Outwash)	21 100 100 101 26 100 126 139		
	102					
			Plateville Limestone			
	104					

9604862

BRAUN ENGINEERING TESTING

Hole no. B116 Date FEB 15, 1988 Project well no. P116 Geologist RON WOLF

R _____ Site ID _____ MP descr. & elev. _____

Site descr. 36th & BELT LINE BLVD, ~9 feet EAST OF W124

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-4					0-4		GRAVEL - FILL ? CLAY DARK SAND, BROWN f-med	
4-9					4-9		SAND, BROWN, f, med, csc w/ med-csc GVL	
9-14					9-14		SAND, BROWN, med-v. csc w/ GVL, f-vcsc & COBBLES	
14-16	3½ 2½	PLASTIC BAG FROM BASKET		15-15½	14-15 15½-16 TIP		SAND, BROWN, med-v. csc w/ GVL SAND, GRAY-BROWN, fine	15"
18-20		SET H CASING N BOD & HEAVE		—	—		SPLIT-SPOON EMPTY — SOME MED GRAY SAND IN CHECK VALVE	0"
23-25				—	TIP		SLEEVES EMPTY - LARGE COBBLE CAUGHT IN BASKET SAND, BROWN, MED-CSC IN TIP	0"
28-30		HEAVING SANDS, BOULDER @26		—	@30" TIP		BROKEN COBBLES & BOULDER - NO OTHER RETURN	2"
33-35		FINE SAND WASHED OUT		—	34½-35		NOT MUCH RETURN COBBLES, GRAVEL & SOME SAND	2"
38-40				39½-40	34-39½ TIP		SAND, BROWN fine-med mostly fine, uniform	4"
43-45				—	43-44 44-44½ 44½-45		do.	13"
48-50				49-49½	48-49 49½-50 TIP		do	18"
53-55		DRILLER SAYS DIFF CRUM @ 52' FOR PERM →		54½-55	54-54½		TILL, WHITISH-GRAY, SANDY	12"
58-60		1st TRY		—	58-60		1st TRY ONLY COBBLES & GRAVEL; COBBLE IN TIP do	4"
60-60½		2nd TRY		—	59-60 TIP		do.	10"
63-65		NO PLASTIC BAG		64-64½ 64½-65	63-64		do	15"
68-70		do.		—	68-69 69-69½ 69½-70		SAND @ 68-69 WEATHERED LMS + BROKEN PIECES	
68-70		ROLLER BIT		—	68-70		SAND & LMS	
70-72				—	70-72		do LMS w/ WHITISH GRAY CLAY	
72-76				—	72-73 73-74 74-75 75-76	✓ ✓ ✓ ✓	LMS, GRAY	
76-79					76-78 78-79	✓	do. DARK OIL (or CREOSOTE?) FILM ON MUD TANK	

Summary

0-2 FILL - SAND AND GRAVEL
2-3 SOIL, DARK BROWN
3-33 SAND AND GRAVEL
SAND, med.-very coarse
GRAVEL, fine to coarse
with some cobbles

33-52
SAND, BROWN, fine to medium, fairly uniform

52-68 TILL, WHITISH-GRAY

68-69 SAND, GRAY, MEDIUM, CSC AND GRAVEL
69-71 LIMESTONE, WHITISH-GRAY, WEATHERED BROKEN PIECES
71-79 LIMESTONE, GRAY, FAIRLY SOLID

9604863

Slug test development

Hold	Cut	W.L	Date	Hours

pipe _____ (see page 2)

screen _____ + _____

grvl. pack _____ stick up⁻ _____

grout _____ calc. T.D. _____

meas. T.D.

(p 2 of 2)

Hole no. B116 Date 2-15-80 / 2-21-80 Project well no. P116 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. 36th + BELT LINE BLVD

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
79-82		ROLLER BIT			79-79½, 79½-80, 80-80½	✓✓✓	SHALE, GRAY TO BLUE-GREEN TO YELLOWISH-GREEN	
82		↓			80½-82	✓	SANDSTONE, YELLOWISH-BROWN WEATHERED, AND SHALE, LIGHT GREENISH-YELLOW	
82-82½	3 X 2½	SAMPLE	FOR MARC	→	82-82½			7"
82½-91½		ROLLER BIT				✓	SANDSTONE, WHITE, VERY FINE UNIFORM	NONE

Summary

79-80½ SHALE, GRAY ABOVE, TO BLUE GREEN TO YELLOWISH-GREEN BELOW

80½-84 SANDSTONE, YELLOW, WEATHERED WITH LIGHT GREENISH-YELLOW SHALE

84-91½ SANDSTONE, WHITE, VERY FINE, UNIFORM

91.5 BOTTOM OF HOLE

9604864

TOP LENGTH = 5' x 1¼" galv = 5.0
8 LENGTHS of 10.5' x 1¼" galv. = 84.0
2½' x 1¼" x 10 SLOT DRIVE POINT 2.5
TOTAL CASING AND SCREEN = 91.5
STICK-UP = 0.0
DEPTH FROM L.S TO BOTTOM = 91.5

Slug test development

Hold	Cut	W. L	Date	Hours

pipe 1 LENGTH 5' x 1¼" GALV; 8 LENGTHS 10½' x 1¼" GALV } 89.0

screen 2½ ft x 1¼" x 10 SLOT + 2.5

grvl. pack SILICA SAND stick up − 0.0

grout TOP OF GRAVEL PACK TO 10' BELOW LAND SURFACE calc. T.D. 91.5

meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOILS BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-116

LOCATION: 36th E. Beltline Blvd. Site #8

DATE: 2/15-21/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 3
	2	SM	SILTY SAND, fine to medium-grained, dark brown, frozen. (Topsoil)			
		SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, moist, medium dense to dense. (Outwash)			
				12		Location of boring determined by U.S.G.S.
				14		Surface elevation of boring to be determined by U.S.G.S.
				16		
				14		Soil Classifications based on drillers log and visual examination of random frozen sample returned to Braun Engineering Testing Laboratory.
				9		BPF does not indicate standard penetration test results since special sampling procedures were used.
				11		
				10		
				14		
				21		
				18		
				17		
				11		
				10		
				18		
	30			8		
				7		
			(continued)			

9604865

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-116 (continued)
LOCATION:
DATE: 2/15-21/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 3
	33	SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, moist, medium dense to dense.			
	52	SP	SAND, very fine to fine-grained, brown to reddish brown, wet, medium dense. (Outwash)	21, 12, 12, 14, 8, 10, 10, 12, 12, 14, 16, 19, 12, 14, 16, 19		
	60	SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, medium dense to dense. (Outwash)	30, 39, 27, 37, 51, 112, 59, 60		
			(continued)			

9604866

BRAUN ENGINEERING TESTING

LOG OF BORING

BRAUN ENGINEERING TESTING

77

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-116 (continued) LOCATION: DATE: 2/15-21/80 SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth 60	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 3 of 3
		SM	SILTY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown, wet, medium dense to dense. (Outwash)	55 60 55 120		
	69			78 157		
	70.5		Plateville Limestone (Weathered)	227 210		
	79		Plateville Limestone			Boring advanced by roller bit below the 70-foot depth.
	79.5		Shale, dark gray.			
	80		Shale, blue gray.			
	80.5		Shale, yellow.			
	85		SANDSTONE, coarse-grained, grayish brown.	500		
	91.5		SANDSTONE, fine to medium-grained, grayish brown. Wellpoint set at 91.5'.			Boring [illegible] at 91.5' depth.

9604867

BRAUN ENGINEERING TESTING

Hole no. B117 Date 2-21-80 Project well no. P117 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. 36th AND BELTLINE BLVD.

Rig CME - DENNIS

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-4		AUGER					SAND	
4-9							SAND AND GRAVEL (NO SAMPLES TAKEN)	
9-14								
14-19								
19-24								
24-26	3 x 2½	PLASTIC BAG	CHEM	25-25½ 25½-26			SAND, BROWN, f-m. CSE w/ f to med GVL	12"
~~24-29~~ 30								
~~29~~-30								
		CASH DOWN						
30-32	3 x 2½	NO PLASTIC BAG	CHEM	31-31½ 31½-32	30-32		SAND, BROWN, cse - v cse, w/ f. GVL	15"
30-32.5		AUGER						

Summary:

0-2 FILL - SAND AND GRAVEL
2-3 SOIL, DARK BROWN
3-33 SAND AND GRAVEL

SET 30 feet CASING PLUS 2½ foot POINT (TOTAL 32.5')

TOP DROPPED AN EXTRA 8" or so BELOW LAND SURFACE,

So ADDED 3 foot EXTENSION ON TOP.

SCREENED INTERVAL = 30.7 - 33.2

9604868

Hold	Cut	W. L	Date	Hours

Slug test development

1¼" x 3.0'
1½" x 2.0
1¼ x 7.0
2 LENGTHS x 10.5' x 1¼" = 21.0
2.5' x 1¼" x 10 SLOT DRIVE POINT 2.5
TOTAL CASING AND SCREEN 35.5
STICK-UP 2.3
DEPTH TO BOTTOM OF POINT 32.8

pipe TOTAL CASING = 33.0

screen 2.5' x 1¼" x 10 SLOT + 2.5

grvl. pack 3 cu ft coarse silica SAND stick up - 2.3

grout FROM JUST ABOVE SCREEN TO TOP calc. T.D. _____

meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

79

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-117

LOCATION: 5'East of B-116.

DATE: 2/21/80 **SCALE:** 1"=4'

Elev.	Depth 0	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	2	SM	SILTY SAND, fine to medium-grained, dark brown, frozen. (Topsoil)			Sheet 1 of 2
		SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, moist, medium dense to dense. (Outwash)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
				20 17 10 10		
	30					
			(continued)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604869

LOG OF BORING

BRAUN ENGINEERING TESTING

80

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-117 (continued)

LOCATION:

DATE: 2/21/80

SCALE: 1"=4'

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes Sheet 2 of 2
	33	SP	SAND, fine to coarse-grained, with some fine to medium Gravel, brown, moist, medium dense to dense.	67 146 200 42 34		Well point set at 32' depth.
		SP	Water level down 14' immediately after withdrawal of auger.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604870

81

Hole no. B 118 Date Feb 22, 1980 Project well no. P 118 Geologist RON WOLF

T-R _____ Site ID _____ MP descr. & elev _____

Site descr. HAMPSHIRE (WEST SIDE) ABOUT 300 feet SOUTH OF LAKE ST & ABOUT 40 NORTH OF W 11

Rig CME

Depth	Tool	Blows or drill action	Sample taken: Auger	Sample taken: core (sleeved)	Sample taken: core (bagged)	Sample taken: cuttings	Sample description	recovery
0-4		AUGER	✓				FILL, DARK SOIL, SAND & GRAVEL AND NAILS, LEAD SLAG, ETC	
4-9			✓				ORGANIC CLAY	
9-11	3X 2½			—	10-10½ 10½-11		SILTY SAND, ORGANIC SILT ETC. (NOT BELOW WT)	12"
9-14								
14-16	SHELBY TUBE		✓	(S.T.) 14-16		OFF AUGER	TOP: BLACK PEATY ORGANIC MATERIAL WITH GRAY CLAY BELOW BOTTOM SAND, MED-CSE GRAY-BROWN	18"
16-18	H CASING AND N SPLIT SPOON	ROD WITH						
18-20	3X 2½	↓		—	TIP		LMS, COBBLE WHITISH-GRAY CAUGHT IN BASKET, NO SAMPLE	0"
23-25	do	↓		—	TIP		DARK IGNEOUS COBBLE IN BASKET	0"
25-26	do			—	TIP TUBES		SAND, GRAY, F-med, some CSE (NO ODOR)	2"
28-30	do		CHEM	29½-30	29-29½		SAND, GRAY, CSE AND GRAVEL fine to VCSE	9"
30-33	do	ON ROLLER BIT 32 — ROLLER BIT 33			30-33	✓		
33-35	3X			?	34-34½			?
38-40	do		CHEM	38½-40			SAND, GRAY, MED-CSE W/ GVL	8"
40-42	do		CHEM	41½-42	40-41½		do	8"
42-45	do		CHEM CHEM	44-44½ 44½-45	43-44		SAND, GRAY, MED-FINE SLIGHT ODOR	18"
48-50	do			—	48-50		VERY LITTLE RETURN	1"
53-55	do				TIP		NO RETURN - COBBLE IN TIP 2nd TRY - VERY LITTLE RETURN	½"
58-60	do		CHEM CHEM	59-59½ 59½-60	58-59 TIP		SAND, GRAY, FINE (TOP FAT) SAND, GRAY, MED-CSE (BOTTOM FAT) STRING ORG AT TIP & BOTTOM SLEEVE	21"
63-65	do	RETURN WATER REDDISH @ 63	POLM CHEM	64-64½ 64½-65	63-64 TIP		REDDISH-GRAY TILL & A LITTLE RED SAND (NO ODOR) PLATTVILLE LMS IN TIP	18"
65-66		TOOK CASING TO 65'-LMS			65-66 TIP 65-66		LMS	

Hold	Cut	W.L	Date	Hours

Slug test development

Summary

0-4 FILL, SAND & GRAVEL, NAILS, LEAD SLAG, DARK SOIL

4-12½ ORGANIC MATERIAL, DARK, CLAYEY, SILTY

12½-15½ CLAY, GRAY, LAKE DEPOSIT?

15½-62 SAND, GRAY-BROWN ABOVE, GRAY BELOW Medium to CSE with fines & COARSE GRAVEL

9604871

62-65 TILL, REDDISH-GRAY, CLAYEY

65-85 LIMESTONE, GRAY, (PLATTVILLE) WITH SAND IN CRACKS

pipe _____

screen _____ + _____

grvl. pack _____ stick up _____

grout _____ calc. T.D. _____

meas. T.D. _____

82

Hole no. B118 Date FEB 22 – MARCH 4, 1980 Project well no. P118 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
66-70						✓		
70-71						✓		
71-75½						✓		
75½-79				—	—	✓	DID NOT TAKE SAMPLES	
79-80½					79-80½	✓	LIMESTONE	
80½-81½				—	—	—	NO SAMPLE	
81-85					81-85	✓	LIMESTONE, GRAY, DENSE, (PLATTVILLE)	
85-85½					85-85½	✓	SHALE, BLUE-GREEN SOFT, BUT FIRM	
85½	3X 2I	1st TRY 2nd TRY 3rd TRY					SHALE, BLUE-GREEN IN TIP	

DRILLER TRIED TO WASH MUD FROM OPEN HOLE IN LIMESTONE BUT (WASH WATER WAS RED) SAND, GRAVEL, AND RED TILL PIECES KEPT WASHING IN. SOUNDED DEPTH AT 70 FEET – DROVE AND JETTED SCREEN TO 72.5 FEET AND LET SIT OVER NIGHT. NEXT MORNING SAND AT ABOUT 67'. POURED SILICA SAND IN CASING (H) UP TO 65. GROUTED ABOVE THAT WITH 5 BAGS CEMENT AND 3 BAGS DRILLING MUD. PULLED H CASING.

Summary

65-85 (cont)
LIMESTONE, GRAY (PLATTVILLE) WITH SAND IN CREVICES OF LMS.

85-87½ SHALE, GLENWOOD, BLUE-GREEN

9604872

Hold	Cut	W.L.	Date	Hours

1 length (top) 7 feet x 1¼" gsb (7')
CL[illegible] transfer 10' gsb 63'
TOTAL PIPE 70'
SS 5 x 1¼" x 10 slot drive point 2.5'
STICK-UP 0.0'
TOP OF POINT BELOW LS. 72.5

Slug test
development

pipe TOTAL CASING 70.0
screen 2.5' x 1¼" x 10 slot point 2.5
FROM 65-70
grvl. pack _____ stick up 0.0
5 BAGS CEMENT
grout AND 3 BAGS MUD calc. T.D. 72.5
meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-118

LOCATION: Lake Street Boulevard & Hampshire
Site #9

DATE: 2/22 - 3/4/80 **SCALE:** 1" =4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill) SILTY SAND, fine to medium-grained, with some medium Gravel, dark brown to black with some steel chunks, frozen to moist.			Sheet 1 of 3 Boring advanced by roller-bit below the 66' depth. Location of boring determined by U.S.G.S.
	8	SC	(Fill) SILTY CLAYEY SAND to CLAYEY SAND, fine to coarse-grained, dark brown to black, moist, loose to medium dense.	10 8 8 9		Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and random frozen samples returned to Braun Engineering Testing Laboratory.
	12.5	CL	SANDY CLAY, with trace of fine Gravel, gray to olive gray, moist, medium. (Till)			
	15.5	SP	SAND, fine to medium-grained, with trace of fine Gravel, gray to grayish brown, wet, medium dense to dense (Outwash)	8 6 6 7 23 10 11 10 20 15 26 12 10 11		BPF does not indicate standard penetration test results since special sampling procedures were used.
	30		Continued			

9604873

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-118 (continued)
LOCATION:
DATE: 2/22-3/4/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense. (Outwash)	7, 8, 10, 9		Sheet 2 of 3. Encountered medium boulders at 32' depth.
				21, 14, 11		
				8, 8, 8		
				7, 8		
				21, 12		
				8, 8		
				18, 17		
				17, 16		
				121, 35		
				22, 21		
				21, 20		9604874
	60			12, 12		
			(continued)			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-118 (continued) LOCATION: DATE: 2/22-3/4/80 SCALE: 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	62	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium *			Sheet 3 of 3
	65	SC	SILTY CLAYEY SAND TO CLAYEY SAND, fine to medium-grained, with a trace of fine Gravel, reddish brown mottled with gray**	45 24 24 125		*dense to dense. **wet, dense. (Outwash)
	73		Plateville Limestone (Weathered)			Well point set at 72.5' depth.
	87.5		Plateville Limestone	8 18 23 52		Boring grouted to surface.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604875

Hole no. B119 Date MAR 5, 1980 Project well no. _____ Geologist GREG JUSTIN

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-42							NO SAMPLES	
12-44		1st try	100/4' 40/8'		TIP + 1 tube		DK. MED. GR.	6"
		2nd try	100/4'		—		heaved up 3' and zilch recovery - DROVE ONLY 1'	0
			—				WASHED OUT TO 44.5 AND SET 25' screen a 4" x 10.5' casing 1½ gals.	
							- PULLED BACK AUGER TO ALLOW FORMATION TO COLLAPSE ON IT	
							THEN GROUTED - TOOK A TUB OF GROUT FROM 40-25'	
							ANOTHER TUB 25-10'	

Summary

3-5-80 BY BBJ
DRILLER WASHED OUT 2' OF FN-MED GRAVEL WHICH FELL IN OVERNIGHT.

mixed grout (bentonite + cement)

9604876

pipe 42.5

screen 25 + ____

grvl. pack _____ stick up ____

grout _____ calc. T.D. ____

meas. T.D. ____

Slug test development

Hold	Cut	W.L.	Date	Hours

LOG OF BORING

BRAUN ENGINEERING TESTING

87

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-119

LOCATION: 5'South of B-119, Site #7.

DATE: 3/4-5/80 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	8	SM	(Fill) SILTY SAND, fine to medium-grained, with some medium Gravel, dark brown to black with some steel chunks, frozen to moist.			Sheet 1 of 2
	12.5	SC	(Fill) SILTY CLAYEY SAND to CLAYEY SAND, fine to coarse-grained, dark brown to black, moist, loose to medium dense.			Location of boring determined by U.S.G.S.
	15.5	CL	SANDY CLAY, with a trace of fine Gravel, gray to olive gray, moist, medium. (Till)			Surface elevation of boring to be determined by U.S.G.S.
	30	SP	SAND fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense. (Outwash)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
						BPF does not indicate standard penetration test results since special sampling procedures were used.
			(continued)			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604877

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LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION Various Locations St. Louis Park, MN U.S. Geological Survey	BORING: B-119 (continued) LOCATION: DATE: 3/4-5/80	SCALE: 1"=4'

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
		SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense. (Outwash)			Sheet 2 of 2
	44.5			50 50 20 20		Well point set at 44.5' depth.

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604878

Hole no. B120 Date 3-5-80 Project well no. St Louis Park Geologist

T&R Site ID MP descr. & elev.

Site descr. ~5' N. of B118

Rig

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0-45							No Sample	
45-54						✓	Sample taken because of creosote smell	
54-59						✓	D.O.	
59-61				1st try			red-gravel.	3"
							Rubbered to 61' and washed out to 61' and to	
							use mud.	
0-61				2 + Tip			60.0-60.5 · clean fn-cr gravel	
0.5-61.0				✓			More sandy w/s fn sand	
T							Inside · sandy gu. Outside - sandy red clay - preserved (frozen) tip	

Summary

Noticed a slight creosote smell @ 40' with increasing odor with depth

Installed 5 10½
1 5
1 2

Pipe 59½

Screen 2½

62.0

Screen 59.5 - 62.0

9604879

Slug test development

Hold	Cut	W.L	Date	Hours

pipe

screen +

grvl pack stick up-

grout calc. T.D.

meas. T.D.

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-120

LOCATION: 5'North of B-118, Site #9.

DATE: 3/5/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM	(Fill) SILTY SAND, fine to medium-grained, with some medium Gravel, dark brown to black with some steel chunks, frozen to moist. (Outwash)			Sheet 1 of 2
	8	SC	(Fill) SILTY CLAYEY SAND TO CLAYEY SAND, fineto coarse-grained, dark brown to black, moist, loose to medium dense.			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S.
	12.5	CL	SANDY CLAY, with a trace of fine Gravel, gray to olive gray, moist, medium. (Till)			Soil Classifications based on drillers log and visual examination of random forzen samples returned to Braun Engineering Testing Laboratory.
	15.5	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense.			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30					
			(continued)			

9604880

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, vN
U.S. Geological Survey

BORING: B-120 (continued)
LOCATION:
DATE: 3/5/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP	SAND, fine to medium-grained, with a trace of fine Gravel, gray to grayish brown, wet, medium dense to dense. (Outwash)			Sheet 2 of 2
						9604881
						*brown, wet, dense. (Outwash)
						**Water level down 14' immediately after withdrawal of auger. Well point set at 62' depth.
	61			12 8 6 6		
	62	SC	SILTY CLAYEY SAND TO CLAYEY SAND, fine to medium-grained, reddish* **	24 28		

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Hole no. B121 Date 3-6-80 Project well no. P 121 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. ON FILL IN SWAMPY AREA - NORTH SIDE OF LAKE STREET

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery
0.4		AUGER				✓	FILL - CLAY + BLACK SOIL (WOOD @ 4 FEET)	
4-6	3 X 2½			—	5-5½ 5½-6 TIP		FILL - CLAY GLASS + WOOD CREOSOTE ODOR AT TIP	9"
6-8						✓	SOUPY CREOSOTE & FINE SAND	
8-9							PEAT	
9-11	3 X 2½			—	10-10½ 10½-11 TIP		PEAT (STRONG ODOR)	12"
14-16	do		PERM CHEM CHEM	14-15 15-15½ 15½-16	~~14-15~~ TIP		PEAT MARL - WHITE STRONG ODOR CLAYEY SILT + FINE SAND, BLUE-GREY	24"
19-21	do	SET W/CASING	PERM CHEM CHEM	19-20 20-20½ 20½-21	BASKET TIP		CLAY - MARL & CLAY CLAY - BLUE-GREEN STRONG ODOR SAND & GVL - WITH CREOSOTE	24"
23-25	do	H CASING + N ROD		—	~~BASKET~~ 24½-25		~~1ST TRY - COBBLE IN BASKET~~ STRONG ODOR ~~STRONG~~ GRAVEL, V. CSE - NEED PLASTIC BAG	3"
30	do	PLASTIC BAG		—	BASKET 29½-30	1ST TRY 2nd TRY	1ST TRY - COBBLE IN BASKET 2nd TRY - SAND, GRAY, f-CSE, MOSTLY medium, STRONG ODOR	1 ft. 4"
28-33	—	BOULDER @ 31 - ROLLER BIT		—	—	✓	BOULDER - PINK CHIPS - GRANITE? ABOUT 8" STRONG ODOR	
33-35	3 X 2½						SAND & GRAVEL V. DIRTY, GRAY TILL ?? (BOULDER CHIPS @ TOP) STRONG ODOR	
38-40	do			—	39½-40		1ST TRY COBBLE IN TIP SAND & GVL, DIRTY WITH STRONG ODOR	4"
40-41	do		CHEM	40-40½	40½-41		~~SAND & GRAVEL - COBBLE~~ ~~STRONG ODOR~~ ~~SAND, GRAY, SILTY f-med~~ STRONG ODOR	12"
43-45	do		CHEM CHEM	44-44½ 44½-45	43-44		SILTY SAND, GRAY (TILL??)	15"
48-50	do			—	49½-50		GRAVEL, BROKEN COBBLES, SAND STRONG ODOR	3"
48-53	—	BOULDER OR BEDROCK @ 52'					NO RETURN - DRILLER SAYS COARSE GRAVEL	
53-55	3 X 2½			54½-55	54-54½		SILTY SAND, GRAY, w/ GRAVEL + BROKEN COBBLES (LAG) TILL ??	11"
58-60	do			—	59-59½ 59½-60		SAND, GRAY, f-med, fairly clean w/ GVL & BROKEN CHIPS & COBBLES OR CONC GVL	9"
63-65	do			—	64½-65		1ST TRY - NOT MUCH RETURN BROKEN COBBLES	3"
63½-65		DRILLER SAYS TILL @ 62 LMS @ 64½		64½-65			2nd TRY - DIRTY SAND & GVL - REDDISH TILL? - WITH RED LMS IN TIP - BROKEN	11"

Summary
0-6 FILL - CLAY, BROWN w/ GLASS, WOOD, ETC.
6-8 SAND, SILTY, FINE; BLACK, LIQUID CREOSOTE
8-15 PEAT, BROWN, FIBEROUS, STRONG CREOSOTE ODOR
15-15½ SILT, WHITE
15½-20 CLAY, BLUE-GREEN (LAKE SEDIMENTS)
20-33 SAND AND GRAVEL SAND, GRAY, fine to coarse GRAVEL, fine to very coarse with cobbles HAS STRONG CREOSOTE ODOR
40-55½ TILL, GRAY, SANDY with large cobbles
55½-62 SAND AND GRAVEL
62-64½ TILL, REDDISH, SANDY
64½-82 LIMESTONE, (PLATTVILLE)

9604882

Slug test development

Hold	Cut	W.L	Date	Hours

pipe _____

screen _____ + _____

grvl. pack _____ stick up _____

grout _____ calc. T.D. _____

meas. T.D. _____

Hole no. B121 (CONT) Date _____ Project well no. P121 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
65-67		ROLLER BIT					LIMESTONE AND SHALE		64½-82 (CONT.) LIMESTONE, GRAY, (PLATTVILLE) WITH SHALE BEDS IN UPPER 2½ feet, AND SOLUTION CHANNELS AT 68 AND 70 feet
67-72	CORE (DIAMOND)		FROZE →	67-72	@ 68		LIMESTONE, GRAY, (PLATTVILLE) WITH SOLUTION CHANNEL @ 68 and 69-70		
72-77	do			72-77			do.		
77-82	do.			77-82			do		
82-82½	do.		FROZE →		82-82½		SHALE, BLUE-GREEN, FIRM		82-82½ SHALE, BLUE-GREEN (GLENWOOD)
		SET CASING, WITH FLOOR FLANGE ATTACHED (NO SCREEN)							
		TO BOTTOM OF PIPE, ON SHELF AT 67 FEET WHICH							
		RESULTED FROM HOLE REDUCTION AT 67 FEET FROM							
		3⅞ TO 3⅛ INCHES. ATTACHED PLASTIC							
		COFFEE CAN LID TO FLOOR FLANGE TO ACT AS							

? × 3 = 3
× 5 = 5
× 7 = 7
× 10½ = 52.5
TOTAL (ALL CASING AND SCREEN) = 67.5
STICK UP = 0.5
67.0

9604883

ET:

LENGTH 3 FEET x 1¼ inch (galv)	=	3.0
LENGTH 5 FEET x 1¼ inch "	=	5.0
LENGTH 7 FEET x 1¼ inch "	=	7.0
LENGTHS 10.5 FEET x 1¼ inch "	=	52.5
TOTAL CASING	=	67.5
STICK-UP		0.4
		67.1
OPEN HOLE		15.4
BOTTOM OF HOLE		82.5

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe _____

screen _____ + _____

grvl. pack NONE FROM 67 feet stick up − _____

grout TO SURFACE calc. T.D. _____

meas. T.D. _____

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B -121

LOCATION: Across from Cardinal Glass
St Louis Park, Site #10

DATE: 3/6 - 3/10/80 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					Sheet 1 of 3
	2.5	SM-SC	Fill: SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			
	3.5	CL	Fill: SANDY CLAY, brown, moist.			Location of boring determined by U.S.G.S.
	8	CL	Fill: SANDY CLAY, with traces of glass and wood, with a trace to some fine to medium SAND, creosote odor, dark brown to black, wet, medium.	3 3 4 4		Surface elevation of boring to be determined by U.S.G.S.
	15.5	Pt	PEAT, fibrous, creosote odor, layer of bog lime at 15', trace of shells at 15', dark brown, wet. (Swamp)	2 2 2 3 4 6 6		Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	20	ML-CL	CLAYEY SILT-SILTY CLAY, lenses of very fine SAND, creosote odor, gray, wet, stiff to very stiff. (Lacustrine)	8 13 16		
	27	SP-SM	SAND SLIGHTLY SILTY, medium to coarse-grained, some fine to medium Gravel, layer of black fine to medium SAND at 20', creosote odor, gray, wet, dense to very dense. (Outwash)	20 21 25 25 21 18		
	30	SP-SM	SAND SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense to very dense. *	10 10 10 10		9604884
			*(Outwash) Continued			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-121 Cont'd
LOCATION: Across from Cardinal Glass
St. Louis Park, Site #10
DATE: 3/6/ - 3/10/89 **SCALE:** 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30	SP-SM	SAND SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense. (Outwash)	44, 44, 45, 43, 14, 28, 33, 33		Sheet 2 of 3
	40	SM	SILTY SAND, fine to medium-grained, some coarse SAND, some fine to medium Gravel, grayish brown, wet, dense to very dense. (Glacial Till)	18, 29, 18, 26, 26, 28, 48, 29, 30, 54		
	50	SM	SILTY SAND, fine to coarse grained, some Gravel, grayish brown, wet, very dense. (Glacial Till)	80, 51, 28, 17		
	55.5	SP	SAND, fine to medium-grained, with a trace of coarse SAND, and a trace of fine Gravel, grayish brown, wet, dense. (Outwash)	21, 16, 17, 16		9604885
	60		Continued			

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St Louis Park, MN
U.S. Geological Survey

BORING: B-121 Cont'd
LOCATION: Across from Cardinal Glass
St Louis Park, Site #10
DATE: 3/6 - 3/10/80 **SCALE:** 1" = 4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	60					
	62	SP	SAND, fine to medium-grained, with a trace of coarse SAND, and a trace of fine Gravel, grayish brown, *			Sheet 3 of 3
	64.5	SM	SILTY SAND, fine to coarse-grained, some Gravel, lenses of reddish brown SAND, grayish brown, wet, very dense. (Glacial Till)	40 48 50		
	67		WEATHERED LIMESTONE, lense of SHALE, gray. (Platteville Formation)	150 200		
			Bedrock cored 67' to 82.5' depth. See attached log of rock coring sheet. *wet, dense.			

(See Report and Standard Plates for evaluation and descriptive terminology.)

9604886

Hole no. B122 Date 3-11-80 Project well no. P122 Geologist RON WOLF

T&R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	Sample taken: core (sleeved)	Sample taken: core (bagged)	Sample taken: cuttings	Sample description	recovery	Summary
0-4							FILL - CLAY, BROWN		0-6 FILL, MOSTLY CLAY, BROWN
4-9			2 SAMPLES (FROZEN) FOR CHEM			✓	SILTY SAND, BLACK, SOUPY; VERY STRONG ODOR; CRESOTE		6-8 SAND, SILTY, FINE, WITH BLACK, LIQUID CREOSOTE
9-14									8-15 PEAT, BROWN, FIBEROUS, STRONG CRESOTE ODOR
14-19									15-20 CLAYS AND SILTS, BLUE-GREEN, (LAKE SEDIMENTS)
19-24									20-33 SAND AND GRAVEL fine to very coarse, with cobbles; has strong creosote odor
24-29									
29-34									
34-36	3 x 2½		CHEM	35-35½			SILTY SAND, GRAY-BLACK fine-med, (TILL, SANDY ??)		33-36 SAND, SILTY, GRAY, fine-med

x 10.5 = 31.5
3
34.5
2.5
37.0
1.5
35.5

960487

ET: 1 LENGTH (TOP) 3 ft x 1¼ incl gslv. = 3.0
[illegible] 10.5 ft x 1¼ incl = 31.5
TOTAL CASING = 34.5
2.5 ft x 1¼" x 10 SLOT POINT = 2.5
TOTAL LENGTH FROM MP. TO TIP = 37.0
STICK-UP = 1.7
BOTTOM OF SCREEN BELOW L.S. = 35.3

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe TOTAL CASING 34.5

screen 2.5' x 1¼" x 10 SLOT POINT + 2.5

grvl. pack _____ stick up − 1.7

grout _____ calc. T.D. 35.3 (2.5)

meas. T.D. _____

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LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS AND PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-122

LOCATION: 5'East of B-121, Site #10.

DATE: 3/10/80 **SCALE:** 1"=4'

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0	SM-SC	Fill, SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			Sheet 1 of 2
	2.5	CL	Fill, SANDY CLAY, brown, moist.			
	3.5	CL	Fill, SANDY CLAY, with traces of glass and wood, with a trace to some fine to medium SAND, creosote odor, dark brown to black, wet, medium.			
	8	Pt	PEAT, fibrous, creosote odor, layer of bog lime at 15', trace of shells at 15', dark brown, wet.			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory. BPF does not indicate standard penetration test results since special sampling procedures were used.
	15.5	ML-CL	CLAYEY SILT-SILTY CLAY, lness of very fine SAND, creosote odor, gray, wet, stiff to very stiff. (Lacustrine)			
	20	SP-SM	SAND, SLIGHTLY SILTY, medium to coarse-grained, some fine to medium Gravel, layer of black, fine to medium SAND at 20', creosote odor, gray, wet, dense to very dense. (Outwash)			
	27	SP-SM	SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish *			9604888
	30		*brown, wet, medium dense to very dense. (Outwash)			

(continued)

(See Report and Standard Plates for evaluation and descriptive terminology.)

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-122 (continued)
LOCATION:
DATE: 3/10/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	30					Sheet 2 of 2
		SP-SM	SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense. (Outwash)	12 8 8 9		Well point set at 36' depth.
	36					

9604889

Hole no. B123 Date 3-11-80 Project well no. P123 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
0-4							FILL		0-6 FILL, MOSTLY CLAY, BROWN
4-9							SOUPY SAND - BLACK V. STRONG ODOUR		6-8 SAND, SILTY, FINE, WITH BLACK, LIQUID CREOSOTE
9-14							NOT MUCH RETURN		8-15 PEAT, BROWN, FIBEROUS, STRONG CREOSOTE ODOR
14-19							do		15-20 CLAYS AND SILTS, WHITE ABOVE, BLUE-GREEN BELOW. (LAKE SEDIMENTS)
19-22							do.		
22-24	3X 2½	1ST TRY					MOSTLY PEAT LAG FROM ABOVE - SOME GVL IN TIP	24"	20-24 SAND AND GRAVEL
22-24A	do	WASH OUT TRY AGAIN			22-24		VERY LITTLE RETURN - WASHED OUT END	1"	

K 2.0 = 2.0
10.5 = 21.0
TOTAL
AL PIPE 23.0
CREEN 2.5
P
TO TIP 25.5
TICK
CK-UP 2.
M TO LS
bottom

9604889

Slug test development	Hold	Cut	W.L	Date	Hours

pipe TOTAL CASING 23.0

screen 2.5' x 1¼" x 10 SLOT POINT + 2.5

grvl. pack _____ stick up - 1.5

grout _____ calc. T.D. _____

meas. T.D. _____

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LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-123

LOCATION: 5'East of B-122, Site #10.

DATE: 3/11/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	2.5	SM-SC	Fill, SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			
	3.5	CL	Fill, SANDY CLAY, brown, moist.			
	8	CL	Fill, SANDY CLAY, with traces of glass and wood, with a trace to some fine to medium SAND, creosote odor, dark brown to black, wet, medium.			
	15.5	Pt	PEAT, fibrous, creosote odor, layer of bog lime at 15', trace of shells at 15', dark brown, wet. (Swamp)			Location of boring determined by U.S.G.S. Surface elevation of boring to be determined by U.S.G.S. Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	20	ML-CL	CLAYEY SILT-SILTY CLAY, lenses of very fine SAND, creosote odor, gray, wet, stiff to very stiff. (Lacustrine)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	24	SP-SM	SAND, SLIGHTLY SILTY, medium to coarse-grained, some fine to medium Gravel, layer of black fine to medium SAND at 20', creosote odor, gray, wet, dense*	7 6 4 4		Well point set at 24' depth.
			SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense to very dense. (Outwash)			*to very dense. (Outwash)

9604890

Hole no. B124 Date 3-11-80 Project well no. P124 Geologist RON WOLF

T & R _____ Site ID _____ MP descr. & elev. _____

Site descr. _____

Rig _____

Depth	Tool	Blows or drill action	Sample taken: Auger	core (sleeved)	core (bagged)	cuttings	Sample description	recovery	Summary
0-4			NO SAMPLES TAKEN				FILL		0-6 FILL, MOSTLY CLAY, BROWN
4-9							FINE SOUPY SAND, BLACK, LIQUID, CREOSOTE		6-8 SAND, SILTY, FINE WITH BLACK, LIQUID CREOSOTE
9-20							PEAT, LAKE CLAYS		8-15 PEAT BROWN, FIBEROUS, STRONG CREOSOTE ODOR; 15-20 CLAYS AND SILTS WHITE ABOVE, BLUE-GREEN BELOW (LAKE SEDIMENTS)
20-59							SAND, GRAVEL, TILL?, ETC		20-40 SAND AND GRAVEL; 40-55½ TILL, GRAY, SANDY
59-61	3 X 2½	HEAVED 8 feet HAD TO WASH OUT AUGER					SAND, GRAY, med-V.CSE with fine GVL; STRONG ODOR		55½-61 SAND AND GRAVEL

9604891

1 X 1 = 2.0
5 X 5 = 5.0
10.5 X 10.5 = 52.5
59.5
SCREEN 2.5
62.0

SET:

2 Length 1 FOOT x 1¼ inch (gals) = 2.0
1 Length 5 FEET x 1¼ inch (gals) = 5.0
Length 10.5 FEET x 1¼ inch (gals) = 52.5
TOTAL CASING =
.5 ft x 1¼" x 10 SLOT POINT 2.5
TOTAL LENGTH FROM MP. TO TIP OF POINT =
TOTAL STICK-UP = 2.4
BOTTOM OF SCREEN BELOW L.S. = 59.6

Slug test development

Hold	Cut	W.L.	Date	Hours

pipe TOTAL CASING 57.5

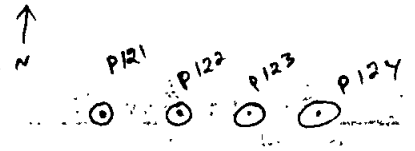
screen 2.5' x 1¼" x 10 SLOT POINT + 2.5

grvl. pack _____ stick up _____

grout _____ calc. T.D. _____

meas. T.D. _____

B124
3-11-80



9604891

LOG OF BORING

BRAUN ENGINEERING TESTING

104

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-124

LOCATION: 5'East of B-123, Site #10

DATE: 3/11/80 **SCALE:** 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	0					
	2.5	SM-SC	Fill, SILTY CLAYEY SAND, fine to medium-grained, dark brown, frozen.			Sheet 1 of 2
	3.5	CL	Fill, SANDY CLAY, brown, moist.			
	8	CL	Fill, SANDY CLAY, with traces of glass and wood, with a trace to some fine to medium SAND, creosote odor, dark brown, wet.			Location of boring determined by U.S.G.S.
	15.5	Pt	PEAT, fibrous, creosote odor, layer of bog lime at 15', trace of shells at 15', dark brown, wet. (Swamp)			Surface elevation of boring to be determined by U.S.G.S.
	20	ML-CL	CLAYEY SILT-SILTY CLAY, lenses of very fine SAND, creosote odor, gray, wet, stiff to very stiff. (Lacustrine)			Soil Classifications based on drillers log and visual examination of random frozen samples returned to Braun Engineering Testing Laboratory.
	27	SP-SM	SAND, SLIGHTLY SILTY, medium to coarse-grained, some fine to medium Gravel, layer of black fine to medium SAND at 20', creosote odor, gray, wet, dense to very dense. (Outwash)			BPF does not indicate standard penetration test results since special sampling procedures were used.
	30	SP-SM	SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30' gray with a trace of reddish *			
			*brown, wet, medium dense to very dense. (Outwash)			

(continued)

9604893

105

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: 79-687 SOIL BORINGS & PIEZOMETER INVESTIGATION
Various Locations
St. Louis Park, MN
U.S. Geological Survey

BORING: B-124 (continued)
LOCATION:
DATE: 3/11/80
SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth 30	ASTM D2487 Symbol	Description of Materials (ASTM: D2488)	BPF	WL	Tests or Notes
	40	SP-SM	SAND, SLIGHTLY SILTY, fine to coarse-grained, with a trace of Gravel, boulders noted at 30', gray with a trace of reddish brown, wet, medium dense. (Outwash)			Sheet 2 of 2
	50	SM	SILTY SAND, fine to medium-grained, some coarse SAND, some fine to medium Gravel, grayish brown, wet, dense to very dense. (Glacial Till)			
	55.5	SM	SILTY SAND, fine to coarse-grained, some Gravel, grayish brown, wet, very dense. (Glacial Till)			9604894
	60	SP	SAND, fine to medium-grained, with a trace of coarse SAND, and a trace of fine Gravel, grayish brown, wet, dense.	32 28 29 40		Well point set at 61'.
			Boring grouted to surface.			

Site Identification Number VP-SB60

NOTICE

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- [ ] slide(s)
- [ ] videotape(s)

P 125

106

Hole no. P128 Date 12-8-80 Loc./Well no. P128

Relation to general land level _____ Alt. _____ Soil _____

Local site desc. 105' E of W2

Map plotted on _____ Geologist MFAUST & G. JUSTIN

County _____ Lat.—long. _____

Depth	Flight number	Drill action	Tightness	Viscosity	Sample returned	Reliability	Cleaned	Sample from flight	Summary
	1								
2	2								
7	3								
12	4								
17	5								
22	6								
27	7								
32	8								
37	9								
42	10								
47	11								
52	12								
57	13								
62	14								
67	15								
72	16								
77	17								
82	18								
87	19								
92	20								
97	21								
102	22								
107									

5x7 = 35
screen 2.5
37.5
sticks -0.7
36.8
screened
34.5
to 36.5

9604895