

SP-094004
(New)



Iowa Department of Transportation

**SPECIAL PROVISIONS
FOR
DEWATERING**

POTTAWATTAMIE COUNTY

Project No.
STP-U-1642(662)--86-78

Effective Date
August 21, 2012

The Standard Specifications, Series 2009, Are Amended By The Following Modifications And Additions. These Are Special Provisions And They Shall Prevail Over Those Published In The Standard Specifications.

1. SCOPE OF WORK

- 1.1.** The WORK of this Section includes site dewatering necessary to lower and control groundwater levels and hydrostatic pressure to permit excavation and construction to be performed properly under dry conditions.
 - 1.1.1.** The groundwater shall be lowered and maintained to an absolute minimum of 3 feet or lower below the lowest excavation made for the trench as required to place pipe bedding and manhole bedding.
- 1.2.** Dewatering operations shall be adequate to assure the integrity of the finished project. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the CONTRACTOR. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the CONTRACTOR.
- 1.3.** The CONTRACTOR shall bear the sole responsibility for the design, installation, operation, monitoring, and removal of the dewatering system to comply with the requirements of this section and any applicable regulatory agencies. The CONTRACTOR shall be required to install additional dewatering equipment as may be required throughout the duration of the project to maintain groundwater level as described in Paragraph 1.1.1.
- 1.4.** The CONTRACTOR shall be responsible for submitting the applications and obtaining the required permits for the well construction including obtaining approval from the Council Bluffs Department of Public Health and the Pottawattamie County Office of Planning and Development. Copies of these guidelines are available from the respective agencies. The CONTRACTOR shall also be responsible for filing a Field Office Notification (FON) with the Iowa Department of Natural Resources (IDNR) and developing a Well Water Pollution Prevention Plan for the discharge of wastewater from well construction activities per the Iowa Department of Natural Resources (IDNR) NPDES General Permit #6. Copies of these guidelines and blank forms are available from the IDNR.
- 1.5.** The CONTRACTING AUTHORITY will notify the CONTRACTOR of any demands brought upon the project by the IDNR. The CONTRACTOR shall cooperate with the CONTRACTING AUTHORITY in its efforts to comply with the site-specific guidelines provided by the IDNR, including the possibility of adjusting the dewatering system if the discharge exceeds limits imposed by the IDNR. The CONTRACTING AUTHORITY will be responsible for the costs of sampling and laboratory analysis if required by the IDNR.

2. SCHEDULE AND PLAN

- 2.1.** Prior to commencement of construction, the CONTRACTOR shall submit a detailed dewatering plan including: dewatering method, a list of equipment and estimated pumping rates.
- 2.2.** Attached for the CONTRACTOR'S information as an Appendix to these Contract Documents is geotechnical information collected for the project. Fluctuations of the groundwater level can occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were completed. The geotechnical information was prepared for design purposes only and may not be adequate for a CONTRACTOR to evaluate construction conditions or design the dewatering system. The CONTRACTOR should independently interpret the soil/groundwater conditions taking into consideration their intended means and methods of construction, and the CONTRACTOR may perform additional exploration at their own expense as necessary for design of the dewatering system.
 - 2.2.1.** Due to possible variations of soil conditions and groundwater levels between soil bore locations the CONTRACTOR shall be responsible for changing or modifying the dewatering system to accommodate such variations.

3. CONTROL AND OBSERVATION

- 3.1.** Adequate control shall be maintained by the CONTRACTOR to ensure that the stability of excavated slopes are not adversely affected by water, that erosion is controlled and that flooding of excavation or damage to structures does not occur. The CONTRACTOR is solely responsible for site excavation safety and compliance with OSHA regulations, in particular Standard 29 CFR, part number 1926. The ENGINEER assumes no responsibility for site safety; the above information is provided for consideration by the CONTRACTOR only.
- 3.2.** The CONTRACTING AUTHORITY reserves the right to install piezometers, at its own expense, to observe the groundwater levels and monitor the performance of the system.
- 3.3.** When directed by the ENGINEER, the CONTRACTOR will be required to excavate a pothole to determine if the groundwater is at the acceptable absolute minimum level or lower as defined in Paragraph 1.1.1.
- 3.3.1.** When observation of the groundwater level is complete the pothole shall be backfilled with clean 3 inch crushed limestone per Pay Item "TRENCH FOUNDATION", and the CONTRACTOR shall be paid for the quantity used based on the contract unit price.
- 3.3.2** The CONTRACTOR will be required to excavate a pothole, disturbing the smallest footprint possible, to the elevation as described in Paragraph 1.1.1 for that reach of piping. Said pothole excavation shall be made with the following minimum frequency:
- At the beginning of any day where any trench has not been completely backfilled.
 - At every 150 lineal feet of trench along the length of the pipe run.
 - At the end of every day. (The pothole made at the end of the day shall be left open and shall be used as the pothole for the beginning of the next day of construction.)

The cost of said pothole excavations, excluding 3 inch foundation rock backfill, shall be considered incidental to the lump sum pay item "DEWATERING". If any additional pothole excavations are requested by the ENGINEER or the CONTRACTING AUTHORITY, the CONTRACTOR will be paid for said excavations on an each basis per Pay Item "POTHOLE EXCAVATIONS". If the additional potholes are needed as a direct result of the CONTRACTOR'S actions or negligence they will be done at the sole expense of the CONTRACTOR.

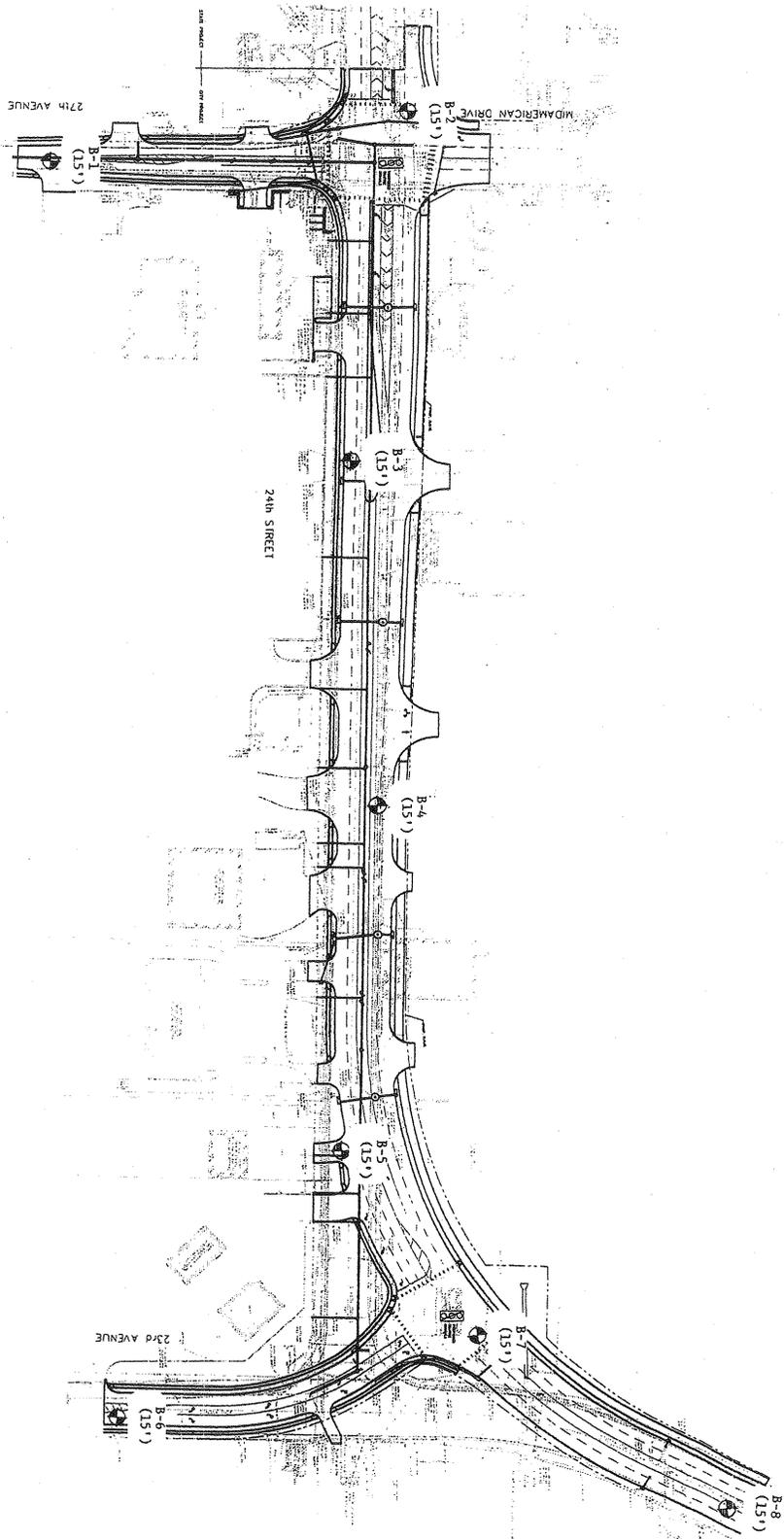
4. INSPECTION

- 4.1.** During or after any trench excavation. If CONTRACTOR observes sufficient soil instability present that may prevent proper installation of pipe bedding, pipelines, backfill and compaction, then CONTRACTOR shall call for inspection of conditions by the ENGINEER. The ENGINEER shall inspect the conditions and determine if they are unacceptable for pipe installation.
- 4.2.** If after dewatering has lowered the groundwater level as specified and unacceptable trench conditions are found by the ENGINEER, then the CONTRACTOR may be directed to increase dewatering pumping rates or install additional wells to lower the groundwater to an acceptable level lower than that defined in Paragraph 1.1.1. If more extensive dewatering is required, the CONTRACTOR must achieve the revised acceptable groundwater level before construction may continue. Any additional work required will be processed in compliance with Article 10 of the General Conditions.

5. EXECUTION

- 5.1.** The CONTRACTOR shall furnish, install, and operate pumps, pipes, appliances, and equipment of sufficient capability to maintain the absolute minimum or lower groundwater elevation described in Paragraph 1.1.1 within the trench excavation limits until the trench is back filled, unless otherwise authorized by the ENGINEER.

- 5.2.** The CONTRACTOR shall provide any temporary ground surface piping necessary to convey dewatering well water discharge to an acceptable storm sewer intake with the capacity to convey said discharge. Any rerouting of temporary ground surface piping, necessary to complete the project, will be provided by the CONTRACTOR. Discharge directly onto the ground surface shall not be allowed unless approved by the ENGINEER. The CONTRACTOR shall supply a clean tapping device at each well location to allow easy discharge water sampling by the ENGINEER.
- 5.3.** An adequate system shall be designed, installed and maintained to lower and control the groundwater elevations as described in Paragraph 1.1.1 to permit excavation, construction of structures, and placement of fill materials to be performed under dry conditions.
- 5.4.** The system shall be placed into operation, prior to beginning excavating below the natural groundwater level, to lower the groundwater to the elevation as described in Paragraph 1.1.1 and shall be operated continuously 24 hours a day, 7 days a week until sewers have been constructed and backfill materials have been placed to the top of the trench.
- 5.4.1.** If the dewatering system shuts down or if pumping is suspended, the groundwater levels will need to be lowered to the required level, as described in Paragraph 1.1.1, and verified by the ENGINEER before continuing any construction, including excavation or backfilling. The ENGINEER will also require any compaction, moisture and/or other soils testing, as determined necessary, of any backfill that is prematurely subjected to groundwater to verify said soils stability prior to placement of additional backfill. If said soils are determined to be unacceptable the CONTRACTOR will be required to remove and replace damaged soils at their own expense.
- 5.5.** Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of subgrade soils at the bottom of the proposed excavation.
- 5.6.** Diversion ditches and dikes shall be used, where necessary, to prevent surface water from entering the excavation.
- 6. MEASUREMENT FOR PAYMENT**
- 6.1.** The measurement and payment for all work covered under this section will be made at the contract lump sum price for "DEWATERING" which shall constitute full compensation for obtaining any necessary permits and furnishing all equipment, labor, and materials to install, operate, maintain, and remove the dewatering system in accordance with all applicable regulations.
- 6.1.1.** No payment shall be made to the CONTRACTOR until copies of the permits are supplied to the CONTRACTING AUTHORITY.
- 6.1.2.** The CONTRACTOR shall be required to submit a schedule of values to the ENGINEER OF RECORD to explain the breakdown of the lump sum price. This schedule of values will only be used to determine the appropriate amount of the lump sum to be attributed to each progress payment. The following list contains items that should be used, at a minimum, for the schedule of values:
- Obtaining permits and complying with permit requirements
 - Drilling the wells
 - Installing the pumps
 - Installing power supply
 - Discharge and/or manifold piping
 - Removal



⊕ Proposed Boring Location

SUBSURFACE EXPLORATION DIAGRAM
 24TH STREET RECONSTRUCTION
 COUNCIL BLUFFS, IOWA

Job # 0507563

Date 09/2007

Drawn GKA

Scale NOT TO SCALE

Terracon

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS: Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted	HS: Hollow Stem Auger
ST: Thin-Walled Tube - 2" O.D., unless otherwise noted	PA: Power Auger
RS: Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA: Hand Auger
DB: Diamond Bit Coring - 4", N, B	RB: Rock Bit
BS: Bulk Sample or Auger Sample	WB: Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL: Water Level	WS: While Sampling
WCI: Wet Cave in	WD: While Drilling
DCI: Dry Cave in	BCR: Before Casing Removal
AB: After Boring	ACR: After Casing Removal

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

<u>Unconfined Compressive Strength, Qu, psf</u>	<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Consistency</u>
< 500	<2	Very Soft
500 – 1,000	2-3	Soft
1,001 – 2,000	4-6	Medium Stiff
2,001 – 4,000	7-12	Stiff
4,001 – 8,000	13-26	Very Stiff
8,000+	26+	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Relative Density</u>
0 – 3	Very Loose
4 – 9	Loose
10 – 29	Medium Dense
30 – 49	Dense
50+	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 15
With	15 – 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

<u>Major Component of Sample</u>	<u>Particle Size</u>
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 5
With	5 – 12
Modifiers	> 12

PLASTICITY DESCRIPTION

<u>Term</u>	<u>Plasticity Index</u>
Non-plastic	0
Low	1-10
Medium	11-30
High	30+



LOG OF BORING NO. B-1

CLIENT HGM Associates Inc		ARCHITECT/ENGINEER									
SITE 24th St between 23rd St and 27th Ave Council Bluffs, IA		PROJECT 24th St Reconstruction									
GRAPHIC LOG		DESCRIPTION		SAMPLES			TESTS				
		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
		0.54			PA						
		3		1	ST	12		27	90		
		5		SP	2	SS	7	17	10		
		5		SP	3	SS	9	13	8		
10				PA							
10		SP	4	SS	14	13	19				
15				PA							
15		SP	5	SS	17	20	26				
15											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual. *Calibrated Hand Penetrometer
**CME Automatic Hammer

WATER LEVEL OBSERVATIONS, ft		<h2 style="font-size: 2em; margin: 0;">Terracon</h2>	BORING STARTED 9-25-07	
WL <input type="checkbox"/>	WD <input type="checkbox"/>		BORING COMPLETED 9-25-07	
WL <input type="checkbox"/>	<input type="checkbox"/>		RIG CME 55	FOREMAN JM
WL <input type="checkbox"/>	<input type="checkbox"/>		APPROVED RDM	JOB # 05075136

BOREHOLE 05075136 LOGS.GPJ TERRACON.GDT 10/16/07

LOG OF BORING NO. B-2

CLIENT HGM Associates Inc		ARCHITECT/ENGINEER						
SITE 24th St between 23rd St and 27th Ave Council Bluffs, IA		PROJECT 24th St Reconstruction						
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS	
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %
3	Grass at surface (FILL) FINE TO MEDIUM SAND , trace fine to coarse gravel Brown	0			PA			
5	CLAYEY SAND fine grained Dark brown, medium dense	3	SC	2	SS	8	15	17
13	FINE TO MEDIUM SAND Brown Medium dense	5	SP	3	SS	11	17	14
15	SILTY FINE SAND Brown Loose	10			PA			
15	BOTTOM OF BORING	15	SM	5	SS	10	5	29

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

*Calibrated Hand Penetrometer
**CME Automatic Hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽ 15	WD	▽
WL	▽		▽
WL			



BORING STARTED		9-25-07	
BORING COMPLETED		9-25-07	
RIG	CME 55	FOREMAN	JM
APPROVED	RDM	JOB #	05075136

BOREHOLE 05075136 LOGS.GPJ TERRACON.GDT 10/16/07

LOG OF BORING NO. B-3

CLIENT HGM Associates Inc		ARCHITECT/ENGINEER							
SITE 24th St between 23rd St and 27th Ave Council Bluffs, IA		PROJECT 24th St Reconstruction							
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS	
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
0.9	10.8 inches of concrete at surface				PA				
1.0	<u>FINE TO MEDIUM SAND</u> Brown		SP	1	ST			5	
1.5			SP	2	ST			5	
2.0			SP	3	ST			6	
3.0					PA				
4.0			SM	4	SS	15	7	16	
5.0					PA				
6.0			SM	5	SS	18	12	27	
7.0									
8.0	<u>SILTY FINE TO MEDIUM SAND</u> Brown Loose to medium dense								
9.0									
10.0									
11.0									
12.0									
13.0									
14.0									
15.0	BOTTOM OF BORING								

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

*Calibrated Hand Penetrometer
**CME Automatic Hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽ 12	WD	▽
WL	▽	WD	▽
WL		WD	



BORING STARTED		9-25-07	
BORING COMPLETED		9-25-07	
RIG	CME 55	FOREMAN	JM
APPROVED	RDM	JOB #	05075136

BOREHOLE 05075136 LOGS.GPJ TERRACON.GDT 10/16/07

LOG OF BORING NO. B-4

CLIENT <p style="text-align: center;">HGM Associates Inc</p>	ARCHITECT/ENGINEER
SITE <p style="text-align: center;">24th St between 23rd St and 27th Ave Council Bluffs, IA</p>	PROJECT <p style="text-align: center;">24th St Reconstruction</p>

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS	
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
0.63	7.5 inches of concrete at surface				PA				
	FINE TO MEDIUM SAND Brown Medium dense		SP	1	SS	10	21	8	
			SP	2	PA SS	10	30	5	
	Trace fine to medium gravel at 5.5 feet	5	SP	3	PA SS	12	18	5	
					PA				
8.5	SILTY FINE TO MEDIUM SAND Brown Loose		SM	4	SS	14	5	22	
		10			PA				
			SM	5	SS	18	5	25	
15	Trace fine to medium gravel at 14.5 feet BOTTOM OF BORING	15							

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

*Calibrated Hand Penetrometer
**CME Automatic Hammer

WATER LEVEL OBSERVATIONS, ft

WL	11	WD	▼
WL	▼	▼	▼
WL			



BORING STARTED	9-25-07
BORING COMPLETED	9-25-07
RIG	CME 55 FOREMAN JM
APPROVED RDM	JOB # 05075136

BOREHOLE 05075136 LOGS.GPJ TERRACON.GDT 10/16/07

LOG OF BORING NO. B-5

CLIENT <p style="text-align: center;">HGM Associates Inc</p>	ARCHITECT/ENGINEER
SITE 24th St between 23rd St and 27th Ave Council Bluffs, IA	PROJECT <p style="text-align: center;">24th St Reconstruction</p>

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS	
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %
0.5	6 inches of gravel parking lot at surface							
	FINE TO MEDIUM SAND with trace fine gravel Brown Medium dense							
		5	SP	1	SS	4	11	5
			SP	2	PA SS	6	11	6
			SP	3	PA SS	5	8	6
			SP	4	SS	7	14	7
		10						
			SP	5	SS	7	17	14
14.5			SM					
15	SILTY FINE TO MEDIUM SAND Brown, medium dense BOTTOM OF BORING							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual. *Calibrated Hand Penetrometer
**CME Automatic Hammer

WATER LEVEL OBSERVATIONS, ft WL <input type="checkbox"/> WD <input type="checkbox"/> WL <input type="checkbox"/> <input type="checkbox"/> WL <input type="checkbox"/>		BORING STARTED 9-25-07 BORING COMPLETED 9-25-07 RIG CME 55 FOREMAN JM APPROVED RDM JOB # 05075136
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BOREHOLE 05075136 LOGS.GPJ TERRACON.GDT 10/16/07

LOG OF BORING NO. B-6

CLIENT HGM Associates Inc		ARCHITECT/ENGINEER						
SITE 24th St between 23rd St and 27th Ave Council Bluffs, IA		PROJECT 24th St Reconstruction						
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS	
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %
0.83	2 inches of Asphalt at surface 10 inches of concrete at surface				PA			
	(FILL) FINE TO MEDIUM CLAYEY SAND Dark brown Medium dense to dense			1	ST	18		4000*
				2	ST	17		3000*
5	FINE SILTY SAND Brown Loose Iron staining at 9 to 10 feet	5	SM	3	ST	12	28	93
					PA			
		10	SM	4	SS	24	35	90
					PA			
		15	SM	5	SS	8	1	31
	BOTTOM OF BORING	15						

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

*Calibrated Hand Penetrometer
**CME Automatic Hammer

WATER LEVEL OBSERVATIONS, ft		<h1 style="font-size: 2em; margin: 0;">Terracon</h1>	BORING STARTED		9-25-07			
WL	▽ 13		WD	▽	BORING COMPLETED		9-25-07	
WL	▽			▽	RIG	CME 55	FOREMAN	JM
WL					APPROVED	RDM	JOB #	05075136

BOREHOLE 05075136 LOGS.GPJ TERRACON.GDT 10/16/07

LOG OF BORING NO. B-7

CLIENT <p style="text-align: center;">HGM Associates Inc</p>	ARCHITECT/ENGINEER
SITE 24th St between 23rd St and 27th Ave Council Bluffs, IA	PROJECT <p style="text-align: center;">24th St Reconstruction</p>

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	SAMPLES				TESTS		
			USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
2	Grass at surface <u>(FILL) FINE CLAYEY SAND</u> Dark brown	0			PA				
	<u>FINE TO MEDIUM SAND</u> Brown Medium dense	5	SP	2	ST	14	5		
		5	SP	3	ST	11	20	101	
		10	SP	4	SS	8	11	25	
10	<u>SILTY FINE TO MEDIUM SAND</u> Brown Medium dense	10			PA				
		15	SM	5	SS		17	24	
15	BOTTOM OF BORING	15							

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

*Calibrated Hand Penetrometer
 **CME Automatic Hammer

WATER LEVEL OBSERVATIONS, ft	<h1 style="font-size: 2em; margin: 0;">Terracon</h1>	BORING STARTED	9-26-07
WL ∇ 15 WD ∇		BORING COMPLETED	9-26-07
WL ∇ ∇		RIG CME 55 FOREMAN	JM
WL		APPROVED RDM JOB #	05075136

BOREHOLE 05075136 LOGS.GPJ TERRACON.GDT 10/16/07

LOG OF BORING NO. B-8

CLIENT HGM Associates Inc		ARCHITECT/ENGINEER						
SITE 24th St between 23rd St and 27th Ave Council Bluffs, IA		PROJECT 24th St Reconstruction						
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS	
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %
0.7	3 inches of asphalt at surface 8.5 inches of concrete at surface							
3	(FILL) SILTY FINE SAND Brown, loose							
	FINE TO MEDIUM SAND Brown Dense	5	SP	2	SS	12	37	7
		5	SP	3	SS	10	39	4
8	FINE TO MEDIUM SILTY SAND Brown Loose to medium dense							
		10	SM	4	SS	10	8	21
		10						
15	BOTTOM OF BORING	15	SM	5	SS	15	11	20

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual. *Calibrated Hand Penetrometer
**CME Automatic Hammer

WATER LEVEL OBSERVATIONS, ft		<h2 style="margin: 0;">Terracon</h2>	BORING STARTED		9-25-07	
WL ∇ 12.5	WD ∇		BORING COMPLETED		9-25-07	
WL ∇	∇		RIG	CME 55	FOREMAN	JM
WL			APPROVED	RDM	JOB #	05075136

BOREHOLE 05075136 LOGS.GPJ TERRACON.GDT 10/16/07