



STS Consultants Ltd.

OWNER
Mn/DOT
 PROJECT NAME
Mn/DOT Hiawatha LRT LSI

LOG OF BORING NUMBER **B-1**
 ARCHITECT-ENGINEER
STS Consultants, Ltd.

SITE LOCATION
Minneapolis, Minnesota

DEPTH(FT) ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²					PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %		
							1	2	3	4	5	10	20	30	40	50	10	20	30	40
				0.5 Topsoil																
	1	MC		Fine to medium sand, trace gravel and silt - brown - (SW)		1														
5.0				6.0																
	2	MC		Coarse sand, with gravel - brown - (SP)		0														
10.0																				
	3	MC				0														
15.0																				
	4	MC				0														
20.0				16.4																
	5	MC		Silty sand, trace gravel - brown - (SM)		1														
25.0				19.0																
	6	MC		End of borehole at 19 feet (refusal). All samples placed in zip-closure polyethylene bags and screened with a photoionization detector equipped with a 10.6 eV lamp source and calibrated to a benzene reference gas. Background PID readings ranged from 0 to 2 PID units. A soil sample for laboratory analysis was collected at 19 feet below ground surface.		0														
30.0																				

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	Not Encountered	BORING STARTED 4/15/04	STS OFFICE Minneapolis Area - 06
WL		BORING COMPLETED 4/15/04	ENTERED BY AC
WL		RIG/FOREMAN Geoprobe/DJ	APP'D BY WT
			SHEET NO. 1 OF 1
			STS JOB NO. 99552-XA

BORING_LOG 99465-XA.GPJ STS.GDT 11/29/04



STS Consultants Ltd.

OWNER
Mn/DOT
PROJECT NAME
Mn/DOT Hiawatha LRT LSI

LOG OF BORING NUMBER **B-1A**
ARCHITECT-ENGINEER

SITE LOCATION
Minneapolis, MN

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²											
							1	2	3	4	5							
							PLASTIC LIMIT %		WATER CONTENT %		LIQUID LIMIT %							
							⊗	⊙	⊙	⊙	⊙	⊙						
							10	20	30	40	50							
							STANDARD PENETRATION BLOWS/FT.											
							⊗	⊙	⊙	⊙	⊙	⊙						
							10	20	30	40	50							
				0.5 Topsoil														
				Fine-medium SAND - brown - (SP)														
5.0																		
10.0	1	HS																
15.0																		
17.0																		
20.0	2	SS		Silty, sandy clay - gray to brown - (CL)		0												
	3	SS				0												
25.0																		
	4	SS																
				26.0														
				26.9	Fine-medium SAND - brown - (SP)		0											
				End of boring at 27.0 feet (refusal - possibly bedrock). Boring grouted with high solids bentonite upon completion.														
30.0																		
35.0																		

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 21	BORING STARTED 10/7/04	STS OFFICE Minneapolis Area - 06
WL	BORING COMPLETED 10/7/04	ENTERED BY AC
WL	RIG/FOREMAN D-50/TM	APP'D BY WT
		SHEET NO. 1 OF 1
		STS JOB NO. 99552-XA

BORING LOG HIAWATHA LRT LOGS.GPJ STS.GDT 11/29/04



STS Consultants Ltd.

OWNER
Mn/DOT
PROJECT NAME
Mn/DOT Hiawatha LRT LSI

LOG OF BORING NUMBER **B-2**
ARCHITECT-ENGINEER
STS Consultants, Ltd.

SITE LOCATION
Minneapolis, Minnesota

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²					PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %		
							1	2	3	4	5	10	20	30	40	50	10	20	30	40
				0.5 Topsoil																
	1	MC		Fine to medium sand, trace gravel - brown - (SW)		1														
5.0				5.0																
	2	MC		Coarse sand, with gravel - brown - (SP)		0														
10.0																				
	3	MC				0														
15.0																				
	4	MC				0														
20.0				16.5																
	5	MC		18.0 Silty sand, trace gravel - brown - (SM)		0														
25.0																				
30.0																				

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	Not Encountered	BORING STARTED 4/15/04	STS OFFICE Minneapolis Area - 06
WL		BORING COMPLETED 4/15/04	ENTERED BY AC
WL		RIG/FOREMAN Geoprobe/DJ	SHEET NO. 1 OF 1 STS JOB NO. 99552-XA

BORING LOG 99465-XA.GPJ STS.GDT 11/29/04



STS Consultants Ltd.

OWNER
Mn/DOT

LOG OF BORING NUMBER **B-3**

PROJECT NAME
Mn/DOT Hiawatha LRT LSI

ARCHITECT-ENGINEER
STS Consultants, Ltd.

SITE LOCATION

Minneapolis, Minnesota

UNCONFINED COMPRESSIVE STRENGTH
TONS/FT.²

1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %

10 20 30 40 50

STANDARD PENETRATION BLOWS/FT.
10 20 30 40 50

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH (TONS/FT. ²)	PLASTIC LIMIT (%)	WATER CONTENT (%)	LIQUID LIMIT (%)	STANDARD PENETRATION BLOWS/FT.
					SURFACE ELEVATION							
					0.5 Topsoil							
		1	MC		Fine to medium sand, trace gravel and silt - brown - (SW)		1					
5.0		2	MC		5.2 Coarse sand, with gravel - brown - (SP)		0					
10.0		3	MC				0					
15.0		4	MC				0					
14.0					End of borehole at 14 feet (refusal). All samples placed in zip-closure polyethylene bags and screened with a photoionization detector equipped with a 10.6 eV lamp source and calibrated to a benzene reference gas. Background PID readings ranged from 0 to 2 PID units. A soil sample for laboratory analysis was collected at 14 feet below ground surface.							
20.0												
25.0												
30.0												

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	Not Encountered	BORING STARTED 4/15/04	STS OFFICE Minneapolis Area - 06
WL		BORING COMPLETED 4/15/04	ENTERED BY AC
WL		RIG/FOREMAN Geoprobe/DJ	APP'D BY WT
			SHEET NO. 1 OF 1
			STS JOB NO. 99552-XA

BORING LOG 99465-XA.GPJ STS.GDT 11/29/04



STS Consultants Ltd.

OWNER
Mn/DOT
PROJECT NAME
Mn/DOT Hiawatha LRT LSI

LOG OF BORING NUMBER **B-3A**
ARCHITECT-ENGINEER

SITE LOCATION

Minneapolis, MN

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²			PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %			
									1	2	3	10	20	30	40	50	10	20	30	40	50
						SURFACE ELEVATION															
						0.5 Topsoil															
		1	PA			Fine-medium SAND - brown - (SP)			0												
		2	SS						0												
	5.0																				
		3	SS						0												
		4	SS						0												
	10.0																				
		5	SS						0												
		6	SS			Coarse SAND, with gravel - brown - (SM)			0												
	15.0																				
		7	SS			Sandy SILT - brown - (ML)			0												
		8	SS						0												
	20.0																				
		9	SS			Sandy SILT to CLAY, trace gravel - gray - (CL)			0												
		10	SS						0												
	25.0																				
		11	SS			Fine-medium SAND - brown - (SP)			0												
						End of boring at 27.0 feet (refusal - possibly bedrock). Boring grouted with high solids bentonite upon completion.															
	30.0																				
	35.0																				

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

BORING LOG HIAWATHA LRT LOGS.GPJ STS.GDT 11/29/04

WL	20.5	BORING STARTED	10/7/04	STS OFFICE	Minneapolis Area - 06
WL		BORING COMPLETED	10/7/04	ENTERED BY	AC
WL		RIG/FOREMAN	D-50/TM	APP'D BY	WT
				SHEET NO.	1 OF 1
				STS JOB NO.	99552-XA



STS Consultants Ltd.

OWNER
Mn/DOT

LOG OF BORING NUMBER **B-4**

PROJECT NAME
Mn/DOT Hiawatha LRT LSI

ARCHITECT-ENGINEER
STS Consultants, Ltd.

SITE LOCATION

Minneapolis, Minnesota

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²						
									1	2	3	4	5		
									PLASTIC LIMIT %		WATER CONTENT %		LIQUID LIMIT %		
									⊗	⊙	⊙	⊙	⊙		
									STANDARD PENETRATION BLOWS/FT.						
									⊗	⊙	⊙	⊙	⊙		
						0.5 Topsoil									
		1	MC			Fine to medium sand - brown - (SW)		0							
5.0		2	MC					0							
10.0		3	MC					0							
15.0		4	MC					0							
						15.5 Silty sand, trace gravel - brown - (SM)									
		5	MC					0							
						18.2 Coarse sand, with gravel - brown - (SP)									
						19.1 Sandy clay, trace silt - gray - (CL)									
20.0		6	MC					0							
		7	MC					0							
25.0						22.0 End of borehole at 22 feet (refusal). All samples placed in zip-closure polyethylene bags and screened with a photoionization detector equipped with a 10.6 eV lamp source and calibrated to a benzene reference gas. Background PID readings ranged from 0 to 2 PID units. A soil sample for laboratory analysis was collected at 22 feet below ground surface.									
30.0															

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	Not Encountered	BORING STARTED 4/15/04	STS OFFICE Minneapolis Area - 06
WL		BORING COMPLETED 4/15/04	ENTERED BY AC
WL		RIG/FOREMAN Geoprobe/DJ	APP'D BY WT
			SHEET NO. 1 OF 1 STS JOB NO. 99552-XA

BORING LOG 99465-XA.GPJ STS.GDT 11/29/04



STS Consultants Ltd.

OWNER
Mn/DOT

LOG OF BORING NUMBER **B-5**

PROJECT NAME
Mn/DOT Hiawatha LRT LSI

ARCHITECT-ENGINEER
STS Consultants, Ltd.

SITE LOCATION

Minneapolis, Minnesota

UNCONFINED COMPRESSIVE STRENGTH

TONS/FT.² 1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT.

10 20 30 40 50

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH (TONS/FT. ²)	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION BLOWS/FT.
					SURFACE ELEVATION							
					0.5 Topsoil							
		1	MC		Fine to medium sand, trace gravel and silt - brown - (SW)		0					
					3.5							
5.0		2	MC		Coarse sand, with gravel - brown - (SP)		0					
10.0		3	MC				0					
15.0		4	MC				0					
					16.2							
		5	MC		Silty sand - brown - (SM)		0					
					18.4							
					19.2							
20.0		6	MC		Fine to medium sand - brown - (SW)		0					
		7	MC		Sandy clay, trace silt - gray - (CL)		0					
					22.0		1					
					End of borehole at 22 feet (refusal). All samples placed in zip-closure polyethylene bags and screened with a photoionization detector equipped with a 10.6 eV lamp source and calibrated to a benzene reference gas. Background PID readings ranged from 0 to 2 PID units.							
25.0					A soil sample for laboratory analysis was collected at 22 feet below ground surface.							
					Installed a temporary well and obtained water samples for analysis. Boring was grouted with high solids bentonite upon completion.							
30.0												

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	18.9 feet	BORING STARTED	4/15/04	STS OFFICE	Minneapolis Area - 06
WL		BORING COMPLETED	4/15/04	ENTERED BY	AC
WL		RIG/FOREMAN	Geoprobe/DJ	APP'D BY	WT
				SHEET NO.	1 OF 1
				STS JOB NO.	99552-XA

BORING LOG 99465-XA.GPJ STS.GDT 11/29/04



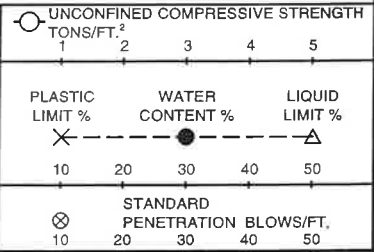
STS Consultants Ltd.

OWNER
Mn/DOT
PROJECT NAME
Mn/DOT Hiawatha LRT LSI

LOG OF BORING NUMBER **B-6**
ARCHITECT-ENGINEER
STS Consultants, Ltd.

SITE LOCATION

Minneapolis, Minnesota



DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION BLOWS/FT.
					SURFACE ELEVATION							
					0.5 Topsoil							
		1	MC		Fine to medium sand, trace gravel - brown - (SW)		1					
5.0		2	MC				0					
10.0		3	MC				0					
15.0		4	MC				0					
		5	MC		16.1 Silty sand - brown - (SM) 17.8		0					
20.0		6	MC		20.0 Coarse sand, with gravel - brown - (SP)		2					
25.0		End of borehole at 20 feet (refusal). All samples placed in zip-closure polyethylene bags and screened with a photoionization detector equipped with a 10.6 eV lamp source and calibrated to a benzene reference gas. Background PID readings ranged from 0 to 2 PID units. A soil sample for laboratory analysis was collected at 20 feet below ground surface.										
30.0												

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	Not Encountered	BORING STARTED 4/15/04	STS OFFICE Minneapolis Area - 06
WL		BORING COMPLETED 4/15/04	ENTERED BY AC
WL		RIG/FOREMAN Geoprobe/DJ	SHEET NO. 1 OF 1 STS JOB NO. 99552-XA

BORING LOG 99465-XA.GPJ STS.GDT 11/29/04