

**APPENDIX B**

**MONITORING WELL LOGS, DEVELOPMENT DATA, AND  
WATER LEVEL RECOVERY DATA**

APPENDIX B-1

BORING LOGS AND MONITORING WELL INSTALLATION LOGS

# MONITORING WELL INSTALLATION LOG

NYSDEC SHIMS Document No. 204409232-00043

JOB NO. 904-1002 PROJECT CWM/REM.DES.SUP/MODEL CITY WELL NO. WDA01D SHEET 1 of 1  
 GA INSP. DJM INSTALLATION METHOD HOLLOW STEM AUGER GROUND ELEV. 316.20 FT. WATER DEPTH 8.45' BTC  
 WEATHER N/A CONTRACTOR EMPIRE SOILS INVESTIGATIONS, INC. COLLAR ELEV. 318.58 FT. DATE/TIME 9/12/91/10:  
 TEMP. 85° F FOREMAN CME-55 DRILLER DAN BEITZ STARTED 10:00 8/30/91 COMPLETED 16:00 9/3/91  
 LOCATION / COORDINATES N9511.68, E8746.39 TIME / DATE

## MATERIALS INVENTORY

WELL CASING 2 in. dia. 31.8 I.F. WELL SCREEN 2 in. dia. 10.7 I.F. BENTONITE SEAL PELLETS 6.8' THICK  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD TREMIE THROUGH CASING  
 JOINT TYPE FLUSH THREADED, TEFLON TAPE, and VITON O-RING SLOT SIZE 0.006 inch FILTER PACK QTY. 200 lbs  
 GROUT QUANTITY N/A CENTRALIZERS NONE FILTER PACK TYPE #1-Q SAND  
 GROUT TYPE BENTONITE SLURRY DRILLING MUD TYPE NONE INSTALLATION METHOD TREMIE THROUGH 6" TEMPORARY CASING

ELEV./DEPTH	TRENCH BACKFILL DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
316.2	GROUND SURFACE		AUGERED TO 22.0 FT BELOW GROU SURFACE (BGS) WITH 12" O.D. HSA WITHDREW AUGERS. MIXED BENTONITE CLAY GROUT. ADDED BENTONITE	
0.0	FILL Loose, red brown to dark brown, Clayey Silt and fine Sand, trace medium to coarse sand. (SM-ML)			GROUT TO BOREHOLE. PUSHED 10" ID STEEL SURFACE CASING TO 24.1
312.2	4.0 UPPER CLAY TILL Soft to firm, red brown, Silty Clay, some med. sand, little fine sand, trace coarse sand; trace gray clay infilling of fractures, trace root material. (CL)			FT. BGS; BENTONITE GROUT WASHE FROM INSIDE OF 10" CASING.
306.2	10.0 UPPER SILT TILL Loose to compact, red brown, Clayey Silt and fine Sand, some med. sand, trace coarse sand; fine sand is moist and dilatant; soft, brown clay seam at 13.7 ft. to 13.9 ft. (SM-ML)			AUGERED THROUGH 10" CASING FR 22.0 FT. TO 40.6 FT. WITH 4 1/4" I.D. HSA. WITHDREW AUGERS AND PUSHED A 6" TEMP. STEEL CASING TO 40.6 FT. BGS. FLUSHED BOREHC USING A TRI-CONE ROLLER BIT UNTIL DISCHARGE CLEARED.
296.2	20.0 GLACIOLACUSTRINE CLAY Soft, red brown, Silty Clay, some coarse sand, trace med. and fine sand; grading to soft, gray brown, Clay, trace med. and fine sand, varved from 26.0 ft. to 27.3 ft.; several thin, fine to med. sand seams at 25.0 ft. to 26.0 ft. (CL)			6" CASING PULLED UP SIX INCHES. ADDED #4-Q SAND TO 40.1 FT. BG. ADDED WELL PIPE (1-10' SCREEN, 31.8' OF RISER); 2.38 FT. STICKUP.
288.9	27.3 GLACIOLACUSTRINE SILT/SAND Loose to compact, tan brown Silt, trace med. sand moist to wet; grading to dense to very dense, red brown, Silt and fine Sand, little coarse sand, trace med. sand, wet and dilatant; very soft, gray and red mottled clay seams at 28.4 ft. to 28.6 ft. and 30.6 ft. to 30.9 ft (SM)			ADDED #1-Q SAND TO 27.4 FT BGS IN 0.5-1.5 FT. INCREMENTS WHILE PULLING UP 6" CASING BY THE SAN AMOUNT AHEAD OF THE SAND.
280.2	36.0 BASAL RED TILL Very dense, brownish red, Silt to fine Sand, little coarse sand, trace fine gravel and gray shale fragments, moist. (SP-SM)			ADDED PELLETS TO 20.6 FT. BGS WHILE PULLING 6" CASING IN 1.0 FT INCREMENTS. ADDED #4-Q SAND TO 20.1 FT. BGS; MIXED BENTONITE CLA GROUT. BENTONITE CLAY GROUT PUMPED INTO REMAINING 6" CASING; 6" CASING REMOVED FROM HOLE. BENTONITE CLAY GROUT PUMPED TO 3.5 FT. BGS AND ALLOWED TO HYDRATE. MIXED CEMEN GROUT. POURED IN HOLE TO GROUT SURFACE. PUT 8" ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF PROTECTIVE CASING WITH #4-Q SAND; THREE DRAIN HOLES WERE PUT IN CASING FOR DRAINAGE.
275.6	40.6 End of boring			WELL DEVELOPMENT NOTES DATE DEVELOPED: 9/4/91 TO 9/12/91 DEVELOPMENT METHOD: STAINLESS STEEL BAILER VOLUME PURGED: 43.9 GAL FOR FURTHER DETAILS SEE ACCOMPANING WELL DEVELOPMENT FIELD RECORDS.

JOB NO. 853-3051 GA. INSP. FWS PROJECT CWM/WELLS/MODEL CITY BORING NO. BW-10  
 DEPTH HOLE 39.7 FT DEPTH WL. 6.06 FT DRILLING METHOD HOLLOW STEM AUGERS-4 1/4 ID SHEET 1 OF 1  
 TEMP 32/55° F TIME WL. 9-22-86 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC SURFACE ELEV. 319.2 FT.  
 WEATHER COLD/SUNNY DRILL RIG ACKER AD-2 DRILLER J. GENOVESE DATUM MSL  
 COORDINATES N 7791.26 E 8049.69 WT. SAMPLER HAMMER 140 LBS. DROP 30 IN. STARTED 10:15 / 4-23-86  
 LOCATION ~4 FT. EAST OF BULLIS WT. CASING HAMMER 300 LBS. DROP 30 IN. COMPLETED 11:30 / 4-24-86

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES				REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC./ATT	
319.2	GROUND SURFACE							GROUND SURFACE
0.0	VERY STIFF TO COMPACT, BROWN, CLAYEY SILT TO SILT, SOME C-F SAND, SOME C-F GRAVEL.	ML	131	1	DO	2-7-124-17	13/24	TOPSOIL AND FILL ORGANIC MATERIAL, ROOTS, LEAVES, ETC. WITH A GREEN GRAY ROAD SLAG, 0.0-2.0 FT. PEA SIZE ROAD GRAVEL 20-40 FT.
315.2			16	2	DO	5-7-9-13	10/24	
4.0	VERY STIFF TO STIFF, BROWN TO GRAY BROWN, CLAYEY SILT GRADING TO SILTY CLAY, LITTLE TO TRACE C-F SAND, TRACE GRAVEL, CLASTS AS MULTICOLORED SUBANGULAR TO SUBROUNDED SHALE AND LIMESTONE, GRAY WEATHERING AND BANDING OF COLORS ALONG VERTICAL FRACTURES AND JOINTS.	CL	36	3	DO	6-13-23-45	14/24	UPPER CLAY TILL CUTTINGS WET AT 6.0 FT. MOTTLED TO 8.0 FT.
			105	4	DO	45-45-40-76	22/24	
			28	5	DO	10-11-17-17	13.5/24	
			54	6	DO	17-24-30-35	24/24	
			22	7	DO	15-12-10-13	0/24	WATER IN BOREHOLE TO 1.5 FT. LOGS AFTER LUNCH
303.2			14	8	DO	3-7-7-6	11/24	
16.0	FIRM TO SOFT, GRAY BROWN, SILTY CLAY, SOME C-F SAND, SOME F GRAVEL, GRADING TO A VERY SOFT, LIGHT GRAY, CLAY TO SILTY CLAY, LITTLE TO TRACE FINE SAND, STICKY, VERY PLASTIC, OCCASIONAL DILATANT SILT AND/OR M-F SAND LENSE TOWARDS BOTTOM.	CL TO CH	8	9	DO	5-4-4-3	24/24	GLACIOLACUSTRINE CLAY
			2	10	DO	WR-WH-2-1	24/24	FIRM GRAY BROWN SILTY CLAY TURNING TO VERY SOFT GRAY CLAY AT 18.0 FT.
			5	11	DO	2-2-3-2	24/24	
			6	12	DO	WR-3-3-3	13/24	
			4	13	DO	WR-2-2-2	15/24	
			15	14	DO	5-6-9-9	20/24	MEDIUM SAND LENSE AT 27.7 FT.
			11	15	DO	8-6-5-4	7.5/24	
			14	16	DO	3-5-9-9	12/24	
287.2	VERY DENSE, BROWN GRAY TO RED BROWN, SILT, AND F-C SAND, SOME TO LITTLE GRAVEL, CLAST AS GREEN GRAY LIMESTONE.	ML TO SM	90	17	DO	3-45-45-17	7/24	GLACIOLACUSTRINE SILT/SAND
32.0			187	18	DO	13-87-100/2	8/24	LARGE ROUNDED CLAST AT 34.0 FT. AUGERED TO 36.0 FT. NO SAMPLING
281.2	VERY DENSE, RED BROWN, SILT, SOME C-F SAND, SOME TO LITTLE CLAY, DRY, FRIABLE, CLASTS AS RED BROWN WEATHERED SHALE AND GRAY SHALEY LIMESTONE.	ML	2180	20	DO	187/2	6/24	AUGERED TO 38.0 FT., NO SAMPLING
38.0			2100	21	DO	6-100/2	8/24	BASAL RED TILL AUGERED TO 39.0 FT., NO SAMPLING
279.5								END OF SAMPLING
39.7	END OF SAMPLING AUGERED TO 39.0 FT.							* NOTE: 300 LB. HAMMER WAS USED.

INSTALLED BW-10  
 SEE ACCOMPANYING  
 MONITORING WELL  
 INSTALLATION LOG.

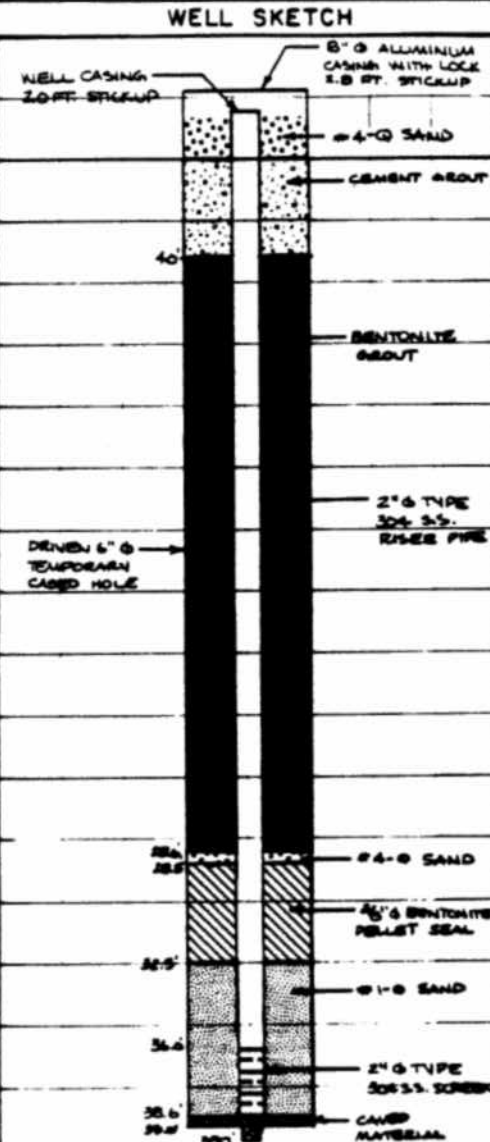
NYCDEP FORM 100 (Rev. 12/2010) No. 2010082200043  
**MONITORING WELL INSTALLATION LOG**

JOB NO. 853-3051 PROJECT CWAA / WELLS / MODEL CITY WELL NO. BW-10 SHEET 1 OF 2  
 SA NSP. FWS DRILLING METHOD HOLLOW STEEL AUGERS - 4 1/2" ID GROUND ELEV. 319.2 FT WATER DEPTH 6.06 FT  
 WEATHER SUNNY DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS INC. COLLAR ELEV. 321.23 FT DATE/TIME 9-22-86  
 TEMP. 79° F DRILL RIG AGRES AD-2 DRILLER J. GENOVESE STARTED 2:30 4-23-86 COMPLETED 2:55 4-30  
 LOCATION/COORDINATES 4.5 FT EAST OF BW-15 / N 77° 1.26' E 8049.69 TIME / DATE TIME / DATE

**MATERIALS INVENTORY**

WELL CASING 2.0 M. dia. 38.0 LF WELL SCREEN 2.0 M. dia. 2.6 LF BENTONITE SEAL PELLETS 4.0' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD THROUGH 6" CASING  
 JOINT TYPE FLUSH TEPLOW VITON TAPE 0-RINGS SLOT SIZE 0.006 INCH FILTER PACK QTY 6.5 L.P.  
 GROUT QUANTITY 38 GAL. CENTRALIZERS NONE FILTER PACK TYPE #1-Q SAND  
 GROUT TYPE BENTONITE DRILLING MUD TYPE NONE INSTALLATION METHOD THROUGH 6" CASING

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
	NOTE: FOR COMPLETE SOIL DESCRIPTIONS SEE BORING LOG BW-10		
319.2	GROUND SURFACE		AUGERED TO 39.0 FT. REMOVED AUGERS, INSTALLED 6" Ø TEMPORARY STEEL CASING; WASHED OUT - OPEN TO 38.6 FT. BELOW GROUND SURFACE; ADDED #1-Q SAND TO 37.1 FT. (SAMPLE TAKEN); INSTALLED WELL PIPE (1-2' SCREEN, 1-3' RISER, 1-5' RISER 3-10' RISERS) 2.0 FT. STICKUP. #1-Q SAND COULD NOT SUPPORT THE WELL - WELL SANK TO 38.6 FT.; ADDED 2 GAL. OF #4-Q SAND AND WASHED WATER THROUGH WELL TO DISPLACE #1-Q SAND TO LET #4-Q SAND SETTLE TO THE BOTTOM; WELL STILL SANK TO 38.6 FT.; ADDED #1-Q SAND TO 32.5 FT.; ADDED PELLETS TO 28.5 FT.; ADDED #4-Q SAND TO 28.0 FT.; MIXED
0.0	TOPSOIL AND FILL VERY STIFF TO MEDIUM BROWN CLAYEY SILT, GRADING TO SILTY CLAY, LITTLE TO TRACES C-F SAND, GRAVEL, CLAYS AS MULTI-LOBBED SUBANGULAR TO SUBROUNDED SHALE AND LIMESTONE, BEAN WEATHERING AND BANDING OF COLOES ALONG VERTICAL FRACTURES AND JOINTS, CUTTING UP AT 6.0 FT., MOTTLED TO 8.0 FT.		
315.2	UPPER CLAY TILL		
4.0			
303.2	GLACIOLACUSTRINE CLAY FIRM TO SOFT, BEAN BROWN SILTY CLAY, SOME C-F SAND, SOME F GRAVEL, GRADING TO A VERY SOFT, LIGHT GREEN CLAY, TO SILTY CLAY, LITTLE TO TRACES F SAND, STICKY, VERY PLASTIC, OCCASIONAL DILATANT SILT AND/OR M-F SAND LENSES TOWARDS BOTTOM. FIRM, BEAN BROWN SILTY CLAY, TURNING TO VERY SOFT, GREEN CLAY AT 18.0 FT. M SAND LENSE AT 27.7 FT.		
16.0			
287.2	GLACIOLACUSTRINE SILT/SAND VERY FINE, BEAN BROWN TO RED BROWN SILT, AND F-C SAND, SAME TO LITTLE GRAVEL, CLAY AS GREEN ORN LIMESTONE LENS BEHIND CLAY AT 30.0 FT.		
32.0			
281.2	BASAL RED TILL VERY FINE, RED BROWN SILT, SOME C-F SAND, SAME TO LITE CLAY, DEN. RELIABLE, CLAYS AS RED BROWN WEATHERED SHALE AND BEAN SHALE LIMESTONE		
38.0			
279.5			
39.7	END OF SAMPLING AUGERED TO 39.0 FT.		



INSTALLATION NOTES (CONTINUED ON NEXT PAGE)  
 WELL DEVELOPMENT NOTES  
 DATE DEVELOPED: 4-30-86 TO 6-12-86  
 DEVELOPMENT METHOD: AIR LIFT  
 VOLUME PURGED: 62.6 GAL.  
 FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.  
 NOTE: A 0.5 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECT. 2, 5, AND 10 FT. SECT. SECTIONS ARE ACTUALLY 2.95, 5.325, 10.325 FT. IN LENGTH, RESPECTIVELY.

**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		BW-1D
Job No. 853-3051	Made by FWS	Date 4-30-86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

GROUT 35 LBS BENTONITE / 25 GAL. H<sub>2</sub>O; 2<sup>ND</sup> BATCH 15 LBS. BENTONITE / 13 GAL. H<sub>2</sub>O; FILLED TO GROUND SURFACE; REMOVED 6" CASING; GROUT AT 4.0 FT. BELOW GROUND SURFACE; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8"  $\phi$  ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF PROTECTIVE CASING WITH # 4-Q SAND; WEED HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PLACED AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEED HOLES WERE PUT IN CASING; A WELL WIZARD WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

# Boring Log

NYSDEC OHMS Document No. 201409232-00043

JOB NO. <u>853-3051</u>	GA. INSP. <u>T-WS</u>	PROJECT <u>CWM/WELLS/MODEL CITY</u>	BORING NO. <u>BW-15</u>
DEPTH HOLE <u>16.0 FT</u>	DEPTH WL. <u>5.81 FT</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS - 4 1/4" ID</u>	SHEET <u>1</u> OF <u>1</u>
TEMP <u>70° F</u>	TIME WL. <u>9-22-86</u>	DRILLING COMPANY <u>EMPRE SOILS INVESTIGATIONS, INC.</u>	SURFACE ELEV. <u>319.4 FT.</u>
WEATHER <u>CLOUDY / MILD</u>	DRILL RIG <u>ACKER AD-2</u>	DRILLER <u>J. GENOVESE</u>	DATUM <u>MSL</u>
COORDINATES <u>N 793.39 E 8045.29</u>	WT. SAMPLER HAMMER <u>140 LBS</u>	DROP <u>30 IN.</u>	STARTED <u>3 40 / 4 30</u>
LOCATION <u>4 FT. WEST OF BW-1D</u>	WT. CASING HAMMER <u>300 LBS</u>	DROP <u>30 IN.</u>	COMPLETED <u>4 17 / 4 15</u>

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES				REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC./ATT	
319.4 0.0	GROUND SURFACE							GROUND SURFACE
305.4 14.0 303.4 16.0	FOR COMPLETE SOILS DESCRIPTION AT THIS LOCATION SEE BORING LOG BW-1D							AUGERED TO 14.0 FT. NO SAMPLING  CUTTINGS BROWN CLAYEY SILT  MOIST AT 10.5 FT.
	SOFT, BROWN GRAY, CLAY, LITTLE SILT, LITTLE FINE SAND, STICKY, PLASTIC.	CH	6	1	DO	3-2-4-6	24/24	GLACIOLACUSTRINE CLAY
	END OF SAMPLING AUGERED TO 14.0 FT.							END OF SAMPLING  INSTALLED BW-15 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

JOB NO. <u>853-3051</u>	<b>Golder Associates</b>	CHECKED <u>DJM</u>
SCALE <u>1 INCH = 5 FEET</u>		DATE DRAWN <u>11/25/86</u>

**MONITORING WELL INSTALLATION LOG**

JOB NO. 853-3051 PROJECT CWMA / WELLS / MOORE CITY WELL NO. BW-15 SHEET 1 OF 2  
 GA INSP. FWS DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" I.D. GROUND ELEV 319.4 FT. WATER DEPTH 5.81 FT.  
 WEATHER SUNNY DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. COLLAR ELEV 321.46 FT. DATE/TIME 9-22-86  
 TEMP. 79°F DRILL RIG ACKER AD-2 DRILLER J. GENOVESE STARTED 3:40 4:30 86 COMPLETED 4:35 4:30 86  
 LOCATION/COORDINATES 4.5 FT. WEST BW-10 / N 7793.39 E 8045.29 TIME / DATE

**MATERIALS INVENTORY**

WELL CASING 2.0 W. #10 B.0 W. #11 WELL SCREEN 2.0 W. #10 7.9 W. #11 BENTONITE SEAL PELLETS 4.0' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD THROUGH AUGERS  
 JOINT TYPE RUSH TIGHTEN VITON O-RINGS SLOT SIZE 0.006 INCH FILTER PACK QTY B.O.L.F.  
 GROUT QUANTITY NA CENTRALIZERS NONE FILTER PACK TYPE #1-Q SAND  
 GROUT TYPE NA DRILLING MUD TYPE NONE INSTALLATION METHOD THROUGH AUGERS

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
319.2	GROUND SURFACE	<p>WELL SKETCH</p> <p>WELL CASING 2.3 FT. STICKUP</p> <p>8" ALUMINUM CASING WITH LOCK 3.4 FT. STICKUP</p> <p>#4-Q SAND</p> <p>CEMENT GROUT</p> <p>1/2" BENTONITE PELLET SEAL</p> <p>2" TYPE 304 S.S. RISER PIPE</p> <p>#1-Q SAND</p> <p>2" TYPE 304 S.S. SCREEN</p> <p>NOV. 8" BORE HOLE</p> <p>1.7'</p> <p>5.7' 6.0'</p> <p>3.6' 14.0'</p> <p>16.0'</p>	<p>AUGERED TO 14.0 FT.; ADDED #1-Q SAND TO 13.6 FT.</p> <p>BELOW GROUND SURFACE; INSTALLED WELL PIPE</p> <p>(1-2' SCREEN, 1-7' SCREEN, 1-3' RISER, 1-5' RISER)</p> <p>2.3 FT. STICKUP; ADDED BENTONITE PELLETS TO 1.7 FT. BELOW GROUND SURFACE; REMOVED AUGERS</p> <p>MIXED CEMENT GROUT; FILLED TO GROUND SURFACE.</p> <p>PUT ON 8" ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF PROTECTIVE CASING WITH #4-Q SAND; WEEP HOLES WERE PUT IN PROTECTIVE CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEEP HOLES WERE PUT IN CASING;</p> <p>(CONTINUED ON NEXT PAGE)</p> <p><b>WELL DEVELOPMENT NOTES</b></p> <p>DATE DEVELOPED: 5-1-86 TO 6-12-86</p> <p>DEVELOPMENT METHOD: AIR LIFT</p> <p>VOLUME PURGED: 14.6 GAL.</p> <p>FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.</p> <p>NOTE: A 0.8 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2.5, AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY.</p>	
0.0	TOPSOIL AND FILL			
315.2	UPPER CLAY TILL			
4.0	GLACIOLACUSTRINE CLAY			
303.4	END OF SAMPLING			



**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		BW-15
Job No. 853-3051	Made by FWS	Date 4-30-86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

A DEDICATED STAINLESS STEEL BAILER WAS INSTALLED  
SUBSEQUENT TO DEVELOPMENT.

### Boring Log

JOB NO. <u>853-3051</u>	QA. INSP. <u>GR</u>	PROJECT <u>CWM/WELLS/MOORE CITY</u>	BORING NO. <u>BW-2D</u>
DEPTH HOLE <u>43.0 FT</u>	DEPTH WL. <u>6.10 FT</u>	DRILLING METHOD <u>HOLLOW STEM AUGER 4 1/2" ID</u>	SHEET <u>1</u> OF <u>1</u>
TEMP <u>57° F</u>	TIME WL. <u>9-22-86</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS, INC</u>	SURFACE ELEV. <u>320.8 FT</u>
WEATHER <u>CLEAR/WARM</u>	DRILL RIG <u>CME 45</u>	DRILLER <u>R. KEPHART</u>	DATUM <u>MSL</u>
COORDINATES <u>N 7720.60 E 11220.67</u>	WT. SAMPLER HAMMER <u>140 LBS</u>	DROP <u>30 IN.</u>	STARTED <u>9:30/4-24-86</u>
LOCATION <u>~4.5 FT. WEST OF BW-23</u>	WT. CASING HAMMER <u>300 LBS</u>	DROP <u>30 IN.</u>	COMPLETED <u>4:03/4-24-86</u>

ELEV. DEPTH (FT.)	DESCRIPTION	UNIFIED CLASS.	BLOWS/FOOT	SAMPLES			REMARKS	
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.		
320.8	GROUND SURFACE						GROUND SURFACE	
0.0	SOFT TO FIRM, BROWN, TURNING STIFF BROWN MOTTLED, CLAYEY SILT, SOME C-F SAND, LITTLE GRAVEL.	CL	17	1	DO	2-7-10-8	10/24	TOP SOIL AND FILL
316.8			18	2	DO	7-9-9-18	2/24	HARD, BLACK ASPHALT IN SPOON MOUTH AT 2.0 FT
4.0	FIRM TO VERY STIFF, BROWN MOTTLED, SILTY CLAY, SOME M-F SAND, GRAY WEATHERING AND COLOR BANDING ALONG VERTICAL FRACTURES AND JOINTS, GRAY SHALEY LIMESTONE CLASTS, OCCASIONAL SAND LENSE TOWARDS BOTTOM.	CL	25	3	DO	4-11-14-21	23/24	UPPER CLAY TILL
			73	4	DO	17-31-42-32	22/24	M-F SAND LENSES AT 6.2 AND 6.6 FT. GRAY SHALEY LIMESTONE FRAGMENT 6.3 FT
312.8			102	5	DO	8-41-61-70	22/24	UPPER SILT TILL
8.0	DENSE TO VERY DENSE, BROWN, SILT, SOME C-F SAND, SLIGHTLY DILATANT, CLASTS AS RED BROWN SHALE AND GRAY SHALEY LIMESTONE FRAGMENTS, OCCASIONAL LAYERS OF CLAYEY SILT AND SILTY CLAY.	ML	93	7	DO	21-45-48-53	22/24	FROM 9.5 TO 9.8 FT SILTY CLAY INTERLAYERED WITH SILT AND F SAND LAYERS
			57	8	DO	33-35-22-15	22/24	FROM 12.0 TO 12.5 FT, CLAYEY SILT LAYER
14.0	SOFT TO VERY SOFT, GRAY, CLAY TO SILTY CLAY, LITTLE TO TRACE M-F SAND, STICKY PLASTIC.	CH TO CL	12	10	DO	WH-8-4-3	24/24	GLACIOLACUSTRINE CLAY
			5	11	DO	2-3-2-2	20/24	FINE SAND AND SILT LENSE AT 15.0 FT.
			0	12	DO	WR-WR-WH-2	24/24	
			0	13	DO	WR-WR-WH-WH	0/24	
			5	14	DO	2-2-3-2	24/24	
			0	15	DO	WH-WH-WH-3	24/24	
			5	16	DO	3-2-3-3	24/24	
			0	17	DO	WH-WH-WH-1	24/24	
			0	18	DO	WH-WH-WH-WH	24/24	
			2	19	DO	WH-WH-2-2	24/24	
288.0	VERY LOOSE, BROWN GRAY SILT INTERLAYERED WITH VERY LOOSE CLAY, M-F SAND AND SOFT, GRAY, SILTY CLAY, GRADING TO COMPACT, BROWN TO RED BROWN, SILT, AND F SAND, LITTLE C-M SAND, TRACE CLAY, WET DILATANT.	ML	5	22	DO	WH-2-3-3	18/24	GLACIOLACUSTRINE SILT/SAND
32.8			14	23	DO	6-6-8-11	8/24	
			100	24	DO	WH-50-50-60	20/24	
281.9	VERY DENSE, RED BROWN, SILT AND C-F SAND, LITTLE F GRAVEL, DRY FRIABLE, CLASTS AS RED BROWN SHALE AND GRAY LIMESTONE.	ML	106	26	DO	10-49-57-62	13/24	BASAL RED TILL
38.9			7100	27	DO	50-100/4	8.5/11	
277.9	END OF SAMPLING AUGERED TO 43.0 FT.							END OF SAMPLING
42.9								INSTALLED BW-2D SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

**MONITORING WELL INSTALLATION LOG**

JOB NO. 853-3051 PROJECT CWM/WELLS/ MODEL CITY WELL NO. BW-20 SHEET 1 OF 2  
 SA INSP. GR DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID GROUND ELEV. 320.8 WATER DEPTH 6.10 FT.  
 WEATHER CLEAR DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS COLLAR ELEV. 322.67 DATE/TIME 9-22-86  
 TEMP 78° F DRILL RIG CME 43 DRILLER R. KEPHART STARTED 1:15 4-29-86 COMPLETED 2:30 4-30-86  
 LOCATION/COORDINATES 50 FT. WEST OF BW-25 / N 7720 60 E 11220 67

**MATERIALS INVENTORY**

WELL CASING 2.0 W. DIA. 30.0 W. WELL SCREEN 2.0 W. DIA. 4.9 BENTONITE SEAL PELLETS 4.2' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD THROUGH 6" CASING  
 JOINT TYPE FLUSH TEPLOM VITON O-RINGS SLOT SIZE 0.006 INCH FILTER PACK QTY 84 L.F.  
 GROUT QUANTITY 50 GAL. H2O CENTRALIZERS NONE FILTER PACK TYPE #1-Q SAND  
 GROUT TYPE BENTONITE DRILLING MUD TYPE NONE INSTALLATION METHOD THROUGH 6" CASING

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
320.8	GROUND SURFACE		AUGERED TO 43.0 FT. BELOW GROUND SURFACE; JULLED UP AUGERS; INSTALLED 6" Ø TEMPORARY STEEL CASING; WASHED OUT - OPEN TO 42.5 FT.; ADDED #1-Q SAND TO 41.0 FT. BELOW GROUND SURFACE (TOK SAMPLE); INSTALLED WELL PIPE (2-2' SCREENS, 1-3' RISER 1-5' RISER; 3-10' RISERS) (1.9 FT. STICKUP); ADDED #1-Q SAND TO 34.1 FT.; ADDED PELLETS TO 29.9 FT.; ADDED #4-Q SAND TO 29.1 FT.; MIXED GROUT 71 LBS BENTONITE/50 GAL. H2O; FILLED TO GROUND SURFACE; REMOVED 6" Ø CASING; GROUT TO 1.5 FT. BELOW GROUND SURFACE; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8" Ø ALUMINUM
0.0	TOPSOIL AND FILL SOFT TO FIRM, BROWN TUEANG STIFF, BROWN, MOTTLED CLAYEY SILT SOME C-F SAND, LITTLE REDDISH HARD, BLACK ASPHALT IN BROWN MOUTH AT 2.0 FT.		
316.8	4.0 UPPER CLAY TILL FIRM TO VERY STIFF, BROWN MOTTLED SILTY CLAY, SOME M-F SAND WITH WEATHERING AND COARSE SANDS ALONG VERTICAL FRACTURES AND JOINTS, SAND SHALEN LIMESTONE CLASTS, OCCASIONAL SAND LENS LENSSES AT 6.2 AND 6.6 FT. WITH SHALEN LIMESTONE FRAGMENT AT 6.3 FT.		
312.8	8.0 UPPER SILT TILL DENSE TO VERY DENSE, BROWN SILT, SOME C-F SAND, SLIGHTLY PLASTIC, CLASTS AS RED BROWN SHALE AND GRAY SHALEN LIMESTONE FRAGMENTS, OCCASIONAL LAYERS OF CLAYEY SILT AND SILTY CLAY, FROM 9.5 TO 9.8 SILTY CLAY (NEAR) LAYERS WITH SILT AND F SAND LAYERS FROM 12.0 - 12.8 FT. CLAYEY SILT LAYER		
306.8	14.0 GLACIOLACUSTRINE CLAY SOFT TO VERY SOFT, GRAY CLAY TO SILTY CLAY, LITTLE TO TRACE M-F SAND, STYCH RAGGIC FINE SAND AND SILT LENSSES AT 15.0 FT.		
288.0	32.8 GLACIOLACUSTRINE SILT/SAND VERY LOOSE, BROWN GRAY SILT, INTERLAYERED WITH VERY LOOSE, GRAY SILT/SAND AND SOFT, GRAY SILTY CLAY, GRAY TO GRAY, BROWN TO RED BROWN SILT, AND F SAND, LITTLE C-M SAND, TRACE CLAY WET, PLASTIC		
281.9	38.9 BASAL RED TILL VERY DENSE, RED BROWN SILT, AND C-F SAND, LITTLE F SAND, DEN. FRAGILE, CLASTS AS RED BROWN SHALE AND GRAY LIMESTONE		
277.9	42.9 END OF SAMPLING AUGERED TO 43.0 FT.		

(CONTINUED ON NEXT PAGE)  
**WELL DEVELOPMENT NOTES**  
 DATE DEVELOPED: 4-30-86  
 TO 6-11-86  
 DEVELOPMENT METHOD: AIR LIFT  
 VOLUME PURGED: 33.7 GAL.  
 FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.  
 NOTE: A 0.9 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION 2, 9, AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.39, 9.325, 10.325 FT IN LENGTH, RESPECTIVELY.

**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		BW-2D
Job No. 853-3051	Made by GR	Date 4.30.86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

PROTECTIVE CASING; FILLED INTERIOR OF PROTECTIVE CASING WITH #4-0 SAND; WEEP HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEEP HOLES WERE PUT IN CASING; A WELL WIZARD WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

Blank lined area for additional notes or drawings.

# Boring Log

NYSDEC OHMS Document No. 201409232-00043

JOB NO. <u>853-3051</u>	GA. INSP. <u>G.R.</u>	PROJECT <u>CWM/WELLS/MODEL CITY</u>	BORING NO. <u>BW-25</u>
DEPTH HOLE <u>16.0 FT.</u>	DEPTH WL. <u>2.11 FT.</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS - 4 1/4" ID</u>	SHEET <u>1</u> OF <u>1</u>
TEMP <u>44° F</u>	TIME WL. <u>9-22-86</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS, INC.</u>	SURFACE ELEV. <u>320.6 FT</u>
WEATHER <u>WINDY/COOL</u>	DRILL RIG <u>CME 45</u>	DRILLER <u>R. KEPHART</u>	DATUM <u>MSL</u>
COORDINATES <u>N 7719.45 E 11225.75</u>	WT. SAMPLER HAMMER <u>140 LBS.</u>	DROP <u>30 IN.</u>	STARTED <u>11/6/86</u>
LOCATION <u>4.5 FT. EAST OF BW-2D</u>	WT. CASING HAMMER <u>300 LBS.</u>	DROP <u>30 IN.</u>	COMPLETED <u>10 58/5</u>

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOW/FOOT	SAMPLES			REMARKS	
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC./ATT		
320.6 0.0	GROUND SURFACE						GROUND SURFACE	
	FOR COMPLETE SOILS DESCRIPTION AT THIS LOCATION SEE BORING LOG BW2D						AUGERED TO 14.0 FT NO SAMPLING	
306.6 14.0	VERY SOFT BROWN GRAY SILTY CLAY TO CLAY, LITTLE F SAND, STICKY, VERY PLASTIC.	CH	5	1	DO	1-2-3-3	24/24	GLACIOLACUSTRINE CLAY
304.6 16.0	END OF SAMPLING AUGERED TO 15.5 FT.							END OF SAMPLING
								INSTALLED BW-25 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

JOB NO. <u>853-3051</u>	<b>Golder Associates</b>	CHECKED <u>DJM</u>
SCALE <u>1 INCH = 5 FEET</u>		DATE DRAWN <u>11/25/86</u>

NYSDEC OHMS Document No. 201469239-00043  
**MONITORING WELL INSTALLATION LOG**

JOB NO. 853-3051 PROJECT CWM / WELLS / MODEL CITY WELL NO. BW-25 SHEET 1 OF 1  
 GA INSP. GR DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID GROUND ELEV. 320.6 FT WATER DEPTH 2.11 FT  
 WEATHER CLOUDY DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS INC. COLLAR ELEV. 322.20 FT DATE/TIME 9-22-86  
 TEMP. 60° F DRILLING CME 48 DRILLER R. KEPHART STARTED 11:00 5-5-86 COMPLETED 12:10 5-5-86  
 LOCATION/COORDINATES 50 FT. EAST OF BW-20 / N 7719.45; E 11225.75 TIME / DATE

**MATERIALS INVENTORY**

WELL CASING 2 IN. DIA. 8 WELL SCREEN 2 IN. DIA. 7.9 BENTONITE SEAL PELLETS 4.3' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD THROUGH AUGERS  
 JOINT TYPE THREADED TAPS, O-RINGS SLOT SIZE 0.006 INCH FILTER PACK QTY 10 Z L.F., 275 LBS.  
 GROUT QUANTITY NA CENTRALIZERS NONE FILTER PACK TYPE #1-Q SAND  
 GROUT TYPE NA DRILLING MUD TYPE NONE INSTALLATION METHOD THROUGH AUGERS

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
320.6	NOTE: FOR COMPLETE SOIL DESCRIPTIONS, SEE BORING LOG BW-25 GROUND SURFACE		AUGERED TO 15.5 FT, ADDED #1-Q SAND TO 14.3 FT BELOW GROUND SURFACE; INSTALLED WELL PIPE (1-2' SCREEN, 1-5' SCREEN, 1-3' RISER, 1-5' RISER 1.6 FT. STICKUP; ADDED #1-Q SAND TO 5.3 FT. BELOW GROUND SURFACE (TOOK SAMPLE); ADDED PELLETS TO 1.0 FT.; REMOVED AUGERS; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8" Ø PROTECTIVE CASING; FILLED INTERIOR OF CASING WITH #4-Q SAND; WEEP HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PLACED AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEEP HOLES WERE PUT IN CASING; A DEDICATED STAINLESS STEEL BAILER WAS INSTALLED	
0.0	TOPSOIL AND FILL SOFT TO FIRM, BROWN TURNING STIFF BROWN, MOTTLED SANDY SILT, SOME C-F SAND, LITTLE GRAVEL; MASS SHALE APPARENT IN UPPER PORTION AT 3.0 FT.			
316.6	4.0 UPPER CLAY TILL FIRM TO VERY STIFF, BROWN MOTTLED SILTY CLAY, SOME M-F SAND, GREEN WEATHERING AND LOOSE BANDING ALONG VERTICAL FRACTURES AND JOINTS; BEAN SHALLEN Limestone CLASTS, OCCASIONAL SAND LENSES TOWARD BOTTOM, M-F SAND LENSES AT 6.2 AND 6.6 FT. BEAN SHALLEN Limestone REMAINS 6.8 FT.			
312.6	8.0 UPPER SILT TILL DENSE TO VERY DENSE, BROWN SILTY, SOME C-F SAND, SLIGHTLY CLASTIC, CLASTS AS RED BROWN SHALE AND BEAN SHALLEN Limestone FRAGMENTS, OCCASIONAL LENSES OF CLAYEN SILT AND SILTY CLAY FROM 9.5 - 9.8 FT. SILTY CLAY INTERLAYERED WITH SILT AND F SAND LENSES FROM 12.0 - 12.5 FT. CLAYEN SILT LAYER.			
306.6	14.0 GLACIOLACUSTRINE CLAY VERY SOFT, BROWN BEAN SILTY CLAY, LITTLE F SAND, SILTY VERY PLASTIC			
304.6	16.0 END OF SAMPLING AUGERED TO 15.5 FT.			
			<b>WELL DEVELOPMENT NOTES</b> DATE DEVELOPED: 5-7-86 TO 6-11-86 DEVELOPMENT METHOD: AIR LIFT VOLUME PURGED: 15 Z GAL  FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.  NOTE: A 0.5 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION 2, 5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY	

**Boring Log**

JOB NO. 853-3051 GA. INSP. FWS PROJECT CWM/WELLS/MODEL CITY BORING NO. BW-30  
 DEPTH HOLE 50.3 FT DEPTH WL. 520 FT. DRILLING METHOD HOLLOW STEM AUGERS-4 1/2 ID SHEET 1 OF 1  
 TEMP 55°-60° F TIME WL. 9-22-86 DRILLING COMPANY EMPRE SOILS INVESTIGATIONS, INC SURFACE ELEV. 319.8 FT  
 WEATHER CLOUDY/COOL DRILL RIG ACKER AD-2 DRILLER J. GENOVESE DATUM M.S.L.  
 COORDINATES N 78 74.97 E 126 77.77 WT. SAMPLER HAMMER 140 LBS DROP 30 IN STARTED 2:20 / 15:18  
 LOCATION ~ 3 FT. EAST OF BW-35 WT. CASING HAMMER 300 LBS DROP 30 IN COMPLETED 11:10 / 15:20

ELEV. DEPTH (FT.)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES			REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC./ATT	
319.8	GROUND SURFACE						GROUND SURFACE
0.0							TOP SOIL AND FILL
315.8	FIRM, MED BROWN TO DARK BROWN, CLAYEY SILT TO SILTY CLAY, SOME M-F SAND.	CL	8	1 DO	3-4-4-6	3/24	ROOT, TWIGS AND ORGANIC MATTER TO 3.0 FT. 3 IN. FIRM DARK BROWN LAYER AT 9.0 FT.
4.0	COMPACT, TAN BROWN C-F SAND AND B GRAVEL, LITTLE SILT. STRATIFIED WITH LENSES OF SILT AND F SAND.	SM	20	2A DO	7-8-12-14	14/24	
313.5			19	3 DO	16-9-10-14	12/24	UPPER ALLUVIUM
6.3	STIFF, GRAY BROWN MOTTLED, SILTY CLAY, SOME C-F SAND.	CL	34	4 DO	22-16-18-14	6/24	UPPER CLAY TILL
311.8			6	5 DO	3-3-3-3	7/24	GLACIOLACUSTRINE CLAY
8.0	SOFT TO VERY SOFT, GRAY TO GRAY BROWN, CLAY TO SILTY CLAY, SOME TO LITTLE M-F SAND.	CL TO CH	3	6 DO	WH-1-2-2	17/24	
			4	7 DO	1-2-2-2	24/24	
			5	8 DO	1-2-3-4	13/24	
			12	9 DO	4-7-5-5	13/24	
			9	10 DO	4-7-2-2	14/24	
			0	11 DO	WR-WR-WH-2	24/24	
			2	12 DO	4-1-1-7	24/24	
			3	13 DO	1-1-2-2	24/24	
			7	14 DO	3-3-4-4	23/24	
			2	15 DO	WR-WH-2-3	17/24	FIRM GRAY BROWN CLAYEY SILT SOME C SAND. SOME F GRAVEL BETWEEN 16.0 FT. AND 17.0 FT.
			2	16 DO	WR-WR-2-2	20/24	1 INCH GRAY M-F SAND LENSE AT 20.9 FT.
			5	17 DO	2-2-3-3	24/24	
			5	18 DO	WR-WR-5-3	24/24	
282.7			18	19 DO	2-7-11-8	15/24	
37.1	COMPACT, RED BROWN, F SAND, SOME SILT, TO COMPACT, MULTI COLORED, F-M SAND, SOME TO LITTLE SILT OR SILTY CLAY, TRACE F GRAVEL (SATURATED).	SM	24	20 DO	11-13-11	12/18	GLACIOLACUSTRINE SILT/SAND
			29	21 DO	4-12-17	7/18	AUGERED TO 40.0 FT, NO SAMPLING
			55	22 DO	23-2-2-23	16/18	AUGERED TO 44.0 FT, NO SAMPLING
275.8			60	23 DO	24-30-30-24	16/24	BASAL RED TILL
44.0	VERY DENSE, RED BROWN, C-F SAND, SOME TO LITTLE SILT, SOME GRAVEL, TO SILT, SOME C-F SAND, SOME GRAVEL, CLASTS AS RED BROWN SHALE AND GREEN GRAY LIMESTONE.	SM TO ML	29	24 DO	24-12-17-12	15/24	
270.3			92	25 DO	4-17-75-100		
49.5	HARD, RED BROWN, HIGHLY WEATHERED SHALE.		100	26 DO	100/13		BEDROCK-QUEENSTON FORMATION AUGERED TO 50.0 FT. NO SAMPLING
269.5							END OF SAMPLING
50.3	END OF SAMPLING AUGERED TO 50.0 FT.						* NOTE: 300 LB HAMMER WAS USED INSTALLED BW-30. SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG

**MONITORING WELL INSTALLATION LOG**

JOB NO. 853-3081 PROJECT CWA / WELLS / MODEL CITY WELL NO. BW-3D SHEET 1 OF 2  
 SA INSP. FWS DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" I.D. GROUND ELEV. 319.8 FT WATER DEPTH 5.20 FT.  
 WEATHER 2 CLOUD DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS INC. COLLAR ELEV. 320.99 FT. DATE/TIME 9-22-86  
 TEMP. 40°F DRILL RIG ACKER AD-2 DRILLER GENOVESE STARTED 11:10 TIME / DATE 5-2-86 COMPLETED 4:00 55 86  
 LOCATION/COORDINATES 40 FT. NORTH OF DW-35 / N 7874.97' E 12677.77

**MATERIALS INVENTORY**

WELL CASING 2.0 W. dia. 40.0 W. WELL SCREEN 2.0 W. dia. 10.6 BENTONITE SEAL PELLETS 40' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD THROUGH 6" CASING  
 JOINT TYPE FLUSH TEFLO VITON SLOT SIZE 0.006 INCH FILTER PACK QTY 13.3 L.F.  
 GROUT QUANTITY 50 GAL. CENTRALIZERS NONE FILTER PACK TYPE #1-0 SAND  
 GROUT TYPE BENTONITE GROUT DRILLING MUD TYPE NONE INSTALLATION METHOD THROUGH 6" CASING

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
(FT.)	NOTE: FOR COMPLETE SOIL DESCRIPTIONS, SEE BORING LOGS BW-3D		
319.8	GROUND SURFACE		AUGERED TO 50.0 FT.; REMOVED AUGERS; INSTALLED 6" Ø TEMPORARY STEEL CASING; CASING HAD TO BE DRIVEN 47.0 FT. TO 50.0 FT.; WASHED OUT CASING - OPEN TO 50.0 FT.; ADDED #4-Ø SAND TO 49.0 FT. (TOOK SAMPLE); INSTALLED WELL PIPE (1-10' SCREEN, 4-10' RISERS) 12 FT. STICKUP; TREATED (WITH WATER); #1-Ø SAND TO 36.7 FT. BELOW GROUND SURFACE (DRY SAMPLE TAKEN); ADDED PELLETS TO 32.7 FT.
0.0	TOPSOIL AND FILL FIRM, MEDIUM BROWN TO DARK BROWN SILTY CLAY TO SILTY CLAY; SOME M-F SAND; 3 INCH FIRM DARK BROWN LAYER AT 8.0 FT.		MIXED GROUT - 1 <sup>ST</sup> BATCH 40 LBS BENTONITE / 25 GAL H <sub>2</sub> O, 2 <sup>ND</sup> BATCH 42 LBS BENTONITE / 25 GAL H <sub>2</sub> O; FILLED TO 2.0 FT BELOW GROUND SURFACE; REMOVED 6" CASING; MIXED CEMENT GROUT; FILLED TO GROUND
315.8	4.0 UPPER ALLUVIUM COMPACT, TAN BROWN C-F SAND AND GRAVEL; LITTLE SILT; STRATIFIED WITH LENSES OF SILT AND F SAND		
313.5	6.3 UPPER CLAY TILL STIFF, DARK BROWN, MOTTLED SILTY CLAY; SOME C-F SAND		
311.8	8.0 GLACIOLACUSTRINE CLAY SOFT TO VERY SOFT, GRAY CLAY TO SILTY CLAY; SOME TO LITTLE M-F SAND.		
	FIRM, MEDIUM BROWN SILTY CLAY; SOME C SAND; SOME F GRAVEL; BETWEEN 11.0 - 17.0 FT.		
	1 INCH GRAY M-F SAND LENS AT 30.9 FT.		
		WELL CASING 1.5 FT. STICKUP 6" Ø ALUMINUM CASING WITH LOCK 1.9 FT. STICKUP #4-Ø SAND CEMENT GROUT BENTONITE GROUT 2" Ø TUBE 304 S.S. RISE PIPE DRIVEN 6" Ø TEMPORARY CASING HOLE 3/8" Ø BENTONITE PELLET SEAL #1-Ø SAND 2" Ø TUBE 304 S.S. SCREEN #4-Ø SAND	
282.7	37.1 GLACIOLACUSTRINE SILT/SAND COMPACT, RED BROWN F SAND; SOME SILT; TO LOOSELY MULTICOLORED F-M SAND; SOME TO LITTLE SILT OR SILTY CLAY; TRACES F GRAVEL (SPHERICAL)		(CONTINUED ON NEXT PAGE) WELL DEVELOPMENT NOTES DATE DEVELOPED: 5-7-86 TO 6-10-86 DEVELOPMENT METHOD: AIR LIFT VOLUME PURGED: 49.3 GAL. FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE
275.8	44.0 BASAL RED TILL VERY DENSE, RED BROWN C-F SAND; SOME TO LITTLE SILT; SOME GRAVEL TO SILT; SOME C-F SAND; SOME GRAVEL; CLASTS AS RED BROWN SHALE AND GREEN GRAY Limestones		
270.3	49.5 BEDROCK - QUEENSTON FORMATION HARD, RED BROWN, HEAVY WEATHERED SHALE		
269.5	50.3 END OF SAMPLING AUGERED TO 50.0 FT.		



**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		BW-3D
Job No. 853-3051	Made by FWS	Date 5.5.86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

SURFACE PUT ON 8"  $\phi$  ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF PROTECTIVE CASING WITH #4-0 SAND; WEEP HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEEP HOLES WERE PUT IN CASING; A WELL WIZARD WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

# Boring Log

JOB NO. 853-3051 GA. INSP. FWS PROJECT CWM/WELLS/MODEL CITY BORING NO. BW-35  
 DEPTH HOLE 12.0 FT DEPTH WL. 1.68 FT. DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID SHEET 1 OF 1  
 TEMP 45° F TIME WL. 6-10-86 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. SURFACE ELEV. 319.4 FT  
 WEATHER CLOUDY/COOL DRILL RIG ACKER AD-2 DRILLER J. GENOVESE DATUM MSL  
 COORDINATES N 7870.92 E 12674.59 WT. SAMPLER HAMMER 140 LBS. DROP 30 IN STARTED 8:30 / 5-6-86  
 LOCATION 23 FT. WEST OF BW-3D WT. CASING HAMMER 300 LBS. DROP 30 IN COMPLETED 9:00 / 5-6-86

ELEV. DEPTH (FT.)	DESCRIPTION	UNIFIED CLASS.	BLOWS/FOOT	SAMPLES			REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC./ATT	
319.4 0.0	GROUND SURFACE						GROUND SURFACE
309.4 10.0	FOR COMPLETE SOILS DESCRIPTION AT THIS LOCATION, SEE BORING LOG BW-3D						AUGERED TO 100 FT. NO SAMPLING
307.4 12.0	VERY SOFT, BROWN GRAY, SILTY CLAY TO CLAY, LITTLE F SAND.	CH	2	1	DO	1-1-1-2	GLAUCOLACUSTRINE CLAY
	END OF SAMPLING AUGERED TO 10.0 FT.						END OF SAMPLING  INSTALLED BW-35 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

# MONITORING WELL INSTALLATION LOG

JOB NO. <u>B53-3051</u>	PROJECT <u>CWM / WELLS / MODEL CITY</u>	WELL NO. <u>BW-35</u>	SHEET <u>1</u> OF <u>1</u>
GA INSP. <u>FWS</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS - 4 1/4" ID</u>	GROUND ELEV. <u>319.4 FT.</u>	WATER DEPTH <u>1.68 FT.</u>
WEATHER <u>CLOUDY</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS, INC.</u>	COLLAR ELEV. <u>322.95 FT.</u>	DATE/TIME <u>9-22-86</u>
TEMP. <u>45° F</u>	DRILL RIG <u>ACKER AD-2</u>	DRILLER <u>J. GENOVESE</u>	STARTED <u>9:05</u> / <u>9:06</u>
LOCATION/COORDINATES <u>4.0 FT. SOUTH OF BW-30 / N 7870 92, E 12674 59</u>		COMPLETED <u>9:18</u> / <u>9:40</u>	TIME / DATE

### MATERIALS INVENTORY

WELL CASING <u>2.0</u> IN DIA. <u>8.0</u> FT.	WELL SCREEN <u>2.0</u> IN DIA. <u>8.6</u> FT.	BENTONITE SEAL <u>PELLETS 2.5' DEEP</u>
CASING TYPE <u>304 STAINLESS STEEL</u>	SCREEN TYPE <u>304 STAINLESS STEEL</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>
JOINT TYPE <u>THREADED TAPE, O-RINGS</u>	SLOT SIZE <u>0.006 INCH</u>	FILTER PACK QTY. <u>6 S.F.</u>
GROUT QUANTITY <u>NA</u>	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1-Q SAND</u>
GROUT TYPE <u>NA</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
319.4	GROUND SURFACE	<p style="font-size: small;">WELL SKETCH 8" Ø ALUMINUM CASING WITH LOCK 4.2 FT. STICKUP #4-Q SAND CEMENT GROUT 2 1/2" Ø BENTONITE PELLET SEAL 2" Ø TYPE 304 SS RISER PIPE #1-Q SAND 2" Ø TYPE 304 SS SCREEN WELL CASING 3.6 FT. STICKUP NOM 8" Ø BOREHOLE 12.0</p>	AUGERED TO 10.0 FT.; INSTALLED WELL PIPE (1-5' SCREEN, 1-3' RISER; 1-5' RISER) 3.6 FT. STICKUP; ADDED
0.0	TOPSOIL AND FILL FIRM, MEDIUM BROWN TO DARK BROWN CLAYEY SILT TO SILTY CLAY, SOME M-F SAND; SLICK FROM DARK BROWN LAYER AT 3.0 FT.		#1-Q SAND TO 3.5 FT. BELOW GROUND SURFACE (SAMPLE TAKEN); ADDED PELLETS TO 1.0 FT.; REMOVED AUGERS;
315.4	UPPER ALLUVIUM COMPACT, TAN BROWN C-F SAND, AND F SILTY CLAY, LITTLE SILT, STRATIFIED WITH LENSES OF SILT AND F SAND		MIXED CEMENT GROUT; FILED TO GROUND SURFACE;
4.0	UPPER CLAY TILL STIFF, BROWN BROWN, MOTTLED SILTY CLAY, SOME C-F SAND		PUT ON 8" Ø ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF CASING WITH #4-Q SAND; WEEP HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEEP HOLES WERE PUT IN CASING; A DEDICATED STAINLESS BAILER WAS INSTALLED SUBSEQUENT TO DEVELOPMENT
313.1	UPPER CLAY TILL STIFF, BROWN BROWN, MOTTLED SILTY CLAY, SOME C-F SAND		
6.3	GLACIOLACUSTRINE CLAY SOFT TO VERY SOFT, BROWN TO BROWN BROWN CLAY TO SILTY CLAY, SOME TO LITTLE M-F SAND TURNING TO VERY SOFT, BROWN BROWN SILTY CLAY, LITTLE F SAND		
311.4	GLACIOLACUSTRINE CLAY SOFT TO VERY SOFT, BROWN TO BROWN BROWN CLAY TO SILTY CLAY, SOME TO LITTLE M-F SAND TURNING TO VERY SOFT, BROWN BROWN SILTY CLAY, LITTLE F SAND		
8.0	GLACIOLACUSTRINE CLAY SOFT TO VERY SOFT, BROWN TO BROWN BROWN CLAY TO SILTY CLAY, SOME TO LITTLE M-F SAND TURNING TO VERY SOFT, BROWN BROWN SILTY CLAY, LITTLE F SAND		
307.4	END OF SAMPLING AUGERED TO 10.0 FT.		
12.0	END OF SAMPLING AUGERED TO 10.0 FT.		
			<b>WELL DEVELOPMENT NOTES</b>
			DATE DEVELOPED: <u>5-7-86</u> TO <u>6-10-86</u>
			DEVELOPMENT METHOD: <u>AIR LIFT</u>
			VOLUME PURGED: <u>78 GAL</u>
			FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.
			NOTE: A 0.9 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION 2.5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT IN LENGTH, RESPECTIVELY.

JOB NO. 853-3056 SA. INSP. NDM PROJECT CWM/BW-25 REPLACEMENT/MODEL CITY BORING NO. BW-4S  
 DEPTH HOLE 16 FT DEPTH WL. - DRILLING METHOD HOLLOW STEM AUGER 4 1/2" ID SHEET 1 OF -  
 TEMP 40° F TIME WL. - DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC SURFACE ELEV. 320.5 FT  
 WEATHER RAINY/SLEET - TURNS SUNNY DRILL RIG TRACK CME 45 DRILLER D. BEITZ DATUM MSL  
 COORDINATES N7853.9 E10253.5 WT. SAMPLER HAMMER 140 lb DROP 30 IN STARTED 1:45 P/11-5-87  
 LOCATION ALONG FENCE SOUTH OF SLF 1-6 WT. CASING HAMMER - DROP - COMPLETED 2:40 P/11-5-87

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES			REMARKS	
				NUMBER	TYPE	HAMMER BLOWS PER 8 IN. REC./ATT		
320.5	GROUND SURFACE						GROUND SURFACE	
0.0	RED, BROWN, GREY, WHITE MOTTLED FIRM TO STIFF SILTY CLAY, & TO LITTLE (DECREASES W/ DEPTH) F-C SAND, TRACE GRAVEL.	CL	6	1	DO	1-2-4-5	13/24	TOPSOIL @ SURFACE
			17	2	DO	6-9-8-12	1/24	UPPER CLAY TILL
			37	3	DO	6-15-22-28	20/24	
			59	4	DO	27-27-32-34	18/24	
			22	5	DO	3-9-13-16	16/24	
			21	6	DO	5-7-14-16	15/24	
307.5	GREY SOFT TO VERY SOFT SILTY CLAY TO CLAY, LITTLE TO TRACE FINE SAND (MOST LENSES), RED SILT LENSES.	CL	31	7	DO	11-13-18-20	24/24	GLACIO LACUSTRINE CLAY
13.0			5	8	DO	1-2-3-4	24/24	
304.5	END OF SAMPLING							END OF SAMPLING DNA HEADSPACE ANALYSIS PERFORMED 11-6-87 SHOWED NO CONTAMINATION  INSTALLED BW-4S SEE BW-4S MONITORING WELL INSTALLATION LOG.
16.0								



Boring Log

JOB NO. 853-3056 GA. INSP. WDM PROJECT ENM/BW-2S REPLACEMENT/Model City BORING NO. BW-4D  
 DEPTH HOLE 40 FT DEPTH WL. - DRILLING METHOD Hollow Stem Auger 6 1/4" & 4 1/8" ID SHEET 1 OF 1  
 TEMP 45°F / 40°F TIME WL. - DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. SURFACE ELEV. 320.6 FT  
 WEATHER CLOUDY / SUNNY DRILL RIG TRACK CME 45 DRILLER D. BEITZ DATUM MSL  
 COORDINATES N 1854.5 E 10249.2 WT. SAMPLER HAMMER 140 lb DROP 30 IN STARTED 11 20A/11-18-87  
 LOCATION ALONG FENCE SOUTH OF SLF1-6 WT. CASING HAMMER - DROP - COMPLETED 10:20A/11-19-87

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES			REMARKS		
				NUMBER	TYPE	HAMMER BLOWS PER 8 IN. REC./ATT			
320.6	GROUND SURFACE						GROUND SURFACE		
0.0	FOR COMPLETE SOILS DESCRIPTION AT THIS LOCATION SEE BORING LOG BW-4S.								
305.1	GREY SOFT TO VERY SOFT SILTY CLAY TO CLAY, TRACE TO SOME (INCREASES W/DEPTH) F-C SAND, TRACE GRAVEL. RED SILT SEAMS THROUGHOUT.	CL	14	1	DO	8-9-5-3	15/24	AUGER TO 15.5' W/ 6 1/4" ID AUGERS, TAKE 2 SAMPLES & AUGER TO 19.5' GROUT HOLE & SET 10" DIA PVC CASING. WASH OUT & CONTINUE SAMPLING @ 20.0' GLACIOLACUSTRINE CLAY  GREEN-GRAY C-F SAND LENSES @ 16.5', & 28.5'	
			12	2	DO	6-6-6-6	24/24		
				4	3	DO	1-2-2-4		24/24
				9	4	DO	4-4-5-4		24/24
				5	5	DO	2-2-3-3		24/24
				13	6	DO	4-9-4-6		24/24
				0	7	DO	WR-WN-WF-3		24/24
				8	8	DO	2-3-5-5		6/24
288.1	BROWN-RED LOOSE TO V. DENSE SILT & F-C SAND, TRACE TO LITTLE GRAVEL	SM ML	12	9	DO	6-5-7-9	24/24	GLACIOLACUSTRINE SILT/SAND	
32.5				60	10	DO	8-32-28-26		18/24
				42	11	DO	21-27-15-21		22/24
281.1	RED HARD SILT - TILL		89	12	DO	18-32-57-10	20/22	BASAL RED TILL END OF SAMPLING	
30.5 280.8 39.8									
39.8	END OF SAMPLING						INSTALLED BW-4D SEE BW-4D MONITORING WELL INSTALLATION LOG.		

**MONITORING WELL INSTALLATION LOG**

JOB NO. <u>853-3056</u>	PROJECT <u>NUM/BW-25 REPLACEMENT / NIDDEL CITY</u>	WELL NO. <u>BW-4D</u>	SHEET <u>1</u> OF <u>1</u>
GA INSP. <u>WDM</u>	DRILLING METHOD <u>Hydro Stem Auger - 6" DIA. 14" HG</u>	GROUND ELEV. <u>320.6 FT</u>	WATER DEPTH <u>-</u>
WEATHER <u>2:10 P / 11:00 P</u>	DRILLING COMPANY <u>EMPIRE SOILS INVEST, INC</u>	COLLAR ELEV. <u>323.61 FT</u>	DATE/TIME <u>-</u>
TEMP <u>7 F / 2 F</u>	DRILL RIG <u>Track ME 45</u>	DRILLER <u>D BERTZ</u>	STARTED <u>2:30 PM / 11-19-87</u>
		COMPLETED <u>9:00 A / 11-20-87</u>	

**MATERIALS INVENTORY**

WELL CASING <u>2</u> in dia. <u>3.0</u> in	WELL SCREEN <u>2</u> in dia. <u>2.5</u> in	BENTONITE SEAL <u>3/8 DIA PELLETS (3/2)</u>
CASING TYPE <u>3/4" WALLS STEEL</u>	SCREEN TYPE <u>STAINLESS STEEL</u>	INSTALLATION METHOD <u>GRAVITY POUR</u>
JOINT TYPE <u>FLUSH THREADED</u>	SLOT SIZE <u>#6</u>	FILTER PACK QTY <u>~100 lbs</u>
GROUT QUANTITY <u>75 GAL (70 lbs)</u>	CENTRALIZERS <u>-</u>	FILTER PACK TYPE <u>#1 Q SAND</u>
GROUT TYPE <u>(1-1/2) (GRANULAR)</u>	DRILLING MUD TYPE <u>-</u>	INSTALLATION METHOD <u>SEAL - POUR</u>
COORDINATES <u>N 7854.5 E 10249.2</u>		

ELEV./DEPTH (FT)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
	NOTE: FOR COMPLETE SOILS DESCRIPTION AT THIS LOCATION SEE BORING LOG BW-4D.		
320.6	GROUND SURFACE		
0.0	TYPICAL @ SURFACE UPPER CLAY TILL RED-BROWN MOTTLED FIRM TO STIFF SILTY CLAY & TO LITTLE F-C SAND, TR. GRAVEL.	<p>The sketch shows a vertical well casing starting at 0.0' and ending at 41.5'. Key features include: a 3" dia. riser at the top; a 2" dia. riser at 2.9'; a 10" dia. PVC casing at 2.5'; a 2" dia. riser at 13.8'; a 3/8" dia. bentonite pellets layer at 28.4'; a #1 Q sand layer at 28.5'; a #4 Q sand layer at 33.0'; a #1 Q sand layer at 37.8'; a #4 Q sand layer at 39.2'; and a cuttings settlement zone at 41.5'. Grout is shown at 10' and 2.5' depths.</p>	SET 6" DIA. STEEL CASING & PUSH TO ADJ. WASH OUT WITH ROLLER BIT & WATER. GO BEYOND 10' WITH ROLLER BIT TO 41.5'. WASH WATER BECOMES CLEAN. REMOVE BIT & ROLLER BIT. CUTTINGS SETTLER TO 39.2'. ADD #4 SAND TO 37.3'. ASSEMBLE WELL SCREEN & RISER & PUSH INTO #4 SAND 1'. PLACE #1 SAND & PULL CASING UP - WELL COMES UP WITH CASING WELL IS PUSHED BACK DOWN TO 37.6'. FINISH PLACING #1 SAND TO 33'. ADD #4 SAND TO 28.4'. MIX UP 5N. BATCH OF VOLCLAY GROUT (~45 GAL) & FILL PERI-MOLE. PULL CASING & LET SIT OVERNIGHT. VOLCLAY GR. IT MEASURES ~16" BELOW CASING. MIX ANOTHER BATCH OF VOLCLAY (~40 GAL). FILL TO 2.5'. FILL TO SURFACE W/ CEMENT GROUT.
307.5 13.1	GLACIOLACUSTRINE CLAY GREY SOFT TO V. SOFT SILTY CLAY TO CLAY, TRACE TO SOME (INCREASES W/ DEPTH) F-C SAND, TR. GRAVEL. RED SILT STAINS THROUGHOUT.		
280.1 52.5	GLACIOLACUSTRINE SILT/SAND BROWN-RED FIRM TO V. STIFF SILT & F-C SAND, TRACE TO LITTLE GRAVEL.		
260.1 39.8 280.8 35.8	BASAL RED TILL RED MARE SILT END OF SAMPLING		

JOB NO. B53-3056 GA. INSP. WDM PROJECT CWM/BW-25 REPLACEMENT/NOBEL CITY BORING NO. BW-55  
 DEPTH HOLE 16 FT DEPTH WL. - DRILLING METHOD HOLLOW STEM AUGER 4 1/4" ID SHEET 1 OF 1  
 TEMP 38°F TIME WL. - DRILLING COMPANY EMPAE SOILS INVESTIGATIONS, INC SURFACE ELEV. 318.8 F  
 WEATHER PARTLY CLOUDY DRILL RIG TRAC CME 45 DRILLER D BEITZ DATUM MSL  
 COORDINATES N 7707.8 E 11540.5 WT. SAMPLER HAMMER 140 lb DROP 30 IN STARTED 1 25 P/11-11-87  
 LOCATION ~315' EAST OF BW-25 WT. CASING HAMMER - DROP - COMPLETED 2 30 P/11-11-87

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES				REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC./ATT	
318.8	GROUND SURFACE							GROUND SURFACE
0.0	TOPSOIL @ SURFACE							
315.8	TAN & ORANGE FIRM CLAYEY SILT TO SILT, TRACE TO SOME FINE SAND, TR GRAVEL.	ML	28	1	DO	5-9-19-21	18/24	TOPSOIL & FILL
3.0	BROWN, TAN, ORANGE, & GREY MOTTLED FIRM TO STIFF SILTY CLAY, LITTLE TO SOME F-C SAND, TRACE GRAVEL.	CL	38	2	DO	12-18-20-25	16/24	UPPER CLAY TILL
			16	3	DO	4-8-8-13	17/24	
			44	4	DO	15-24-20-21	22/24	POCKETS OF TAN & BLACK MEDIUM SAND 8-10'
			11	5	DO	3-4-7-9	24/24	
307.1			14	6	DO	4-7-7-10	24/24	
11.7	RED-BROWN FIRM CLAYEY SILT, SOME TO AND F-C SAND, TR. GRAVEL.	ML	13	7	DO	10-8-5-5	12/24	UPPER SILT TILL
305.8								
13.0	GREY SOFT TO VERY SOFT SILTY CLAY TO CLAY, TRACE TO LITTLE FINE SAND, RED SILT SEAMS.	CL	2	8	DO	1-1-1-2	24/24	GLACIOLACUSTRINE CLAY
302.8								
16.0	END OF SAMPLING							END OF SAMPLING PERFORMED OVA HEADSPACE ANALYSIS ON ALL SAMPLES 11-12-87.  INSTALLED BW-55 SEE BW-55 MONITORING WELL INSTALLATION LOG



# MONITORING WELL INSTALLATION LOG

NYSDEC OHMS Document No. 201469232-00043

JOB NO. <u>853-3056</u>	PROJECT <u>CWM/BW-25 REPLACEMENT MODEL CITY</u>	WELL NO. <u>BW-55</u>	SHEET <u>1</u> OF <u>1</u>
GA INSP. <u>WDM</u>	DRILLING METHOD <u>HOLLOW STEM AUGER 4 1/4" ID</u>	GROUND ELEV. <u>318.8 F</u>	WATER DEPTH <u>7.8' BGS</u>
WEATHER <u>CLOUDY</u>	DRILLING COMPANY <u>EMPIRE SOILS INVEST., INC</u>	COLLAR ELEV. <u>321.11 F</u>	DATE/TIME <u>11-28/8 35A</u>
TEMP <u>36 °F</u>	DRILL RIG <u>TRACK GME 45</u>	DRILLER <u>D. BEITZ</u>	STARTED <u>8:35 A / 11-12-87</u>
			COMPLETED <u>10:00 A / 11-12-87</u>

## MATERIALS INVENTORY

WELL CASING <u>2</u> in. dia. <u>10.0</u> ft.	WELL SCREEN <u>2</u> in. dia. <u>7.7</u> ft.	BENTONITE SEAL <u>3.1</u> '
CASING TYPE <u>STAINLESS STEEL</u>	SCREEN TYPE <u>STAINLESS STEEL</u>	INSTALLATION METHOD <u>GRAVITY POUR</u>
JOINT TYPE <u>FIRST THREADED</u>	SLOT SIZE <u>#6</u>	FILTER PACK QTY. <u>200</u> lbs
GROUT QUANTITY <u>—</u>	CENTRALIZERS <u>—</u>	FILTER PACK TYPE <u>#1 Q SAND</u>
GROUT TYPE <u>—</u>	DRILLING MUD TYPE <u>—</u>	INSTALLATION METHOD <u>GRAVITY POUR</u>
COORDINATES <u>N 7707.8 E 11540.5</u>		

ELEV./DEPTH (FT)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
318.8	GROUND SURFACE	<p style="font-size: x-small;">8" DIA. ALUMINUM CASING W/ LOCK CEMENT GROUT 3/8" DIA. BENTONITE PELLETS #1 Q SAND #4 Q SAND 2" DIA. S.S. #6 SLOT SCREEN 2" DIA. S.S. RISER -2.3' -3.0' -6.1' -15.4' -16.0'</p>	<p>MEASURE HOLE @ 16.0'</p> <p>PLACE #4 Q SAND TO 15.4'</p> <p>ASSEMBLE 7' SCREEN #10'</p> <p>RISER &amp; PLACE IN HOLE</p> <p>2.3' OF STICKUP. ADD #1 Q SAND AROUND SCREEN TO 6.1' BGS. POUR 1 BUCKET OF 3/8" DIA BENTONITE PELLETS TO 3.0' BGS. POUR WATER ON PELLETS TO HYDRATE</p> <p>MIX CEMENT GROUT &amp; POUR INTO HOLE TO SURFACE.</p> <p>PUSH 8" DIA. ALUMINUM CASING TO 13" ABOVE TOP OF RISER. POUR #4 Q SAND INSIDE CASING TO WITHIN 3" OF TOP OF CASING.</p>
0.0	TOP SOIL SURFACE		
315.8	TAN & ORANGE FIRM CLAYEY SILT TO SILT, TR. TO SOME F. SAND, TR. GRAVEL. FILL		
3.0	UPPER CLAY TILL Brown, tan, orange & grey WORKED FIRM TO STIFF SILTY CLAY, LITTLE TO SOME F-C SAND, TR. GRAVEL.		
307.1	UPPER SILT TILL Red-br. brown clayey silt, silt to #1 Q sand, TR. GRAVEL		
305.8	GLACIOLACUSTRINE CLAY GREEN SPT TO 4 SOFT SILTY CLAY TO CLAY, TR. TO LITTLE F. SAND, RED SILT GRAVEL.		
302.8	END OF SAMPLING		
16.0	AUGER TO 16.0'		
			WELL DEVELOPMENT NOTES

Boring Log

JOB NO. 853-3056 GA. INSP. WDM PROJECT CWM/BW-25 REPLACEMENT/NOBEL CITY BORING NO. BW-5D  
 DEPTH HOLE 42 FT DEPTH WL. - DRILLING METHOD HOLLOW STEM AUGER 6 1/4" 4 1/2" ID SHEET 1 OF 1  
 TEMP 35°F / 43°F TIME WL. - DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS INC. SURFACE ELEV. 318.9 F  
 WEATHER CLOUDY / SUNNY DRILL RIG TRACER CME 45 DRILLER D. BEITZ DATUM M.S.L.  
 COORDINATES N7708.3 E11544.4 WT. SAMPLER HAMMER 140 lb DROP 30 IN STARTED 10:20 A / 11-12-87  
 LOCATION ~315' EAST OF BW-25 WT. CASING HAMMER - DROP - COMPLETED 3:20 P / 11-13-87

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES			REMARKS	
				NUMBER	TYPE	HAMMER BLOWS PER 8 IN. REC./ATT		
318.9	GROUND SURFACE						GROUND SURFACE	
0.0	FOR A COMPLETE SOILS DESCRIPTION AT THIS LOCATION SEE BORING LOG BW-5S.						11-12-87 AUGER TO 15.0' WITH 6 1/4" ID AUGERS. TAKE 2 SAMPLES & AUGER TO 19.0'. GRout BOREHOLE & SET 10" DIA PVC CASING TO 19.5'. 11-13-87 WASH OUT CASING & CONTINUE SAMPLING.	
503.9								
15.0	GREY SOFT TO VERY SOFT SILTY CLAY TO CLAY, SOME TO TRACE F-C SAND, TRACE GRAVEL. F-M SAND SEAMS THROUGHOUT.	CL TO CL	15	1	DO	13-8-7-5	2 1/24	GLACIOLACUSTRINE CLAY
			15	2	DO	10-8-7-7	16/24	
			4	3	DO	2-2	0/12	
			1	4	DO	WR-WN-1-2	23/24	
			6	5	DO	3-3-3-4	23/24	
			3	6	DO	WH-WH-3-4	24/24	
			8	7	DO	4-4-4-5	24/24	
			3	8	DO	WN-1-2-3	24/24	
			0	9	DO	WN-WN-WN-3	24/24	
286.9								
32.0	GREY SOFT CLAY INTERLAYERED WITH GREEN-GREY F-C SAND, & RED SILT. GRADES TO RED DENSE TO VERY DENSE SILT & F-C SAND, TRACE GRAVEL.	SM-ML	7	10	DO	2-3-4-5	24/24	GLACIOLACUSTRINE SILT / SAND
			8	11	DO	3-4-4-7	24/24	
			66	12	DO	27-32-3A-33	24/24	
			8A	13	DO	38-20-6A-92	18/24	
277.4			7A	14	DO	18-40-3A-54	18/24	
41.5	RED HARD SILT & F-C SAND - TILL	ML						RED BASAL TILL
42.0	END OF SAMPLING							END OF SAMPLING
								WU HEADSPACE ANALYSIS PERFORMED 11-14-87 ON ALL SAMPLES.
								INSTALLED BW-5D SEE BW-5D MONITORING WELL INSTALLATION LOG

# MONITORING WELL INSTALLATION LOG

JOB NO. <u>853-3056</u>	PROJECT <u>CWM / BW-25 REPLACEMENT MONITORING</u>	WELL NO. <u>BW-5D</u>	SHEET <u>1</u> OF <u>1</u>
GA INSP. <u>WDM</u>	DRILLING METHOD <u>HOLLOW STEM AUGER 4 1/2" ID, 6" TEMP DRIVING</u>	GROUND ELEV. <u>318.9 FT</u>	WATER DEPTH <u>-</u>
WEATHER <u>SUNNY</u>	DRILLING COMPANY <u>EMPIRE SPITS INDUST, INC.</u>	COLLAR ELEV. <u>321.63 F</u>	DATE/TIME <u>-</u>
TEMP <u>55°F</u>	DRILL RIG <u>TRACK CME 45</u>	DRILLER <u>D. BEITZ</u>	STARTED <u>12:15 P / 11-16-87</u> COMPLETED <u>3:30 P / 11-16-87</u>

## MATERIALS INVENTORY

WELL CASING <u>2</u> in dia. <u>40.0</u> ft	WELL SCREEN <u>2</u> in dia. <u>2.5</u> ft	BENTONITE SEAL <u>3.2</u> (3" DIA.)
CASING TYPE <u>STAINLESS STEEL</u>	SCREEN TYPE <u>STAINLESS STEEL</u>	INSTALLATION METHOD <u>GRAVITY POUR</u>
JOINT TYPE <u>FLUSH THREADED</u>	SLOT SIZE <u>#6</u>	FILTER PACK QTY <u>2</u> 30 lbs
GROUT QUANTITY <u>100</u> lbs	CENTRALIZERS <u>-</u>	FILTER PACK TYPE <u>#1 Q SAND</u>
GROUT TYPE <u>GRANULAR VOLCLAY</u>	DRILLING MUD TYPE <u>-</u>	INSTALLATION METHOD <u>GRAVITY POUR</u>
COORDINATES <u>N 7708.3 E 11544.4</u>		

ELEV./DEPTH (FT)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
318.9	NOTE FOR COMPLETE SOIL DESCRIPTION AT THIS LOCATION SEE BORING LOG BW-5D.		BORING WAS AUGERED TO 40' BGS. TEMPORARY STEEL 10\"/>	
0.0	TOPSOIL & FILL TAN & ORANGE FIRM CLAY SILT TO SILT, TA TO SA, F. SAND, TB GRAY			TO 39.5' BGS. A ROLLER BIT & WATER WAS USED TO CLEAN OUT THE CASING & BELOW TO 42.5' BGS. CUTTINGS SETTLED TO 41.7'. ADD #4 Q SAND TO 39.8' BGS. WELL SCREEN (2') & RISER WAS INSTALLED & SETTLED TO 39.8' BGS. ADD #1 Q SAND TO 35.2'. ADD 3/8\"/>
315.8	UPPER CLAY TILL BROWN, ORANGE NOTED FIRM TO STIFF SILTY CLAY, LITTLE TO SOME F-C SAND, TB GRAVEL.			AFTER LUNCH BOREHOLE MEAS 31' (PELLETS SWELLING). MIX GRANULAR VOLCLAY GROUT & PUMP INTO BOREHOLE. LET SET UP OVERNIGHT. VOLCLAY TO 35' BGS. USE CEMENT GROUT TO FILL TO SURFACE. PLACE ALUMINUM PROTECTIVE CASING. FILL WITH #4 SAND.
307.1	UPPER SILT TILL RED-BL. FIRM GRANULIF. SAND			
11.8 305.8 13.1	GLACIOLACUSTRINE CLAY GREY SOFT TO V. SOFT SILTY CLAY TO CLAY, SOME TO TRACE F-C SAND, TRACE GRAVEL. F-M SAND SEAMS.			
286.9 32.0	GLACIOLACUSTRINE SILT/SAND GREY SOFT SILT INTERLACED WITH GREEN-GRAY F-C SAND & RED SILT SEAMS. GRADED TO RED FIRM TO VERY STIFF SILT & F-C SAND, TRACE GRAVEL.			
277.4 41.5 276.9 42.0	BASIL RED TILL RED HARD SILT & F-C SAND END OF SAMPLING			



Golder Associates, Inc.

# SOIL BOREHOLE LOG

SITE NAME AND LOCATION  
CWM CHEMICAL SERVICES, MODEL CITY, N.Y.

DRILLING METHOD: 4 1/4 INCH HOLLOW STEM AUGER

BORING NO.

TMW-21S

SAMPLING METHOD: 24 INCH SPLIT SPOON SAMPLER

SHEET

1 OF 1

DRILLING

START TIME

FINISH TIME

08:40 DATE

09:55 DATE

DATUM MSL ELEVATION 320.5 FT

CASING DEPTH

09/27/88 09/27/88

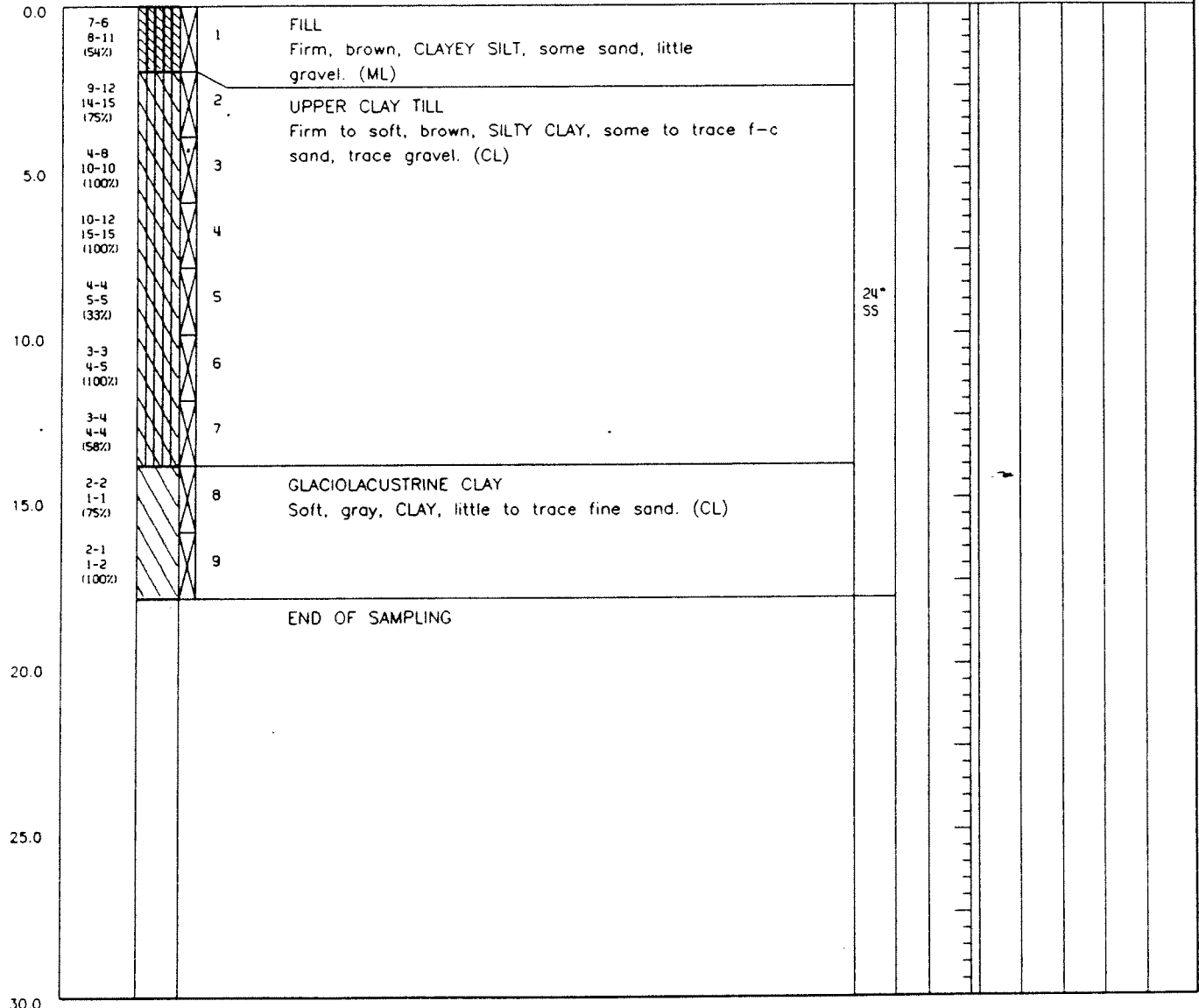
DRILL RIG TRACK CME 45

SURFACE CONDITIONS:

ANGLE VERTICAL BEARING

SAMPLE HAMMER TORQUE

DEPTH IN FEET	BLOWS/6 IN. ON SAMPLER (RECOVERY)	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS				
							WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTIC INDEX	OTHER TESTS



EMPIRE SOILS INVESTIGATIONS, INC.  
DRILLING CONTR DAN BIEZ

SL 10965 C

LOGGED BY A. L. GRASSO  
DATE 09/27/88  
CHKD BY WDA

# MONITORING WELL INSTALLATION LOG

NYSDEC OHMS Document No. 201409252-00049

JOB NO. <u>83-3056</u>	PROJECT <u>CWM/WELL INV/MODEL CITY</u>	WELL NO. <u>TMW-219</u>	SHEET <u>1</u> OF <u>1</u>
GA INSP. <u>ALG</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS-4 1/4" ID</u>	GROUND ELEV. <u>320.5 FT.</u>	WATER DEPTH <u>19.22 TOE</u>
WEATHER <u>SUNNY</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS</u>	COLLAR ELEV. <u>323.60 FT.</u>	DATE/TIME <u>10/10/83 / 7:50</u>
TEMP. <u>60°</u>	DRILL RIG <u>TRACK</u>	DRILLER <u>DAN BELTZ</u>	STARTED <u>10:00</u> <u>9/27/83</u> COMPLETED <u>11:00</u> <u>9/27/83</u>
		TIME / DATE	TIME / DATE

## MATERIALS INVENTORY

WELL CASING <u>2.0</u> in dia. <u>10.0</u> in	WELL SCREEN <u>2.0</u> in dia. <u>10.45</u> in	BENTONITE SEAL <u>BENTONITE PELLETS</u>
CASING TYPE <u>PVC</u>	SCREEN TYPE <u>PVC</u>	INSTALLATION METHOD <u>POUR FROM SURFACE</u>
JOINT TYPE <u>ELPH THREAD W/ O RING</u>	SLOT SIZE <u>0.01 INCH</u>	FILTER PACK QTY <u>3 1/2 BAGS 94 LB. BAG</u>
GROUT QUANTITY <u>12 GALLONS</u>	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1 Q SAND</u>
GROUT TYPE <u>CEMENT-BENTONITE</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>RAN THROUGH AUGER</u>

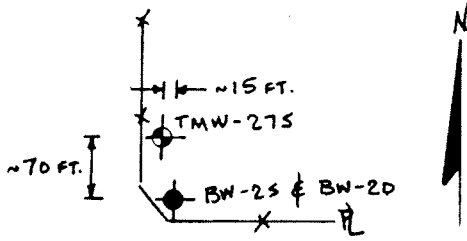
ELEV./DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
320.5	GROUND SURFACE		<p>AUGERED TO 18.0 BAGS                      PLACED #4 Q SAND TO                      17.5' BAGS. INSTALLED WELL                      (ONE 10' SCREEN, ONE 10'                      FEET, ONE END CAP, ONE TOP CAP)                      PLACED #1 Q SAND TO                      5.25' BAGS PULLING THE                      AUGERS OUT DURING                      INSTALLATION. POURED                      BENTONITE PELLETS                      TO 2.25' BAGS HYDRATED                      PELLETS WITH IONIZED                      WATER. PLACED CEMENT                      TO GROUND SURFACE.                      INSTALLED 8" Ø ALUMINUM                      PROTECTIVE CASING OVER                      WELL. PLACED #4 Q                      SAND IN THE ANNULUS                      BETWEEN THE WELL                      AND THE PROTECTIVE                      CASING.</p>	
0.0 318.5 2.0	<p>FILL                      Firm brown, CLAYEY                      SILT, some sand, little                      gravel. (CML)</p> <p>UPPER CLAY TILL                      Firm to soft brown,                      SILTY CLAY, some                      TO trace fc sand,                      trace gravel. (CL)</p>		<p>8" Ø ALUMINUM                      PROTECTIVE                      CASING W/                      LOCKING CAP</p> <p>3.15'</p> <p>#4 Q SAND</p> <p>CEMENT                      GROUT</p> <p>225</p> <p>2" Ø PVC                      RISER</p> <p>2" Ø PVC                      0.01" SLOT                      SCREEN</p> <p>#1 Q                      SAND</p> <p>17.5</p> <p>18.0</p>	<p>WELL DEVELOPMENT NOTES                      A 0.2 FT. END CAP WAS                      PLACED AT THE BOTTOM                      OF THE SCREEN SECTION                      THE 10 FT SCREEN                      SECTION IS ACTUALLY                      10.45 FT. IN LENGTH.</p>
300.5 14.0	<p>GLACIOCLASTIC                      CLAY. Soft, gray,                      CLAY, little to trace fine                      sand. (CL)</p>			
302.5 18.0	<p>END OF SANDPUNK</p>			



Golder Associates, Inc.

# SOIL BOREHOLE LOG

SITE NAME AND LOCATION  
CWM CHEMICAL SERVICES, MODEL CITY, N.Y.



DRILLING METHOD: 4 1/4 INCH HOLLOW STEM AUGER

BORING NO.

TMW-27S

SAMPLING METHOD: 24 INCH SPLIT SPOON SAMPLER

SHEET

1 OF 1

DRILLING

WATER LEVEL

START

FINISH

TIME

09:00

10:10

DATE

DATE

CASING DEPTH

09/29/88

09/29/88

DATUM MSL

ELEVATION 320.0 FT

DRILL RIG TRACK CME 45

SURFACE CONDITIONS:

ANGLE VERTICAL

BEARING

SAMPLE HAMMER TORQUE

DEPTH IN FEET	BLOWS/ 6 IN. ON SAMPLER (RECOVERY)	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS				
							WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTIC INDEX	OTHER TESTS

0.0	12-20 36-41 (100%)	[Symbol]	1 FILL Stiff, brown, CLAYEY SILT, some f-c sand, little gravel. (ML)											
2.5	25-20 17-17 (112%)	[Symbol]	2											
5.0	7-6 5-4 (133%)	[Symbol]	3 UPPER CLAY TILL Firm, brown, SILTY CLAY, little to some f-m sand, trace gravel. Treated wood fragments in top 4 feet. (CL)											
7.5	4-6 9-10 (175%)	[Symbol]	4											
10.0	5-8 12-25 (175%)	[Symbol]	5			24"								
12.5	3-21 12-9 (62%)	[Symbol]	6											
15.0	7-25 26-19 (175%)	[Symbol]	7											
17.5	1-2 2-1 (54%)	[Symbol]	8 GLACIOLACUSTRINE CLAY Very soft, brown-gray, CLAY, trace fine sand. (CL)											
20.0	2-1 1-2 (175%)	[Symbol]	9											
22.5			END OF SAMPLING											
25.0														
30.0														

EMPIRE SOILS INVESTIGATIONS, INC.

DRILLING CONTR DAN BIETZ

SL10973 C

LOGGED BY *AWA*

CHKD BY *AWA*

DATE 09/29/88

LOGGED BY A L GRASSO

DATE 09/29/88

# MONITORING WELL INSTALLATION LOG

NYSDEC OHMS Document No. 201460232-00043

JOB NO. <u>88830527</u>	PROJECT <u>CNM/WELL INV/ROSEL CITY</u>	WELL NO. <u>TMW-275</u>	SHEET <u>1</u> OF <u>1</u>
GA INSP. <u>ALG</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS 4 1/4" ID</u>	GROUND ELEV. <u>320.0 FT.</u>	WATER DEPTH <u>7.14' TO G</u>
WEATHER <u>CLIMBY</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS</u>	COLLAR ELEV. <u>323.20 FT.</u>	DATE/TIME <u>01/31/88 16:25</u>
TEMP. <u>65°F</u>	DRILL RIG <u>TRAX</u>	DRILLER <u>DAN BEITZ</u>	STARTED <u>10:30 9/29/88</u> COMPLETED <u>11:45 9/29/88</u>

## MATERIALS INVENTORY

WELL CASING <u>2.0</u> in dia. <u>2.0</u> I.F.	WELL SCREEN <u>2.0</u> in dia. <u>10.45</u> I.F.	BENTONITE SEAL <u>BENTONITE PELLETS</u>
CASING TYPE <u>PVC</u>	SCREEN TYPE <u>PVC</u>	INSTALLATION METHOD <u>POUR FROM SURFACE</u>
JOINT TYPE <u>ELBOW THREADED W/ 2" RINGS</u>	SLOT SIZE <u>0.2"</u>	FILTER PACK QTY <u>3 BAGS #1 Q SAND</u> (COARSE)
GROUT QUANTITY <u>1 1/2 GALS.</u>	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1 Q SAND</u>
GROUT TYPE <u>CEMENT-BENTONITE</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>POUR THROUGH AUGER</u>

ELEV./DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
320.0	GROUND SURFACE		<p>Augered and sampled to 18.0' below ground surface (BGS). Installed well (one 10' screen, one 10' riser) placed #4 Q sand to 17.8' BGS. Placed #1 Q sand to 0.2' BGS while pulling the augers out during installation. Placed bentonite pellets to 3.0' BGS. Hydrated bentonite pellets with deionized water. Placed cement grout to ground surface. Installed 0" diameter aluminum protective casing over well. Place #4 Q sand in the annulus between the well and the protective casing.</p>	
0.0	FILL Stiff, brown, clayey silt, some f.c. sand, little gravel. (ML)			
316.0 4.0	UPPER CLAY TILL Firm, brown, silty clay, little to some f.m. sand, trace gravel. Treated wood fragments in top 4 FT. (CL)			
306.0 14.0	CLACIOLACSTRINE CLAY Very soft, brown-gray, clay, trace fine sand. (CL)			
302.0 18.0	END OF SAMPLING			
			<p><b>WELL DEVELOPMENT NOTES</b></p> <p>A 0.2' END CAP WAS PLACED ON THE BOTTOM OF THE SCREEN SECTION. THE 10' SCREEN SECTION ACTUALLY IS 10.45' IN LENGTH.</p>	

Boring Log

JOB NO. 853-3051 GA. INSP. G.P. PROJECT CWM/WELLS/MODEL CITY BORING NO. MWI-15  
 DEPTH HOLE 160 FT DEPTH WL. 4.55 FT DRILLING METHOD HOLLOW STEM AUGERS-4 1/4" ID SHEET 1 OF 1  
 TEMP 67° F TIME WL. 9-22-86 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. SURFACE ELEV. 319.5 FT.  
 WEATHER WARM DRILL RIG CME 45 DRILLER K. SWINNICHODATUM MSL  
 COORDINATES N 8277.05 E 9017.18 WT. SAMPLER HAMMER 140 LBS DROP 30 IN. STARTED 8:05 / 5-14-86  
 LOCATION 4.5 FT. S OF MWI-10 WT. CASING HAMMER 300 LBS DROP 30 IN. COMPLETED 9:17 / 5-14-86

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES			REMARKS	
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC./ATT		
319.5	GROUND SURFACE						GROUND SURFACE	
0.0	FIRM, BROWN, CLAYEY SILT, SOME FINE TO MEDIUM SAND, PLANT MATERIAL, ROOTS ETC. DRY, CRUMBLY	ML	20	1	DO	8-8-12-15	19/24	TOP SOIL
319.0								UPPER CLAY TILL
0.5	FIRM TO STIFF, BROWN MOTTLED, CLAYEY SILT TO SILTY CLAY SOME F TO M SAND, GRAY WEATHERING ALONG VERTICAL FRACTURES	CL	23	2	DO	10-11-14-16	23/24	2.0-4.0 FT, DRY, PLANT MATERIAL
								4.0-4.5 FT, LOOSE GRAY AND BROWN F SAND AND SILT, MOST
								6.0-6.5 FT, COMPACT, GRAY AND BROWN F SAND AND SILT, NET
311.5			56	5	DO	19-26-30-37	24/24	
8.0	FIRM TO VERY SOFT, GRAY BROWN TO GRAY, SILTY CLAY TO CLAY, LITTLE F-C SAND	CL	15	7	DO	4-6-9-9	7/24	GLACIOLACUSTRINE CLAY
								13.0-13.4 FT, CLAYEY SILT
		CH	8	8	DO	2-3-5-5	24/24	COMPACT BROWN SILT
			12	9	DO	3-6-6-6	24/24	
303.5			<1	12	DO	WH-WH-1-1	24/24	VERY SOFT FROM 13.5 FT.
16.0	END OF SAMPLING AUGERED TO 14.6 FT.							END OF SAMPLING
								INSTALLED MWI-15 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.



# MONITORING WELL INSTALLATION LOG

JOB NO. B53-3081 PROJECT CWM/ WELLS/ MODEL CITY WELL NO. MW1-15 SHEET 1 OF 2  
 GA INSP. G.R. DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID GROUND ELEV. 319.5 FT. WATER DEPTH 4.35 FT.  
 WEATHER CLOUDY DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. COLLAR ELEV. 321.30 FT. DATE/TIME 7-27-86  
 TEMP. 65° F DRILL RIG CME 45 DRILLER K. SWINNICH STARTED 9:15 7-19-86 COMPLETED 10:00 7-19-86  
 LOCATION/COORDINATES 4.5 FT. SOUTH OF MW1-1D / N 8277.05 E 9017.18

## MATERIALS INVENTORY

WELL CASING <u>20</u> IN. DIA. <u>8.0</u> IN. DIA.	WELL SCREEN <u>20</u> IN. DIA. <u>7.9</u> IN. DIA.	BENTONITE SEAL <u>PELLETS 4.5' DEEP</u>
CASING TYPE <u>304 STAINLESS STEEL</u>	SCREEN TYPE <u>304 STAINLESS STEEL</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>
JOINT TYPE <u>FLUSH TAPER VITON O-RINGS</u>	SLOT SIZE <u>0.006 INCH</u>	FILTER PACK QTY <u>9.6 L.F. 240 LBS.</u>
GROUT QUANTITY <u>NA</u>	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1-Q SAND</u>
GROUT TYPE <u>NA</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
319.5	GROUND SURFACE		AUGERED TO 14.6 FT.; ADDED #1-Q SAND TO 14.0 FT. (TOOK SAMPLE); INSTALLED WELL PIPE (1-2' SCREEN, 1-5' SCREEN, 1-3' RISER, 1-5' RISER, 1.8 FT. STICKUP; BOTTOM OF WELL SANK TO 14.1 FT. BELOW GROUND SURFACE; ADDED #1-Q SAND TO 9.0 FT.; ADDED PELLETS TO 0.5 FT. BELOW GROUND SURFACE; REMOVED AUGERS; MIXED CEMENT GROUT FILLED TO GROUND SURFACE; INSTALLED 8" PROTECTIVE CASING; REDEK LID OFF OF CASING - IT WAS LATER FIXED; FILLED INTERIOR OF PROTECTIVE CASING WITH #4 SAND; WEED HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL ON THE SITE AND NEW WEED HOLES WERE PUT IN	
0.0	TOP SOIL FIRM, BROWN, CLAYEY SILT, SOME F.T.M. SAND, DILATANT MATERIAL.			
0.5	UPPER CLAY TILL FIRM TO STIFF BROWN MOTTLED CLAYEY SILT TO SILTY CLAY SOME F.T.M. SAND; CERT. WEEDHOLES ALONG VERTICAL FRAGMENTS 4.0-4.5 FT. LOOSE GRAY AND BROWN F SAND AND SILT, MOIST.			
8.0	GLACIOLACUSTRINE CLAY FIRM TO VERY SOFT, GRAY BROWN TO GRAY SILTY CLAY, TO CLAY, LITTLE F TO C SAND CLAYEY COMPACT SILT FROM 13.0-13.4 FT.			
16.0	END OF SAMPLING AUGERED TO 14.6 FT.			
			(CONTINUED ON NEXT PAGE)	
			<b>WELL DEVELOPMENT NOTES</b>	
			DATE DEVELOPED: <u>5-14-86</u> TO <u>7-30-86</u>	
			DEVELOPMENT METHOD: <u>AIR LIFT</u>	
			VOLUME PURGED: <u>11.2 GAL.</u>	
			FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.	
			NOTE: A 8.5 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION 2.5, 9 AND 10 FT. 5.8 SECTIONS ARE ACTUALLY 7.50, 9.825, 10.325 FT. IN LENGTH, RESPECTIVELY	

**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY MW1-15		
Job No. 853-3051	Made by GR.	Date 5.14.86
Ref.	Checked DSM	Sheet 2 of 2
	Reviewed JFC	

CASING: A DEDICATED STAINLESS STEEL BAILER WAS INSTALLED  
SUBSEQUENT TO DEVELOPMENT.

# Boring Log

JOB NO. B53-3051 GA. INSP. G.R. PROJECT CWM/WELLS/MODEL CITY BORING NO. MWI-2  
 DEPTH HOLE 48.1 FT. DEPTH WL. 550 FT. DRILLING METHOD HOLLOW STEM AUGERS-4 1/4" ID SHEET 1 OF 1  
 TEMP 75°F TIME WL. 9/22/86 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. SURFACE ELEV. 319.5 FT.  
 WEATHER WARM/CLEAR DRILL RIG CME 55 DRILLER M GAUDY DATUM MSL  
 COORDINATES 8282.24N 9017.06E WT. SAMPLER HAMMER 140 LBS. DROP 30 IN. STARTED 9:30 15-28-86  
 LOCATION 4.5 FT. NORTH OF MWI-15 WT. CASING HAMMER 300 LBS. DROP 30 IN. COMPLETED 2:30 15-30-86

ELEV. DEPTH (FT.)	DESCRIPTION	UNIFIED CLASS	BLOW/FOOT	SAMPLES				REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC/ATT	
303.5	FOR COMPLETE SOILS DESCRIPTION AT THIS LOCATION ALSO SEE BORING LOG MWI-15							AUGERED TO 16.0 FT., NO SAMPLING. SAMPLE 16.0-18.0 FT., AUGERED TO 200 FT. INSTALLED 10 INCH DIAM PVC SURFACE CASING TO 20.0 FT.
16.0			-	-	-	NO SAMPLE OBTAINED	-	NO SAMPLE RECOVERED
286.5	VERY SOFT TO SOFT, GRAY, CLAY, SOME F TO M SAND, MOIST	CH	41	1	DO	19-19-22-22	12/24	GLACIOLACUSTRINE CLAY 22.7 FT., M TO C SAND LENSE 24.0 FT., SAND LENSE INTERLAYERED WITH CLAY 26.0-26.9 FT., COMPACT F TO M SAND, WET. 31.1-32.0 FT., CLAY INTERLAYERED WITH BROWN DILATANT SILT LENSES
286.5			0	2	DO	WH-WH-WH-2	24/24	
286.5			6	3	DO	3-3-3-3	18/24	
286.5			18	4	DO	14-12-6-10	24/24	
286.5			22	5	DO	14-12-10-10	24/24	
286.5			7	7	DO	3-3-4-6	20/24	
286.5			8	8	DO	2-3-5-4	24/24	
286.5			8	9	DO	4-4-4-3	24/24	
33.0	COMPACT TO VERY DENSE, GRAY BROWN, F SAND, AND TO SOME SILT	ML	27	11	DO	2-8-19-28	18/24	GLACIOLACUSTRINE SILT/SAND 33.0-34.0 FT., FIRM GRAY BROWN CLAYEY SILT AND F SAND 44.0-47.0 FT., DILATANT
33.0			114	12	DO	38-43-71-100	24/24	
33.0			52	13	DO	12-15-37-80	20/24	
33.0			171	14	DO	37-71-100	17/24	
33.0			48	15	DO	6-11-37-50	21/24	
33.0			62	16	DO	2-22-40-75	20/24	
272.5			7100	17	DO	67-110	20/18	
47.0	VERY STIFF, RED BROWN, CLAYEY SILT, SOME F TO C SAND, AND SHALE FRAGMENTS	ML	7100	19	DO	100/1		BASAL RED TILL
271.4								
48.1	END OF SAMPLING AUGERED TO 48.0 FT.							END OF SAMPLING INSTALLED MWI-1D SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

# MONITORING WELL INSTALLATION LOG

JOB NO. <u>B53-3031</u>	PROJECT <u>CNM/WELLS/MODEL CITY</u>	WELL NO. <u>MW1-1D</u>	SHEET <u>1</u> OF <u>2</u>
GA INSP. <u>GB</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS - 4 1/4" ID</u>	GROUND ELEV. <u>319.5 FT</u>	WATER DEPTH <u>5.50 FT</u>
WEATHER <u>CLEAR</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS, INC.</u>	COLLAR ELEV. <u>322.63 FT</u>	DATE/TIME <u>9-22-86</u>
TEMP. <u>82°F</u>	DRILL RIG <u>CAE 95</u>	DRILLER <u>M. GAUDY</u>	STARTED <u>10:05 9-29-86</u> COMPLETED <u>2:30 9-30-86</u>
LOCATION/COORDINATES <u>4.5 FT. NORTH OF MW1-1S / N 82° 24' E 9017.06</u>			
MATERIALS INVENTORY			
WELL CASING <u>2.0</u> IN. DIA. <u>40.0</u> LI.	WELL SCREEN <u>2.0</u> IN. DIA. <u>10.6</u> LI.	BENTONITE SEAL <u>PELLETS 4.3</u> DEEP	
CASING TYPE <u>304 STAINLESS STEEL</u>	SCREEN TYPE <u>304 STAINLESS STEEL</u>	INSTALLATION METHOD <u>TREMIPE TUBE + WASH</u>	
JOINT TYPE <u>FLUSH TIGHTEN TYPE 4-TON 0-RINGS</u>	SLOT SIZE <u>0.006</u> INCH	FILTER PACK QTY <u>14.0</u> L.F. <u>250</u> LBS	
GROUT QUANTITY <u>70</u> GAL.	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1-0 SAND</u>	
GROUT TYPE <u>BENTONITE</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>TREMIPE TUBE + WASH</u>	

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
319.5	GROUND SURFACE		<p>Augered to 19.5 ft. with 12 inch (0.0) augers.</p> <p>Grouted 10 inch PVC casing to 19.5 ft. (took sample).</p> <p>Pushed casing to 20 ft.</p>
0.0	TOP SOIL FIRM, BROWN CLAYEY SILT, SOME F TO M SAND, DILATANT MATERIAL		<p>Augered to 48.0 ft. with 4 1/4 (1.0) augers. Pulled augers. Installed 6 inch casing to 48.0 ft. Washed out borehole - open to 48.0 ft. Tremied (with water) #4-0 sand to 43.2 ft. (sample taken). Installed well pipe (1-10' screen, 4-10' risers) 3.1 ft. stickup. Tremied #1-0 sand to 34.0 ft. (took sample). Tremied bentonite pellets to 29.7 ft. Tremied #4-0 sand to 28.8 ft. Mixed grout 100 lbs. Bentonite/70 gal. H<sub>2</sub>O filled 6" steel casing to ground surface with grout. Removed temporary.</p>
0.5	UPPER CLAY TILL FIRM TO STIFF BROWN TO MOTTLED SANDY SILT TO SILTY CLAY, SOME F TO M SAND, ORGY WEATHERING ALONG VERTICAL FRACTURES 4.0 TO 4.5 FT. LOOSE GRAY AND BROWN F SAND AND SILT, MOIST		<p>(CONTINUED ON NEXT PAGE)</p>
311.5	GLACIOLACUSTRINE CLAY FIRM TO VERY SOFT, GRAY BROWN TO GRAY, SILTY CLAY TO CLAY, LITTLE F TO C SAND, CLAYEY COMPACT SILT, FROM 13.0 TO 13.4 FT.		<p><b>WELL DEVELOPMENT NOTES</b></p> <p>DATE DEVELOPED: 6-9-86 TO 7-23-86</p> <p>DEVELOPMENT METHOD: AIR LIFT</p> <p>VOLUME PURGED: 66.0 GAL.</p>
303.5	GLACIOLACUSTRINE CLAY VERY SOFT, TO SOFT, GRAY, CLAY, SOME F TO M SAND, INTERLAYERED SAND LENSES FROM 22.7 TO 24.0 FT. COMPACT F TO M SAND FROM 26.0 TO 26.9 FT. INTERLAYERED SILT LENSES FROM 31.1 TO 32.0 FT.		<p>FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE</p>
16.0	GLACIOLACUSTRINE CLAY VERY SOFT, TO SOFT, GRAY, CLAY, SOME F TO M SAND, INTERLAYERED SAND LENSES FROM 22.7 TO 24.0 FT. COMPACT F TO M SAND FROM 26.0 TO 26.9 FT. INTERLAYERED SILT LENSES FROM 31.1 TO 32.0 FT.		<p>NOTE: A 0.5 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2.5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY.</p>
286.5	GLACIOLACUSTRINE SILT/SAND COMPACT TO VERY DENSE GRAY BROWN F SAND, AND TO SOME SILT DILATANT FROM 44.0-47.0 FT.		
37.0	GLACIOLACUSTRINE SILT/SAND COMPACT TO VERY DENSE GRAY BROWN F SAND, AND TO SOME SILT DILATANT FROM 44.0-47.0 FT.		
272.5	Basal red till very stiff red brown clayey silt, some fine sand, red shale fragments. END OF SAMPLING AUGERED TO 48.0 FT.		

**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		MWI-1D
Job No. 853-3051	Made by GR	Date 5-30-86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

6" STEEL CASING; GROUT FELL TO 1.0 FT. BELOW GROUND SURFACE; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8" Ø ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF CASING WITH #4-Q SAND; WEEP HOLES WERE PUT IN PROTECTIVE CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PUT AROUND WELL BY THE SITE AND NEW WEEP HOLES WERE PUT IN CASING; A WELL WIZARD WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

# Boring Log

JOB NO. B53-3051 GA. INSP. GR PROJECT CWM/WELLS/MODEL CITY BORING NO. MWI-25  
 DEPTH HOLE 24.0 FT. DEPTH WL. 2.56 FT. DRILLING METHOD HOLLOW STEM AUGERS 4 1/4 ID SHEET 1 OF 1  
 TEMP 65° F TIME WL. 9/23/86 DRILLING COMPANY EMPIRE SOIL INVESTIGATIONS INC. SURFACE ELEV. 320.3 FT  
 WEATHER CLOUDY DRILL RIG CME 45 DRILLER K SWINNICH DATUM MSL  
 COORDINATES N8138.87 E9168.11 WT. SAMPLER HAMMER 140 LBS DROP 30 IN. STARTED 11 24 / 5/14/86  
 LOCATION --- WT. CASING HAMMER 300 LBS DROP 30 IN. COMPLETED 3 00 / 9/14/86

ELEV. DEPTH (FT.)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES				REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC./ATT	
320.3 0.0	GROUND SURFACE							GROUND SURFACE
309.4 10.9	FIRM TO STIFF, GRAY BROWN MOTTLED, SILTY CLAY, SOME F TO M SAND, LITTLE C SAND	CL	18	1	DO	12-9-9-9	22/24	UPPER CLAY TILL SAND LENSE AT 1.5 FT. ROOTS PRESENT. SAND LENSES AT 2.8 FT AND 3.2 FT. FROM GROUND SURFACE. 5.7-6.0 FT., BLACK BROWN SHINY APPEARANCE. 6.0-8.0 FT. GRAY WEATHERING ALONG VERTICAL FRACTURES. SAND LENSE AT 6.5 FT. RED SHALE FRAGMENTS AT 9.0 FT.
			14	2	DO	5-7-7-9	20/24	
			21	3	DO	3-9-12-7	24/24	
			48	5	DO	20-22-26-27	19/24	
			20	6	DO	8-9-11-20	18/24	
297.8 22.5 296.3 10.9	COMPACT, BROWN, F.T.C. SAND AND SOFT TO FIRM, CLAYEY SILT, SOME F TO C SAND, LITTLE F GRAVEL. WET.	ML	25	8	DO	4-12-13-15	15/24	UPPER SILT TILL
			23	10	DO	5-11-12-17	21/24	
			10	12	DO	2-3-7-8	22/24	
			16	15	DO	5-7-9-33	24/24	
			17	17	DO	4-6-11-14	12/24	
			20	18	DO	8-9-11-21	8/24	
294.3 24.0	VERY SOFT, GRAY, CLAY, LITTLE F SAND	CH	11	19	DO	10-7-4-4	24/24	GLACIOLACUSTRINE CLAY
	END OF SAMPLING AUGERED TO 23.0 FT.							END OF SAMPLING
								INSTALLED MWI-25 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

**MONITORING WELL INSTALLATION LOG**

JOB NO. 853-3081 PROJECT CWM / WELLS / MODEL CITY WELL NO. MW1-23 SHEET 1 OF 2  
 GA WSP OR DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4 ID GROUND ELEV 320.3 WATER DEPTH 2.56 FT.  
 WEATHER CLOUDY DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS INC. COLLAR ELEV 321.76 DATE/TIME 9-23-86  
 TEMP 65° F DRILL RIG CME 45 DRILLER K. SWINNICH STARTED 3:00 5-14-86 COMPLETED 10:23 9-15-86  
 LOCATION/COORDINATES N 8138.07 E 9168.11 TIME / DATE TIME / DATE

**MATERIALS INVENTORY**

WELL CASING 2.0 in dia. 8.0 lf. WELL SCREEN 2.0 in dia. 15.9 lf. BENTONITE SEAL PELLETS 4.7' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD THROUGH AUGERS  
 JOINT TYPE ALUM. THREADS TERCON TAPE VITON O-RINGS SLOT SIZE 0.006 INCH FILTER PACK QTY 17.8 L.F. 375 LBS  
 GROUT QUANTITY NA CENTRALIZERS NONE FILTER PACK TYPE #1-0 SAND  
 GROUT TYPE NA DRILLING MUD TYPE NONE INSTALLATION METHOD THROUGH AUGERS

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
320.3	GROUND SURFACE		AUGERED TO 23.0 FT. ADDED #1-0 SAND TO 22.4 FT. BELOW GROUND SURFACE. INSTALLED WELL PIPE (1-5' SCREEN, 1-10' SCREEN, 1-3' RISER, 1-5' RISER) 1.5 FT. STICKUP. HAD TROUBLE WITH #1-0 SAND SETTLING. ADDED #1-0 SAND TO 5.2 FT. (TOOK SAMPLE). ADDED PELLETS TO 0.5 FT. BELOW GROUND SURFACE. INITIALLY ADDED TOO MANY PELLETS HAD TO DIG SOME OUT OF AUGER HOLE. REMOVED AUGERS, MIXED CEMENT GROUT, FILLED TO GROUND SURFACE. INSTALLED 8" ALUMINUM PROTECTIVE CASING. FILLED INTERIOR OF PROTECTIVE CASING WITH #4-0 SAND. WEED HOLES WERE PUT IN CASING FOR DRAINAGE. PROTECTIVE POSTS WERE PLACED AROUND WELL. A
0.0	UPPER CLAY TILL FIRM TO STIFF GRAY BROWN MOTTLED SILTY CLAY SOME F TO M SANDS GRAY WEATHERING ALONG VERTICAL FRACTURES		(CONTINUED ON NEXT PAGE)
309.4	UPPER SILT TILL COMPACT, BROWN, FIRM SAND, AND SOFT TO FIRM CLAYEY SILT, SOME F TO C SAND, LITTLE F GRAVEL, WET		WELL DEVELOPMENT NOTES
297.8	GLAUCOLACSTRINE CLAY VERY SOFT, GRAY, CLAY, LITTLE F SAND		DATE DEVELOPED: 5-19-86 TO 9-4-86
225	END OF SAMPLING AUGERED TO 23.0 FT.		DEVELOPMENT METHOD: AIR LIFT
240			VOLUME PURGED: 82.6 GAL.
		FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.	
		NOTE: A 0.5 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION 2, 5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY.	

**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		MW 1-25
Job No. 853-3051	Made by GR	Date 5-15-86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND  
NEW WEEP HOLES WERE PUT IN CASING; A DEDICATED STAINLESS  
STEEL BAULER WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.



JOB NO. 853-3031 QA. INSP. G.R. PROJECT CWM/WELLS/MODEL CITY BORING NO. MW2-15  
 DEPTH HOLE 20.0 FT DEPTH WL. 7.06 FT. DRILLING METHOD HOLLOW STEM AUGERS 4 1/4" ID SHEET 1 OF 1  
 TEMP 70° F TIME WL. 9/22/86 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. SURFACE ELEV. 320.3 FT  
 WEATHER CLEAR DRILL RIG CME 45 DRILLER K. SWINNICH DATUM M.S.L.  
 COORDINATES N 8470.82 E 9009.52 WT. SAMPLER HAMMER 140 LBS. DROP 30 IN. STARTED 11/29/5/14  
 LOCATION 4.5 FEET SOUTH OF MW 2-10 WT. CASING HAMMER 300 LBS. DROP 30 IN. COMPLETED 3/09/5/14

ELEV. DEPTH (FT.)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES				REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC/ATT	
320.8	GROUND SURFACE							GROUND SURFACE
0.0	VERY STIFF TO FIRM, DARK BROWN, SILTY CLAY, SOME F TO C SAND	CL	24	1	DO	4-12-12-6	21/24	UPPER CLAY TILL
			25	2	DO	11-13-12-15	0/24	0.0-6.0 FT. OCCASIONAL ROOT MATERIAL
			17	4	DO	6-6-11-14	24/24	6.8 FT. SAND LENSE, WET
			34	5	DO	18-16-18-18	24/24	MOTTLED TO 8.0 FT.
			18	6	DO	5-7-11-14	24/24	8.0-12.0 FT. GRAY WEATHERING ALONG VERTICAL FRACTURES
			12	7	DO	3-4-8-11	22/24	
			27	8	DO	11-15-12-13	13/24	
			9	9	DO			
306.8	LOOSE, GRAY BROWN, F TO C SAND, SOME F GRAVEL, LITTLE SILTY CLAY	ML	7	10	DO	4-3-4-2	5/24	UPPER SILT TILL
14.0	VERY SOFT TO SOFT, GRAY BROWN, CLAY AND SILTY CLAY, SOME F TO C SAND	CL	7	11	DO	3-3-4-4	8/24	GLACIOLACUSTRINE CLAY
304.5			12	12	DO			
16.3			13	14	DO	3-3-3-4	24/24	
302.8	END OF SAMPLING AUGERED TO 19.1 FT.							END OF SAMPLING
20.0								INSTALLED MW2-15 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

NYREG-011MS-D Document No. 201409232-00043  
**MONITORING WELL INSTALLATION LOG**

JOB NO. 853-3051 PROJECT CWM / WELLS / MODEL CITY WELL NO. MW2-13 SHEET 1 OF 2  
 GA INSP. GR DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4 ID GROUND ELEV. 320.8 FT. WATER DEPTH 7.0 FT.  
 WEATHER CLEAR DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS COLLAR ELEV. 322.78 FT. DATE/TIME 9-22-86  
 TEMP. 73 F DRILL RIG GME 45 DRILLER K. SWINNICH STARTED 2:00 5-13-86 COMPLETED 3:09 9-13-86  
 LOCATION/COORDINATES 4.5 FT. SOUTH OF MW2-1D / N 84 70.82 E 9009.22

**MATERIALS INVENTORY**

WELL CASING 2.0 in dia. 10.0 ft WELL SCREEN 2.0 in dia. 10.6 ft BENTONITE SEAL PELLETS 4.0' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD THROUGH AUGERS  
 JOINT TYPE FLUSH TEFLOON VITON TAPE O-RINGS SLOT SIZE 0.006 INCH FILTER PACK QTY 12.1 L.F. ; 330 LBS  
 GROUT QUANTITY NA CENTRALIZERS NONE FILTER PACK TYPE # 1-Q SAND  
 GROUT TYPE NA DRILLING MUD TYPE NONE INSTALLATION METHOD THROUGH AUGERS

ELEV./DEPTH (FT)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
320.8	GROUND SURFACE		AUGERED TO 19.1 FT.; HAD 2 FT. OF WATER IN BOREHOLE. DECIDED NOT TO WASH HOLE; ADDED # 1-Q SAND TO 18.6 FT. BELOW GROUND SURFACE (TOOK SAMPLE); INSTALLED WELL PIPE (1-10' SCREEN, 1-10' RISER) 2.0 FT. STICKUP; WELL PIPE SUNK TO 19.1 FT. CONTINUED TO ADD # 1-Q SAND AND RAISED WELL PIPE BOTTOM TO 18.6 FT. BELOW GROUND SURFACE. ADDED # 1-Q SAND TO 7.0 FT.; ADDED PELLETS TO 3.0 FT.; ADDED BENTONITE POWDER TO 2.0 FT.
0.0	UPPER CLAY TILL VERY STIFF TO FIRM, DARK BROWN, SILTY CLAY, SOME FTOC SAND, GRAY WEATHERING ALONG VERTICAL FRACTURES		REMOVED AUGERS; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; INSTALLED 8" x ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF PROTECTIVE CASING WITH # 4-Q SAND; WEED HOLES WERE PUT IN CASING FOR
306.8	UPPER SILT TILL LOOSE, GRAY BROWN TO SAND, SOME F GRAVEL, LITTLE SILTY CLAY		(CONTINUED ON NEXT PAGE)
304.5	GLACIOFLUVIAL CLAY VERY SOFT TO SOFT GRAY BROWN, GRAY AND SILTY CLAY, SOME FTOC SAND		WELL DEVELOPMENT NOTES
300.8	END OF SAMPLING AUGERED TO 19.1 FT.		DATE DEVELOPED: 5-14-86 TO 7-30-86 DEVELOPMENT METHOD: AIR LIFT VOLUME PURGED: 28.4 GAL
			FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.
			NOTE: A 8.8 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2, 5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY.

**Golder  
Associates**

NYSDEC OHMS Document No. 201469732,00043

**SUBJECT CWM/WELLS/MODEL CITY**

**MW 2-15**

Job No. **855-3051**

Made by **GR**

Date **5-13-86**

Ref.

Checked **DJM**

Sheet **2 of 2**

Reviewed **JFC**

DRAINAGE; PROTECTIVE POSTS WERE PLACED AROUND WELL; A CONCRETE  
PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEED  
HOLES WERE PUT IN CASING; A DEDICATED STAINLESS STEEL BAULER  
WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

JOB NO. 853-3051 GA. INSP. LEL PROJECT CWM/WELLS/MODEL CITY BORING NO. MW2-1D  
 DEPTH HOLE 46.9 FT DEPTH WL. 6.43 FT. DRILLING METHOD HOLLOW STEM AUGERS 4 1/4 ID SHEET 1 OF 1  
 TEMP 60° F TIME WL. 9/22/86 DRILLING COMPANY ENPIRE SOILS INVESTIGATIONS, INC SURFACE ELEV. 320.5 FT  
 WEATHER CLOUDY DRILL RIG CME 55 DRILLER M GAUDY DATUM MSL  
 COORDINATES N8475.58 E9008.43 WT. SAMPLER HAMMER 140 LBS DROP 30 IN STARTED 9:50 / 9/22/86  
 LOCATION 4.5 FT. N OF MW2-15 WT. CASING HAMMER 300 LBS DROP 30 IN COMPLETED 12:5 / 9/22/86

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES			REMARKS	
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC./ATT		
300.5 20.0	FOR COMPLETE SOILS DESCRIPTION AT THIS LOCATION ALSO SEE BORING LOG MW2-15						INSTALLED 10 IN. DIAM PVC SURFACE CASING TO 19.7 FT. AUGERED TO 200 FT. NO SAMPLING	
289.5 31.0	VERY SOFT TO SOFT, GRAY, CLAY, SOME F TO C SAND, LITTLE TO SOME SILT, WET.	CL TO CH	8	1	DO	3-4-4-4	12/24	GLACIOLACUSTRINE CLAY AT 25.6 AND 25.8 FT. RED BROWN SILT LENSES AT 27.2 AND 27.4 FT., SILT LENSES AT 30.6 AND 30.8 FT. COMPACT BROWN SILT LENSES
			6	2	DO	2-3-3-4	24/24	
			11	4	DO	1-4-7-7	24/24	
			26	5	DO	9-10-16-5	24/24	
			20	7	DO	2-9-11-11	16/24	
284.5 36.0	COMPACT, GRAY BROWN SILT, AND F SAND, LITTLE C SAND.	ML	16	9	DO	6-8-8-11	23/24	MIDDLE SILT TILL
			19	12	DO	9-11-8-8	24/24	SOFT GRAY CLAYEY SILT FROM 32.0 TO 32.5 FT.
275.2 45.2	COMPACT TO VERY DENSE, GRAY BROWN TO BROWN, F SAND, AND SILT, TRACE TO LITTLE F GRAVEL, SATURATED, DILATANT.	SM	93	15	DO	20-38-55-90	24/24	GLACIOLACUSTRINE SILT/SAND
			120	19	DO	20-20-100	21/18	36.9-37.2 FT. VERY DENSE BROWN SILT
			126	21	DO	23-51-75-100	24/21	39.7-40.0 FT. NO SAMPLE
			85	23	DO	15-35-50-100	24/24	41.7-42.0 FT., NO SAMPLE
274.3 46.2	VERY DENSE, RED BROWN F TO C SAND, SOME GRAVEL, SOME SILTY CLAY, GREEN GRAY SHALE FRAGMENTS, WET	ML	156	26	DO	37-56-100	24/18	44.0-45.0 FT., NO SAMPLE
	END OF SAMPLING AUGERED TO 46.9							BASAL RED TILL
								END OF SAMPLING
								INSTALLED MW2-1D SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

**MONITORING WELL INSTALLATION LOG**

JOB NO. B53-3051 PROJECT GWM / WELLS / MODEL CITY WELL NO. MW2-1D SHEET 1 OF 2  
 GA INSP. LEL DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID GROUND ELEV. 320.5 FT WATER DEPTH 6.43 FT  
 WEATHER CLOUDY DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS INC. COLLAR ELEV. 322.95 FT DATE/TIME 9-22-86  
 TEMP. 63° F DRILL RIG CME 55 DRILLER M. GAUDY STARTED 8:55 6-12-86 COMPLETED 2:55 6-12-86  
 LOCATION/COORDINATES 4.9 FT. NORTH OF MW2-1S / N 8475 5B E 900843

**MATERIALS INVENTORY**

WELL CASING 2.0 IN DIA. 38.0 FT WELL SCREEN 2.0 IN DIA. 10.6 FT BENTONITE SEAL PELLETS 40 LBS  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD TREMIE LINE & WASH  
 JOINT TYPE FLUSH TEFLON VITON SLOT SIZE 0.006 INCH FILTER PACK QTY. 12.9 LBS. 210 LBS.  
 GROUT QUANTITY \_\_\_\_\_ CENTRALIZERS NONE FILTER PACK TYPE #1-Q SAND  
 GROUT TYPE BENTONITE DRILLING MUD TYPE NONE INSTALLATION METHOD TREMIE LINE & WASH

ELEV./DEPTH (FT)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
320.5	GROUND SURFACE	WELL CASING 2.5 FT. STICKUP	AUGHERED TO 9.7 FT. WITH 12 INCH (O.D.) AUGERS; GROUTED 10 INCH PVC CASING TO 9.7 FT. (TOOK GROUT SAMPLE) AUGERED TO 46.9 FT. WITH 4 1/4 (I.D.) AUGERS; PULLED AUGERS, INSTALLED 6" TEMPORARY STEEL CASING TO 46.9 FT. WASHED OUT - OPEN 46.9 FT. TREMIED (WITH WATER) #4-Q SAND TO 46.1 FT. B.G.S. (TOOK SAMPLE); INSTALLED WELL PIPE (1-10 SCREEN, 1-3 RISER, 1-5 RISER, 3-10 RISERS) 2.5 FT. STICKUP; TREMIED #1-Q SAND; WHILE REMOVING A 5' SECTION OF 6" STEEL CASING, THE WELL 2.25' ALSO CAME UP TO - 7 FT. ABOVE GROUND SURFACE; WELL WAS WASHED DOWN STICKUP BACK TO 2.5 FT. ABOVE GROUND SURFACE; CONTINUED TO TREMIE #1-Q SAND TO 34.0 FT.
0.0	UPPER CLAY TILL VERY STIFF TO FIRM DARK BROWN SILTY CLAY, SOME F TO C SAND, GRAY WEATHERING ALONG VERTICAL FRACTURES	12" ALUM. BORING	(CONTINUED ON NEXT PAGE)
306.5	UPPER SILT TILL LOOSE, GRAY BROWN, FINE SAND, SOME F GRAVEL, LITTLE SILTY CLAY	19.7'	<b>WELL DEVELOPMENT NOTES</b>
304.2	GLACIOLAUSTRINE CLAY VERY SOFT TO SOFT, GRAY BROWN, CLAY, AND SILTY CLAY, SOME F TO C SAND	DEIVEN 6" TEMPORARY CASED HOLE	DATE DEVELOPED: 7-7-86 TO 7-23-86
16.3			DEVELOPMENT METHOD: AIR LIFT
14.0			VOLUME PUMPED: 69.5 GAL
304.2			FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE
289.5	MIDDLE SILT TILL COMPACT, GRAY BROWN, SILT AND F SAND, LITTLE C SAND	28.0'	
31.0		28.0'	
284.5	GLACIOLAUSTRINE SILT/SAND COMPACT TO VERY DENSE, GRAY BROWN TO BROWN, F SAND, AND SILT TRACE TO LITTLE F GRAVEL, DILUTANT	28.5'	
36.0		28.5'	
275.3	BASAL RED TILL VERY DENSE RED BROWN FINE SAND, SOME GRAVEL, SOME SILTY CLAY	44.1'	NOTE: A 0.3 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2.5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY.
45.2		44.1'	
274.3		46.9'	
46.2	END OF SAMPLING AUGERED TO 46.9 FT.	46.9'	

**Golder Associates**

SUBJECT CWM/WELLS/MODEL CITY MW 2-1D		
Job No. 853-3051	Made by LEL	Date 6-12-86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

B.G.S.: USED 210 LBS OF #1-Q SAND; THIS SMALL AMOUNT OF SAND WAS BELIEVED TO BE THE RESULT OF SOME AUGER HOLE CAVE IN; TREMIED BENTONITE PELLETS TO 30.0 FT. B.G.S.; TREMIED #4-Q SAND TO 29.0 FT. B.G.S.; MIXED GROUT; 1ST BATCH 65 LBS BENTONITE/ 40 GAL H2O, 2ND BATCH 40 LBS BENTONITE/ 30 GAL. H2O, 3RD BATCH 30 LBS. BENTONITE/ 18 GAL. H2O; FILLED TO GROUND SURFACE; REMOVED 6" STEEL CASING; GROUT AT 1.0 FT. B.G.S.; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8" Ø ALUMINUM PROTECTIVE CASING; INTERIOR OF CASING FILLED WITH #4-Q SAND; WEEP HOLES PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PUT AROUND WELL ON THE SITE AND NEW WEEP HOLES WERE PUT IN CASING; A WELL WIZARD WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

# Boring Log

JOB NO. <u>853-3051</u>	GA. INSP. <u>LEL</u>	PROJECT <u>CWM/WELLS/NOVEL CITY</u>	BORING NO. <u>MW3-25</u>
DEPTH HOLE <u>180 FT</u>	DEPTH WL. <u>129 FT</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS-4 1/4 ID</u>	SHEET <u>1</u> OF <u>1</u>
TEMP <u>71° F</u>	TIME WL. <u>9/23/86</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS, INC.</u>	SURFACE ELEV. <u>319.5 FT</u>
WEATHER <u>PARTLY CLOUDY</u>	DRILL RIG <u>CME 45</u>	DRILLER <u>K. SWINNICH</u>	DATUM <u>MSL</u>
COORDINATES <u>N8221.25 E9374.06</u>	WT. SAMPLER HAMMER <u>140 LBS</u>	DROP <u>30 IN</u>	STARTED <u>1:45 PM</u>
LOCATION <u>---</u>	WT. CASING HAMMER <u>300 LBS</u>	DROP <u>30 IN</u>	COMPLETED <u>3:05 PM</u>

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS.	BLOWS/FOOT	SAMPLES				REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC./ATT	
319.5	GROUND SURFACE							GROUND SURFACE
319.2 0.3	DARK BROWN, F-C SAND TO CLAYEY SILT	4	33	1	DO	10-18-15-10	15/24	TOPSOIL
	COMPACT TO DENSE, GRAY BROWN MOTTLED, CLAYEY SILT, SOME F TO C SAND, DRY		22	2	DO	9-10-12-10	23/24	UPPER CLAY TILL
			39	5	DO	19-21-18-12	23/24	3.7-3.9 FT., DISCOLORED DARK GRAY CLAYEY SILT, ORGANIC CHEMICAL ODOR
			41	7	DO	16-19-22-32	24/24	4.3-5.8 FT., COMPACT TAN SILT AND F SAND
			25	10	DO	10-12-13-7	22/24	6.0-7.8 FT., FIRM TO STIFF BROWN MOTTLED SILTY CLAY, SOME F TO C SAND
				9	12	DO	2-3-6-6	24/24
309.8 9.7	SOFT TO VERY SOFT, GRAY BROWN TO GRAY, SILTY CLAY TO CLAY, LITTLE TO SOME F TO C SAND		10	13	DO	5-5-5-5	23/24	GLACIOLACUSTRINE CLAY AT 10.1 FT, 10.8 FT, 11.2 FT AND 11.8 FT. SAND AND SILT LENSES
			0	15	DO	WH-WH-WH-3	24/24	12.5-13.0 FT., LOOSE TAN SILT AND SAND LAYER
301.5 180	END OF SAMPLING AUGERED TO 17.0 FT.		6	16	DO	1-3-3-3	24/24	END OF SAMPLING
								INSTALLED MW3-25 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

# MONITORING WELL INSTALLATION LOG

NYSDEC OHMS Document No. 201469232-00043

JOB NO. <u>B53-3051</u>	PROJECT <u>CWM / WELLS / MODEL CITY</u>	WELL NO. <u>MWB-25</u>	SHEET <u>1</u> OF <u>1</u>
SA INSP. <u>LEL</u>	DRILLING METHOD <u>NO-HOW STEM AUGERS - 4 1/4" ID</u>	GROUND ELEV. <u>319.5 FT</u>	WATER DEPTH <u>1.29 FT</u>
WEATHER <u>CLOUDY</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS INC.</u>	COLLAR ELEV. <u>320.92 FT</u>	DATE/TIME <u>9-23-86</u>
TEMP. <u>71°F</u>	DRILL RIG <u>CME 45</u>	DRILLER <u>K. SWINNICH</u>	STARTED <u>8:10 9-15-86</u>
LOCATION/COORDINATES <u>N 8221.25 E 9374.06</u>		COMPLETED <u>4:05 9-15-86</u>	

## MATERIALS INVENTORY

WELL CASING <u>2.0</u> IN DIA. <u>10.0</u> FT.	WELL SCREEN <u>2.0</u> IN DIA. <u>7.9</u> FT.	BENTONITE SEAL <u>PELLETS 4.0' DEEP</u>
CASING TYPE <u>304 STAINLESS STEEL</u>	SCREEN TYPE <u>304 STAINLESS STEEL</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>
JOINT TYPE <u>THREADED TAPER O-RINGS</u>	SLOT SIZE <u>0.006 INCH</u>	FILTER PACK QTY <u>10.0 L.F.; 2.5 LBS.</u>
GROUT QUANTITY <u>NA</u>	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1-Q SAND</u>
GROUT TYPE <u>NA</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
319.5	GROUND SURFACE		AUGERED TO 17.0 FT., ADDED #1-Q SAND TO 16.5 FT. BELOW GROUND SURFACE (SAMPLE TAKEN); INSTALLED WELL PIPE (1-2' SCREEN 1-5' SCREEN 1-0' RISER) 1.4 FT. STICKUP. ADDED #1-Q SAND TO 7.0 FT. ADDED PELLETS TO 3.0 FT. ADDED BENTONITE POWDER TO 2.0 FT. REMOVED AUGERS. MIXED CEMENT GROUT FILLED TO GROUND SURFACE; PUT ON 8" ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF CASING WITH #4-Q SAND; WEED HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL. A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEED HOLES WERE PUT IN CASING. A DEDICATED STAINLESS STEEL BAILER WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.
0.0	TOP SOIL DARK BROWN, F TO C SAND TO CLAYEY SILT		
319.2	0.5 UPPER CLAY TILL COMPACT TO DENSE, GRAY BROWN MOTTLED, CLAYEY SILT, SOME F TO C SAND. COMPACT SAND AND SILT, SATURATED, FROM 8.1-9.6 FT.		
309.8	9.7 GLACIOLACUSTRINE CLAY SOFT TO VERY SOFT, GRAY BROWN TO GRAY, SILTY CLAY TO CLAY, LITTLE TO SOME F TO C SAND. OCCASIONAL THIN SILT LENSES.		
301.5	18.0 END OF SAMPLING AUGERED TO 17.0 FT.		
18.0			
			<b>WELL DEVELOPMENT NOTES</b>
			DATE DEVELOPED: 5-19-86 TO 7-30-86
			DEVELOPMENT METHOD: AIR LIFT
			VOLUME PURGED: 43.7 GAL.
			FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.
			NOTE: A 0.8 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2.5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY.



JOB NO. B53-3051 GA. INSP. FWS/LEL PROJECT CWM/WELLS/MODEL CITY BORING NO. MW4-25  
 DEPTH HOLE 22.0 FT. DEPTH WL. 3.69 FT. DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID SHEET 1 OF 1  
 TEMP 55°/73° F TIME WL. 9/23/86 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC SURFACE ELEV. 319.9 FT  
 WEATHER RAIN/SUNNY DRILL RIG ACKER AD-2/CME 45 DRILLER B. GENOVESE DATUM MSL  
 COORDINATES N 8123.96 E 9664.84 WT. SAMPLER HAMMER 140 LBS. DROP 50 IN. STARTED 15-19-  
 LOCATION --- WT. CASING HAMMER 300 LBS. DROP 30 IN. COMPLETED 1-40 15-22-86

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOW/FOOT	SAMPLES			REMARKS	
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC/ATT		
319.9	GROUND SURFACE						INSTALLED 10 IN. DIAM PVC SURFACE CASING TO 6.0 FT.	
0.0	SOFT TO FIRM, DARK BROWN, CLAYEY SILT SOME F TO C SAND, SMALL FIBROUS ROOTS.	CL	22	1	DO	1-11-11-8	10/24	TOPSOIL AND FILL
317.9			2.0	62	2	DO	11-24-38-36	4/24
	FIRM TO STIFF, GRAY BROWN, CLAYEY SILT, SOME F-C SAND	CL	42	3	DO	14-24-18-14	4/24	LAYER OF VERY SOFT SILTY CLAY AT 4.0 FT.
			31	4	DO	7-13-18-18	20/24	GRAY WEATHERING ALONG VERTICAL FRACTURES FROM 6.0 TO 10.0 FT.
			25	5	DO	10-12-13-14	24/24	
309.9			10.0	11	6	DO	3-4-7-7	22/24
	FIRM TO VERY SOFT, GRAY BROWN TO GRAY, SILTY CLAY TO CLAY, SOME TO LITTLE F-C SAND.	CL	34	8	DO	7-14-20-13	24/24	13.8-14.0 FT., TAN SILT AND SAND LENSE
			9	9	DO	3-3-6-8	6/24	
			15	10	DO	7-7-8-5	24/24	19.2-19.8 FT., SILT AND SAND LENSES MIXED WITH CLAY
			18	12	DO	WH-7-11-10	22/24	20.0-22.0 FT., BROWN DILATENT SILT LENSES
297.9			22.0	9	13	DO	3-5-4-4	22/24
	END OF SAMPLING AUGERED TO 18.0 FT.							END OF SAMPLING
								INSTALLED MW4-25 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

# MONITORING WELL INSTALLATION LOG

NYSDEC OHMS Document No. 201469232-00643

JOB NO. <u>853-3051</u>	PROJECT <u>GWM / WELLS / MODEL CITY</u>	WELL NO. <u>MW4-25</u>	SHEET <u>1</u> OF <u>2</u>
GA INSP. <u>FWS / LEL</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS - 4 1/4" ID</u>	GROUND ELEV. <u>319.9 FT.</u>	WATER DEPTH <u>3.69 FT.</u>
WEATHER <u>RAIN / SUNNY</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS INC.</u>	COLLAR ELEV. <u>321.04 FT.</u>	DATE/TIME <u>9-23-86</u>
TEMP <u>55°F / 75°F</u>	DRILL RIG <u>ACKER AD-2 / CME 45</u>	J. GENOVESE DRILLER <u>R. KERNST</u>	
LOCATION / COORDINATES <u>N 8123.96 E 9664.84</u>		STARTED <u>10:30</u>	COMPLETED <u>3:15</u>
		TIME / DATE	TIME / DATE

## MATERIALS INVENTORY

WELL CASING <u>2.0</u> in. dia. <u>80</u> ft.	WELL SCREEN <u>2.0</u> in. dia. <u>10.6</u> ft.	BENTONITE SEAL <u>PELLETS 4.0' DEEP</u>
CASING TYPE <u>304 STAINLESS STEEL</u>	SCREEN TYPE <u>304 STAINLESS STEEL</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>
JOINT TYPE <u>THREADED</u> <span style="font-size: x-small;">FLUSH TIGHTEN VITON O-RINGS</span>	SLOT SIZE <u>0.006 INCH</u>	FILTER PACK QTY. <u>12.7 L.F. 350 LBS</u>
GROUT QUANTITY <u>35 GAL. H<sub>2</sub>O / 50 LBS</u>	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1-0 SAND</u>
GROUT TYPE <u>BENTONITE</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
(FT.)	NOTE: FOR COMPLETE SOIL DESCRIPTIONS, SEE BORING LOG MW4-25		AUGERED TO 5.0 FT. WITH 12 INCH (O.D.) AUGERS.	
319.9	GROUND SURFACE		12" Ø AUGER BORING	GROUTED HOLE TO 5.0 FT. INSTALLED 10" Ø PVC CASING.
0.0	TOP SOIL AND FILL SOFT TO FIRM, DARK BROWN CLAYEY SILT, SOFT F-C SAND		5.0' 12" Ø AUGER BORING	TO 5.0 FT. BELOW GROUND SURFACE; WASHED OUT CASING AND REMOVED WATER.
317.9	UPPER CLAY TILL		5.0' 12" Ø AUGER BORING	AUGERED TO 18.0 FT. WITH 4 1/4" (I.D.) AUGERS. ADDED #1-0 SAND TO 17.5 FT. BELOW GROUND SURFACE; INSTALLED WELL PIPE (1-10' SCREEN 1-3' RISER 1-5' RISER) 2.1 FT. STICKUP; ADDED #1-0 SAND TO 5.3 FT. (TOOK SAMPLE); ADDED PELLETS TO 1.3 FT.
2.0	FIRM TO STIFF GRAY BROWN, CLAYEY SILT; SOME F-C SAND. GRAY WEATHERING ALONG VERTICAL FRACTURES FROM 6.0-10.0 FT.		5.0' 12" Ø AUGER BORING	REMOVED AUGERS; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8" Ø ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF PROTECTIVE CASING WITH #4-Q SAND. WEEP HOLES WERE PUT IN CASING FOR DRAINAGE.
309.9	GLACIOFLUVIAL CLAY		10.0' 8" Ø BOREHOLE	(CONTINUED ON NEXT DATE)
10.0	FIRM TO VERY SOFT, GRAY BROWN TO GRAY, SILTY CLAY TO CLAY; SOME TO LITTLE F-C SAND. OCCASIONAL SILT LENSES	10.0' 8" Ø BOREHOLE	<b>WELL DEVELOPMENT NOTES</b>	
2979	END OF SAMPLING AUGERED TO 18.0 FT.	11.0' 8" Ø BOREHOLE	DATE DEVELOPED: <u>5-28-86</u> TO <u>7-30-86</u> DEVELOPMENT METHOD: <u>AIR LIFT</u> VOLUME PURGED: <u>32.4 GAL.</u>	
22.0			FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.	
			NOTE: A 0.3 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2.5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.25, 9.75, 10.375 FT. IN LENGTH, RESPECTIVELY.	

**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		MW 4-25
Job No. 853-3051	Made by LEL	Date 5-28-86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

PROTECTIVE POSTS WERE PUT AROUND WELL. A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEED HOLES WERE PUT IN CASING. A DEDICATED STAINLESS STEEL BAILER WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

# Boring Log

JOB NO. 853-3051 GA. INSP. LEL PROJECT CWM/WELLS/MODEL CITY BORING NO. MWS-15  
 DEPTH HOLE 24.0 FT DEPTH WL. 4.82 FT DRILLING METHOD HOLLOW STEM AUGERS-4 1/4" ID SHEET 1 OF 1  
 TEMP 70° F TIME WL. 9/22/86 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS INC SURFACE ELEV. 325.2 FT  
 WEATHER SUNNY DRILL RIG CME 45 DRILLER J. LAMM DATUM MSL  
 COORDINATES N8739.48 E9958.07 WT. SAMPLER HAMMER 140 LBS. DROP 30 IN. STARTED 2:00 / 6-4-86  
 LOCATION 5.5 FT. E OF MWS-1D WT. CASING HAMMER 300 LBS. DROP 30 IN. COMPLETED 8:30 / 6-5-86

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES			REMARKS		
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC./ATT			
325.2	GROUND SURFACE						GROUND SURFACE		
324.9 0.3	TOPSOIL WITH PLANT MATERIAL	CL	7	1	DO	3-5-4-3	15/24	TOPSOIL	
	FIRM TO VERY STIFF, BROWN MOTTLED, CLAYEY SILT, SOME F TO M SAND, TRACE GRAVEL	CL	10	2	DO	4-5-5-5	16/24	UPPER CLAY TILL SILT LENSE AT 0.5 FT FROM GROUND SURFACE	
			9	3	DO	4-3-6-6	22/24		
			16	5	DO	8-9-7-8	24/24		
316.9 8.3			COMPACT, BROWN, SILT, AND STIFF, BROWN, CLAYEY SILT, SOME F TO C SAND, LITTLE TO TRACE GRAVEL, DILATENT SILT.	ML	70	6	DO		10-20-50-13
	28	8			DO	5-8-20-24	24/24		
	39	11			DO	19-21-18-24	24/24		
	25	12			DO	9-14-11-8	17/24		
	16	13			DO	8-8-8-7	19/24	16.2-17.8 FT, SOFT BROWN GRAY CLAY LITTLE F TO C SAND	
	10	15			DO	3-4-6-10	21/24		
309.7 20.5	SOFT TO FIRM, GRAY BROWN, CLAY, SOME TO LITTLE F TO M SAND.	CL	6	17	DO	3-4-2-4	18/24	GLACIOLACUSTRINE CLAY 22.0-24.0 FT, 2.0 INCH LIGHT BROWN SILT LENSE DILATENT WET	
301.2 24.0			5	19	DO	3-4-1-4	19/24		
	END OF SAMPLING AUGERED TO 23.9 FT.							END OF BORING	
								INSTALLED MWS-15 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.	

# MONITORING WELL INSTALLATION LOG

NYSDDEC FORMS Document No. 20146923Z-00043

JOB NO. B53-3051 PROJECT GWM / WELLS / MODEL CITY WELL NO. MWS-15 SHEET 1 OF 2  
 SA MSP PMS DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID GROUND ELEV 325.2 FT WATER DEPTH 4.82 FT  
 WEATHER OVERCAST DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. COLLAR ELEV 327.74 FT DATE/TIME 9-22-86  
 TEMP 60° F DRILL RIG CME 45 DRILLER J. LAMM STARTED 8:45 6-9-86 COMPLETED 9:53 6-9-86  
 LOCATION/COORDINATES 55 FT. EAST OF MWS-10 / N8739 48 E 9938.07

## MATERIALS INVENTORY

WELL CASING <u>2.0</u> IN DIA. <u>10.0</u> LI	WELL SCREEN <u>2.0</u> IN DIA. <u>15.9</u> LI	BENTONITE SEAL <u>PELLETS 4.0' DEEP</u>
CASING TYPE <u>304 STAINLESS STEEL</u>	SCREEN TYPE <u>304 STAINLESS STEEL</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>
JOINT TYPE <u>FLUSH THREADED</u> <u>TEFLON TAPE</u> <u>VITON O-RINGS</u>	SLOT SIZE <u>0.006 INCH</u>	FILTER PACK QTY <u>17.9 L.F. 379.105</u>
GROUT QUANTITY <u>NA</u>	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1-0 SAND</u>
GROUT TYPE <u>NA</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
325.2	GROUND SURFACE		AUGERED TO 23.9 FT. WATER LEVEL IN BOREHOLE AT 4.7 FT. ADDED #1-0 SAND (DRY) TO 23.9 FT. HAD TROUBLE WITH SAND BRIDGING; ADDED 5 GALS. OF WATER; INSTALLED WELL PIPE (1-5\" SCREEN 1-10\" SCREEN 1-10\" RISER) 2.5 FT. STICKUP; ADDED #1-0 SAND DRY. STILL HAD TROUBLE WITH BRIDGING; ADDED 5 MORE GALS. OF WATER; MADE A SAND SLURRY AND CONTINUED TO ADD SAND TO 6.0 FT. BELOW GROUND SURFACE (TOOK DRY SAMPLE); ADDED PELLET TO 2.0 FT.; REMOVED AUGER MIXED CEMENT GROUT FILLED TO GROUND SURFACE; PUT ON 8\" ALUMINUM PROTECTIVE CASING; PUT WEED HOLES IN CASING FOR DRAINAGE; FILLED INTERIOR	
0.0 324.9 0.3	TOPSOIL UPPER CLAY TILL FIRM TO VERY STIFF, BROWN MOTTLED, CLAYEY SILT, SOME F TO M SAND, TRACE GRAVEL			(CONTINUED ON NEXT PAGE)
316.9 8.3	UPPER SILT TILL COMPACT, BROWN, SILT, AND STIFF, BROWN, CLAYEY SILT, SOME F-C SAND, LITTLE TO TRACE GRAVEL, DILATANT SILT			<b>WELL DEVELOPMENT NOTES</b>
304.7 20.5	GLACIOLACUSTRINE CLAY SOFT TO FIRM, GRAY BROWN, CLAY, SOME TO LITTLE F TO M SAND			DATE DEVELOPED: <u>6-9-86</u> TO <u>9-4-86</u>
301.2 24.0	END OF SAMPLING AUGERED TO 23.9 FT.			DEVELOPMENT METHOD: <u>AIR LIFT</u> VOLUME PURGED: <u>46.2 GAL</u>
				FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.
			NOTE: A 8.5 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2, 5 AND 10 FT. S&S SECTIONS ARE ACTUAL 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY.	

**Golder  
Associates**

<b>SUBJECT</b> CWM/WELLS/MODEL CITY		MW5-15
Job No. 853-3051	Made by PMS	Date 6.6.86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

OF PROTECTIVE CASING WITH #4-Q SAND; PROTECTIVE POSTS WERE PLACED AROUND WELL; A CONCRETE PAD WAS LATER RAISED AROUND WELL BY THE SITE AND NEW WEED HOLES WERE PUT IN CASING; A DEDICATED STAINLESS STEEL BAILER WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

Boring Log

JOB NO. 853-3051 GA. INSP. LEL PROJECT CWM/WELLS/MOORE CITY BORING NO. MWS-10  
 DEPTH HOLE 54.6 FT. DEPTH WL. 10.5 FT. DRILLING METHOD HOLLOW STEM AUGERS 4 1/4" ID SHEET 1 OF 1  
 TEMP 58° F TIME WL. 9/22/86 DRILLING COMPANY EMPRE SOILS INVESTIGATIONS, INC. SURFACE ELEV. 324.8 FT.  
 WEATHER CLOUDY DRILL RIG CME 55 DRILLER M. GAUDY DATUM MSL  
 COORDINATES N 8740.29 E 9952.51 WT. SAMPLER HAMMER 140 LBS. DROP 30 IN. STARTED 10:50 AM  
 LOCATION ~5.5 FT. W. OF MWS-13 WT. CASING HAMMER 300 LBS. DROP 30 IN. COMPLETED 4:25 PM

ELEV. DEPTH (FT.)	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	SAMPLES				REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC./ATT	
300.8 24.0	FOR COMPLETE SOILS DESCRIPTION AT THIS LOCATION ALSO SEE BORING LOG MWS-15							INSTALLED 10 IN. DIAM PVC SURFACE CASING TO 20.0 AUGERED TO 24.0 FT., NO SAMPLING
287.1 37.7	VERY SOFT TO SOFT, GRAY, CLAY, SOME F TO C SAND.	CL TO CH	7	1	DO	2-3-4-5	14/24	GLACIOLACUSTRINE CLAY- 28.0-32.2 FT., OCCASIONAL GRAY AND BROWN SILT LENSE. 33.0-34.0 FT., OCCASIONAL RED BROWN SILT LENSE AT 34.3 FT., 1 IN. GRAY SAND LENSE. 36.3-37.8 FT., OCCASIONAL BROWN SILT LENSE (DILATENT).
			11	2	DO	5-5-6-6	24/24	
			5	3	DO	2-2-3-6	18/24	
			14	4	DO	7-8-6-6	16/24	
			12	6	DO	6-6-6-5	20/24	
			3	7	DO	2-1-2-2	24/24	
			6	8	DO	1-2-4-5	24/24	
			8	9	DO	11-3-5-18	15/24	
			95	10	DO	10-30-65-48	24/24	
			99	11	DO	25-47-52-80	14/24	
271.5 53.3 270.4 54.4	COMPACT TURNING TO VERY DENSE, GRAY TO RED BROWN, F SAND, AND TO TRACE SILT, TO SILT, AND F SAND, SOME M TO C GRAY SAND, LITTLE GRAVEL.	SM	7100	12	DO	100/.3	6/3	44.3-46.5 FT., NO SAMPLE 47.0-48.0 FT., NO SAMPLE 51.0-51.5 FT., NO SAMPLE 52.5-53.5 FT., NO SAMPLE BASAL RED TLL
			117	13	DO	57-60 *	12/6	
			20	14	DO	2-7-13-19 *	24/24	
			76	15	DO	15-61 *	24/12	
			7100	16	DO	21-25-60/4 *	24/17	
			7100	17	DO	50-100/4 *	11/11	
			7100	18	DO	50-100/4 *	11/11	
271.5 53.3 270.4 54.4	VERY DENSE, RED BROWN, SILT, SOME F-C SAND, LITTLE GREEN GRAY AND RED BROWN SHALE FRAGMENTS.	ML	>100	27	DO	50-100/4 *	11/11	BASAL RED TLL
	END OF SAMPLING AUGERED TO 54.6 FT.							END OF SAMPLING
								INSTALLED MWS-10 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

# MONITORING WELL INSTALLATION LOG

JOB NO. 853-3051 PROJECT CWM / WELLS / MODEL CITY WELL NO. MW5-1D SHEET 1 OF 2  
 GA M&P LEL DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID GROUND ELEV. 324.8 FT WATER DEPTH 0.47 FT  
 WEATHER SUNNY DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. COLLAR ELEV. 326.89 FT DATE/TIME 9-22-86  
 TEMP. 54°F DRILL RIG CME 55 DRILLER M. GAUDY STARTED 11:20 6:20 8:56 COMPLETED 4:20 6:20 8:56  
 LOCATION/COORDINATES 2.0 FT. WEST OF MW5-1S / N 8740 29 E 9952.51 TIME / DATE TIME / DATE

### MATERIALS INVENTORY

WELL CASING 2.0 in dia. 400 ft. WELL SCREEN 2.0 in dia. 16.2 ft. BENTONITE SEAL PELLETS 30' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD TREMIE LINE WASH  
 JOINT TYPE FLUSH TAPER W/ TON O-RINGS SLOT SIZE 0.006 INCH FILTER PACK QTY 18.6 LF, 40 LBS.  
 GROUT QUANTITY 80 GAL CENTRALIZERS NONE FILTER PACK TYPE #1-Q SAND  
 GROUT TYPE BENTONITE DRILLING MUD TYPE NONE INSTALLATION METHOD TREMIE LINE WASH

ELEV./DEPTH (FT.)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
324.8	GROUND SURFACE	<p style="font-size: small;">WELL CASING 2.0" STICKUP                      5" Ø ALUMINUM CASING WITH LOCK 2.5 FT STICKUP                      4" Ø SAND                      CEMENT GROUT                      2" Ø TYP 304 S.S. RUBBER PIPE                      BENTONITE GROUT                      10" PVC CASING                      12" Ø AUGER DOERING                      DRIVEN 6" Ø TEMPORARY CAPPED HOLE                      4" Ø SAND                      3" Ø BENTONITE PELLET SEAL                      2" Ø TYP 304 S.S. RUBBER                      21" Ø SAND                      2" Ø TYP 304 S.S. RUBBER                      24" Ø SAND</p>	AUGERED TO 20.0 FT WITH 12 INCH (O.D.) AUGERS. GROUTED 12" Ø PVC CASING TO 20.0 FT. B.G.S. (TOOK SAMPLE); AUGERED TO 54.6 FT WITH 4 1/4" I.D. AUGERS; PULLED AUGERS; INSTALLED 6" Ø TEMPORARY STEEL CASING; WASHED OUT - OPEN TO 54.6 FT. B.G.S.	
0.0 324.5 0.5	TOPSOIL			TREMIED (WITH WATER) #4-Q SAND TO 54.1 FT. B.G.S. (TOOK DRY SAMPLE); INSTALLED WELL PIPE (3-5' SCREENS, 4-10' RISERS) 2.1 FT STICKUP.
316.5 8.3	UPPER CLAY TILL FIRM TO VERY STIFF, BROWN, MOTTLED, CLAYEY SILT, SOME F TO M SAND, TRACE GRAVEL			TREMIED #1-Q SAND TO 36.0 FT. B.G.S. (TOOK DRY SAMPLE); TREMIED BENTONITE PELLETS TO 31.0 FT. B.G.S.
304.5 20.5	UPPER SILT TILL COMPACT, BROWN, SILT, AND STIFF, BROWN, CLAYEY SILT, SOME F-C SAND, LITTLE TO TRACE GRAVEL, DILATANT SILT			TREMIED #4-Q SAND TO 30.0 FT. B.G.S.; M.C.E. GROUT 1ST BATCH 65 LBS BENTONITE/40 GAL. - 10 2ND BATCH 60 LBS.
287.1 37.7	GLACIOLACUSTRINE CLAY SOFT TO FIRM, GRAY BROWN, CLAY, SOME TO LITTLE F-TOM SAND, OCCASIONAL THIN SILT LENSES, DILATANT			(CONTINUED ON NEXT PAGE)
271.5 53.5	GLACIOLACUSTRINE SILT/SAND COMPACT TURNING TO VERY DENSE, GRAY TO RED BROWN, F SAND, AND TO TRACE SILT, SOME M TO C SAND			WELL DEVELOPMENT NOTES DATE DEVELOPED: 7-10-86 TO 7-24-86 DEVELOPMENT METHOD: AIR LIFT VOLUME PURGED: 42.9 GAL.
270.4 54.4	BASAL RED TILL VERY DENSE, RED BROWN, SILT, SOME F-C SAND, LITTLE SHALE FRAGMENTS			FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.
270.4 54.4	END OF SAMPLING AUGERED TO 54.6 FT.			NOTE: A 8.3 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2, 5, AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 5.325, 10.325 FT. IN LENGTH RESPECTIVELY.



**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		MWS-ID
Job No. 853-3051	Made by LEL	Date 6-20-86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

BENTONITE / 40 GAL. H<sub>2</sub>O; REMOVED 6"  $\Phi$  STEEL CASING; GROUT AT 20 FT. B.G.S.; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8"  $\Phi$  ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF CASING WITH #4-Q SAND; WEEP HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE FOSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEEP HOLES WERE PUT IN CASING; A WELL WIZARD WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.

**Boring Log**

JOB NO. 853-3051 GA. INSP. LEL PROJECT CWM/WELLS/MODEL CITY BORING NO. MWS-25  
 DEPTH HOLE 16.0 FT DEPTH WL. 3.26 FT DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID SHEET 1 OF 1  
 TEMP 75° F TIME WL. 9/23/80 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS, INC. SURFACE ELEV. 319.8 FT  
 WEATHER CLOUDY DRILL RIG CME 45 DRILLER K. SWINNICH DATUM MSL  
 COORDINATES N 8115.91 E 9931.97 WT. SAMPLER HAMMER 140 LBS. DROP 30 IN. STARTED 9:35 / 5-16-80  
 LOCATION --- WT. CASING HAMMER 300 LBS. DROP 30 IN. COMPLETED 10:35 / 5-16-80

ELEV. DEPTH (FT)	DESCRIPTION	UNIFIED CLASS	BLOW/FOOT	SAMPLES			REMARKS	
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC./ATT		
319.8	GROUND SURFACE						GROUND SURFACE	
319.5 0.3	DARK PLANT MATERIAL (TOPSOIL)		22	1 2	DO	8-11-11-11	22/24	TOPSOIL
	VERY STIFF TO FIRM, BROWN, SILTY CLAY TO CLAYEY SILT, LITTLE TO SOME F TO M SAND.	CL	28	3	DO	13-13-15-20	24/24	UPPER CLAY TILL MOTTLED TO 4.0 FT
			19	4 6	DO	8-8-11-13	16/24	4.0-8.0 FT. COMPACT BROWN TO TAN SILT TO CLAYEY SILT TO F SAND LAYER
			25	7 8	DO	12-12-13-6	24/24	
			16	9	DO	4-16-10-10	24/24	
307.8 12.0					11	10	DO	5-5-6-6
	VERY SOFT, GRAY AND GRAY BROWN, CLAY. TRACE TO LITTLE F SAND.	CL TO CH	9	11	DO	4-5-4-5	24/24	GLACIOLACUSTRINE CLAY
303.8 16.0			1	12	DO	WH-WH-1-2	24/24	GRAY SILT LENSE AT 13.8 FT.
	END OF SAMPLING AUGERED TO 19.5 FT.							END OF SAMPLING
								INSTALLED MWS-25 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

# MONITORING WELL INSTALLATION LOG

JOB NO. 853-3031 PROJECT CWM / WELLS / MODEL CITY WELL NO. MW5-25 SHEET 1 OF 1  
 QA INSP. LEL DRILLING METHOD HOLLOW STEM AUGERS - 4 1/4" ID GROUND ELEV. 319.8 FT WATER DEPTH 326 FT  
 WEATHER CLOUDY DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS COLLAR ELEV. 322.70 FT DATE/TIME 9-23-86  
 TEMP. 63° F DRILL RIG CME 45 DRILLER K. SWINNISH STARTED 11:00 5-16-86 COMPLETED 11:50 9-16-86  
 LOCATION/COORDINATES N 8115.91 E 9931.97 TIME / DATE TIME / DATE

## MATERIALS INVENTORY

WELL CASING 2.0 IN DIA. 10.0 FT WELL SCREEN 2.0 IN DIA. 7.9 FT BENTONITE SEAL PELLETS 40' DEEP  
 CASING TYPE 304 STAINLESS STEEL SCREEN TYPE 304 STAINLESS STEEL INSTALLATION METHOD THROUGH AUGERS  
 JOINT TYPE FLUSH TEPLOX VITON O-RINGS SLOT SIZE 0.006 INCH FILTER PACK QTY 9.5 LF; 200 LBS  
 GROUT QUANTITY NA CENTRALIZERS NONE FILTER PACK TYPE #1-Q SAND  
 GROUT TYPE NA DRILLING MUD TYPE NONE INSTALLATION METHOD THROUGH AUGERS

ELEV./DEPTH (FT)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
	NOTE: FOR COMPLETE SOIL DESCRIPTIONS, SEE BORING LOG MW5-25	<p style="font-size: small;">                         WELL CASING 2.0 FT. STICKUP                          8" Ø ALUMINUM CASING WITH LOGS 3.5 FT. STICKUP                          #4-Q SAND                          CEMENT GROUT                          2" Ø TYPE 304 SS. RISER PIPE                          #1-Q SAND                          2" Ø TYPE 304 SS. SCREEN                          NOM. 8" Ø BOREHOLE                          2.0 FT. STICKUP                          6.0 FT. STICKUP                          7.1 FT. STICKUP                          18.0 FT. STICKUP                          15.5 FT. STICKUP                          6.0 FT. STICKUP                     </p>	<p>AUGERED TO 15.5 FT. ADDED #1-Q SAND TO 15.0 FT. (TOOK SAMPLE); INSTALLED WELL PIPE (1-2' SCREEN, 1-5' STICKUP, 1-10' RISER) 2.9 FT TO 6.0 FT. BELOW GROUND SURFACE; ADDED PELLETS TO 2.0 FT.; REMOVED AUGERS; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8" Ø ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF CASING WITH #4-Q SAND; WEEP HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE PDS WERE PUT AROUND WELL. A CONCRETE PAD WAS PLACED AROUND WELL LATER IN THE SITE AND NEW WEEP HOLES WERE PUT IN CASING. A DEDICATED STAINLESS STEEL CASING WAS INSTALLED SUBSEQUENT TO DEVELOPMENT.</p>	
319.8	GROUND SURFACE			
0.0 319.5 0.3	TOPSOIL			
307.8 12.0	UPPER CLAY TILL VERY STIFF TO FIRM, BROWN, SILTY CLAY TO CLAYEY SILT, LITTLE TO SOME F TO M SAND. GRAY WEATHERING ALONG VERTICAL FRACTURES FROM 8.0-10.0 FT.			
303.8 16.0	GLAUCOLUSTRINE CLAY VERY SOFT, GRAY AND GRAY BROWN, CLAY, TRAILS TO LITTLE F SAND			
	END OF SAMPLING AUGERED TO 15.5 FT.			
			<p><b>WELL DEVELOPMENT NOTES</b>                      DATE DEVELOPED: 5-22-86 TO 7-25-86                      DEVELOPMENT METHOD: AIR LIFT                      VOLUME PURGED: 21.1 GAL.</p> <p>FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.</p>	
			<p>NOTE: A 0.9 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2, 5, AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 5.325, 10.325 FT IN LENGTH, RESPECTIVELY.</p>	

JOB NO. 853-3051 GA. INSP. LEL PROJECT CWM/WELLS/MODEL CITY BORING NO. MW6-15  
 DEPTH HOLE 24.0 FT DEPTH WL. 4.03 FT DRILLING METHOD HOLLOW STEM AUGERS 4 1/4 ID SHEET 1 OF 1  
 TEMP 60° F TIME WL. 9/22/86 DRILLING COMPANY EMPIRE SOILS INVESTIGATIONS SURFACE ELEV. 322.5 FT  
 WEATHER SUNNY DRILL RIG CME 45 DRILLER R. KEFHART DATUM MSL  
 COORDINATES N 8732.63 E 10219.65 WT. SAMPLER HAMMER 140 LBS DROP 30 IN. STARTED 2:00 / 6-2-86  
 LOCATION 4.0 FT. W OF MW6-1D WT. CASING HAMMER 300 LBS DROP 30 IN. COMPLETED 3:30 / 6-2-86

ELEV. DEPTH (FT.)	DESCRIPTION	UNIFIED CLASS.	BLOWS/FOOT	SAMPLES			REMARKS
				NUMBER	TYPE	HAMMER BLOWS PER 6 IN. REC / ATT	
322.5	GROUND SURFACE						GROUND SURFACE
322.3 0.2	TOPSOIL WITH PLANT MATERIAL	-	12	2	DO	6-7-5-5 21/24	TOPSOIL
	FIRM TURNING TO VERY STIFF, BROWN, SILTY CLAY TO CLAYEY SILT, SOME F TO C SAND, TRACE TO LITTLE GRAVEL.	CL	9	3	DO	4-5-4-5 14/24	UPPER CLAY TILL
			5	4	DO	1-1-4-4 13/24	7.1-13.1 FT., BECOMING MOTTLED
			18	5	DO	4-5-13-20 24/24	
			28	7	DO	4-7-21-34 21/24	
			36	8	DO	9-16-20-26 24/24	
309.4			51	9	DO	18-30-21-17 24/24	
13.1	COMPACT TO LOOSE, RED BROWN, F-C SAND, SOME F-C GRAVEL, TO GRAY BROWN, SILT, AND F SAND, LITTLE M TO C SAND, TRACE CLAY, TRACE GRAVEL.	ML	38	11	DO	7-16-22-29 24/24	UPPER SILT TILL
			41	13	DO	16-19-22-20 14/24	
302.5			11	14	DO	2-4-7-9 16/24	
20.0	VERY SOFT, GRAY CLAY, LITTLE F TO M SAND, MOIST, PLASTIC, STICKEY.	CH	3	15	DO	WH-1-2-3 22/24	GLACIOLACUSTRINE CLAY
298.5			6	16	DO	1-3-3-4 24/24	
24.0	END OF SAMPLING AUGERED TO 21.6 FT.						END OF SAMPLING
							INSTALLED MW6-15 SEE ACCOMPANYING MONITORING WELL INSTALLATION LOG.

# MONITORING WELL INSTALLATION LOG

NYSDEC OHMS Document No. 201469202-00043

JOB NO. <u>B53-3051</u>	PROJECT <u>CWM/WELLS/MODEL CITY</u>	WELL NO. <u>MW6-15</u>	SHEET <u>1</u> OF <u>2</u>
SA INSP <u>LEL</u>	DRILLING METHOD <u>HOLLOW STEM AUGERS - 4/4" ID</u>	GROUND ELEV. <u>322.5 FT.</u>	WATER DEPTH <u>4.03 FT.</u>
WEATHER <u>SUNNY</u>	DRILLING COMPANY <u>EMPIRE SOILS INVESTIGATIONS, INC.</u>	COLLAR ELEV. <u>324.34 FT.</u>	DATE/TIME <u>9-22-86</u>
TEMP <u>60° F</u>	DRILL RIG <u>CME 45</u>	DRILLER <u>R. KEPHART</u>	STARTED <u>3:30 6-2-86</u>
LOCATION/COORDINATES <u>40 FT. WEST OF MW6-10 / N 8732.63 E 10219.65</u>		COMPLETED <u>4:40 6-2-86</u>	

MATERIALS INVENTORY		
WELL CASING <u>2.0</u> IN. Ø <u>10.0</u> FT.	WELL SCREEN <u>2.0</u> M. Ø <u>12.9</u> FT.	BENTONITE SEAL <u>PELLETS 4.5' DEEP</u>
CASING TYPE <u>304 STAINLESS STEEL</u>	SCREEN TYPE <u>304 STAINLESS STEEL</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>
JOINT TYPE <u>THREADED, TAPE, O-RINGS</u>	SLOT SIZE <u>0.006 INCH</u>	FILTER PACK QTY <u>14.5 LF, 340 LBS.</u>
GROUT QUANTITY <u>NA</u>	CENTRALIZERS <u>NONE</u>	FILTER PACK TYPE <u>#1-Q SAND</u>
GROUT TYPE <u>NA</u>	DRILLING MUD TYPE <u>NONE</u>	INSTALLATION METHOD <u>THROUGH AUGERS</u>

ELEV./DEPTH (FT)	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
322.5	GROUND SURFACE		AUGERED TO 21.6 FT.; ADDED #1-Q SAND TO 21.0 FT. BELOW GROUND SURFACE; INSTALLED WELL PIPE (1-2" SCREEN, 1-10" SCREEN, 1-10" RISER) 1.7 FT. STICKUP; ADDED #1-Q SAND TO 7.1 FT. (TOOK SAMPLE); ADDED PELLETS TO 2.6 FT.; ADDED BENTONITE POWDER TO 2.0 FT. BELOW GROUND SURFACE; REMOVED AUGERS; MIXED CEMENT GROUT; FILLED TO GROUND SURFACE; PUT ON 8" Ø ALUMINUM PROTECTIVE CASING; FILLED INTERIOR OF CASING WITH #4-Q SAND; WEEP HOLES WERE PUT IN CASING FOR DRAINAGE; PROTECTIVE POSTS WERE PUT AROUND WELL; A CONCRETE PAD WAS LATER PLACED AROUND WELL BY THE SITE AND NEW WEEP HOLES WERE PUT IN CASING!	
0.0 322.3 0.2	TOPSOIL			(CONTINUED ON NEXT PAGE)
309.4	UPPER CLAY TILL FIRM TURNING TO VERY STIFF, BROWN, SILTY CLAY TO CLAYEY SILT, SOME F-C SAND, LITTLE GRAVEL			WELL DEVELOPMENT NOTES
13.1	UPPER SILT TILL COMPACT TO LOOSE, RED-BROWN, F-C SAND TO GRAY BROWN, SILT, AND F SAND, TRACE CLAY, TRACE GRAVEL			DATE DEVELOPED: 6-9-86 TO 9-4-86
20.0	GLACIOFLUVIAL CLAY VERY SOFT, GRAY, CLAY, LITTLE F TO M SAND, MOIST, PLASTIC			DEVELOPMENT METHOD: AIR LIFT
298.5 24.0	END OF SAMPLING AUGERED TO 21.6 FT.			VOLUME PURGED: 80.2 GAL.
			FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT TABLE.	
			NOTE: A 0.5 FT. END CAP WAS PLACED AT THE BOTTOM OF THE SCREEN SECTION. 2.5 AND 10 FT. SCREEN SECTIONS ARE ACTUALLY 2.35, 9.325, 10.325 FT. IN LENGTH, RESPECTIVELY.	

**Golder  
Associates**

SUBJECT CWM/WELLS/MODEL CITY		MW6-15
Job No. 853-3051	Made by LEL	Date 6-2-86
Ref.	Checked DJM	Sheet 2 of 2
	Reviewed JFC	

A DEDICATED STAINLESS STEEL BAILER WAS INSTALLED  
SUBSEQUENT TO DEVELOPMENT.