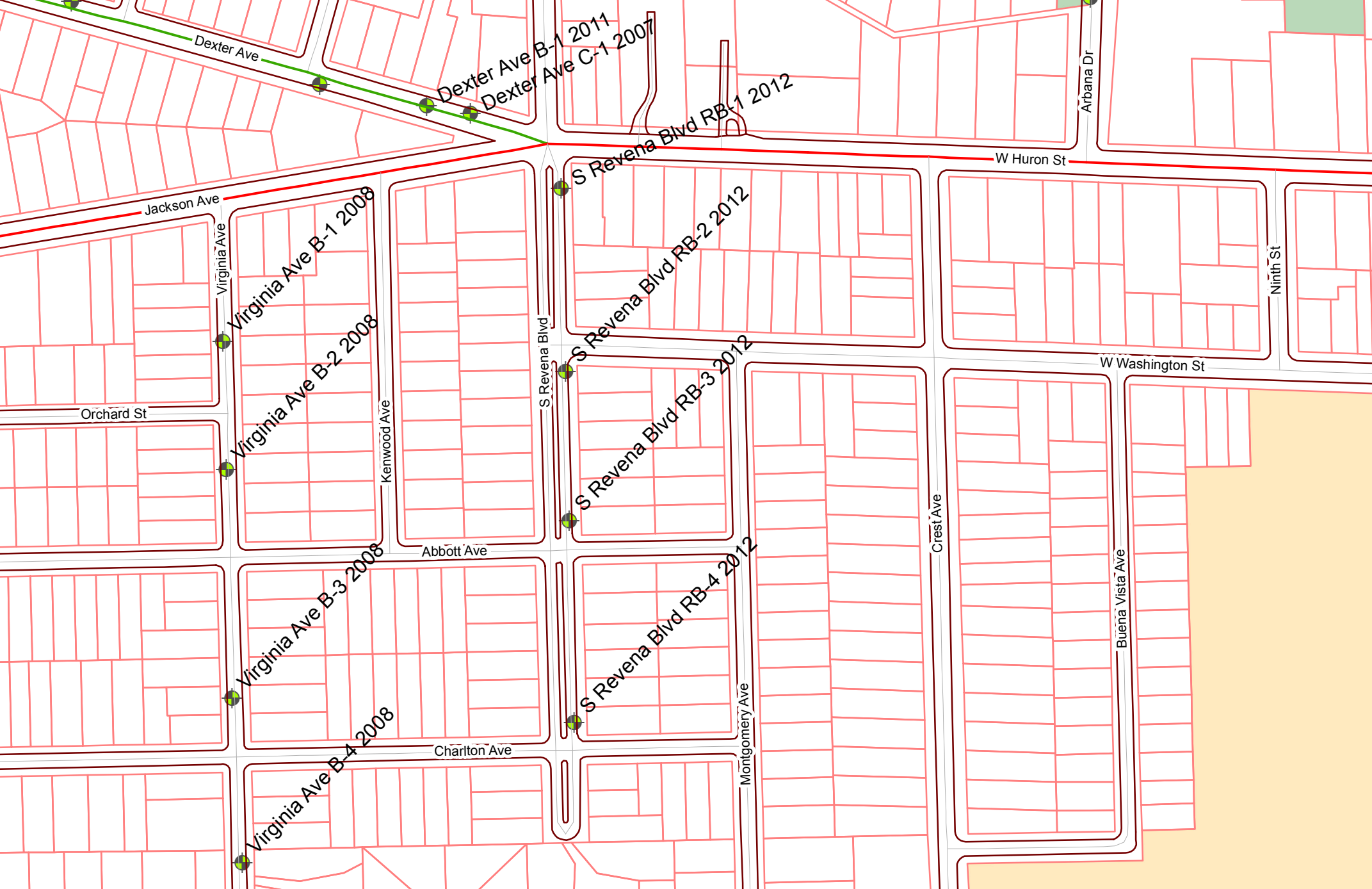
APPENDIX A – SOIL BORINGS


Dexter Ave
Dexter Ave B-1 2011
Dexter Ave C-1 2007
S Revena Blvd RB-1 2012
W Huron St
Arbana Dr
Jackson Ave
Virginia Ave
Virginia Ave B-1 2008
Virginia Ave B-2 2008
Kenwood Ave
S Revena Blvd
S Revena Blvd RB-2 2012
S Revena Blvd RB-3 2012
Ninth St
W Washington St
Orchard St
Abbott Ave
Virginia Ave B-3 2008
S Revena Blvd RB-4 2012
Crest Ave
Buena Vista Ave
Montgomery Ave
Charlton Ave
Virginia Ave B-4 2008

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A

Soil Boring No. **RB-4**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (4 inches) 0.3						
		Fill: Gravel (2 inches) 0.5						
		Portland Cement Concrete (6 inches) 1.0		AS-1	6	24.4		2500*
		Stiff Brown Silty Clay with trace sand and gravel 2.0			4			
		Medium Compact Brown Gravelly Sand with trace silt		AS-2	27			
					25			
5		5.0	5		25			
		End of Boring @ 5ft						
10			10					
15			15					

Total Depth: 5ft
Drilling Date: September 26, 2012
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: J. Hayball, P.E.

Drilling Method:
4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
Boring performed 4 feet west of SB East Curbline
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 67

PAVEMENT CORE DCP 120547A.GPJ G2_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A

Soil Boring No. **RB-3**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (4 inches) 0.3						
		Fill: Gravel (3 inches) 0.6						
		Portland Cement Concrete (5 inches) 1.0		AS-1	6	24.0		2500*
		Stiff Brown Silty Clay with trace sand and gravel 2.0			6			
		Medium Compact to Compact Brown Gravelly Sand with trace silt		AS-2	32			
					25			
5		5.0	5		29			
		End of Boring @ 5ft						
10			10					
15			15					

Total Depth: 5ft
Drilling Date: September 26, 2012
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: J. Hayball, P.E.

Drilling Method:
4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
Boring performed 4 feet east of NB West Curbline
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 66

PAVEMENT CORE DCP 120547A.GPJ G2_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A

Soil Boring No. **RB-2**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (4 inches) 0.3						
		Fill: Gravel (3 inches) 0.4						
		Portland Cement Concrete (5 inches) 0.9		AS-1	5	24.2		2000*
		Stiff Brown Silty Clay with trace sand and gravel			4			
					5			
		3.5		AS-2	29			
5		Medium Compact to Compact Brown Gravelly Sand with trace silt 5.0	5		30			
		End of Boring @ 5ft						
10			10					
15			15					

Total Depth: 5ft
Drilling Date: September 26, 2012
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: J. Hayball, P.E.

Drilling Method:
4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
Boring performed 12 feet east of SB West Curbline
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 65

PAVEMENT CORE DCP 120547A.GPJ G2_CONS.GDT 10/19/12

Project Name: Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 120547A

Latitude: N/A Longitude: N/A

Soil Boring No. **RB-1**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (5-1/2 inches) 0.5						
		Portland Cement Concrete (6-1/2 inches) 1.0		AS-1	11			
		Loose to Medium Compact Brown Silty Sand with trace clay and gravel			10			
		2.5		AS-2	28			
		Medium Compact Brown Gravelly Sand with trace silt			26			
5		5.0	5		28			
		End of Boring @ 5ft						
10			10					
15			15					

Total Depth: 5ft
Drilling Date: September 26, 2012
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: J. Hayball, P.E.

Drilling Method:
4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

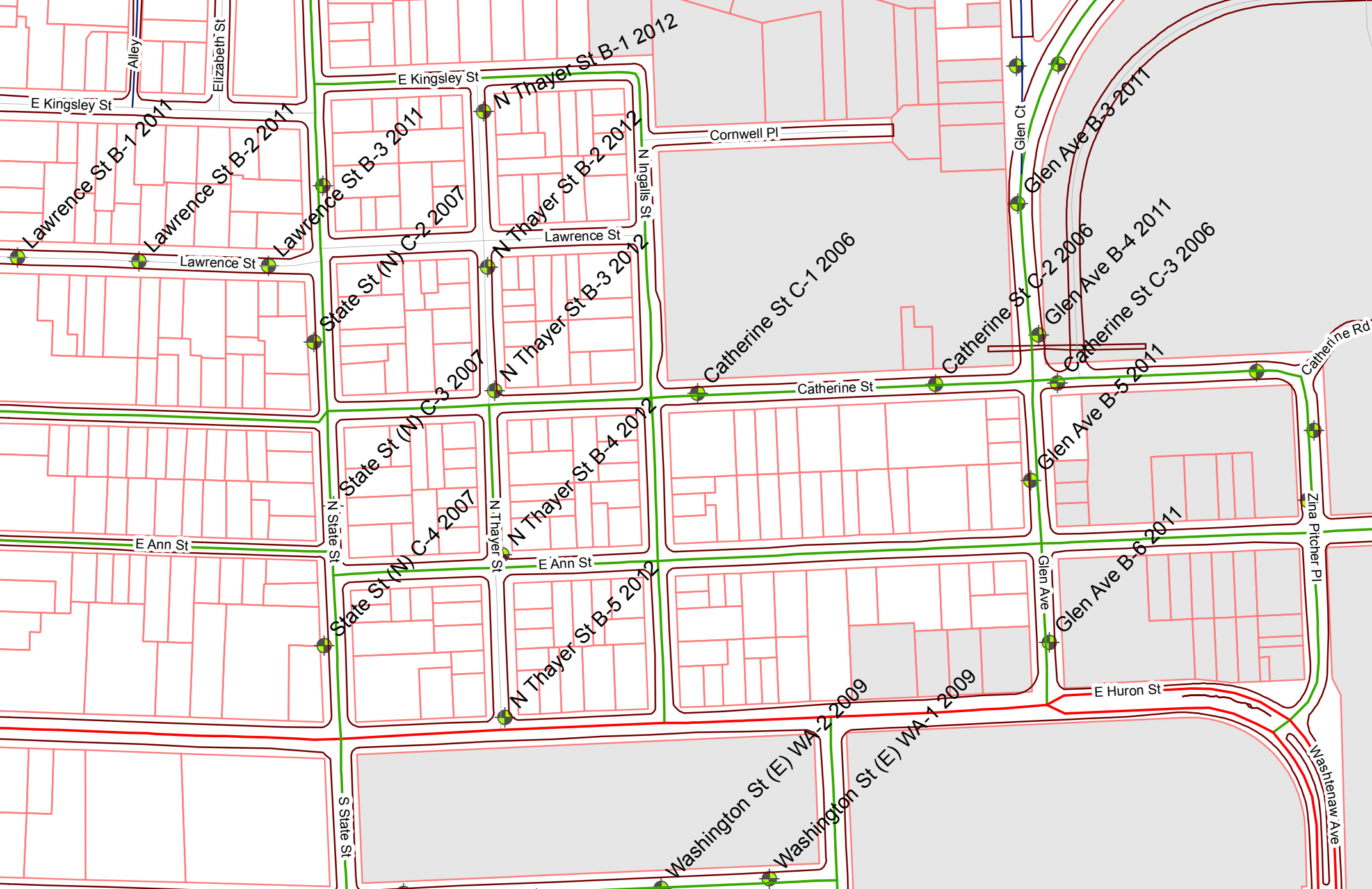
Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
Boring performed 10 feet west of NB East Curbline

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 64

PAVEMENT CORE DCP 120547A.GPJ G2_CONS.GDT 10/19/12


Alley
Elizabeth St
E Kingsley St
E Kingsley St
Lawrence St B-1 2011
Lawrence St B-2 2011
Lawrence St B-3 2011
N Thayer St B-1 2012
N Thayer St B-2 2012
Cornwell Pl
N Ingalls St
Glen Ct
Glen Ave B-3 2011
Lawrence St
Lawrence St
State St (N) C-2 2007
N Thayer St B-3 2012
Catherine St C-1 2006
Catherine St C-2 2006
Glen Ave B-4 2011
Catherine St C-3 2006
Catherine St
Catherine Rd
Glen Ave B-5 2011
State St (N) C-3 2007
N Thayer St B-4 2012
N State St
N Thayer St
E Ann St
E Ann St
State St (N) C-4 2007
N Thayer St B-5 2012
Glen Ave
Glen Ave B-6 2011
Zina Pitcher Pl
E Huron St
Washington St (E) WA-2 2009
Washington St (E) WA-1 2009
Washtenaw Ave
S State St

CTI and Associates Inc

BORING NUMBER: Thayer B-5

CLIENT City of Ann Arbor
PROJECT NAME 2012 Ann Arbor Misc. Geotechnical Services - North Area Borings
PROJECT NUMBER 3122040060-1
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 10/9/12 **COMPLETED** 10/9/12
GROUND ELEVATION N/A
DRILLING CONTRACTOR Stearns Drilling
GROUND WATER LEVELS:
DRILLING METHOD 2-1/4 inch HSA
DURING DRILLING None
LOGGED BY G. Geerlings **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched.
COLLAPSE DEPTH 3' 6"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		4 inches of ASPHALT PAVEMENT						
		8 inches of brown moist silty fine to medium SAND with some gravel - (FILL)	GB	100				
		Brown moist medium dense fine to coarse SAND with some gravel and silt and occasional clay seams - (SP-SM)	SS 1	94	6-7-6 (13)			
2.5		Brown moist medium dense fine to medium SAND with some gravel and silt - (SP-SM)	SS 2	78	6-7-10 (17)			
5.0		Bottom of borehole at 5.0 feet.						

Boring performed 10' west of curb, 8' north of E. Huron Street

CTI and Associates Inc

BORING NUMBER: Thayer B-4

CLIENT City of Ann Arbor
PROJECT NAME 2012 Ann Arbor Misc. Geotechnical Services - North Area Borings
PROJECT NUMBER 3122040060-1
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 10/9/12 **COMPLETED** 10/9/12
GROUND ELEVATION N/A
DRILLING CONTRACTOR Stearns Drilling
GROUND WATER LEVELS:
DRILLING METHOD 2-1/4 inch HSA
DURING DRILLING None
LOGGED BY G. Geerlings **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched.
COLLAPSE DEPTH 3' 6"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		5 inches of ASPHALT PAVEMENT					
		12 inches of CONCRETE PAVEMENT					
		6 inches of brown moist silty fine to medium SAND with some gravel - (FILL)	SS 1	78	4-2-3 (5)	0.75	
2.5		Reddish-brown moist medium stiff sandy CLAY with silt and some gravel - (CL)					18
		Brown moist loose clayey fine to coarse SAND with some gravel - (SC)	SS 2	83	3-2-3 (5)		
5.0		Bottom of borehole at 5.0 feet.					

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Boring performed 4' west of curb, 10' north of Ann Street

CTI and Associates Inc

BORING NUMBER: Thayer B-3

CLIENT City of Ann Arbor
PROJECT NAME 2012 Ann Arbor Misc. Geotechnical Services - North Area Borings
PROJECT NUMBER 3122040060-1
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 10/9/12 **COMPLETED** 10/9/12
GROUND ELEVATION N/A
DRILLING CONTRACTOR Stearns Drilling
GROUND WATER LEVELS:
DRILLING METHOD 2-1/4 inch HSA
DURING DRILLING None
LOGGED BY G. Geerlings **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched.
COLLAPSE DEPTH 3' 6"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		3 inches of ASPHALT PAVEMENT						
		3 inches of gray moist crushed LIMESTONE - (FILL)	GB	100				
		Dark brown moist silty fine to medium SAND with gravel and trace of clay - (FILL)	SS 1	11	7-5-4 (9)			
2.5								
		Brown moist medium dense fine to coarse SAND with some gravel and silt - (SP-SM)	SS 2	100	5-5-8 (13)			
5.0								

Bottom of borehole at 5.0 feet.

Boring performed 10' west of curb, 12' north of Catherine Street

CTI and Associates Inc

BORING NUMBER: Thayer B-2

CLIENT City of Ann Arbor
PROJECT NAME 2012 Ann Arbor Misc. Geotechnical Services - North Area Borings
PROJECT NUMBER 3122040060-1
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 10/10/12 **COMPLETED** 10/10/12
GROUND ELEVATION N/A
DRILLING CONTRACTOR Stearns Drilling
GROUND WATER LEVELS:
DRILLING METHOD 2-1/4 inch HSA
DURING DRILLING None
LOGGED BY G. Geerlings **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched.
COLLAPSE DEPTH 3' 6"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		5 inches of ASPHALT PAVEMENT					
		19 inches of gray moist crushed LIMESTONE - (FILL)	GB	100			
			SS 1	94	10-6-3 (9)	1.25	
2.5		Brown moist stiff sandy CLAY with silt and some gravel - (CL)					15
		Brown moist loose clayey fine to coarse SAND with some gravel and occasional clay lenses - (SC)	SS 2	100	2-3-6 (9)		
5.0		Bottom of borehole at 5.0 feet.					

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Boring performed 10' west of curb, at driveway to 321 N. Thayer Street

CTI and Associates Inc

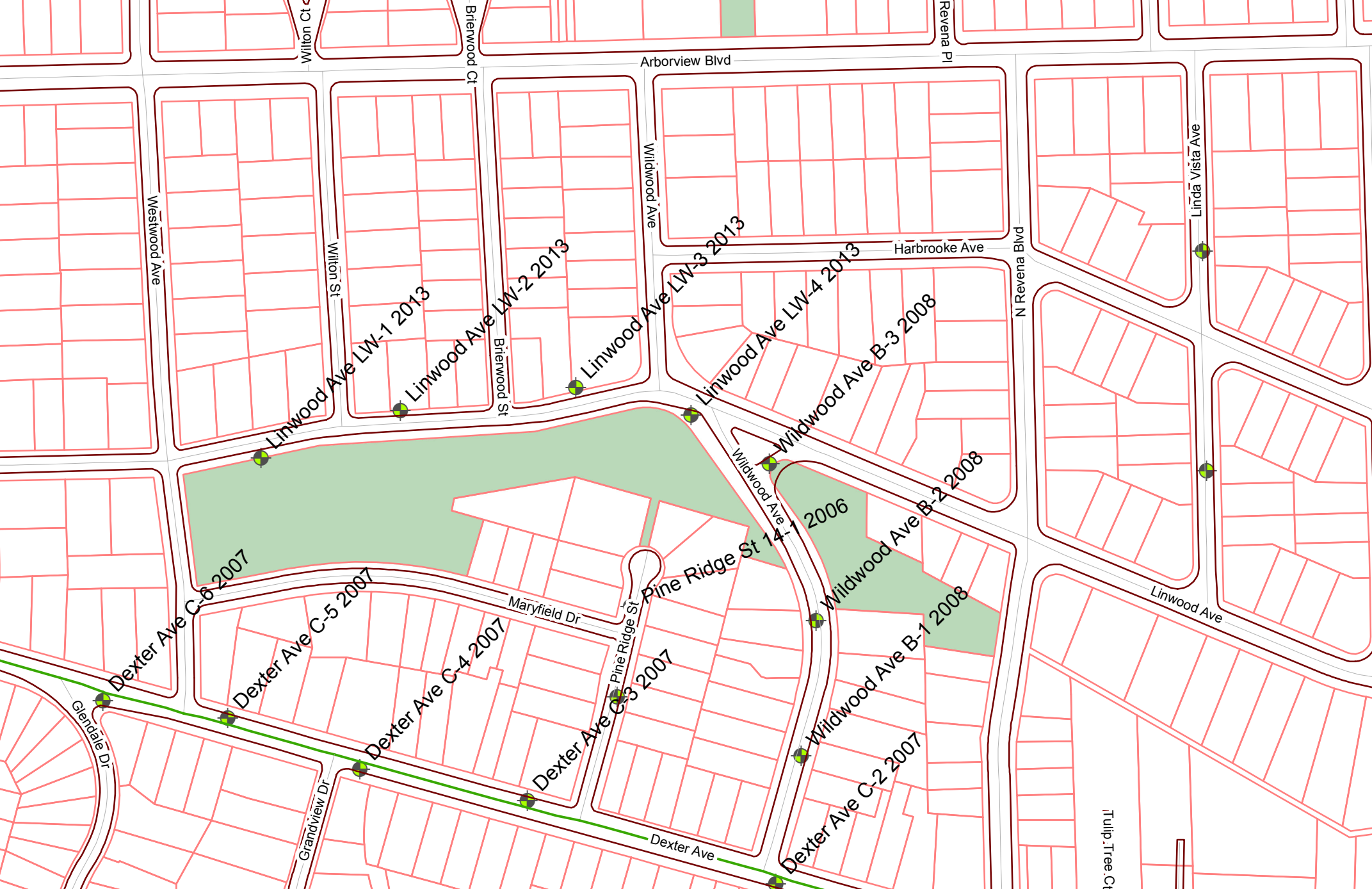
BORING NUMBER: Thayer B-1

CLIENT City of Ann Arbor
PROJECT NAME 2012 Ann Arbor Misc. Geotechnical Services - North Area Borings
PROJECT NUMBER 3122040060-1
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 10/10/12 **COMPLETED** 10/10/12
GROUND ELEVATION N/A
DRILLING CONTRACTOR Stearns Drilling
GROUND WATER LEVELS:
DRILLING METHOD 2-1/4 inch HSA
DURING DRILLING None
LOGGED BY G. Geerlings **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched.
COLLAPSE DEPTH 3' 6"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		6 inches of ASPHALT PAVEMENT						
		12 inches of dark brown moist silty fine SAND with some gravel and clay - (FILL)	GB	100				
		Brown moist medium dense to dense silty fine to coarse SAND with some gravel and occasional clay seams - (SM)	SS 1	78	5-7-7 (14)			
2.5								
			SS 2	78	6-11-26 (37)			
5.0								

Bottom of borehole at 5.0 feet.

Boring performed 10' west of curb, 50' south of Kingsley Street


Arborview Blvd
Wilton Ct
Brierwood Ct
Revena Pl
Westwood Ave
Wilton St
Brierwood St
Wildwood Ave
Harbrooke Ave
N Revena Blvd
Linda Vista Ave
Linwood Ave LW-1 2013
Linwood Ave LW-2 2013
Linwood Ave LW-3 2013
Linwood Ave LW-4 2013
Wildwood Ave B-3 2008
Wildwood Ave B-2 2008
Wildwood Ave B-1 2008
Wildwood Ave 14-1 2006
Linwood Ave
Dexter Ave C-6 2007
Dexter Ave C-5 2007
Dexter Ave C-4 2007
Dexter Ave C-3 2007
Dexter Ave C-2 2007
Maryfield Dr
Pine Ridge St
Pine Ridge St
Glendale Dr
Grandview Dr
Dexter Ave
Tulip Tree Ct

Legend

Pavement Cores/Hand Auger Borings performed by G2 Consulting Group, LLC on November 26, 2013

Soil Boring Location Plan

2013 Ann Arbor Geotechnical
Linwood Avenue
Ann Arbor, Mihigan

G2 CONSULTING GROUP
1866 Woodslee Street
Troy, Michigan 48083

Project No. 130744	
Drawn by: JMH	
Date: 12/2/2013	Plate No. 2
Scale: NTS	

Project Name: 2013 Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 130744

Latitude: 42.284281° Longitude: -83.770317°

Soil Boring No. **LW-1**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 900.0 ft	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (3 inches) 0.3		BS-1				
		Fill: Brown Sand and Gravel with trace silt (Natural Aggregate Base, 9 inches) 1.0						
		Loose Brown Sand with trace silt and gravel 2.5		BS-2	8			
895.0		Stiff Brown Sandy Clay with trace silt and gravel 5.0	5	BS-3	7	18.5		2000*
		End of Boring @ 5ft						
890.0			10					
885.0			15					
880.0			20					
875.0			25					
870.0			30					

Total Depth: 5ft
Drilling Date: November 27, 2013
Inspector:
Contractor: G2 Consultin Group, LLC
Driller: J. Hayball, P. E.

Drilling Method:
4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
Linwood Avenue, Station 1+50
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 3

PAVEMENT CORE DCP 130744.GPJ G2_CONS.GDT 12/10/13

Project Name: 2013 Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 130744

Latitude: 42.284414° Longitude: -83.769400°

Soil Boring No. **LW-2**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 898.0 ft	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (3 inches) 0.3		BS-1				
		Fill: Brown Sand and Gravel with trace silt (Natural Aggregate Base, 6 inches) 0.8						
		Compact Brown Gravelly Sand with trace silt		BS-2	37			
		3.0						
893.0		Stiff Brown Sandy Clay with trace silt and gravel 5.0	5	BS-3	8	20.6		2500*
		End of Boring @ 5ft						
888.0			10					
883.0			15					
878.0			20					
873.0			25					
868.0			30					

Total Depth: 5ft
Drilling Date: November 27, 2013
Inspector:
Contractor: G2 Consultin Group, LLC
Driller: J. Hayball, P. E.

Drilling Method:
4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
Linwood Avenue, Station 4+50
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 4

PAVEMENT CORE DCP 130744.GPJ G2_CONS.GDT 12/10/13

Project Name: 2013 Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 130744

Latitude: 42.284481° Longitude: -83.768328°

Soil Boring No. **LW-3**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 892.0 ft	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (5 inches) 0.4		BS-1				
		Fill: Brown Silty Sand with trace clay and gravel (10 inches) 1.3						
		Loose Brown Clayey Sand with trace gravel 3.0		BS-2	6			
887.0		Stiff Brown Sandy Clay with trace silt and gravel 5.0	5	BS-3	7	19.6		2500*
		End of Boring @ 5ft						
882.0			10					
877.0			15					
872.0			20					
867.0			25					
862.0			30					

Total Depth: 5ft
Drilling Date: November 27, 2013
Inspector:
Contractor: G2 Consultin Group, LLC
Driller: J. Hayball, P. E.

Drilling Method:
4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
Linwood Avenue, Station 7+50
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 5

PAVEMENT CORE DCP 130744.GPJ G2_CONS.GDT 12/10/13

Project Name: 2013 Ann Arbor Geotechnical

Project Location: Ann Arbor, Michigan

G2 Project No. 130744

Latitude: 42.284481° Longitude: -83.767550°

Soil Boring No. **LW-4**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 885.0 ft	DEPTH (ft)	SAMPLE TYPE/NO.	DCP BLOWS/ 1.75-INCHES	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCOF. COMP. ST. (PSF)
		Bituminous Concrete (3 inches) 0.5		BS-1				
		Fill: Brown Silty Clay (2 inches) 0.7						
		Fill: Brown Sand and Gravel with trace silt (2 inches) 0.8		BS-2	14	16.2		5000*
		Very Stiff Brown and Gray Silty Clay with trace sand and gravel						
880.0		5.0	5	BS-3	15	15.3		5000*
		End of Boring @ 5ft						
875.0			10					
870.0			15					
865.0			20					
860.0			25					
855.0			30					

Total Depth: 5ft
Drilling Date: November 27, 2013
Inspector:
Contractor: G2 Consultin Group, LLC
Driller: J. Hayball, P. E.

Drilling Method:
4-inch diameter diamond tipped core barrel; 3-inch diameter hand auger

Water Level Observation:
Dry during and upon completion of drilling operations

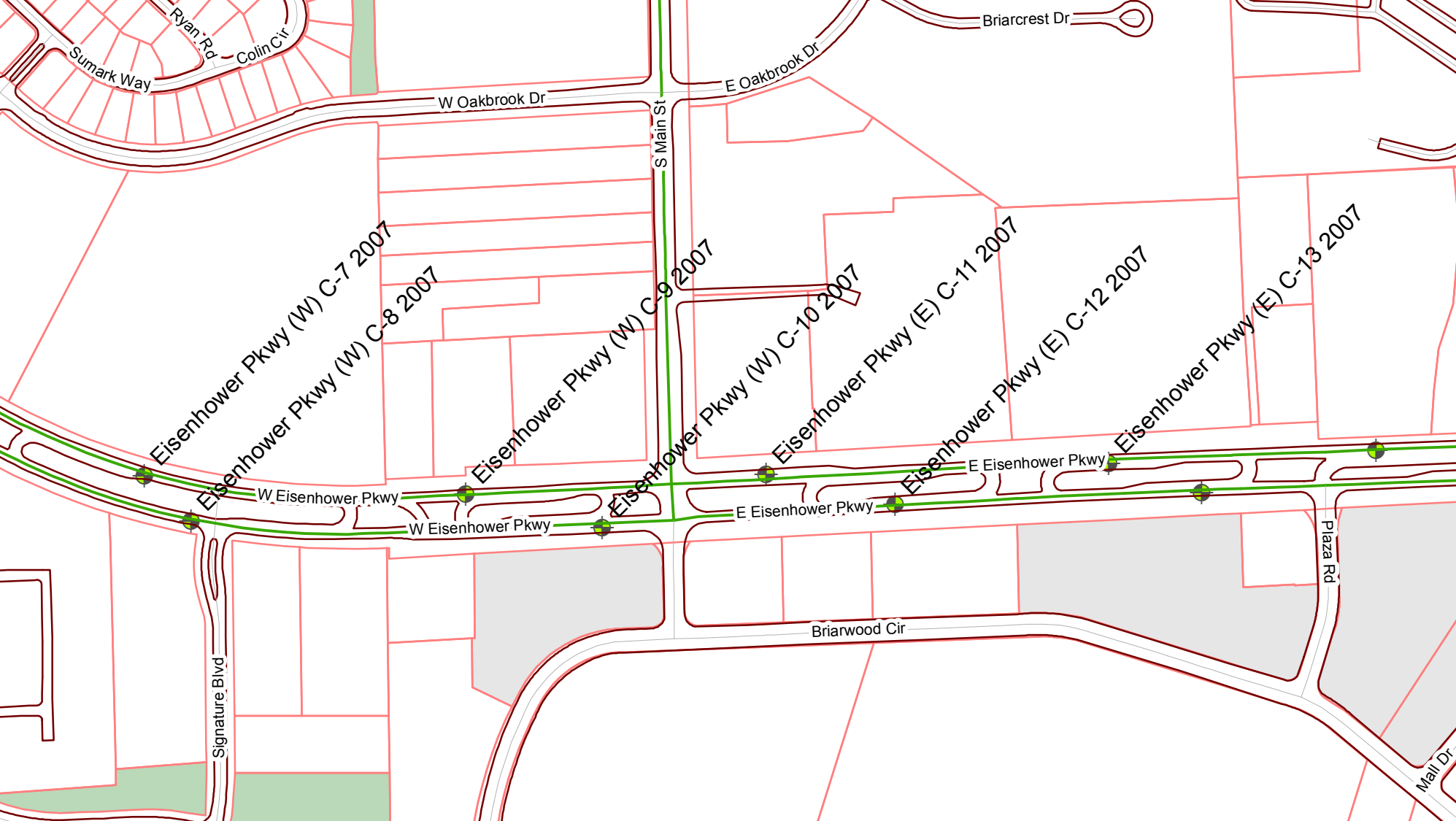
Notes:
Linwood Avenue, Station 9+50
* Calibrated Hand Penetrometer

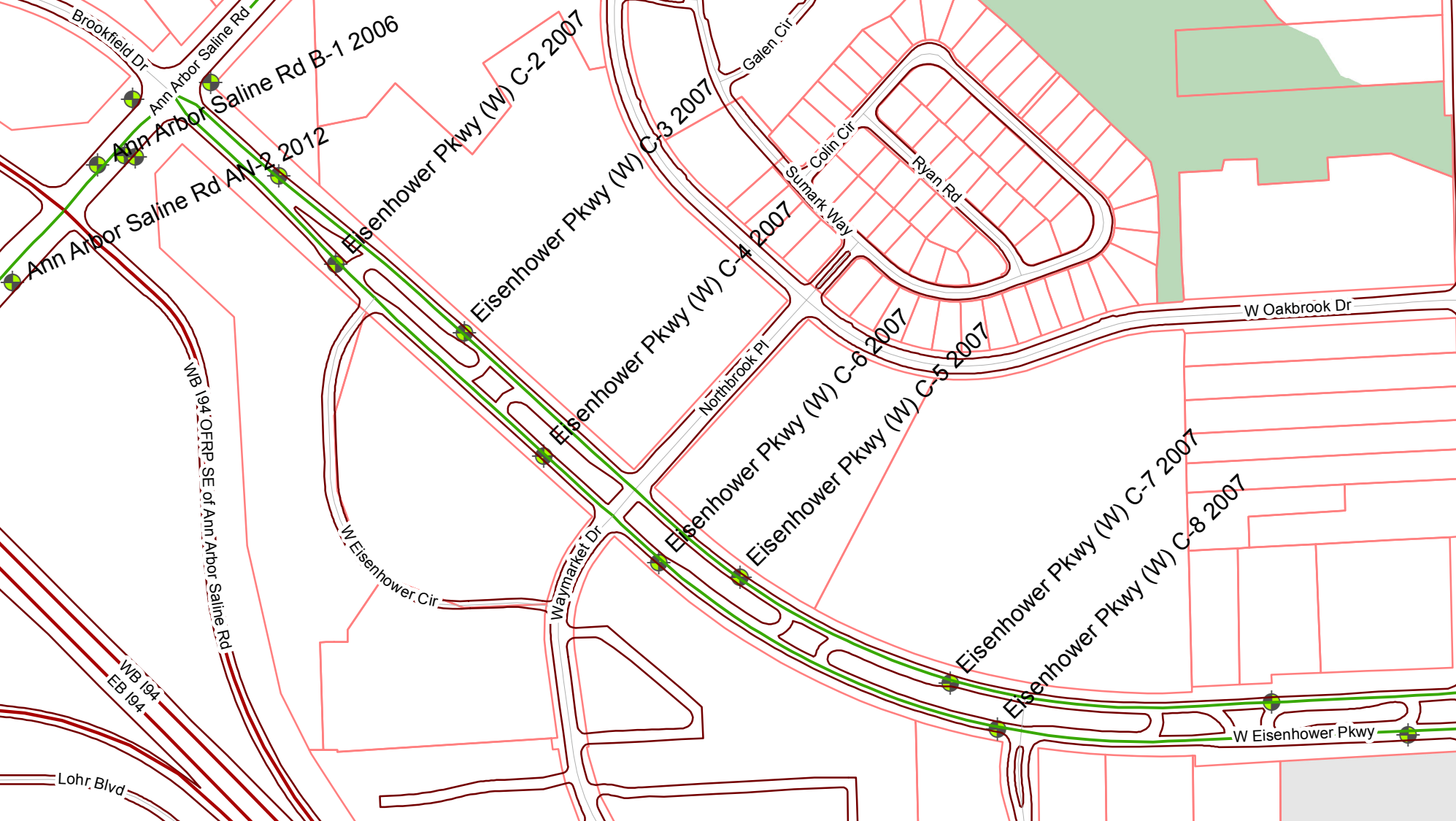
Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 6

PAVEMENT CORE DCP 130744.GPJ G2_CONS.GDT 12/10/13


Briarcrest Dr
Hidden Valley Club Dr
Campus Dr
S State St B-4 2011
S State St B-5 2011
S State St B-6 2011
S State St B-7 2011
S State St B-8 2011
S State St
Access
Access
Eisenhower Pkwy (E) C-13 2007
Eisenhower Pkwy (E) C-14 2007
Eisenhower Pkwy (E) C-15 2007
Eisenhower Pkwy (E) C-16 2007
Eisenhower Pkwy (E) C-19 2007
Eisenhower Pkwy (E) C-20 2007
Eisenhower Pkwy (E) C-22 2007
E Eisenhower Pkwy
E Eisenhower Pkwy
Plaza Rd
Market Pl
Briarwood Cir
Mall Dr
State St (S) B-1 2010
Boardwalk Dr


Sumark Way
Ryan Rd
Colin Cir
W Oakbrook Dr
E Oakbrook Dr
S Main St
Briarcrest Dr
Eisenhower Pkwy (W) C-7 2007
Eisenhower Pkwy (W) C-8 2007
Eisenhower Pkwy (W) C-9 2007
Eisenhower Pkwy (W) C-10 2007
Eisenhower Pkwy (E) C-11 2007
Eisenhower Pkwy (E) C-12 2007
Eisenhower Pkwy (E) C-13 2007
W Eisenhower Pkwy
W Eisenhower Pkwy
E Eisenhower Pkwy
E Eisenhower Pkwy
Signature Blvd
Briarwood Cir
Plaza Rd
Mall Dr


Brookfield Dr
Ann Arbor Saline Rd
Ann Arbor Saline Rd B-1 2006
Ann Arbor Saline Rd AN-2 2012
Ann Arbor Saline Rd
Eisenhower Pkwy (W) C-2 2007
Eisenhower Pkwy (W) C-3 2007
Eisenhower Pkwy (W) C-4 2007
Eisenhower Pkwy (W) C-6 2007
Eisenhower Pkwy (W) C-5 2007
Eisenhower Pkwy (W) C-7 2007
Eisenhower Pkwy (W) C-8 2007
Galen Cir
Colin Cir
Sumark Way
Ryan Rd
W Oakbrook Dr
Northbrook Pl
W Eisenhower Cir
Waymarket Dr
W Eisenhower Pkwy
WB I94 OFRP SE of Ann Arbor Saline Rd
WB I94
EB I94
Lohr Blvd

Project: City of Ann Arbor 2008 Road Construction Project

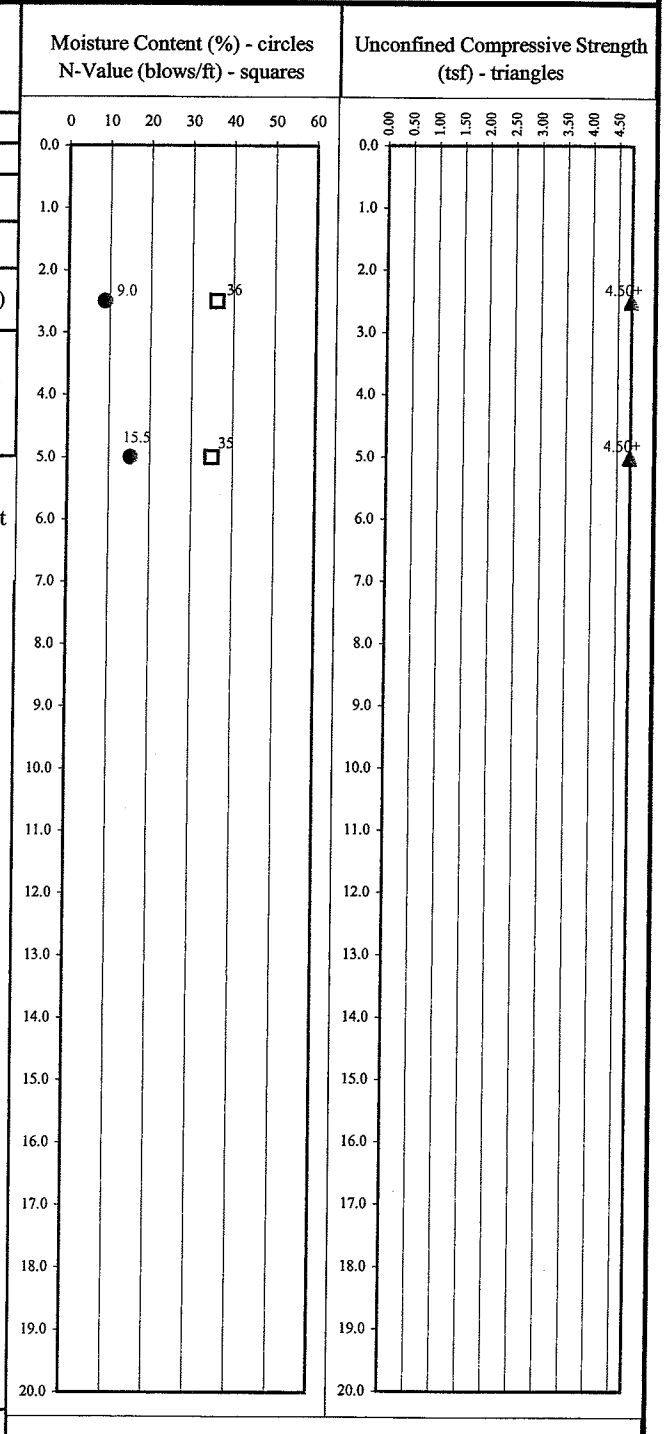
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-10-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			7.0" of Bituminous Concrete Pavement
		1	Note 1
SS-1	18		Note 2
		2	SANDY CLAY FILL - trace gravel - hard - brown - (CL-Fill)
		3	
SS-2	18	4	SILTY CLAY - trace sand and gravel - hard - mottled brown and gray - (CL)
		5	
		6	Note 1: 8.0" SILTY FINE TO COARSE SAND (Crushed Limestone) FILL - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		7	
		8	Note 2: 9.0" FINE TO COARSE SAND FILL - trace sand and gravel - moist - brown - (SP-SM-Fill)
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 9/28/07
Boring Completed: 9/28/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

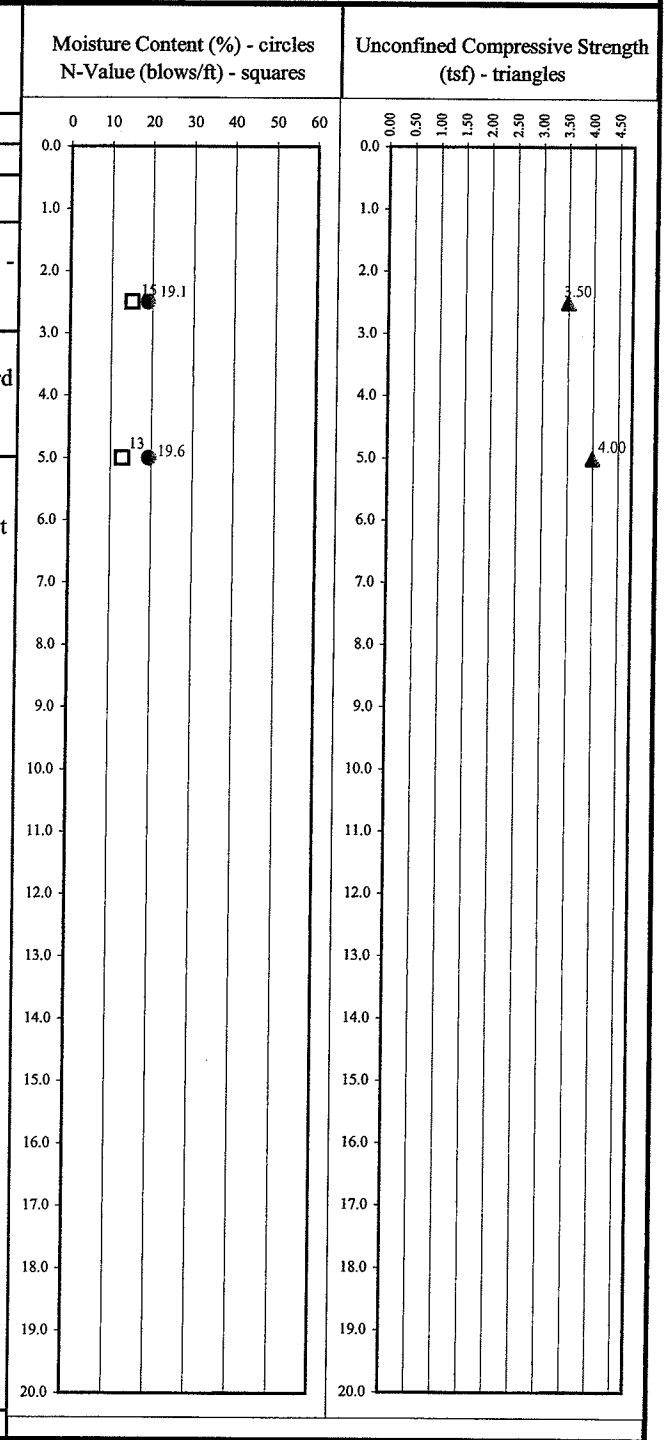
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-9-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			7.0" of Bituminous Concrete Pavement
		1	Note 1
SS-1	18	2	FINE TO COARSE SAND FILL - trace silt and gravel - moist - brown - (SP-SM-Fill)
		3	
SS-2	18	4	SILTY CLAY - trace sand and gravel - very stiff to hard - mottled brown and gray - (CL)
		5	
		6	Note 1: 6.0" OF SILTY FINE TO COARSE SAND (Crushed Limestone) FILL - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

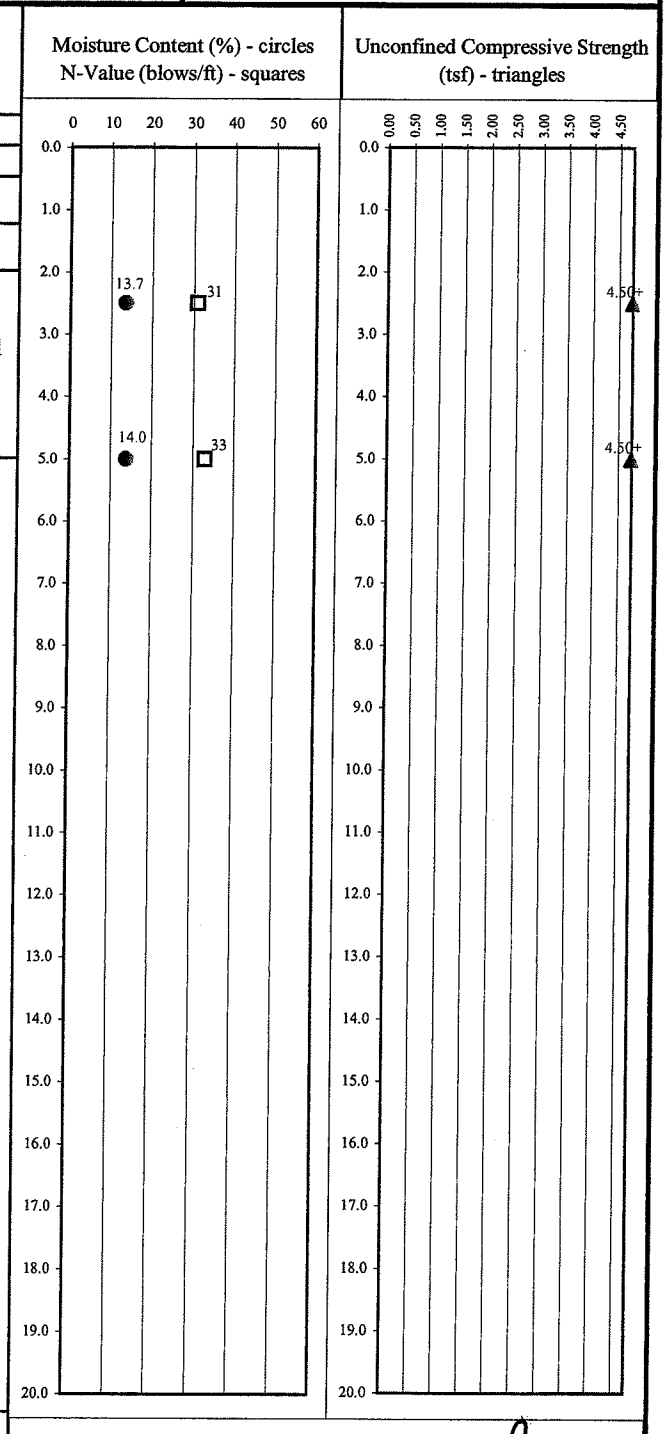
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-8-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			6.0" of Bituminous Concrete Pavement
		1	Note 1
SS-1	18		Note 2
		2	
		3	SILTY CLAY - trace sand and gravel - hard - mottled brown and gray - (CL)
SS-2	18	4	
		5	
		6	Note 1: 7.0" of SILTY FINE TO COARSE SAND (Crushed Limestone) Fill - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		7	
		8	Note 2: 11.0" of FINE TO COARSE SAND FILL - trace silt and gravel - moist - brown - (SP-SM-Fill)
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 9/28/07
Boring Completed: 9/28/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

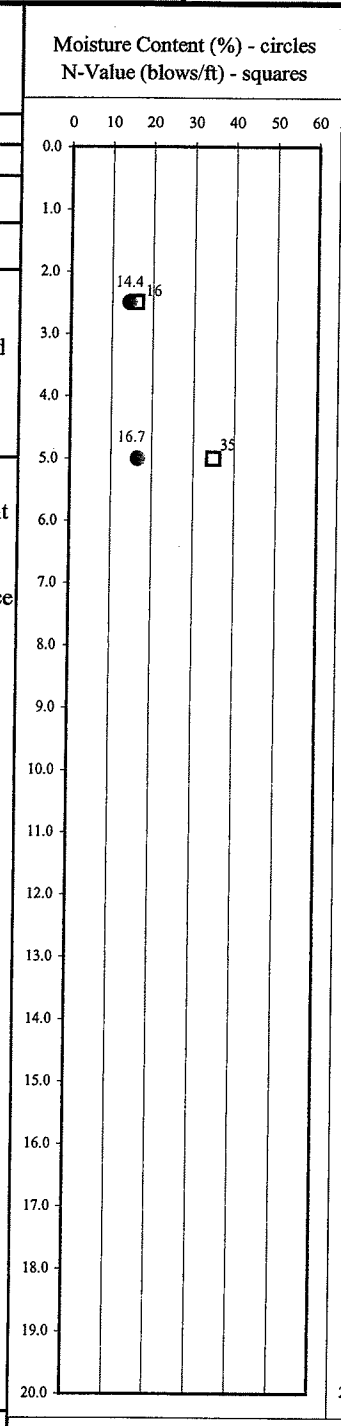
Client: City of Ann Arbor

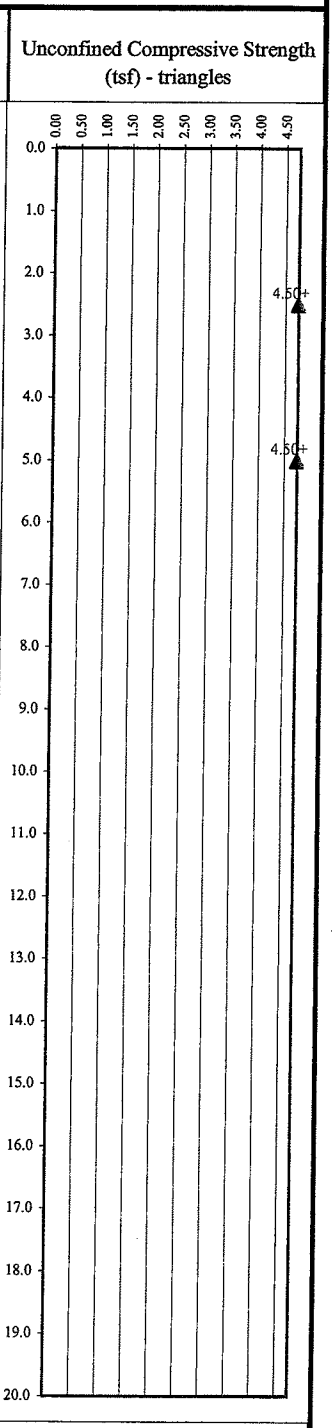
Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-7-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			6.5" of Bituminous Concrete Pavement
		1	Note 1
SS-1	18		Note 2
		2	
		3	SILTY CLAY - trace sand and gravel - hard - mottled brown and gray - (CL)
SS-2	18	4	
		5	
		6	Note 1: 7.0" SILTY FINE TO COARSE SAND (Crushed Limestone) FILL - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		7	NOTE 2: 10.5" FINE TO MEDIUM SAND FILL - trace silt and gravel - moist - brown - (SP-SM)
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	





Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved: JTA

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

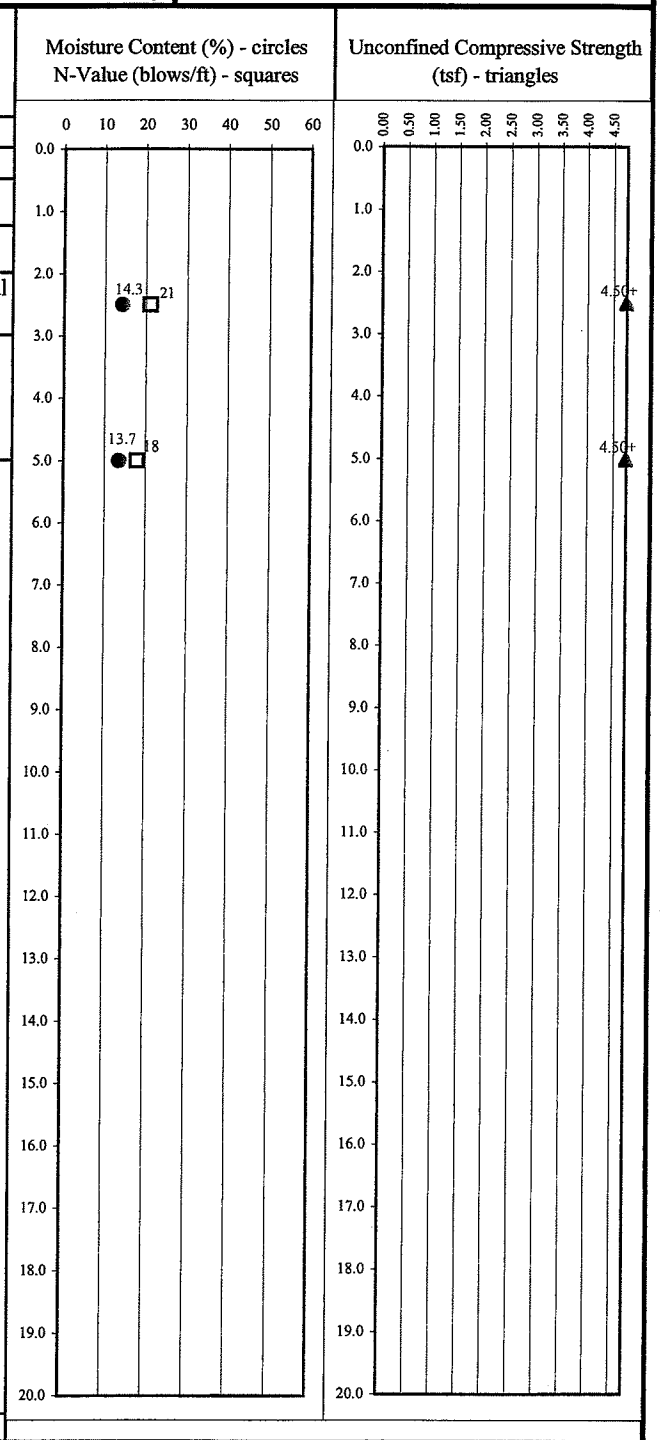
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-6-Eisonhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			7.0" of Bituminous Concrete Pavement
		1	Note 1
SS-1	18		Note 2
		2	SILTY CLAY FILL - trace sand and gravel - occasional topsoil and root matter - stiff - brown and black - (CL-
		3	
SS-2	18	4	SILTY CLAY - trace sand and gravel - hard - mottled brown and gray - (CL)
		5	
		6	Note 1: 6.0" OF SILTY FINE TO COARSE SAND (Crushed Limestone) Fill - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		7	
		8	Note 2: 11.0" OF FINE TO MEDIUM SAND FILL - trace silt and gravel - moist - brown - (SP-SM-Fill)
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	



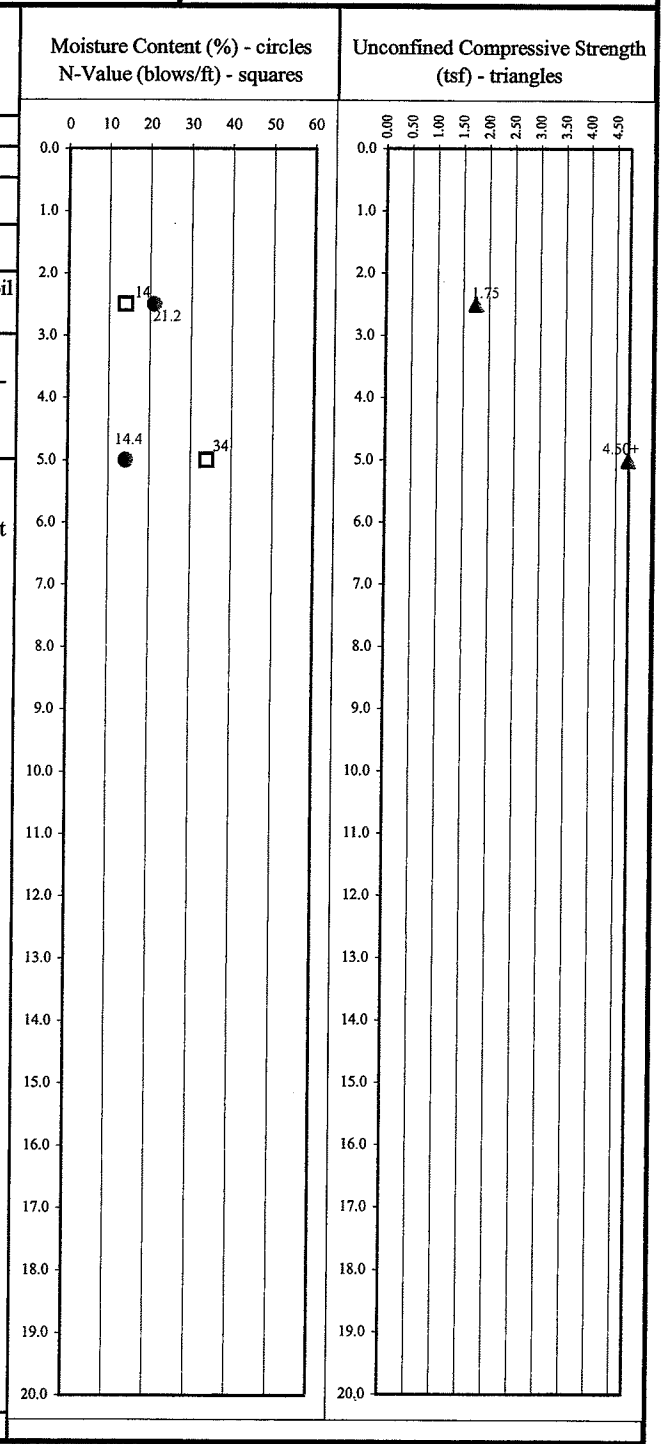
Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 9/28/07
Boring Completed: 9/28/07
Rig: CME 55
Driller: J. Faitel

Approved:
Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project	TES CONSULTANTS, P.C.
Client: City of Ann Arbor	23943 Industrial Park Drive
Location: Ann Arbor, Michigan	Farmington Hills, MI 48335
Project #: 07-1192 Boring Log #: C-5-Eisenhower Parkway	Ph: (248) 615-3000 Fx: (248) 615-3512

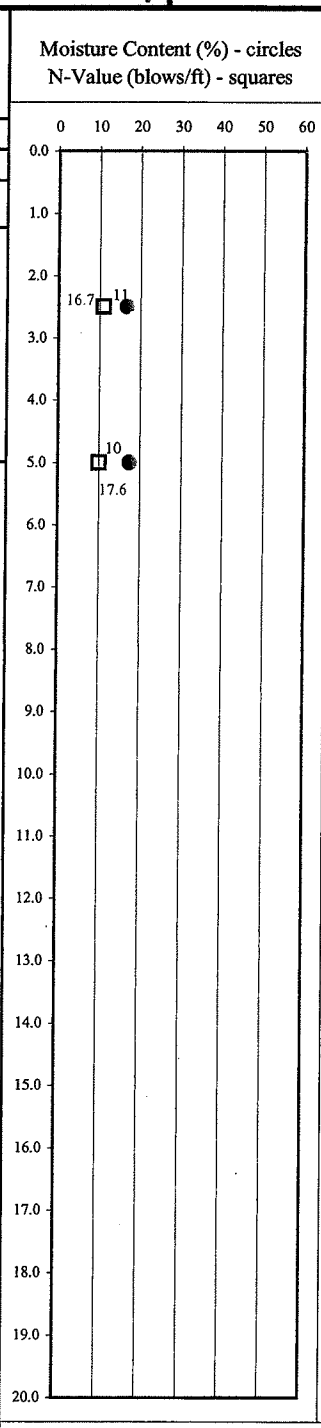
Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			6.5" Bituminous Concrete Pavement
		1	Note 1
SS-1	18		Note 2
		2	SILTY CLAY FILL - trace sand and gravel - occasional topsoil and root matter - stiff - brown and black - (CL-Fill)
		3	
SS-2	18	4	SILTY CLAY - trace sand and gravel - hard - mottled - brown and gray - (CL)
		5	
		6	Note 1: 6.0" SILTY FINE TO COARSE SAND (Crushed Limestone) FILL - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		7	
		8	Note 2: 11.5" OF FINE TO MEDIUM SAND FILL - trace silt and gravel - moist - brown - (SP-SM-Fill)
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	

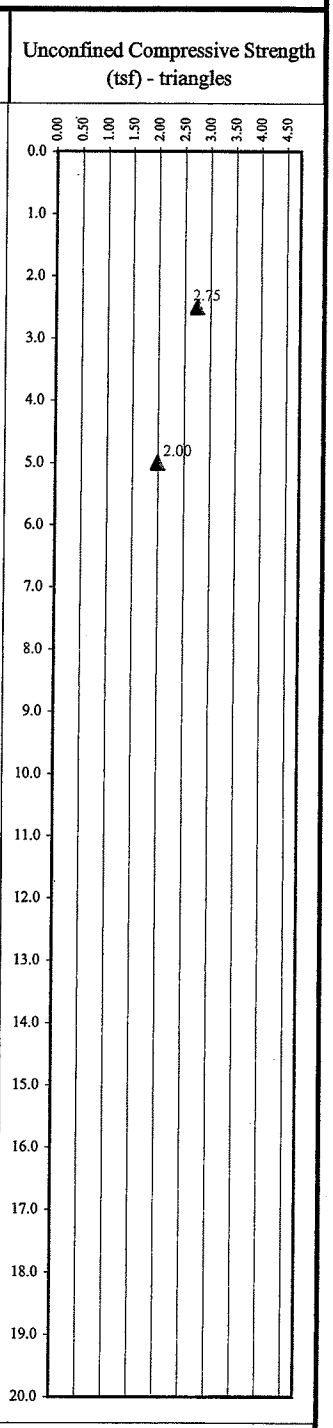


Water Level Observations:	Boring Started: 10/2/07	Approved:
While Drilling: Dry	Boring Completed: 10/2/07	
At Completion: Dry	Rig: CME 55	Drawn By: AH
Cave-In At:	Driller: J. Faitel	

Project: City of Ann Arbor 2008 Road Construction Project	TES CONSULTANTS, P.C.
Client: City of Ann Arbor	23943 Industrial Park Drive
Location: Ann Arbor, Michigan	Farmington Hills, MI 48335
Project #: 07-1192 Boring Log #: C-4-Eisenhower Parkway	Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			6.5" Bituminous Concrete Pavement
		1	Note 1
SS-1	18	2	SILTY CLAY FILL - trace sand and gravel - very stiff - brown - (CL-Fill)
		3	
SS-2	18	4	
		5	NOTE 1: 6.0" of SILTY FINE TO COARSE SAND (Crushed Limestone) FILL - some gravel - moist - light gray (SM-GM Crushed Limestone Fill)
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	

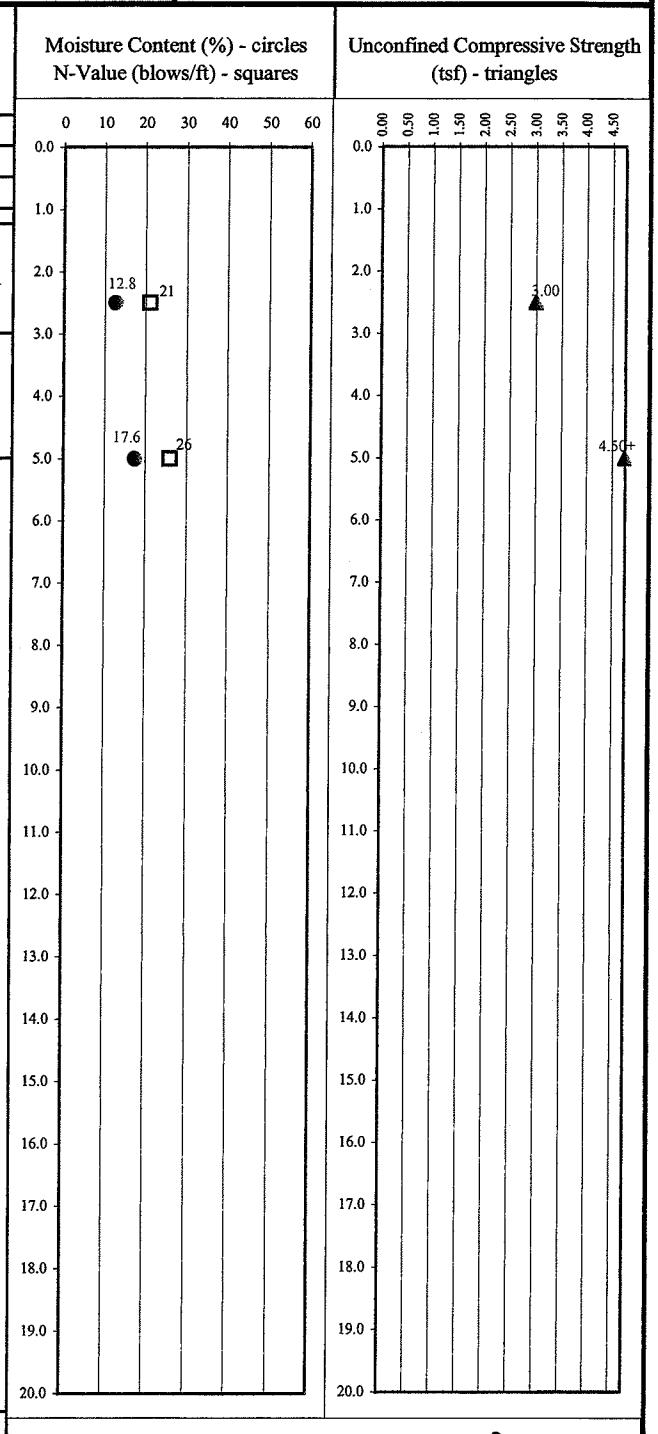




Water Level Observations:	Boring Started: 9/28/07	Approved:
While Drilling: Dry	Boring Completed: 9/28/07	
At Completion: Dry	Rig: CME 55	Drawn By: AH
Cave-In At:	Driller: J. Faitel	

Project: City of Ann Arbor 2008 Road Construction Project	TES CONSULTANTS, P.C.
Client: City of Ann Arbor	23943 Industrial Park Drive
Location: Ann Arbor, Michigan	Farmington Hills, MI 48335
Project #: 07-1192 Boring Log #: C-3-Eisenhower Parkway	Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			6.0" Bituminous Concrete Pavement
		1	Note 1: NOTE 2
SS-1	18	2	SILTY CLAY FILL - some sand - trace gravel - occasional topsoil seams - very stiff - brown - gray and black - (CL-Fill)
		3	
SS-2	18	4	SILTY CLAY - trace sand and gravel - hard - mottled brown and gray - (CL)
		5	Note 1: 6.0" SILTY FINE TO COARSE SAND (Crushed Limestone Fill) - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		6	
		7	Note 2: 6.0" FINE TO COARSE SAND FILL - some gravel - trace silt - moist - brown - (SP-SM Fill)
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	



Water Level Observations:	Boring Started: 10/2/07	Approved:
While Drilling: Dry	Boring Completed: 10/2/07	
At Completion: Dry	Rig: CME 55	Drawn By: AH
Cave-In At:	Driller: J. Faitel	

Project: City of Ann Arbor 2008 Road Construction Project

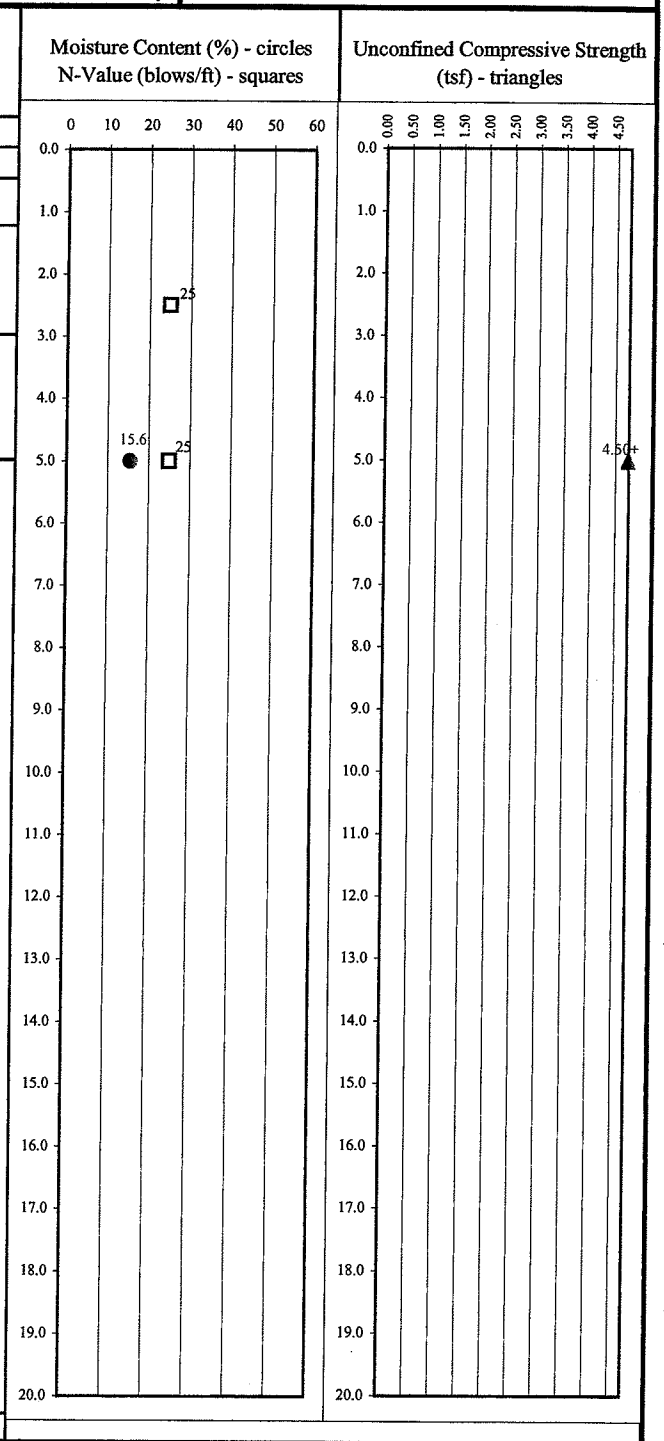
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-2-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			6.0" Bituminous Concrete Placement
		1	Note 1
SS-1	18	2	FINE TO MEDIUM SAND - FILL - trace silt and gravel - moist - brown - (SP-SM-Fill)
		3	
SS-2	18	4	SILTY CLAY - trace sand and gravel - hard - mottled brown and gray - (CL)
		5	
		6	Note 1: 8.0" SILTY FINE TO COARSE SAND (Crushed Limestone-Fill) - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

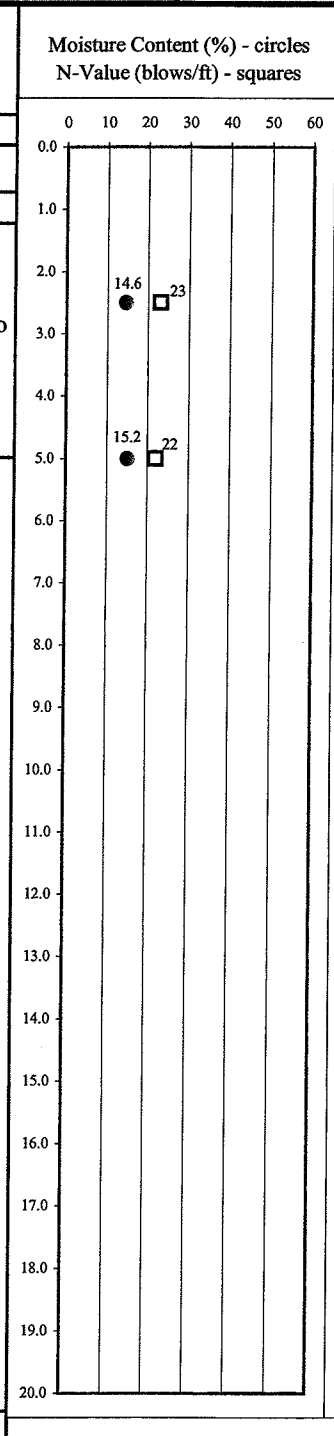
Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

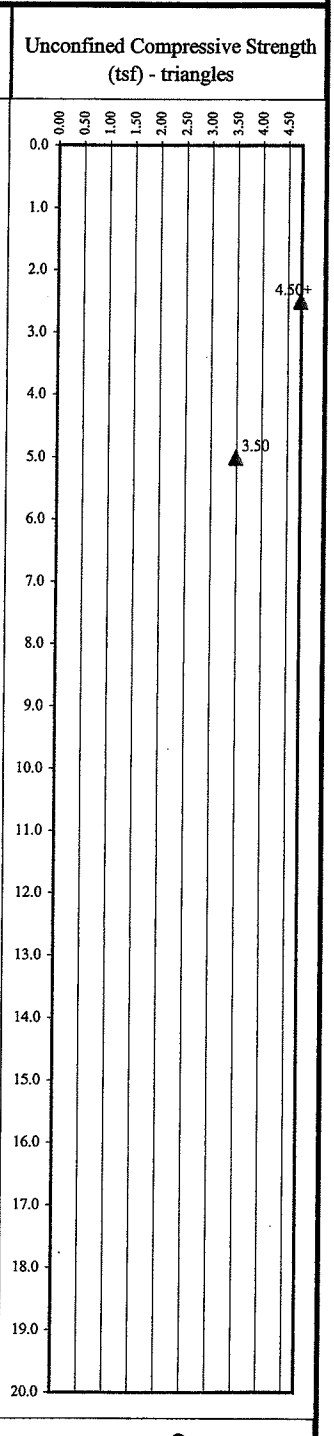
Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project	TES CONSULTANTS, P.C.
Client: City of Ann Arbor	23943 Industrial Park Drive
Location: Ann Arbor, Michigan	Farmington Hills, MI 48335
Project #: 07-1192 Boring Log #: C-1-Eisenhower Parkway	Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			7.5" Bituminous Concrete Pavement
		1	Note 1
SS-1	18	2	SILTY CLAY FILL - some sand - trace gravel - hard to very stiff - brown, gray , and black - (CL-Fill)
		3	
SS-2	18	4	
		5	
		6	NOTE 1: 6.0" of SILTY FINE TO COARSE SAND (Crushed Limestone Fill) - some gravel - moist - light gray - (SM-GM Crushed Limestone Fill)
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	





Water Level Observations:	Boring Started: 9/28/07	Approved:
While Drilling: Dry	Boring Completed: 9/28/07	
At Completion: Dry	Rig: CME 55	Drawn By: AH
Cave-In At:	Driller: J. Faitel	

Project: City of Ann Arbor 2008 Road Construction Project

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-22-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			9.0" of Bituminous Concrete Pavement
		1	15.0" OF SILTY FINE TO COARSE SAND FILL - trace gravel - moist - brown - (SM-GM-Fill)
SS-1	18	2	
		3	SILTY FINE TO COARSE SAND FILL - trace asphalt and topsoil - dense - moist - brown and dark gray - (SM-Fill)
SS-2	18	4	SILTY CLAY - trace sand and gravel - hard - brown - (CL)
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
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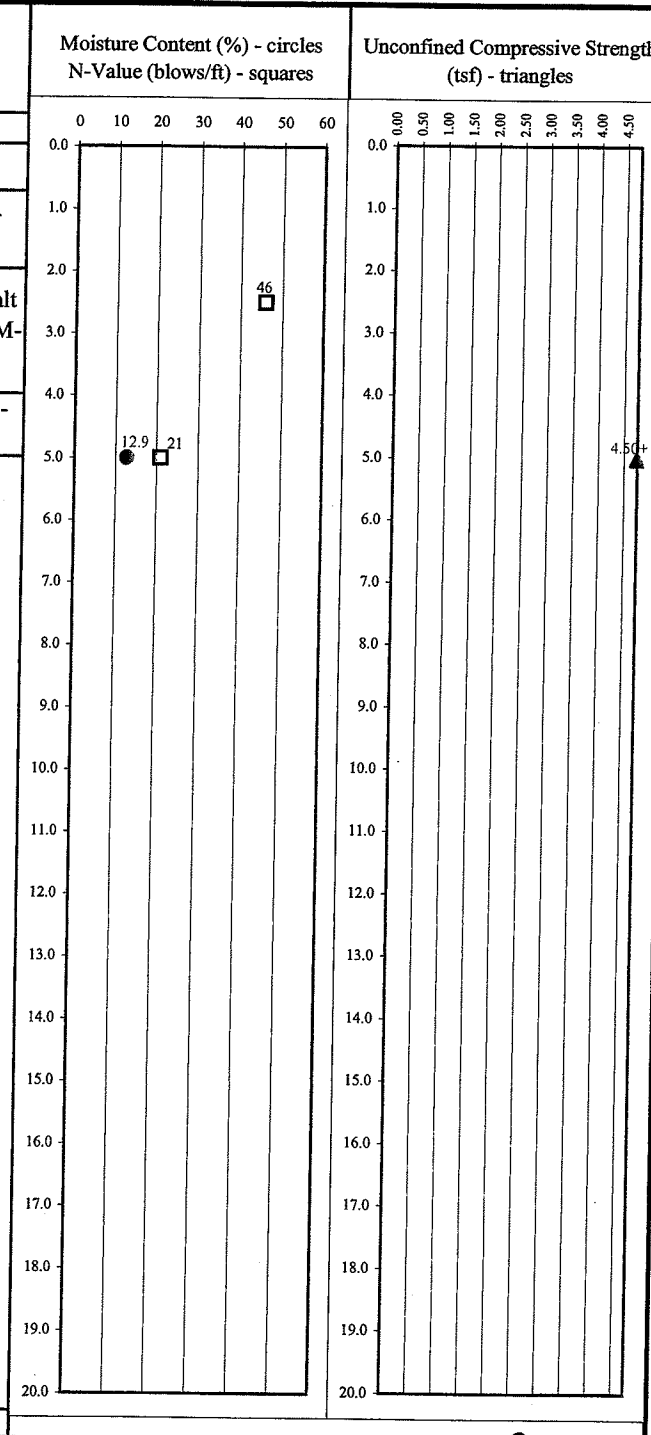
		17	
		18	
		19	
		20	



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:
Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

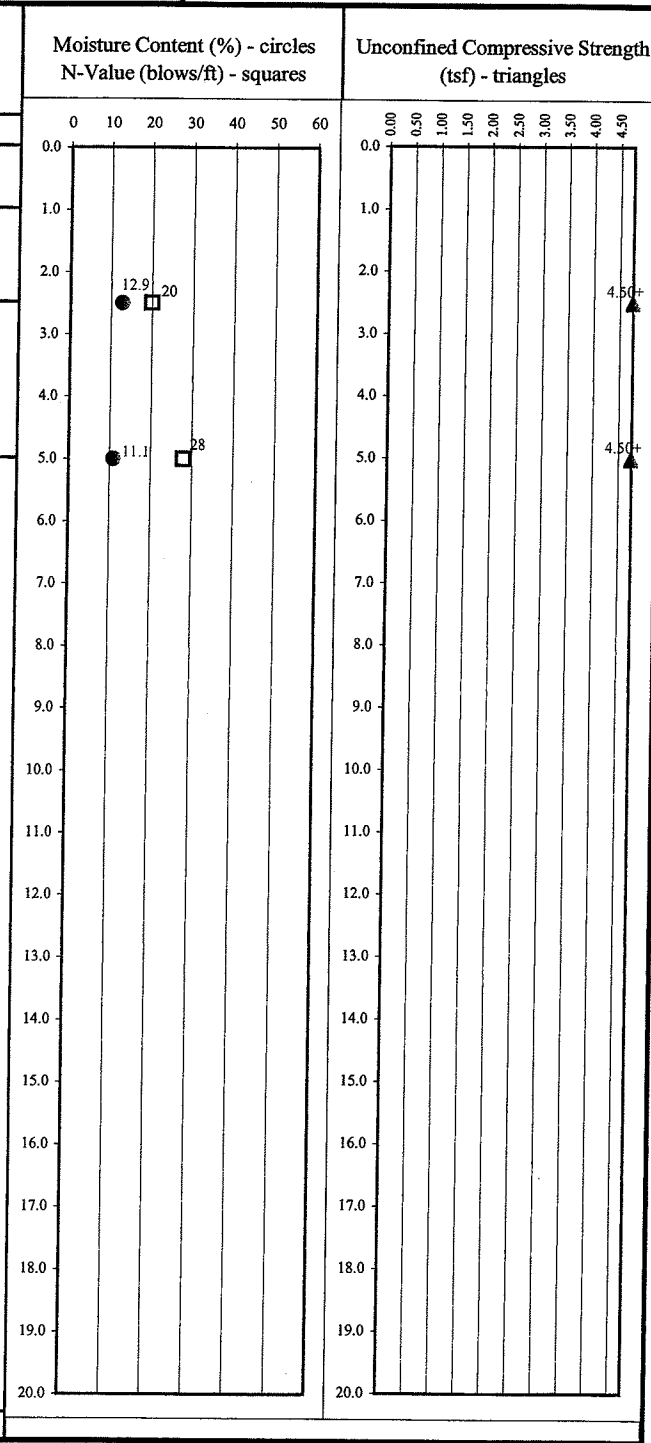
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-21-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
		1	12.0" of Bituminous Concrete Pavement
SS-1	18	2	18.0" OF SILTY FINE TO COARSE SAND FILL - trace gravel - moist - brown - (SM-Fill)
		3	SILTY CLAY FILL - trace sand and gravel -trace topsoil - occasional sand seams - hard - brown - (CL-Fill)
SS-2	18	4	
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	
			End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

Client: City of Ann Arbor

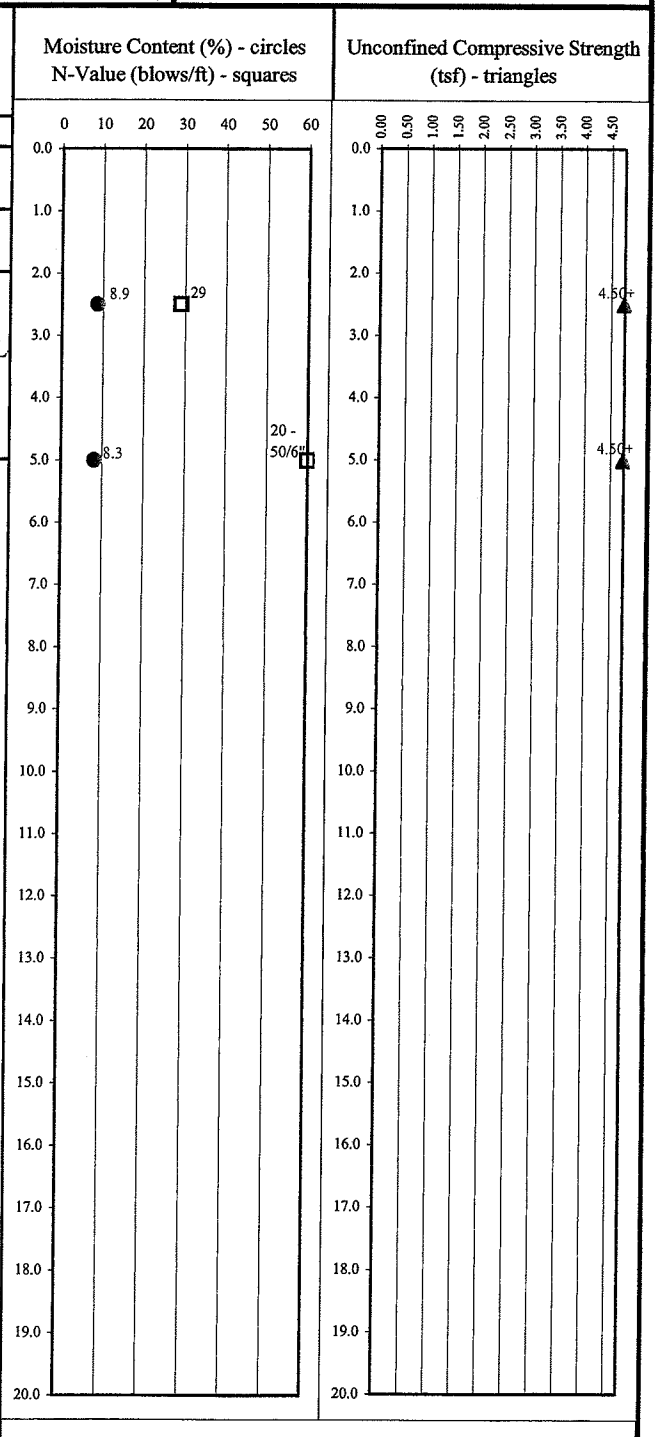
Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-20-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
		1	12.0" of Bituminous Concrete Pavement
SS-1	18	2	12.0" OF SILTY FINE TO COARSE SAND FILL - some gravel - moist - brown - (SM-GM-Fill)
		3	SANDY CLAY FILL - trace gravel - hard - brown - (CL Fill)
SS-2	18	4	
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	

End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

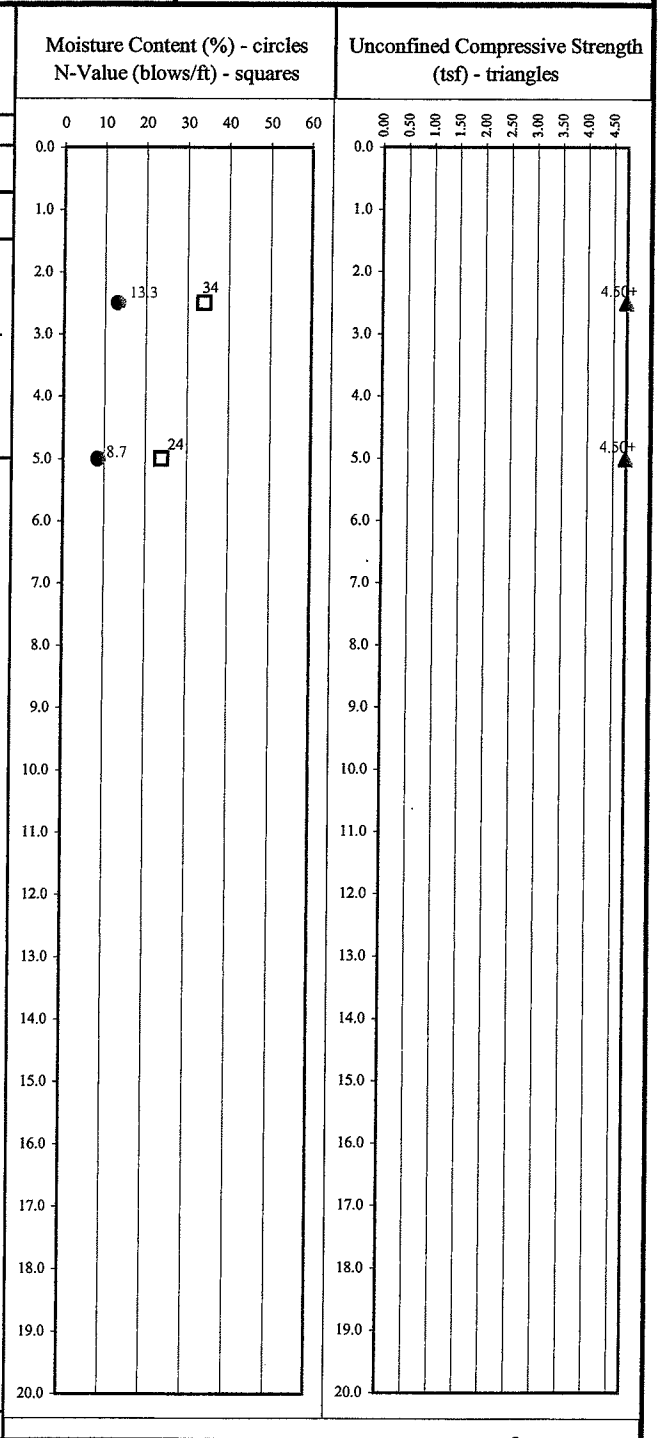
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-19-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			10.0" of Bituminous Concrete Pavement
		1	Note 1
SS-1	18	2	
		3	SANDY CLAY FILL - trace gravel and topsoil - hard - brown and black - (CL-Fill)
SS-2	18	4	
		5	
		6	Note 1: 14.0" OF SILTY FINE TO MEDIUM SAND FILL - trace gravel - moist - brown - (SM-Fill)
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	
			End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

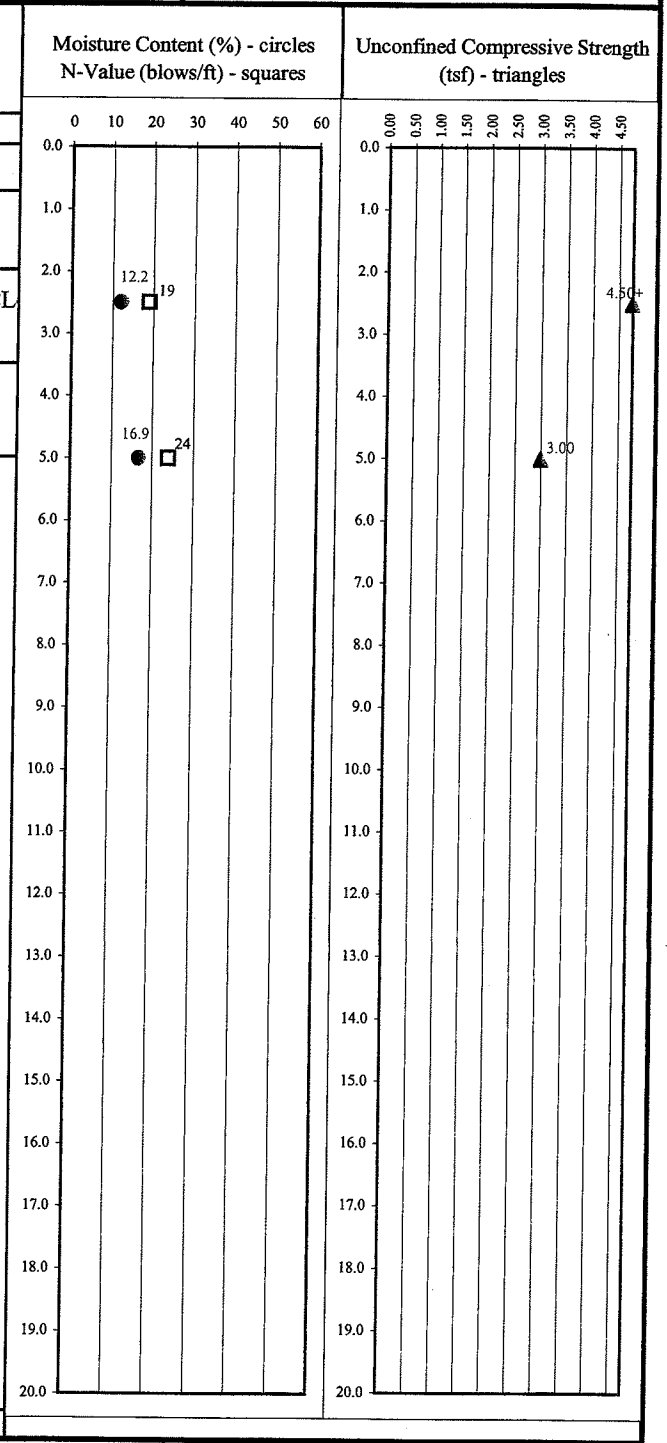
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-18-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			11.0" of Bituminous Concrete Pavement
SS-1	18	1	13.0" OF SILTY FINE TO COARSE SAND FILL - some gravel - moist - brown - (SM-GM-Fill)
		2	SANDY CLAY FILL - trace gravel - hard - brown - (CL Fill)
		3	
SS-2	18	4	SILTY CLAY - trace sand and gravel - very stiff - mottled brown and gray - (CL)
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	
			End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

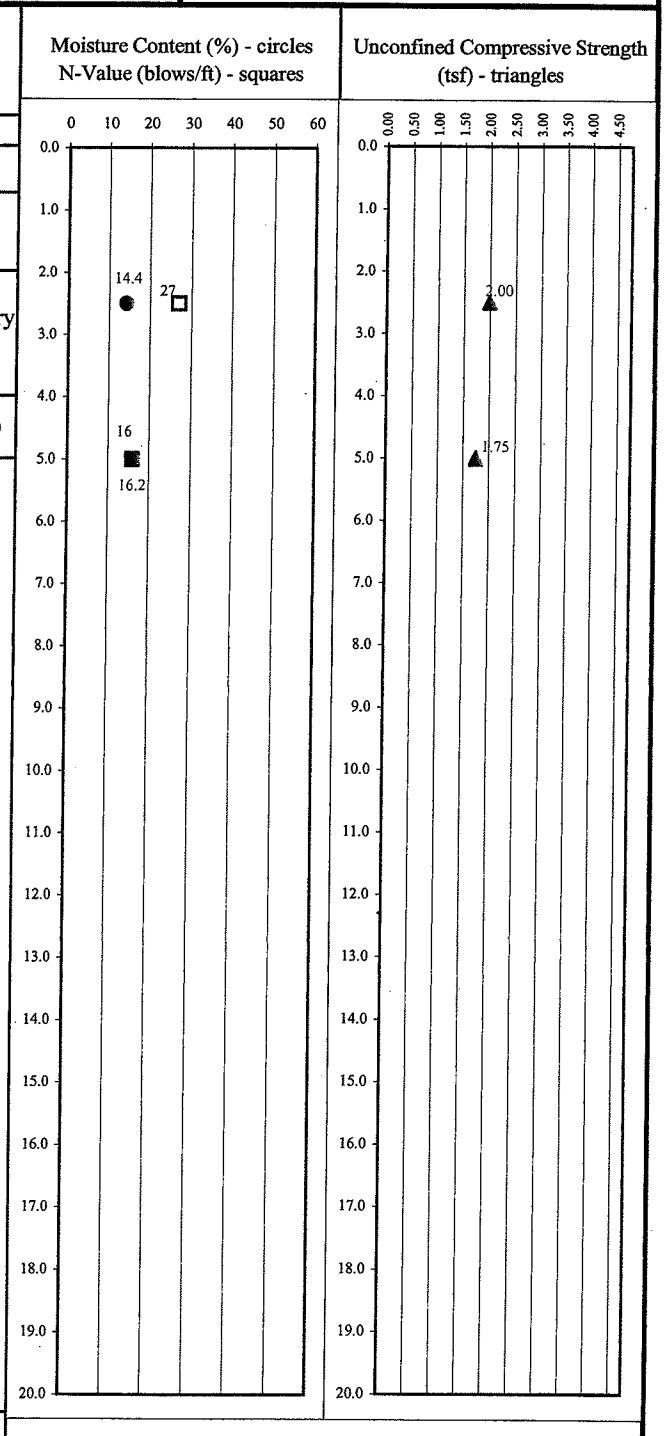
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-17-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			10.0" Bituminous Concrete Pavement
		1	14.0" OF SILTY FINE TO COARSE SAND FILL - some gravel - moist - brown - (SM-GM-Fill)
SS-1	18	2	
		3	SANDY CLAY FILL - trace gravel - some topsoil - very stiff - brown and black - (CL with some OL Fill)
SS-2	18	4	SANDY CLAY FILL - trace gravel - stiff - brown - (CL-Fill)
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	
			End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

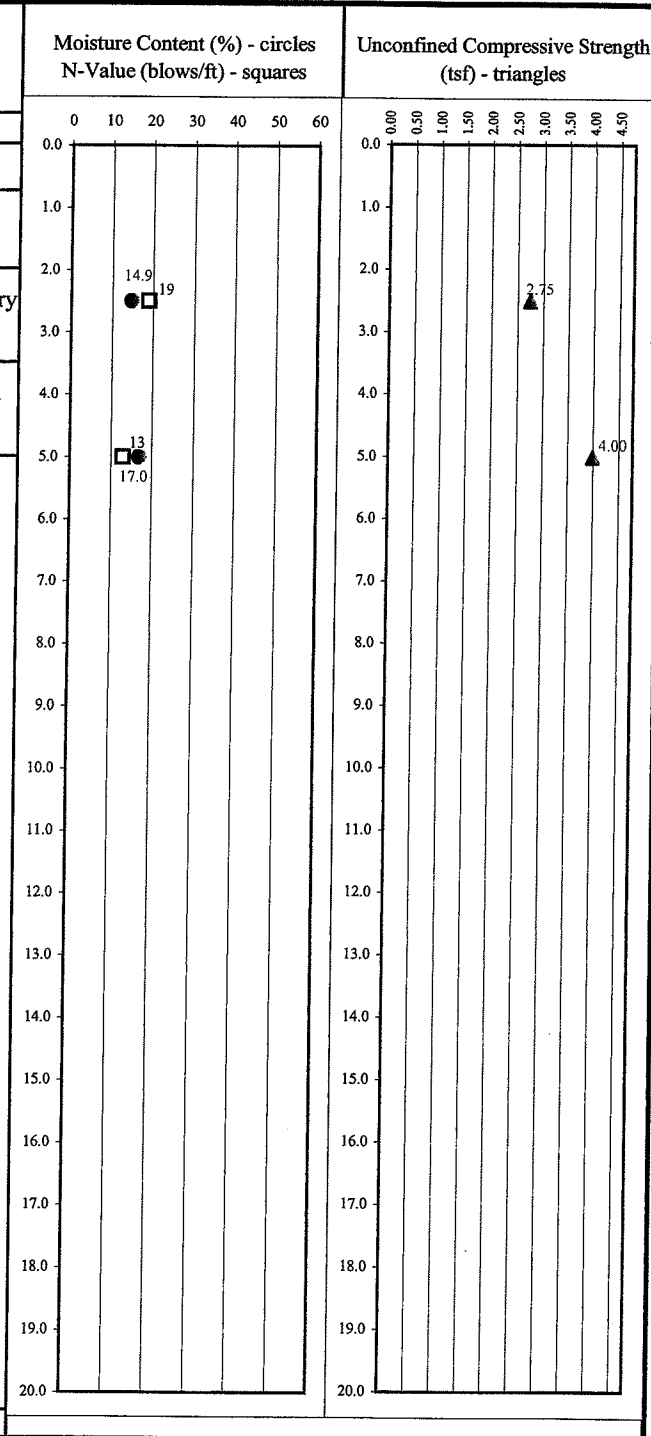
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-16-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			11.5" of Bituminous Concrete Pavement
		1	12.5" OF SILTY FINE TO COARSE SAND FILL - some gravel - moist - brown - (SM-GM-Fill)
SS-1	18	2	
			SANDY CLAY FILL - trace gravel - some topsoil - very stiff - brown and black - (CL with some OL Fill)
		3	
SS-2	18	4	SILTY CLAY - trace sand and gravel - hard - mottled brown and gray - (CL)
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	
			End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

Client: City of Ann Arbor

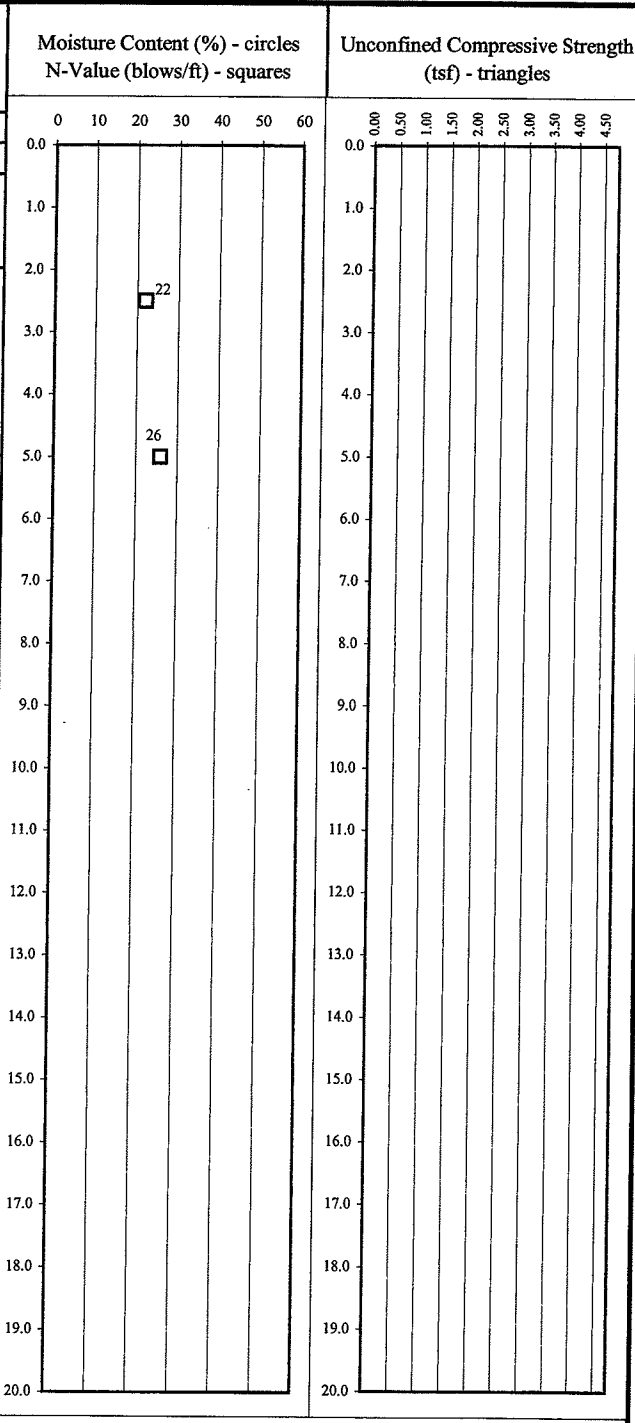
Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-15-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			6" of Bituminous Concrete Pavement
		1	18" OF FINE TO COARSE SAND FILL - trace silt and gravel - medium dense - moist - brown - (SP-SM-Fill)
SS-1	18	2	
		3	SILTY FINE TO COARSE SAND FILL - trace silt and gravel - medium dense - moist - brown - (SM-Fill)
SS-2	18	4	
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	

End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved: JCA

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

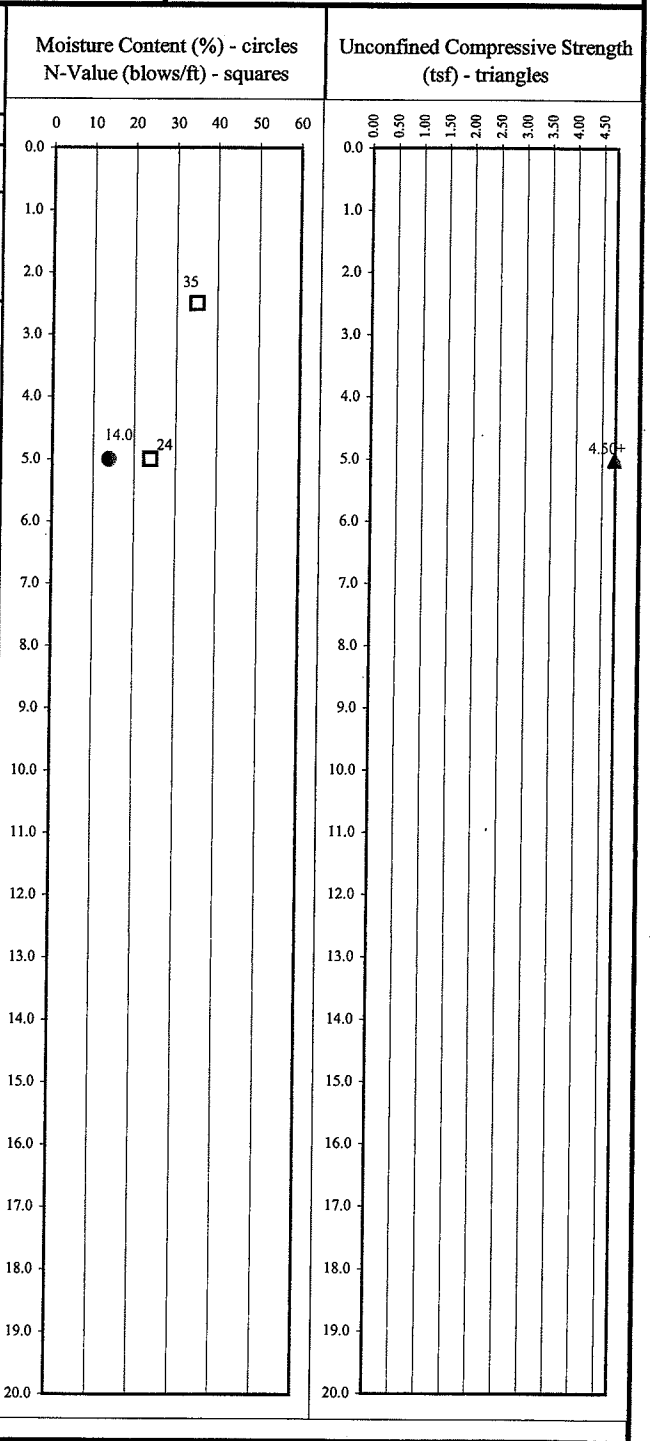
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-14-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			9.0" Bituminous Concrete Pavement
SS-1	18	1–2	27.0" SILTY FINE TO COARSE SAND FILL - some gravel - moist - brown - (SM-GM-Fill)
SS-2	18	3–5	SILTY CLAY - trace sand and gravel - hard - brown - (CL)
		6–20	
			End of Boring (ft): 5.0'



Water Level Observations:

While Drilling: Dry

At Completion: Dry

Cave-In At:

Boring Started: 10/1/07

Boring Completed: 10/1/07

Rig: CME 55

Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

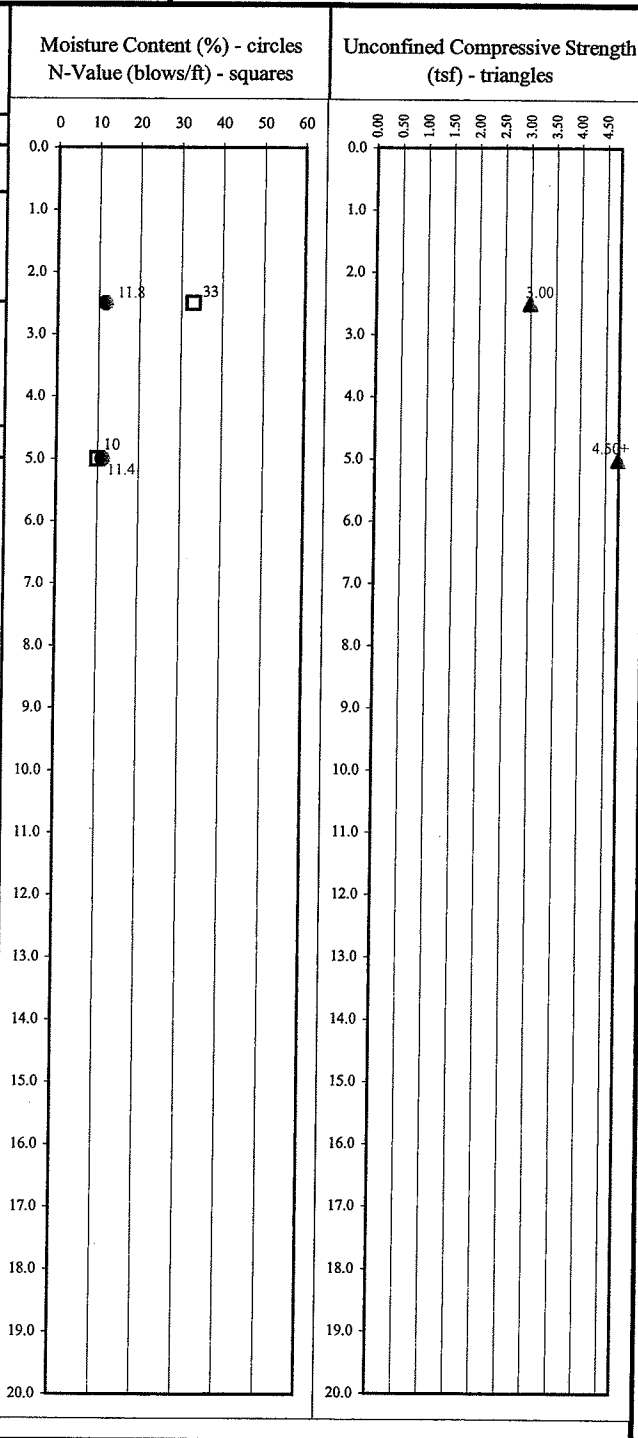
Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-13-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			10.5" Bituminous Concrete Pavement
SS-1	18	1–2	25.5" SILTY FINE TO MEDIUM SAND FILL - trace gravel - moist - brown - (SM-Fill)
		3	SILTY CLAY FILL - trace sand and gravel - very stiff - brown and black - (CL-Fill)
SS-2	18	4	
		5	SILTY CLAY - trace sand and gravel - hard - brown - (CL)
		6–20	
			End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

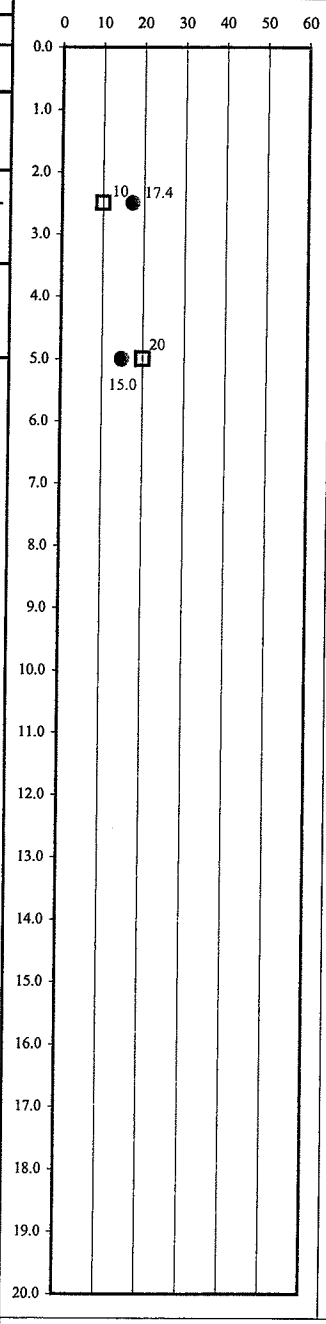
Project #: 07-1192 **Boring Log #:** **C-12-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

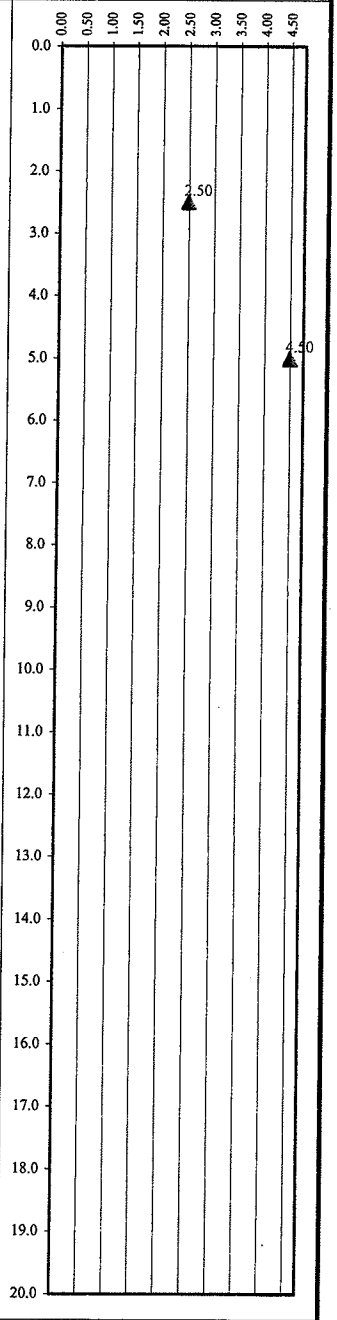
Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			11.5" Bituminous Concrete Pavement
SS-1	18	1	12.5" SILTY FINE TO COARSE SAND FILL - some gravel - moist - brown - (SM-GM-Fill)
		2	SILTY CLAY FILL - trace sand and gravel - very stiff - brown, gray, and black - (CL-Fill)
SS-2	18	3	
		4	SILTY CLAY - trace sand and gravel - hard - brown - (CL)
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	

End of Boring (ft): 5.0'

Moisture Content (%) - circles
N-Value (blows/ft) - squares



Unconfined Compressive Strength (tsf) - triangles



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/1/07
Boring Completed: 10/1/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project: City of Ann Arbor 2008 Road Construction Project

Client: City of Ann Arbor

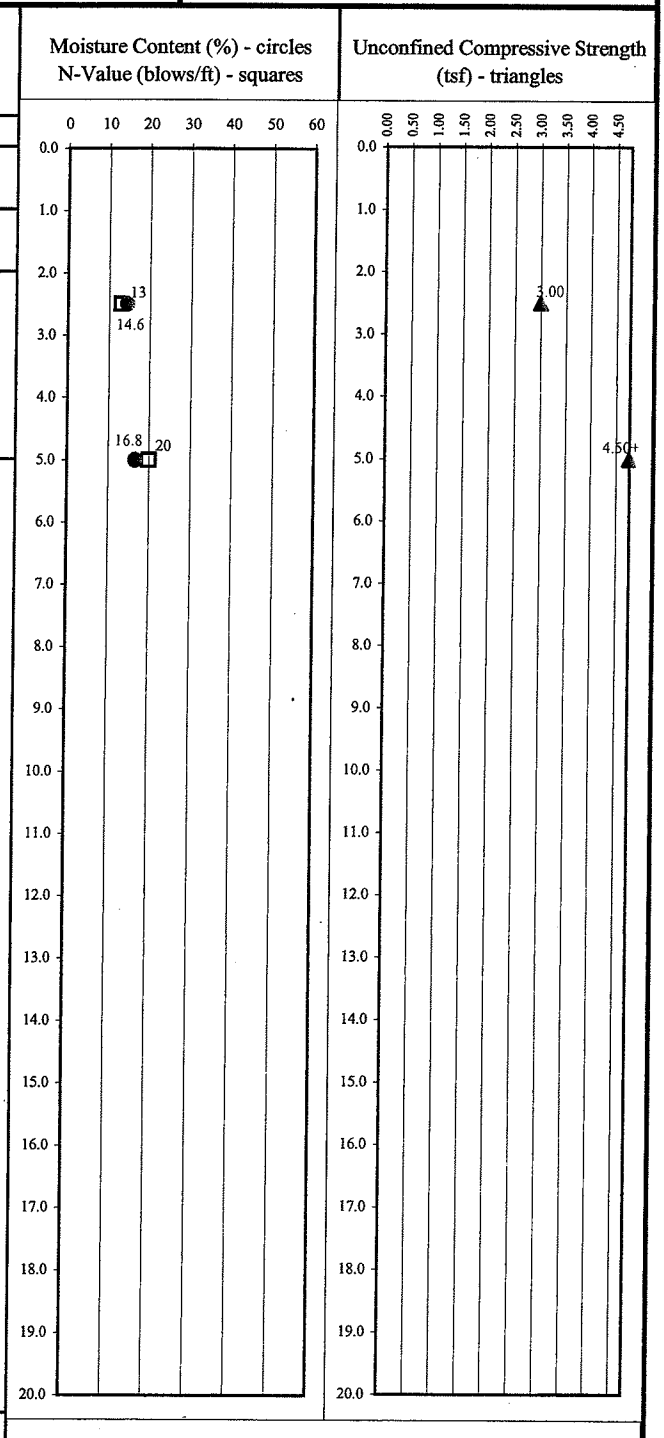
Location: Ann Arbor, Michigan

Project #: 07-1192 **Boring Log #:** **C-11-Eisenhower Parkway**

TES CONSULTANTS, P.C.
23943 Industrial Park Drive
Farmington Hills, MI 48335
Ph: (248) 615-3000 Fx: (248) 615-3512

Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
		1	12" Bituminous Concrete Pavement
SS-1	18	2	12" SILTY FINE TO COARSE SAND FILL - some gravel -moist - brown - (SM-GM-Fill)
		3	SILTY CLAY FILL - some sand - trace gravel - very stiff to hard- mottled brown and gray - (CL-Fill)
SS-2	18	4	
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	
		18	
		19	
		20	

End of Boring (ft): 5.0'



Water Level Observations:
While Drilling: Dry
At Completion: Dry
Cave-In At:

Boring Started: 10/2/07
Boring Completed: 10/2/07
Rig: CME 55
Driller: J. Faitel

Approved:

Drawn By: AH

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

Soil Boring No. B-1

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PROFILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6-1/2 inches) 0.5							
		Aggregate Base: Yellowish Brown Sand with trace gravel (8-1/2 inches) 1.3							
		Fill: Medium Greenish Gray Sandy Clay with trace gravel and organic matter		S-1	3 2 2	4	15.1		2000*
		4.0							
5	▽		5	S-2	2 2 2	4	21.3		1500*
		Medium Greenish Gray Silt with trace sand		S-3	4 4 5	9	22.2		2000*
		8.0							
10		Very Stiff Gray Silt with trace clay 10.0	10	S-4	3 6 7	13	16.2		7000*
		End of Boring @ 10 ft							
15			15						

Total Depth: 10 ft
Drilling Date: May 29, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Groundwater observed at 5 feet during drilling operations; none upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 1

BORING LOG W/STA IN HEADER NO LAT LONG 130744 - DEVONSHIRE.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 9/26/14

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

Soil Boring No. B-2

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PROFILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6-1/2 inches) 0.5							
		Aggregate Base: Light Gray Sandy Gravel (Crushed Limestone) (10-1/2 inches) 1.4							
		Fill: Stiff Gray Silty Clay with trace sand and gravel 2.5		S-1	6 3 2	5	14.1		2500*
5			5	S-2	4 2 2	4	17.2		1000*
		Fill: Very Soft to Soft Greenish Gray Silty Clay with trace sand and gravel		S-3	2 1 1	2	22.1		0*
		8.0							
10		Gray Silty Clay with trace sand and gravel 10.0	10	S-4	2 1 1	2	26.9		500*
		End of Boring @ 10 ft							
15			15						

Total Depth: 10 ft
Drilling Date: May 29, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Groundwater observed at 8 feet 7 inches during drilling operations; none upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 2

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

Soil Boring No. B-3

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

DEPTH (ft)	PROFILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Aggregate Base: Yellowish Brown Sandy Gravel (13 inches) 1.3							
		Fill: Medium Compact Dark Yellowish Brown Silty Sand with trace gravel 2.5		S-1	7 7 5	12			
5		Medium Yellowish Brown and Gray Silty Clay with trace sand and gravel 5.5	5	S-2	5 2 3	5	20.2		2000*
		Stiff Yellowish Brown Silty Clay with trace sand and gravel 9.0		S-3	5 6 8	14	17.6		4000*
10		Hard Gray Silty Clay with trace sand and gravel 10.0	10	S-4	6 13 17	30	8.5		9000*
		End of Boring @ 10 ft							
15			15						

Total Depth: 10 ft
Drilling Date: May 29, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: D. Klitz

Drilling Method:
3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 3

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

Soil Boring No. B-4

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PROFILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches) 0.5							
		Very Stiff Dark Yellowish Brown Sandy Clay with trace gravel 2.5		S-1	4 4 4	8	10.7		5500*
5		Medium Dark Yellowish Brown Sandy Clay witht trace gravel	5	S-2	3 6 3	9	12.2		1000*
				S-3	2 1 1	2	17.0		1000*
		(Occaisonal Sand Seams @ 8 feet) 8.0							
10		Very Stiff Yellowish Brown Sandy Clay with trace silt and gravel 10.0	10	S-4	4 8 17	25	7.5		6000*
		End of Boring @ 10 ft							
15			15						

Total Depth: 10 ft
Drilling Date: June 3, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 4

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

Soil Boring No. B-5

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PROFILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (5 inches) 0.4							
		Aggregate Base: Yellowish Brown Silty Sand with trace gravel (31 inches)		S-1	6 7 5	12			
		3.0							
5		Loose Yellowish Brown Silty Sand with trace gravel	5	S-2	3 3 4	7			
		6.0							
		Medium to Stiff Yellowish Brown Sandy Clay with trace gravel		S-3	10 12 11	23	8.9		2000*
10		10.0	10	S-4	9 11 13	24	8.2		1500*
		End of Boring @ 10 ft							
15			15						

Total Depth: 10 ft
Drilling Date: June 3, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 5

Project Name: Ann Arbor Soil Borings

Project Location: Devonshire, Londonderry, Belmont Roads
Ann Arbor, Michigan

G2 Project No. 130744

Station: N/A

Soil Boring No. B-6

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PROFILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (5 inches) 0.4							
		Aggregate Base: Loose Yellowish Brown Silty Sand with trace gravel (25 inches) 2.5		S-1	5 6 4	10			
5		Loose Dark Yellowish Brown Silty Sand with trace gravel 6.5	5	S-2	4 3 4	7			
				S-3	3 3 3	6			
10		Loose Yellowish Brown Sand 10.0	10	S-4	3 3 4	7			
15		End of Boring @ 10 ft	15						

Total Depth: 10 ft
Drilling Date: June 3, 2014
Inspector:
Contractor: West Michigan Drilling
Driller: G. Strauch

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
No groundwater observed during or upon completion of drilling operations

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings; asphalt repaired with cold patch

Figure No. 6

GEOTECHNICAL INVESTIGATION
ANN ARBOR STREET RESURFACING
ANN ARBOR, MICHIGAN
CTI PROJECT NO. 3142040009-2

FEBRUARY 13, 2015

Prepared for:

City of Ann Arbor
Project Management Services Unit
301 E. Huron Street
P.O. Box 8647
Ann Arbor, Michigan 48107-8647

Prepared by:

CTI and Associates, Inc.
51331 W. Pontiac Trail
Wixom, Michigan 48393
248-486-5100

CTI and Associates, Inc.

51331 W. Pontiac Trail, Wixom, MI 48393 248.486.5100 Main 248.486.5050 Fax

February 13, 2015

Ms. Elizabeth Rolla, P.E., Senior Project Manager
City of Ann Arbor
Project Management Services Unit
301 E. Huron Street
P.O. Box 8647
Ann Arbor, Michigan 48107-8647

RE: Geotechnical Investigation
Ann Arbor Street Resurfacing
Ann Arbor, Michigan
CTI Project No. 3142040009-2

Dear Ms. Rolla:

As requested, CTI and Associates, Inc. (CTI) has completed a geotechnical investigation for the Ann Arbor Street Resurfacing project. This phase of work included performing a total of 22 pavement cores and 20 soil borings on eleven different streets within Ann Arbor city limits. The pavement cores and soil borings were performed for the design phase of the City of Ann Arbor's 2015 Street Resurfacing program.

The enclosed report presents the results of our findings and an engineering interpretation of these with respect to the soil related phases of the project including pavement and construction recommendations. In general, granular and cohesive fill materials containing trace amounts of organics were encountered to varying depths across portions of three of the six roadways that were explored with soil borings. These areas may require some measure of subgrade improvement. The specific areas requiring subgrade improvement should be anticipated during the design phase, based on the information contained in this report, and further defined during the construction phase.

We appreciate the opportunity to be of service to you on this project. If you have any questions regarding this report or if we can be of further assistance, such as providing field monitoring and quality control inspection services during construction, please contact our office.

Sincerely,

CTI and Associates, Inc.

Ihsan Wahab
Project Engineer

Theresa M. Marsik, P.E., LEED AP
Senior Project Engineer

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CTI and Associates, Inc.
51331 W. Pontiac Trail, Wixom, MI 48393 248.486.5100 Main 248.486.5050 Fax

GEOTECHNICAL INVESTIGATION
ANN ARBOR STREET RESURFACING
ANN ARBOR, MICHIGAN
CTI PROJECT NO. 3142040009-2

FEBRUARY 13, 2015

1.0 INTRODUCTION

1.1. General

This report presents the results of the geotechnical investigation performed by CTI and Associates, Inc. (CTI) for the pavement cores and soil borings performed as part of the Street Resurfacing contract. The soil borings were performed for the design phase of the City of Ann Arbor's 2015 Street Resurfacing program.

Recommendations for the construction observation and preparation of the encountered subgrade soils to make them suitable for pavement construction are included in the report sections that follow. Of particular concern is the poor-draining nature of the encountered soils and fill materials in the subgrade. These materials may not be suitable for direct pavement support and will require further evaluation and improvement as detailed below.

Our evaluation was performed in general accordance with the scope of services determined by City of Ann Arbor personnel in an e-mail dated January 6, 2015.

1.2. Purpose and Scope

The purpose of this study was to determine the general pavement and subsurface conditions at the site by performing pavement cores and drilling test borings, and to evaluate these conditions with respect to pavement support requirements for the proposed project. Specifically, the report presents our evaluations and recommendations regarding the following items:

A. General subsurface (soil and groundwater) conditions at the site.

B. Design recommendations: These include recommendations for support of pavement, including pavement design parameters as they relate to the encountered soils.

C. Construction recommendations: These include site preparation and earthwork operations, groundwater conditions and controls, potential construction problems and recommendations dealing with quality control during construction.

The evaluations and recommendations discussed in this report are based on the soil conditions encountered in the test borings performed at the specific locations on the date indicated on the boring logs. The soil conditions may vary at locations other than those encountered at the soil boring locations. These variations may not become evident until the time of construction.

If variations in the reported soil conditions are encountered, CTI should be contacted immediately. In such a case, it may be necessary for CTI to reevaluate the recommendations of this report. Such a reevaluation may be possible from on-site observations or may require additional investigations. If any such variations are revealed, they may result in increased construction costs. A contingency should be provided in the project budget to accommodate such variations.

CTI's authorized scope of services included a geotechnical study of the subject site and did not include an environmental assessment for determining the presence or absence of hazardous or toxic materials in the soil or groundwater at, below or around the site. The presence or absence of contaminated material is not implied, inferred or suggested by this report or the results of this study. Any statement contained within this report or presented on the soil boring logs regarding odors, colors or unusual items are strictly for informational purposes only. If any recognized environmental concerns are identified for this site, the evaluations and/or recommendations presented in this report may require amendment.

2.0 SITE CONDITIONS AND PROJECT DESCRIPTION

2.1. Project Description

This phase of work included performing a total of 22 pavement cores and 20 soil borings on eleven different streets within Ann Arbor city limits. The proposed core and boring locations were marked in the field by the City of Ann Arbor personnel prior to our field activities. CTI was notified on December 22, 2014 that all of the pavement cores and boring locations were marked. Once we were notified that the boring locations had been marked, CTI requested the Miss Dig service to locate the existing underground utility locations at each boring location. Several borings were off-set from the marked location due to conflicts with underground utilities, overhead obstructions (trees and overhead electric lines) and/or to maintain traffic flow. Table 1 presents the specific breakdown of the number of borings per street, the boring depths, and the limits of exploration.

Table 1. Summary of Geotechnical Investigation Scope			
Street Name	Limits	Number of Borings/ Cores	Boring Depth (ft)
Jewett Avenue	S. Industrial Highway to Packard Street	6	5
Pine Valley Boulevard	Packard Street to Esch Avenue	4	5
Tacoma Circle	King George Boulevard to Birch Hollow Drive	2	5**
Brierwood Street	Arborview Boulevard to Linwood Avenue	2	5
Burgundy Road	Andover Road to end	3	5
Vintage Valley Road	Green Road to Burgundy Road	3	5
Ellsworth Road	State Street to Platt Road	6	N/A (core)
State Street	Eisenhower Road to I-94	4	N/A (core)
Newport Road	Miller Road to Sunset Road	4	N/A (core)
Huron Parkway	Plymouth Road to Hubbard	4	N/A (core)
Dhu Varren Road	RR to west of Nixon Road	4	N/A (core)

**Boring SB-6 was terminated at a depth of 3½ feet upon encountering auger and spoon refusal.

The recommendations presented in this report are based on the provided and/or assumed project information and the results of our geotechnical exploration. If any of the above noted project information is considered incorrect or is changed, CTI should be informed in writing so that a review can be performed and any necessary revisions to our recommendations can be made.

2.2. Site Conditions

At the time of our field investigation, the existing roadway surfaces consisted of asphalt pavement. No information was provided regarding the age of the existing asphalt pavement.

3.0 INVESTIGATION PROCEDURES

3.1. Field Investigation

Our field investigation consisted of performing 22 pavement cores and drilling 20 soil borings on eleven different streets within Ann Arbor city limits. The approximate as-drilled locations of the borings are listed on the boring logs, included with this report. As requested, the majority of the borings were extended to a depth of approximately 5 feet below the top of pavement. Boring SB-6 was terminated at a depth of 3.6 feet upon encountering auger and spoon refusal on a suspected cobble or boulder obstruction.

The cores and borings were located in the field by City of Ann Arbor personnel prior to the drilling activities. CTI performed the pavement coring operations on January 23rd, 26th and 27th, 2015. The pavement structure was explored with a core drill equipped with a six-inch nominal diameter core barrel. After extraction of the cores at each location, a sample of the aggregate base material was collected, the subgrade soil types were verified and the core samples were measured and labeled.

The drilling operations were performed by Brax Drilling, under direction of CTI personnel on January 27 through January 29, 2015. The soil borings were drilled with a truck-mounted rotary drill rig using continuous flight hollow stem augers. Soil samples were obtained at select intervals by the Standard Penetration Test Method (ASTM D-1586), whereby a 2-inch outside diameter split-barrel sampler is driven into the soil with a 140-pound weight falling freely through a distance of 30 inches. The sampler is generally driven three successive 6-inch increments, with the number of blows for each increment being recorded. The number of blows required to advance the sampler from 6 to 18 inches is termed the Standard Penetration Resistance, N. An additional grab sample was obtained of the aggregate base material directly below the pavement for visual classification purposes.

The soil samples obtained with the split-barrel sampler were sealed in glass jar containers and transported to our laboratory along with the pavement core samples for further classification

and testing. After completion of the drilling operations, the boreholes were backfilled with excavated soil (i.e., auger cuttings) and patched with a cold bituminous patching mix.

Soil and groundwater conditions observed in the test borings have been evaluated and are presented on the boring logs included in the Appendix. To aid in understanding the data presented on the boring logs, "General Notes for Soil Classification," describing nomenclature used in soil descriptions, are also included in the Appendix. It should be noted that the soil descriptions reported on the test boring logs are based upon field logs prepared by experienced drillers with modifications made based on the results of laboratory testing and engineering review.

3.2. Laboratory Testing

The laboratory testing program was directed towards determining the general soil classification and physical properties of the soil pertinent for pavement design and site preparation. All laboratory testing was performed in general accordance with applicable ASTM test method standards. The laboratory testing consisted of visual soil classification of every sample, and natural moisture content and loss-on-ignition (organic) testing of selected samples. The unconfined compressive strength of selected cohesive samples was also estimated based on the resistance to a calibrated spring-loaded hand penetrometer.

The soil samples were visually classified in general accordance with the Unified Soil Classification System (USCS). The estimated USCS group symbol is shown in parentheses following the written description of the various strata on the boring logs. The results of all laboratory tests are indicated on the boring logs at the depths the samples were obtained and/or on the "Summary of Laboratory Test Results" included in the Appendix.

4.0 GENERAL SUBSURFACE CONDITIONS

The following paragraphs present generalized pavement, soil and groundwater conditions encountered at the test boring locations. For a more detailed description of the subsurface conditions encountered at the site, please refer to the individual soil boring logs. Frozen soils were encountered to depths of about 1½ to 3½ feet below the existing grades. Review of the boring logs may indicate that higher N-values than are noted in the following paragraphs were recorded, but they were due to encountering frozen subgrade materials.

As mentioned previously, a total of 22 pavement cores were performed on five different roadways within the city of Ann Arbor. In addition to collecting the pavement core, samples of the aggregate base material and the exposed subgrade soils were collected from each core location for visual classification purposes. The pavement cores were measured in our laboratory using a calibrated digital caliper. Table 2 below presents the information collected from the pavement coring program.

Table 2. Summary of Pavement Coring Program					
Roadway/Core #	Core Location	Asphalt Pavement Thickness (in)	Number of Pavement Lifts	Sand and Gravel Aggregate Base Thickness (in)	Subgrade Material
Huron Parkway/1	Right NB Lane, STA 9+00	5.86	3	5½	Clayey Sand
Huron Parkway/2	Left NB Lane, STA 19+15	6.14	3	6	Clayey Sand
Huron Parkway/3	Left SB Lane, STA 19+25	6.58	3	5	Clayey Sand
Huron Parkway/4	Right SB Lane, STA 9+50	6.17	3	5½	Clay
State Street/1	Across from 3010 S. State sign, Right SB thru-lane	8.20	4	6	Sandy Clay
State Street/2	3230 S. State, Left SB thru-lane	9.98	4	6	Sandy Clay
State Street/3	3201 S. State, Left NB thru-lane	8.71	4	6	Sandy Clay
State Street/4	Across from 3003 S. State sign, Right NB thru-lane	8.29	4	6	Sandy Clay
Ellsworth Road/1	24’ W of 233 Ellsworth driveway, EB	3.32	2	4½	Silty Sand
Ellsworth Road/2	12’ E of 47 Ellsworth driveway, WB	3.19	2	4½	Silty Sand
Ellsworth Road/3	W of 1180 Ellsworth, EB	3.56	2	4	Silty Sand
Ellsworth Road/4	Across from 4019 Stone School driveway, WB Ellsworth	3.42	2	4½	Silty Sand
Ellsworth Road/5	249’ E of Shadowood Drive, EB Ellsworth	3.21	2	5	Silty Sand
Ellsworth Road/6	79’ E of Braeburn Circle, WB Ellsworth	3.76	2	4	Silty Sand
Dhu Varren Road/1	Near 2000 Dhu Varren mailbox, EB	3.54	2	5	Sandy Clay
Dhu Varren Road/2	185’ E of Birchwood Road, WB Dhu Varren	3.38	2	5	Sandy Clay
Dhu Varren Road/3	Across from 2291 Dhu Varren, EB	3.37	2	6	Sandy Clay
Dhu Varren Road/4	43’ E of 2475 Dhu Varren, WB	3.24	2	6	Sandy Clay
Newport Road/1	STA 6+21, W of centerline	4.11	3	4	Sandy Clay
Newport Road/2	STA 12+65, E of centerline	4.19	3	5	Sandy Clay
Newport Road/3	STA 18+80, W of centerline	8.45	4	6	Clay
Newport Road/4	STA 25+28, E of centerline	6.55	3	6	Clay

4.1. Pavement and Soil Conditions – Roadways Explored by Soil Boring

4.1.1. Jewett Avenue

Six borings were performed on Jewett. Borings SB-2, SB-3, SB-4, SB7 and SB-8 were explored to a depth of 5 feet and SB-6 was explored to the depth of 3.6 feet. Borings SB-1 and SB-5 were cancelled by City of Ann Arbor prior to the field activities.

Pavement Section: Approximately 3 to 6 inches of asphalt pavement was encountered, underlain by 6 to 8 inches of sand and gravel aggregate base material.

Fill: The pavement section encountered at the location of Borings SB-4 and SB-6 was underlain by fill materials. Within SB-4, clay fill was encountered to a depth of about 3½ feet below the existing grade. Silty sand fill was encountered within SB-6, and extended to the final explored depth of 5 feet.

Sand: Below the pavement section encountered at SB-2, SB-3 SB-7 and SB-8, apparently native sand containing varying amounts of silt and clay was encountered. The sand extended to a depth of 3½ feet within SB-2, and to the final explored depths of the remaining borings. The Standard Penetration Test (SPT) resistance (N) values recorded for the native granular soils ranged from 5 to 32 blows per foot, indicating very loose to dense relative densities.

Clay: Below the clay fill encountered within SB-4 and below the apparently native sand encountered within SB-2, clay was encountered to the final explored depth of the borings. N-values for the encountered clay soils ranged from 5 to 17 blows per foot. The unconfined compressive strength of the tested samples typically ranged from 2,500 pounds per square foot (psf) to 3,500 psf, indicating a stiff consistency.

4.1.2. Pine Valley Boulevard

Borings SB-9 through SB-12 were performed on Pine Valley Boulevard.

Pavement Section: Approximately 3 to 4 inches of asphalt pavement was encountered, underlain by 6 to 8 inches of sand and gravel aggregate base material.

Silty Sand: Below the pavement sections, sand with varying amounts of silt was encountered to the final explored depth of the borings. The N-values recorded for the native granular soils ranged from 4 to 17 blows per foot, indicating loose to medium dense relative densities.

4.1.3. Tacoma Circle

Borings SB-13 and SB-14 were performed on Tacoma Circle.

Pavement Section: Approximately 3 to 4 inches of asphalt pavement was encountered, underlain by 6 to 8 inches of sand and gravel aggregate base material.

Clay: Below the pavement section encountered at the location of SB-13, sandy clay was encountered to a depth of approximately 3½ feet. An N-value of 7 blows per foot was recorded within the clay layer. The unconfined compressive strength of the tested sample was approximately 5,000 psf, indicating a very stiff consistency.

Sand: Below the pavement section at the location of SB-14, and below the clay layer encountered within SB-13, silty sand was encountered to the final explored depth of the borings. The N-values recorded for the silty sand ranged from 10 to 42 blows per foot, indicating medium dense to dense relative densities.

4.1.4. Brierwood Street

Borings SB-15 and SB-16 were performed on Brierwood Street.

Pavement Section: Approximately 4 to 5 inches of asphalt pavement was encountered, underlain by 6 to 14 inches of sand and gravel aggregate base material.

Clay: The pavement section encountered at the location of SB-15 was underlain by clay soils. The clay extended to the final explored depth of the boring. N-values recorded within the clay ranged from 10 to 19 blows per foot. The unconfined compressive strength of the tested samples was in the range of 6,000 psf to more than 9,000 psf, indicating very stiff to hard consistencies.

Silty Sand: Below the pavement section encountered at the location of SB-16, silty sand was encountered. The silty sand extended to the final explored depth of the boring. The N-values recorded within the silty sand ranged from 20 to 31 blows per foot, indicating medium dense to dense relative densities.

4.1.5. Burgundy Road

Borings SB-17 through SB-19 were performed on Burgundy Road.

Pavement Section: Approximately 5 inches of asphalt pavement was encountered. The asphalt pavement encountered at the location of SB-17 and SB-18 was underlain by 5 to 6 inches of recycled asphalt pavement. The asphalt pavement encountered at the location of SB-19 was underlain by approximately 8 inches of sand and gravel aggregate base material.

Clay Fill: The pavement sections at the location of SB-17 and SB-19 were underlain by clay fill containing trace amounts of organics. The fill extended to depths of about 3½ to 4¾ feet below the existing ground surface.

Clay: Below the pavement section at the location of SB-18 and below the clay fill encountered within the remaining borings, apparently native clay was encountered to the final explored depth of the borings. N-values recorded within the native clay ranged from 8 to 27 blows per foot. The unconfined compressive strength of the tested samples was in the range of 5,000 psf to more than 9,000 psf, indicating very stiff to hard consistencies.

4.1.6. Vintage Valley Road

Borings SB-20 through SB-22 were performed on Vintage Valley Road.

Pavement Section: Approximately 5 to 6 inches of asphalt pavement was encountered. The asphalt pavement encountered at the location of SB-20 and SB-21 was underlain by 5 to 6 inches of recycled asphalt pavement. The asphalt pavement

encountered at the location of SB-22 was underlain by approximately 6 inches of sand and gravel aggregate base material.

Clay Fill: The pavement section at the location of SB-21 was underlain by clay fill containing trace amounts of organics. The fill extended to a depth of about 3½ feet below the existing ground surface.

Clay: Below the clay fill at the location of SB-21 and below the pavement sections encountered at the remaining boring locations, apparently native clay was encountered to the final explored depth of the borings. N-values recorded within the native clay ranged from 9 to 12 blows per foot. The unconfined compressive strength of the tested samples was in the range of 5,500 psf to more than 9,000 psf, indicating very stiff to hard consistencies.

4.2. Groundwater Conditions

Groundwater observations were conducted during the drilling operations and shortly after completion of the borings. Groundwater seepage was not observed within the test borings either during or after drilling.

The groundwater levels, including perched groundwater accumulations, should be expected to fluctuate seasonally, based on variations in precipitation, evaporation, surface run-off and other factors not evident at the time of our investigation. Typically, groundwater levels and volumes are expected to be higher in the winter and spring seasons compared to the summer and fall months. The actual groundwater levels at the time of construction may vary from those provided herein.

The above soil and groundwater conditions represent a generalized summary of the subsurface conditions and material characteristics. The individual Boring Logs should be reviewed for specific information and details relating to specific areas of the site.

5.0 ANALYSIS AND DESIGN RECOMMENDATIONS

At the time this report was prepared, the overall project was in the planning and design stage. The following recommendations have been developed based on the previously assumed/described project characteristics and subsurface conditions. If there is any significant change in the project characteristics from those presented earlier, a review should be made by CTI to determine if any modifications in the evaluations and recommendations included in this report will be required.

In general, granular and cohesive fill materials containing trace amounts of organics were encountered to varying depths across portions of Jewett Avenue, Burgundy Road and Vintage Valley Road. The presence and thickness of fill materials and/or organic-containing soils may vary across the various streets. If the owner is willing to assume the risks related to decreased pavement life/serviceability by doing so, some or all of the fill could be left in place for pavement support, following proper subgrade preparation activities described in Section 5.1 of this report.

5.1. Site Preparation and Engineered Fill Placement

At the start of earthwork operations, the existing pavement and any other deleterious materials are to be stripped from the new roadway areas. The thickness of the existing pavement, aggregate base and near surface fill layer (where present) should be expected to vary across the site. The depth of unsuitable soil removal should be determined by a representative of CTI at the time of stripping and rough grading.

Proper evaluation and conditioning (if necessary) of the subgrade should be performed prior to any engineered fill placement. After stripping and excavating to the proposed subgrade level, and after removing any unsuitable materials and underground objects, the rough graded subgrade area should be proofrolled with a loaded tandem-axle dump truck or similar rubber-tired vehicle. The purpose of proofrolling operations is to locate areas of excessively loose, soft or weak subgrade soils which may be present at the time of construction. Soils that are observed to rut or deflect excessively during proofrolling should be stabilized by conventional methods such as disking, drying and re-compacting.

If it is not feasible to dry and re-compact the unsuitable subgrade soils due to unfavorable weather conditions, scheduling, etc., it may be necessary to remove such soils and replace them with engineered fill. The thickness of the undercut will depend on the severity of the unstable soils encountered at specific locations. A layer of crushed aggregate may be necessary to stabilize the subgrade before placement of the selected engineered fill material. The use of a geotextile material (e.g. geogrid or woven geotextile fabric) below the crushed aggregate layer could also be considered to provide additional subgrade stability.

It should be noted that the actual locations and depths of any undercutting and/or stabilization should be established in the field at the time of construction. The extent to which yielding subgrades may be a problem is difficult to predict beforehand since it is dependent upon several factors including seasonal conditions, precipitation, construction practices, etc.

Once the subgrade has been evaluated, proofrolled and/or stabilized, the inspected area should not be allowed to remain exposed to wet conditions more than one day or subjected to construction traffic, otherwise a re-evaluation should be made. The site earthwork operations should be carried out during a period of dry weather, if possible. This should minimize potential subgrade problems, although they may not be eliminated. The severity of subgrade instability will depend to a high degree on the weather conditions prevailing during construction.

After subgrade preparation and observation have been completed, any fill placement required to bring the site to the design subgrade level (i.e. the bottom of the proposed aggregate base course) may begin. Any fill placed below the proposed pavement area should be an approved material that is free of topsoil, organics, frozen soil or any other unsuitable material. If granular soils containing greater than 12 percent fines (i.e., silt or clay) are used as fill, close moisture content control will be required to achieve the recommended degree of compaction. Any fill materials encountered at locations other than the boring locations can be further evaluated during site preparation to determine if some of the soils can be reused as engineered fill.

The engineered fill should be placed in uniform horizontal layers not exceeding 8 to 12 inches in loose thickness for clean granular soils and 4 to 6 inches in loose thickness for clay soils (or clayey granular soils exhibiting cohesive characteristics), depending on the type and size of compaction equipment used. The lift thickness for sands that have an appreciable amount of

fines should be decreased accordingly. The engineered fill should be compacted to achieve a density of not less than 95 percent of the maximum dry density as determined by the Modified Proctor Compaction Test (ASTM D1557). Also, the upper 12 inches of the subgrade soils should be compacted, prior to any fill placement, to achieve a density of not less than 95 percent of the maximum dry density as determined by the Modified Proctor test. The as-compacted moisture content of the engineered fill should be within 2 to 3 percent of the optimum moisture content for the soil. The placement and testing of engineered fill should be observed and properly documented in the field by CTI.

We recommend that the contract specifications include provisions for moisture conditioning of any on-site soils that are to be used as engineered fill. Some of the natural soils may require moisture conditioning to allow for proper compaction. The success of aeration and drying of clay soils will be dependent on the time of year, the prevailing weather conditions and the contractor's effort. During cold and/or wet periods of the year, the saturated or disturbed clay soils will be more difficult to dry. In this case, the contractor may have to use drier on-site soils or imported sand.

If site grading or other construction activity is planned during cold weather, it is recommended that proper winter construction practices are followed. All snow and ice should be removed from cut and fill areas prior to grading. Frozen materials should not be used as engineered fill and no fill or pavement should be placed on soils that are frozen or contain frozen material.

5.2. Pavement Design Considerations

The subgrade soils for support of the pavement sections should be prepared in accordance with the methods presented in Section 5.1 of this report. It appears the existing soils and anticipated newly placed engineered fill will be adequate to support the majority of the pavement sections following site preparation activities. Proper evaluation of the subgrade soils should be performed during construction to verify that suitable soil conditions exist for support of the pavement.

The long-term performance of the pavement will typically be a function of the quality of the subgrade soil at the time of construction along with the quality, thickness and strength of the

overall pavement section. The most critical portion of the subgrade is the 3 feet immediately beneath the pavement section, which provides the primary strength needed for pavement section support. Soils in a saturated condition, uncontrolled fill and/or organic materials present within the upper 2 to 3 feet of the pavement subgrade can be detrimental if the design does not account for this substandard soil condition, especially during the spring freeze-thaw cycles.

The pavement system should be properly drained to reduce the potential for weakening the subgrade. Provisions should be made to prevent surface run-off water from accumulating within the aggregate base course of the pavement. The pavement and underlying subgrade should be suitably crowned or sloped to promote effective surface drainage and prevent water ponding.

We anticipate that the pavement surface will drain via storm sewers (where present) and via run-off methods where storm sewers are not available. Where the reconstruction project includes the installation of a storm sewer system, finger drains should be installed at all catch basin locations to provide drainage for surface water that may become trapped in the pavement aggregate base course. At a minimum, a system of finger drains or stub drains should be placed around all catch basins within the pavement areas to minimize the accumulation of water in the frost susceptible subgrade soils. These under drains should be installed below the aggregate base course layer of the pavement system and be properly protected with free-draining coarse aggregate material and filter fabric.

All pavements require regular maintenance and occasional repairs to keep them in a serviceable condition. Of particular value is timely sealing of joints and cracks, which if left un-repaired, can serve to permit water to enter the pavement section and cause rapid deterioration of the pavement during freeze-thaw cycles. The need for such routine maintenance and repair is not necessarily indicative of premature pavement failure. However, if appropriate maintenance and repairs are not performed on a timely basis, the serviceable life of the pavement can be reduced significantly.

Actual pavement section thickness should be provided by the design civil engineer based on design traffic loads and volume and the owner's design life requirements. All pavement

materials and procedures should conform to standard MDOT, City of Ann Arbor or appropriate local municipal agency requirements.

Based on the results of the soil borings performed, Resilient Modulus values (M_r) for the encountered soils have been estimated and are presented in Table 3, along with a summary of the encountered pavement and subgrade conditions.

Table 3. Summary of Encountered Conditions and Estimated Soil Properties

Street	Limits	Pavement Thickness (in)		Aggregate Base Thickness (in)		Subgrade Soil Description	Estimated Resilient Modulus, M_r (psi)
		Asphalt	Concrete	Crushed Asphalt Base	Sand and Gravel		
Jewett Avenue	S. Industrial Highway to Packard Street	3-6	0	0	6-8	Sand/Silty Sand/ Clay Fill	5,000
Pine Valley Boulevard	Packard Street to Esch Avenue	3-4	0	0	6-8	Silty Sand	6,000
Tacoma Circle	King George Boulevard to Birch Hollow Drive	3-4	0	0	6-8	Sandy Clay/Silty Sand	6,000
Brierwood Street	Arborview Boulevard to Linwood Avenue	4-5	0	0	6-14	Silty Sand	5,500
Burgundy Road	Andover Road to end	5	0	5-6 (SB-17,SB-18)	8 (SB-19)	Clay Fill/Clay	5,000
Vintage Valley Road	Green Road to Burgundy Road	5-6	0	5-6 (SB-20, SB-21)	6 (SB-22)	Clay Fill/Clay	5,000
Ellsworth Road	State Street to Platt Road	3.19-3.76	0	0	4-5	Silty Sand	N/A
State Street	Eisenhower Road to I-94	8.20-9.98	0	0	6	Sandy Clay	N/A
Newport Road	Miller Road to Sunset Road	4.11-8.45	0	0	4-6	Sandy Clay	N/A
Huron Parkway	Plymouth Road to Hubbard	5.86-6.58	0	0	5-6	Clayey Sand/Clay	N/A
Dhu Varren Road	RR to west of Nixon Road	3.24-3.54	0	0	5-6	Sandy Clay	N/A

6.0 GENERAL CONSTRUCTION PROCEDURES / RECOMMENDATIONS

6.1. General

Experience indicates that variations in soil conditions are encountered during construction. In order to permit correlation between the soil boring data and the actual soil conditions encountered during construction, it is recommended that a continuous inspection and review of the soil related phases of construction work be carried out. We recommend the site preparation activities, engineered fill placement and pavement construction be observed by a qualified engineering technician. The technician should perform the appropriate type and number of field tests needed to verify compliance with construction specifications and that the pavement subgrade soils are suitable.

The existing silty and clayey soils at the site could be potentially troublesome for some earthwork operations, depending on the prevailing moisture content. These soils have relatively poor drainage characteristics and are susceptible to ponding, subsequent softening and pumping due to construction traffic. During a wet season or periods of heavy precipitation, the silty and clayey subgrade soils may become unstable and provide limited support for some rubber-tired construction equipment. If pumping of the subgrade occurs due to construction traffic, an evaluation of the site and construction procedures should be made by a geotechnical engineer.

6.2. Groundwater Control

Based on the observed groundwater conditions in the test borings, no significant groundwater related problems are anticipated during pavement construction. However, the conditions encountered at the majority of the boring locations are conducive to the development of perched water accumulations within the granular soils. If perched accumulations occur, some groundwater seepage could be encountered.

Proper groundwater control measures should be maintained during all earthwork activities in order to limit the disturbance of the subgrade soils. These measures should include a provision

of temporary drainage ditches to discharge any perched water outside the construction area. For relatively shallow excavations, it appears that minor perched groundwater accumulations, if encountered, should be controllable by conventional pumping methods from standard sump pits extending into the natural clay soils.

Any groundwater related problems should be evaluated in the field by a qualified geotechnical engineer so that the best remedial measures can be determined.

APPENDIX

Boring Logs
Summary of Laboratory Test Results
General Notes for Soil Classification

Boring Logs

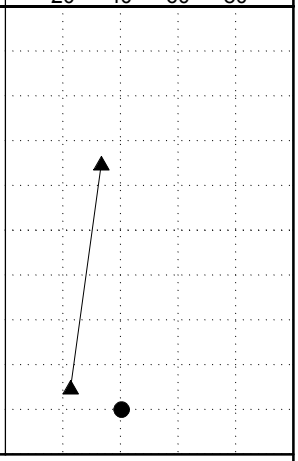
CTI and Associates, Inc.

BORING NUMBER SB-2

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH None

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		6 inches of ASPHALT					
		6 inches of SAND AND GRAVEL FILL - brown, moist					
		SILTY SAND (SM) - brown, fine to medium, trace gravel, medium dense, moist	SS 1	100	10-13-12 (25)		
2.5							
		CLAY (CL) - grayish-brown, with silt, trace sand, occasional silt partings, stiff, moist	SS 2	100	2-5-12 (17)	1.75	20
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Jewett Avenue STA 4+50. Frozen to a depth of 2 feet.

CTI and Associates, Inc.

BORING NUMBER SB-3

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 9"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 15 30 45 60 / PL MC LL 10 20 30 40 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		4 inches of ASPHALT						
		6 inches of SAND AND GRAVEL FILL - brown, moist						
		SILTY SAND (SM-POSSIBLE FILL) - brown, fine, trace gravel and clay, medium dense, moist	SS 1	100	23-19-9 (28)			
2.5		SILTY SAND (SM) - brown, fine, trace gravel, loose, moist	SS 2	100	4-4-4 (8)			
5.0		Bottom of borehole at 5.0 feet.						

Jewett Avenue STA 7+50. Frozen to a depth of 3.5 feet.

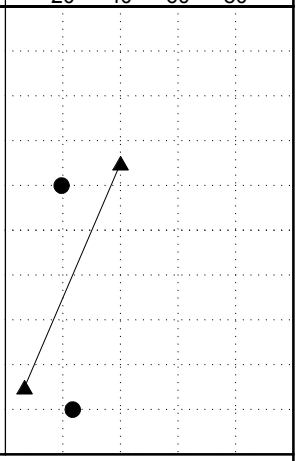
CTI and Associates, Inc.

BORING NUMBER SB-4

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH None

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		5 inches of ASPHALT					
		5 inches of SAND AND GRAVEL FILL - brown, moist					
		CLAY FILL - mottled brown and dark brown, with silt, trace sand and gravel, occasional pieces of asphalt, moist	SS 1	100	20-18-12 (30)		10
2.5							
		CLAY (CL-POSSIBLE FILL) - brown, with silt, trace sand and gravel, occasional sand partings, stiff, moist	SS 2	100	2-2-3 (5)	1.25	12
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Jewett Avenue STA 10+40. Frozen to a depth of 3.5 feet.

CTI and Associates, Inc.

BORING NUMBER SB-6

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 3' 5"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		4 inches of ASPHALT					
		6 inches of SAND AND GRAVEL FILL - brown, moist					
		SILTY SAND FILL - mottled brown and dark brown, fine, trace gravel, occasional pieces of asphalt and cobbles, moist	SS 1	100	24-14-5 (19)		
2.5							11
		Bottom of borehole at 3.6 feet.	SS 2	100	100/1"		

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80

Jewett Avenue STA 16+50. Frozen to a depth of 2 feet. Boring terminated at a depth of 3.6 feet upon encountering auger and spoon refusal on suspected boulder obstruction.

CTI and Associates, Inc.

BORING NUMBER SB-7

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 7"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 15 30 45 60 / PL MC LL 10 20 30 40 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		5 inches of ASPHALT						
		5 inches of SAND AND GRAVEL FILL - brown, moist						
		SAND (SP-SM) - brown, fine, some silt and gravel, medium dense to dense, moist	SS 1	100	23-15-7 (22)			
2.5								
			SS 2	100	8-14-18 (32)			
5.0								

Bottom of borehole at 5.0 feet.

Jewett Avenue STA 18+73. Frozen to a depth of 2 feet.

CTI and Associates, Inc.

BORING NUMBER SB-8

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 11"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 15 30 45 60 / PL MC LL 10 20 30 40 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		3 inches of ASPHALT						
		7 inches of SAND AND GRAVEL FILL - brown, moist						
		SILTY, CLAYEY SAND (SC-SM) - brown, fine, trace gravel, dense, moist	SS 1	100	53-29-18 (47)			
2.5		SAND (SM) - reddish-brown, fine to medium, with silt, trace gravel, loose, moist	SS 2	100	3-2-3 (5)			
5.0		Bottom of borehole at 5.0 feet.						

Jewett Avenue STA 22+00. Frozen to a depth of 3.5 feet.

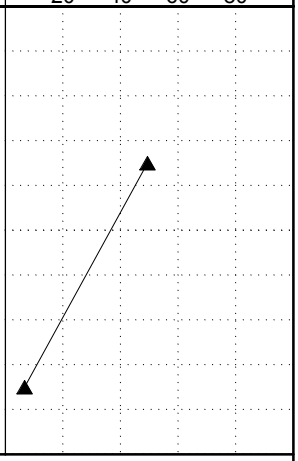
CTI and Associates, Inc.

BORING NUMBER SB-9

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH None

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		3 inches of ASPHALT					
		7 inches of SAND AND GRAVEL FILL - brown, moist					
		SILTY SAND (SM-POSSIBLE FILL) - brown, fine, trace gravel and clay, dense, moist	SS 1	100	26-24-13 (37)		
2.5							
		SILTY SAND (SM) - brown, fine, some clay, trace gravel, loose, moist	SS 2	100	3-2-3 (5)		
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Pine Valley Boulevard STA 2+00. Frozen to a depth of 3.5 feet.

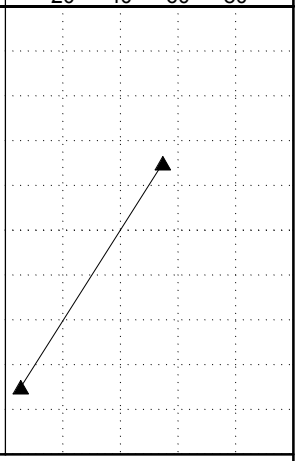
CTI and Associates, Inc.

BORING NUMBER SB-10

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 11"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		4 inches of ASPHALT					
		8 inches of SAND AND GRAVEL FILL - brown, moist					
		SILTY SAND (SM-POSSIBLE FILL) - brown, fine, some clay, trace gravel, dense, moist	SS 1	100	34-27-14 (41)		
2.5							
		SILTY SAND (SM) - brown, fine, trace gravel, loose, moist	SS 2	100	3-2-2 (4)		
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Pine Valley Boulevard STA 7+33. Frozen to a depth of 3.5 feet.

CTI and Associates, Inc.

BORING NUMBER SB-11

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH None

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 15 30 45 60 / PL MC LL 10 20 30 40 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		4 inches of ASPHALT						
		6 inches of SAND AND GRAVEL FILL - brown, moist						
		SILTY SAND (SM-POSSIBLE FILL) - brown, fine, some clay, trace gravel, very dense, moist	SS 1	100	36-33-18 (51)			
2.5								
		SILTY SAND (SM) - brown, fine, trace gravel, medium dense, moist	SS 2	100	6-8-9 (17)			
5.0								

Bottom of borehole at 5.0 feet.

Pine Valley Boulevard STA 10+94. Frozen to a depth of 3.5 feet.

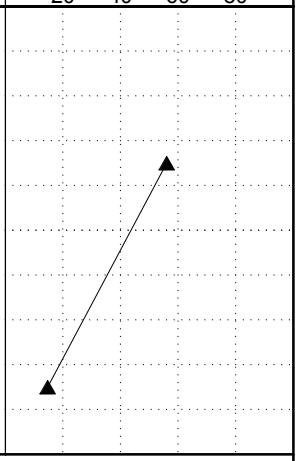
CTI and Associates, Inc.

BORING NUMBER SB-12

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 7"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		4 inches of ASPHALT					
		6 inches of SAND AND GRAVEL FILL - brown, moist					
		SILTY SAND (SM-POSSIBLE FILL) - brown, fine, some clay, trace gravel, dense, moist	SS 1	100	56-27-15 (42)		
2.5		SAND (SM) - brown, fine, with silt, trace gravel, occasional clay seams, medium dense, moist	SS 2	100	4-5-6 (11)		
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Pine Valley Boulevard STA 14+00. Frozen to a depth of 3.5 feet.

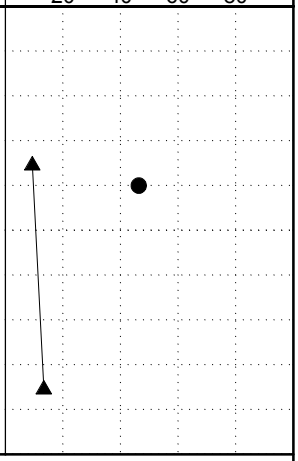
BORING NUMBER SB-13

CTI and Associates, Inc.

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/29/15 **COMPLETED** 1/29/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 11"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		4 inches of ASPHALT					
		6 inches of SAND AND GRAVEL FILL - brown, moist					
		SANDY CLAY (CL) - mottled brown and gray, with silt, trace sand, occasional sand seams, very stiff, moist	SS 1	100	15-3-4 (7)	2.5	23
2.5		SILTY SAND (SM) - brown, fine, some clay, trace gravel, medium dense, moist	SS 2	100	6-5-5 (10)		
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Tacoma Circle STA 2+04. Frozen to a depth of 1.5 feet.

CTI and Associates, Inc.

BORING NUMBER SB-14

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/29/15 **COMPLETED** 1/29/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 3"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 15 30 45 60 / PL MC LL 10 20 30 40 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		3 inches of ASPHALT						
		9 inches of SAND AND GRAVEL FILL - brown, moist						
		SILTY SAND (SM) - brown, fine, some clay, trace gravel, medium dense, moist	SS 1	100	10-8-12 (20)			
2.5								
		SILTY SAND (SM) - brown, fine to medium, trace gravel, dense, moist	SS 2	100	28-26-16 (42)			
5.0								

Bottom of borehole at 5.0 feet.

Tacoma Circle STA 4+33. Frozen to a depth of 3.5 feet.

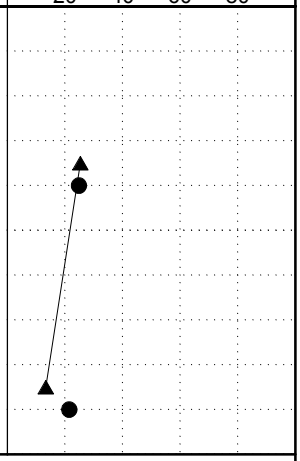
CTI and Associates, Inc.

BORING NUMBER SB-15

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 10"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		4 inches of ASPHALT					
		14 inches of SAND AND GRAVEL FILL - brown, moist					
		SANDY CLAY (CL-POSSIBLE FILL) - brown, with silt, trace gravel, hard, moist	SS 1	100	15-8-11 (19)	4.5+	12
2.5							
		CLAY (CL) - brown. with silt, trace sand and gravel, occasional sand partings, very stiff, moist	SS 2	100	6-5-5 (10)	3.0	11
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Brierwood Street STA 1+54. Frozen to a depth of 1.5 feet.

CTI and Associates, Inc.

BORING NUMBER SB-16

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/28/15 **COMPLETED** 1/28/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 11"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)	▲ SPT N VALUE ▲ 15 30 45 60 / PL MC LL 10 20 30 40 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		5 inches of ASPHALT						
		5 inches of SAND AND GRAVEL FILL - brown, moist						
		SILTY SAND (SM) - brown, fine, trace gravel, dense, moist	SS 1	100	35-17-14 (31)			
2.5		SAND (SP-SM) - brown, fine to medium, some silt, trace gravel, medium dense, moist	SS 2	100	4-8-12 (20)			
5.0		Bottom of borehole at 5.0 feet.						

Brierwood Street STA 4+58. Frozen to a depth of 1.5 feet.

CTI and Associates, Inc.

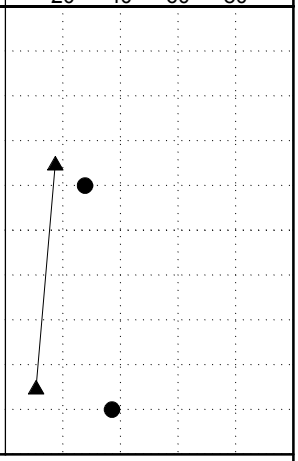
BORING NUMBER SB-17

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/27/15 **COMPLETED** 1/27/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH None

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		5 inches of ASPHALT					
		6 inches of CRUSHED ASPHALT BASE					
		CLAY FILL - brown, with silt, trace sand, gravel and organics, moist	SS 1	100	12-6-7 (13)		14
2.5							
			SS 2	100	4-4-4 (8)	2.5	19
5.0		CLAY (CL) - brown, with silt, trace sand and gravel, very stiff, moist					

Bottom of borehole at 5.0 feet.

Burgundy Road STA 2+20. Frozen to a depth of 1.5 feet.



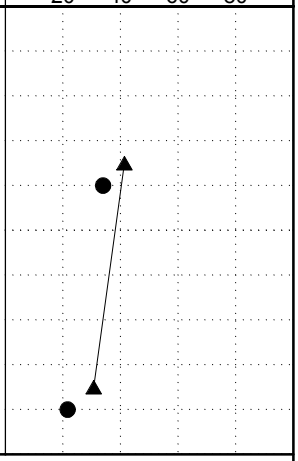
CTI and Associates, Inc.

BORING NUMBER SB-18

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/27/15 **COMPLETED** 1/27/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 9"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		5 inches of ASPHALT					
		5 inches of CRUSHED ASPHALT BASE					
		CLAY (CL) - mottled brown and gray, with silt, trace sand and gravel, occasional silt partings, very stiff to hard, moist	SS 1	100	16-18-13 (31)	2.5	17
2.5							
			SS 2	100	8-11-12 (23)	4.5+	11
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Burgundy Road STA 4+91. Frozen to a depth of 3.5 feet.

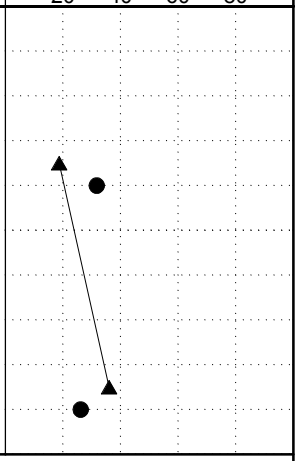
CTI and Associates, Inc.

BORING NUMBER SB-19

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/27/15 **COMPLETED** 1/27/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH None

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		5 inches of ASPHALT					
		9 inches of SAND AND GRAVEL FILL - brown, moist					
		CLAY FILL - brown, with silt, trace sand, gravel and organics, moist	SS 1	100	6-8-6 (14)		16
2.5							
		CLAY (CL) - mottled brown and gray, with silt, trace sand and gravel, occasional silt partings, hard, moist	SS 2	100	8-12-15 (27)	4.5+	13
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Burgundy Road STA 8+11. Frozen to a depth of 1.2 feet.

CTI and Associates, Inc.

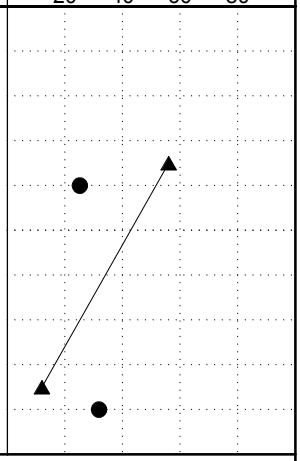
BORING NUMBER SB-20

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/27/15 **COMPLETED** 1/27/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 10"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		6 inches of ASPHALT					
		6 inches of CRUSHED ASPHALT BASE					
		CLAY (CL) - brown, with silt, trace sand and gravel, occasional sand partings, hard, moist	SS 1	100	19-24-18 (42)	4.5+	13
2.5							
			SS 2	100	4-4-5 (9)	4.5+	16
5.0							

Bottom of borehole at 5.0 feet.

Vintage Valley Road STA 2+00. Frozen to a depth of 3.5 feet.



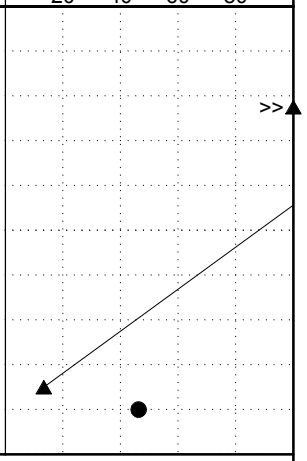
CTI and Associates, Inc.

BORING NUMBER SB-21

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/27/15 **COMPLETED** 1/27/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 11"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		6 inches of ASPHALT					
		5 inches of CRUSHED ASPHALT BASE					
		CLAY FILL - dark brown, with silt, trace sand, gravel and organics, moist	SS 1	100	100/3"		
2.5							
		CLAY (CL) - grayish-brown, with silt, trace sand and gravel, very stiff, moist	SS 2	100	4-4-6 (10)	3.0	23
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Vintage Valley Road STA 6+23. Frozen to a depth of 3.5 feet.

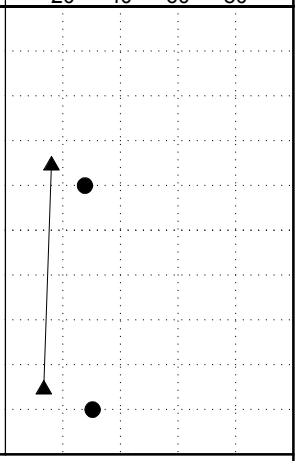
BORING NUMBER SB-22

CTI and Associates, Inc.

CLIENT City of Ann Arbor
PROJECT NAME Ann Arbor Street Resurfacing
PROJECT NUMBER 3142040009-2
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 1/27/15 **COMPLETED** 1/27/15
GROUND ELEVATION N/A
DRILLING CONTRACTOR Brax Drilling
GROUND WATER LEVELS:
DRILLING METHOD 4-inch Solid Stem Auger
DURING DRILLING None
LOGGED BY A. Rau **CHECKED BY** T. Marsik
AFTER DRILLING None
NOTES Boring backfilled with auger cuttings and patched
COLLAPSE DEPTH 4' 10"

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf) UNC. STRENGTH (psf)	NATURAL MOISTURE CONTENT (%)
0.0		5 inches of ASPHALT					
		5 inches of SAND AND GRAVEL FILL - brown, moist					
		CLAY (CL) - brown, with silt, trace sand and gravel, occasional silt partings, hard to very stiff, moist	SS 1	100	9-6-6 (12)	4.5+	14
2.5							
			SS 2	100	3-4-6 (10)	2.75	15
5.0							

▲ SPT N VALUE ▲
15 30 45 60
PL MC LL
10 20 30 40
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 5.0 feet.

Vintage Valley Road STA 9+57. Frozen to a depth of 0.8 feet.

Summary of Laboratory Test Results

CTI and Associates, Inc.

SUMMARY OF LABORATORY RESULTS

CLIENT City of Ann Arbor **PROJECT NAME** Ann Arbor Street Resurfacing

PROJECT NUMBER 3142040009-2 **PROJECT LOCATION** Ann Arbor, Michigan

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Unc. Strength (tsf)	Loss-on-Ignition (%)
SB-2	5.0						CL	20		1.75	
SB-4	2.5						FILL	10			
SB-4	5.0						CL/Poss. FILL	12		1.25	
SB-6	3.5						FILL	11			
SB-13	2.5						CL	23		2.5	
SB-15	2.5						CL/Poss. FILL	12		4.5+	
SB-15	5.0						CL	11		3.0	
SB-17	2.5						FILL	14			
SB-17	5.0						CL	19		2.5	
SB-18	2.5						CL	17		2.5	
SB-18	5.0						CL	11		4.5+	
SB-19	2.5						FILL	16			
SB-19	5.0						CL	13		4.5+	
SB-20	2.5						CL	13		4.5+	
SB-20	5.0						CL	16		4.5+	
SB-21	5.0						CL	23		3.0	
SB-22	2.5						CL	14		4.5+	
SB-22	5.0						CL	15		2.75	

General Notes for Soil Classification

CTI and Associates, Inc.
51331 W. Pontiac Trail Wixom, MI 48393 248.486.5100 Main 248.486.5050 Fax

GENERAL NOTES FOR SOIL CLASSIFICATION

STANDARD PENETRATION TEST: Driving a 2" outside diameter, 1-3/8" inside diameter sampler a distance of 18 inches into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. The sampler is driven three successive 6-inch increments. The number of blows required for the last 12 inches of penetration is termed the Standard Penetration Resistance (N).

GROUNDWATER: Observations are made at the times indicated on logs. Porosity of soil strata, weather conditions and site topography may cause changes in the water levels.

SOIL CLASSIFICATION PROCEDURE: Classification on the logs is generally made by visual inspection. For fine-grained soils (silt, clay and combinations thereof), the classification is primarily based upon plasticity. For coarse-grained soils (sand and gravel), the classification is based upon particle size distribution. Minor soil constituents are reported as "trace" (0-5%), "some" (5-12%) and "with" (15-29%). Where the minor constituents are in excess of 29%, an adjective is used preceding the major constituent name (i.e. for sands containing 35% silt, the soil is classified as silty sand).

PARTICLE SIZE DISTRIBUTION

Boulders	-	Greater than 12 inches average diameter
Cobbles	-	3 inches to 12 inches
Gravel –		
Coarse	-	¾ inches to 3 inches
Fine	-	No. 4 (4.75mm) to ¾ inches
Sand –		
Coarse	-	No. 10 (2.00mm) to No. 4 (4.75mm)
Medium	-	No. 40 (0.425mm) to No. 10 (2.00mm)
Fine	-	No. 200 (0.075mm) to No. 40 (0.425mm)
Silt and Clay	-	Less than 0.075mm, Classification based upon plasticity. Generally silt particles size ranges from 0.005mm to 0.075mm and clay particle size is less than 0.005mm.

CONSISTENCY OF FINE GRAINED SOILS IN TERMS OF UNCONFINED COMPRESSIVE STRENGTH AND N-VALUES

Consistency	Unconfined Compressive Strength (Tons per square foot)	Approximate range of N
Very Soft	Less than 0.25	0 - 2
Soft	0.25 to 0.5	3 - 4
Medium Stiff	0.5 to 1.0	5 - 8
Stiff	1.0 to 2.0	9 - 15
Very Stiff	2.0 to 4.0	16 - 30
Hard	over 4.0	over 31

RELATIVE DENSITY OF COARSE GRAINED SOILS ACCORDING TO N-VALUES

Density Classification	Relative Density, %	Approximate Range of N
Very Loose	0 – 15	0 – 4
Loose	16 – 35	5 – 10
Medium Dense	36 - 65	11 - 30
Dense	66 - 85	31 – 50
Very Dense	86 – 100	over 50

Relative density of cohesionless soils is based upon an evaluation of the Standard Penetration Resistance (N), modified as required for overburden pressure.