Appendix B

Boring Logs, Well Logs, Well Records, Sealing Records, and Photos

LOG OF WELL MW-B1-001

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/8/09 Ended 1/8/09 | Elevation 947.6

Location 194474.25'N, 553294.50'E | Logged By EJC | Total Depth 75.0

Screened Interval 61-71'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
			0	Organic-rich Soil (OL): very dark grayish brown (10YR 3/2), frozen, dense, low plasticity. [Topsoil]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	
		1	0	Silt (ML): dark yellowish brown (10YR 4/4), low plasticity, dry, blocky. [Loess]		945
			0	Silty Clay (CL): yellowish brown (10YR 5/6) with 5% well-rounded gravel and cobbles, granite and basalt, moist, medium consistency, low plasticity.	RISER CASING Diameter: **2"** Type: **Black Steel** Interval:	
5			0	Lean Clay (CL): brown (10YR 5/3) with 5% well-rounded granite cobbles, moist, medium to soft consistency, oxidation mottling, low to medium plasticity.	GROUT Type: **High Solids Bentonite** Interval: **4-55'**	940
			0	Clayey Sand (SC): dark yellowish brown (10YR 4/4), well-graded, sub to well-rounded, fine to coarse-grained, (5/75/20), moist, medium density.	SEAL Type: **Bentonite** Interval: **55-58'**	
10			0	Poorly Graded Sand (SP): brown (10YR 5/3), sub to well-rounded, moist, medium-grained, (2/98/0), granite gravel. [Outwash]	SANDPACK Type: **Red Flint, 40-pack** Interval: **58-75'**	935
		2			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **61-71'**	
15					BOREHOLE Diameter: **6"**	930
20						925
25						920

(continued)

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Remarks:
Unique ID # 769796.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-B1-001

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/8/09 Ended 1/8/09 | Elevation 947.6

Location 194474.25'N, 553294.50'E | Logged By EJC | Total Depth 75.0

Screened Interval 61-71'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		3		Poorly Graded Sand (SP): brown (10YR 5/3), sub to well-rounded, moist, medium-grained, (2/98/0), granite gravel. [Outwash] *(continued)*		
35						915
						910
40				39': Six inches of silty sand.		
						905
45						
						900
50		4				
						895
55						
						890
				(continued)		

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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-B1-001

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 194474.25'N, 553294.50'E

Drill Contractor Traut
Drill Method Rotasonic (4"x6")
Drilling Started 1/8/09 Ended 1/8/09
Logged By EJC

Elevation 947.6
Total Depth 75.0
Screened Interval 61-71'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Poorly Graded Sand (SP): brown (10YR 5/3), sub to well-rounded, medium-grained, (2/98/0), granite gravel. [Outwash] Wet		885
65						
		5		Six inches of very fine-grained silty sand at 68'.		880
70						
				Silty Sand (SM): brown (10YR 5/3), very fine-grained, (0/70/30), wet, stiff consistency.		875
75				End of Boring - 75 feet		
						870
80						
						865
85						
						860

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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C2-002

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/28/09 Ended 1/28/09 | Elevation 949.6

Location 189952.63'N, 555403.36'E | Logged By EJC | Total Depth 75.0

Screened Interval 65-75'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
0				Organic-rich Soil (OL): very dark grayish brown (10YR 3/2), soft, frozen, low plasticity (0/0/100). [Topsoil]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	
		1		Silt (ML): dark yellowish brown (10YR 4/4), dry, blocky, non-plastic. [Loess]	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-65'**	945
5				Poorly Graded Sand (SP): yellowish brown (10YR 5/4), moist, medium-grained, (15/85/0). [Outwash]	GROUT Type: **High Solids Bentonite** Interval: **4-60'**	
		2			SEAL Type: **Bentonite** Interval: **60-62'**	940
10					SANDPACK Type: **Red Flint, 40-pack** Interval: **62-75'**	
15		3			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **65-75'**	935
					BOREHOLE Diameter: **6"**	
20						930
25						925
						920

(continued)

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Remarks:
Unique ID # 769493.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C2-002

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/28/09 Ended 1/28/09 | Elevation 949.6

Location 189952.63'N, 555403.36'E | Logged By EJC | Total Depth 75.0

Screened Interval 65-75'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		4		Poorly Graded Sand (SP): yellowish brown (10YR 5/4), moist, medium-grained, (15/85/0). [Outwash] *(continued)*		
35						915
40						910
45						905
50		5		Gravel lens at 50' bgs, about one inch thick.		900
55						895
				(continued)		890

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Unique ID # 769493.

BGS = "below ground surface"
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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C2-002

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/28/09 Ended 1/28/09 | Elevation 949.6

Location 189952.63'N, 555403.36'E | Logged By EJC | Total Depth 75.0

Screened Interval 65-75'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
65		6		Poorly Graded Sand (SP): yellowish brown (10YR 5/4), moist, medium-grained, (15/85/0). [Outwash] *(continued)*		885
70		7		70-75': No recovery; same as above based on ease of drilling.		880
75				End of Boring - 75 feet		875
80						870
85						865
						860

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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C2-202

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Mud Rotary

SHEET 1 OF 5

Number 23/19-0B05 | Drilling Started 1/21/09 Ended 1/21/09

Location 189954.47'N, 555375.45'E | Logged By EJC

Elevation 949.9
Total Depth 150.0
Screened Interval 137-147'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
0				Silt (ML): brown. [Loess]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	
5				Sand (SP): brown, medium-grained with gravel. [Outwash]	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-137'** GROUT Type: **High Solids Bentonite** Interval: **4-131'** SEAL Type: **Bentonite** Interval: **131-133'** SANDPACK Type: **Red Flint, 40-pack** Interval: **133-150'** SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **137-147'** BOREHOLE Diameter: **6"**	945
10						940
15						935
20						930
25				*(continued)*		925

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769493.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C2-202

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 189954.47'N, 555375.45'E

Drill Contractor Traut
Drill Method Mud Rotary
Drilling Started 1/21/09 Ended 1/21/09
Logged By EJC

Elevation 949.9
Total Depth 150.0
Screened Interval 137-147'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained with gravel. [Outwash] *(continued)*		
35						915
40				40-45': bit chattering - gravel.		910
45						905
50				52-60': bit chattering - gravel.		900
55						895
				(continued)		

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Remarks:
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Additional data may have been collected in the field which is not included on this log.

LOG OF WELL MW-C2-202

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 189954.47'N, 555375.45'E

Drill Contractor Traut
Drill Method Mud Rotary
Drilling Started 1/21/09 Ended 1/21/09
Logged By EJC

Elevation 949.9
Total Depth 150.0
Screened Interval 137-147'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained with gravel. [Outwash] *(continued)*		
65						885
70						880
75						875
80						870
85						865
				(continued)		

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LOG OF WELL MW-C2-202

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Mud Rotary

Number 23/19-0B05 | Drilling Started 1/21/09 Ended 1/21/09 | Elevation 949.9

Location 189954.47'N, 555375.45'E | Logged By EJC | Total Depth 150.0

Screened Interval 137-147'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained with gravel. [Outwash] *(continued)*		
95						855
100						850
105						845
110						840
115						835
				(continued)		

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Remarks:
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LOG OF WELL MW-C2-202

Client University of Minnesota
Drill Contractor Traut
Project Name UMA Groundwater Assessment
Drill Method Mud Rotary
Number 23/19-0B05
Drilling Started 1/21/09 Ended 1/21/09
Location 189954.47'N, 555375.45'E
Logged By EJC
Elevation 949.9
Total Depth 150.0
Screened Interval 137-147'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained with gravel. [Outwash] *(continued)*		
125						825
130						820
135						815
140						810
145						805
				148-150': Limestone [Prairie du Chien]		
				End of Boring - 150 feet		

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Remarks:
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BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL PW-C2-202

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 189952.13'N, 555431.99'E

Drill Contractor Traut
Drill Method Mud Rotary
Drilling Started 1/26/09 Ended 1/27/09
Logged By EJC

Elevation 949.6
Total Depth 147.0
Screened Interval 125-145'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
0				Silt (ML) [Loess]	PRO. CASING Diameter: **None** Type: **None** Interval: **None** RISER CASING Diameter: **6"** Type: **Black Steel** Interval: **2-125'** GROUT Type: **High Solids Bentonite** Interval: **6-113'** SEAL Type: **Bentonite** Interval: **113-115'** SANDPACK Type: **Red Flint, 40-pack** Interval: **115-145'** SCREEN Diameter: **2"** Type: **30 Slot, Stainless Steel** Interval: **125-145'** BOREHOLE Diameter: **10"**	945
5				Sand (SP): brown, medium-grained with gravel. [Outwash]		940
10						935
15						930
20						925
25				*(continued)*		920

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769482.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL PW-C2-202

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 189952.13'N, 555431.99'E

Drill Contractor Traut
Drill Method Mud Rotary
Drilling Started 1/26/09 Ended 1/27/09
Logged By EJC

Elevation 949.6
Total Depth 147.0
Screened Interval 125-145'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained with gravel. [Outwash] *(continued)*		
35						915
40						910
45						905
50						900
55						895
						890
				(continued)		

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769482.

BGS = "below ground surface"
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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL PW-C2-202

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 189952.13'N, 555431.99'E

Drill Contractor Traut
Drill Method Mud Rotary
Drilling Started 1/26/09 Ended 1/27/09
Logged By EJC

Elevation 949.6
Total Depth 147.0
Screened Interval 125-145'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained with gravel. [Outwash] *(continued)*		
65						885
70						880
75						875
80						870
85						865
						860

(continued)

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Remarks:
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BGS = "below ground surface"
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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL PW-C2-202

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 189952.13'N, 555431.99'E

Drill Contractor Traut
Drill Method Mud Rotary
Drilling Started 1/26/09 Ended 1/27/09
Logged By EJC

Elevation 949.6
Total Depth 147.0
Screened Interval 125-145'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained with gravel. [Outwash] *(continued)*		
95						855
100						850
105						845
110						840
115						835
						830

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769482.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL PW-C2-202

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Mud Rotary

Number 23/19-0B05 | Drilling Started 1/26/09 Ended 1/27/09 | Elevation 949.6

Location 189952.13'N, 555431.99'E | Logged By EJC | Total Depth 147.0

Screened Interval 125-145'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained with gravel. [Outwash] *(continued)*		
125						825
130						820
135						815
140						810
145				Lean Clay (CL): gray with gravel. [Till]		805
				147: Limestone Bedrock [Prairie du Chien] End of Boring - 147 feet		800

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Remarks:
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BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-A3-003

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/5/09 Ended 1/5/09 | Elevation 941.0

Location 196104.46'N, 559964.79'E | Logged By JME | Total Depth 85.0

Screened Interval 72-82'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
			0	Fill: Sandy Clay (CL), black, dry, hard.	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	940
5		1	0	Poorly Graded Sand (SP): brown (10YR 5/3), dry, 95% fine to medium sand, 5% fine gravel, trace fines.	RISER CASING Diameter: **2"** Type: **Steel** Interval: **0-72'**	935
10				10-11.5': Abundant gravel, well-rounded, mineralogy includes mafics and granite.	GROUT Type: **High Solids Bentonite** Interval: **4-67'** SEAL Type: **Bentonite** Interval: **67-69'**	930
15		2		Light brownish gray (10YR 6/2), dry. 90% fine sand, 10% fine to medium gravel.	SANDPACK Type: **Red Flint, 40-pack** Interval: **69-85'** SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **72-82'** BOREHOLE Diameter: **6"**	925
20				20-22': medium to coarse sand with few large gravel and sandstone clasts.		920
25				95% medium sand, 5% fine gravel.		915
				27-29': 95% fine sand, 5% gravel, trace fines.		

(continued)

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Remarks:
WL=58.3' bgs on 1/15/09. Unique ID # 769494.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-A3-003

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/5/09 Ended 1/5/09 | Elevation 941.0

Location 196104.46'N, 559964.79'E | Logged By JME | Total Depth 85.0

Screened Interval 72-82'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		3		100% fine sand, yellowish brown (10YR 5/4).		910
35						905
40				95% fine sand, 5% medium sand.		900
45						895
				100% fine to medium sand, trace fine gravel, trace fines.		
50		4		100% fine sand.		890
				95% medium sand, 5% fine gravel, trace fines.		
55						885

(continued)

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Remarks:
WL=58.3' bgs on 1/15/09. Unique ID # 769494.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-A3-003

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/5/09 Ended 1/5/09 | Elevation 941.0

Location 196104.46'N, 559964.79'E | Logged By JME | Total Depth 85.0

Screened Interval 72-82'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				95% medium and coarse sand, 5% fine to medium gravel.		880
				63-64': 95% fine sand, 5% coarse sand, dry.		
65		5		65-67': Abundant medium and coarse gravel.		875
				68-69': Well Graded Sand (SW).		
70				95% medium sand, 5% fine gravel.		870
				100% medium to fine sand, trace fines, wet.		
75		6		Silt (ML): brown (10YR 4/3), wet, 100% non-plastic fines, massive, soft, weak reaction to HCl.		865
				Poorly Graded Sand (SP): brown, 100% fine to medium sand, wet.		
				Silt (ML): As above.		
80				Poorly Graded Sand (SP): brown, fine to medium-grained.		860
				Silt (ML): as above.		
		7				
85				End of Boring - 85 feet		855

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Remarks:
WL=58.3' bgs on 1/15/09. Unique ID # 769494.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C7-004

Client University of Minnesota | Drill Contractor Traut | SHEET 1 OF 3

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/13/09 Ended 1/13/09 | Elevation 928.6

Location 191395.22'N, 568057.40'E | Logged By EJC | Total Depth 90.0 | Screened Interval 80-90'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
0				Organic-rich Soil (OL): brown (10YR 4/3), frozen, platy, (10/40/50). [Topsoil]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	925
		1		Well Graded Sand (SW): dark yellowish brown (10YR 4/4) with 10% angular gravel, (10/90/0), dry. [Fill]		
				Organic-rich Soil (OL): very dark grayish brown (10YR 3/2), moist, blocky, medium stiff consistency, low plasticity, (0/0/100). [Former Topsoil]	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-65'**	
5				Silt (ML): brownish yellow (10YR 6/6), dry, blocky, medium consistency, non-plastic, (0/0/100). [Loess]		
				Well Graded Sand (SW): brownish yellow (10YR 6/6) with 2% subrounded gravel, dry, granular. Gravel mostly basalt and granite. [Outwash]	GROUT Type: **High Solids Bentonite** Interval: **4-74'**	920
		2			SEAL Type: **Bentonite** Interval: **74-77'**	
10					SANDPACK Type: **Red Flint, 40-pack** Interval: **77-90'**	915
15		3			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **80-90'**	
					BOREHOLE Diameter: **6"**	910
20				Moist beginning at 20' bgs.		
						905
25						
						900

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769484.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C7-004

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/13/09 Ended 1/13/09 | Elevation 928.6

Location 191395.22'N, 568057.40'E | Logged By EJC | Total Depth 90.0 | Screened Interval 80-90'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		4		Well Graded Sand (SW): brownish yellow (10YR 6/6) with 2% subrounded gravel, dry, granular. Gravel mostly basalt and granite. [Outwash] *(continued)*		
35						895
				39-41': Granite and basalt gravel and cobbles, well-rounded.		890
40						
				Poorly Graded Sand (SP): medium-grained.		885
45						
						880
50		5				
						875
55						
				59-61': Well-rounded granite and basalt gravel and cobbles, and angular dolomite cobbles.		870
				(continued)		

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769484.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C7-004

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/13/09 Ended 1/13/09 | Elevation 928.6

Location 191395.22'N, 568057.40'E | Logged By EJC | Total Depth 90.0

Screened Interval 80-90'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Well Graded Sand (SW).		
65						865
70		6				860
75						855
80				Poorly Graded Sand with Silt (SP-SM): wet. Silt lenses at 82' and 83'.		850
				Sandy Silt (ML): fine-grained.		845
85		7		Poorly Graded Sand with Silt (SP-SM)		
				Sandy Silt (ML): fine-grained.		
				Poorly Graded Sand (SP): coarse-grained.		840
				End of Boring - 90 feet		

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Remarks:
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BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E2-305

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/30/09 Ended 1/30/09 | Elevation 939.0

Location 184388.28'N, 557403.68'E | Logged By EJC | Total Depth 75.0 | Screened Interval 64-74'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
			0	Organic-rich Soil (OL): very dark grayish brown, frozen, low plasticity, (0/0/100). [Topsoil]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	
		1	0	Silt (ML): brownish yellow (10YR 6/6), dry, blocky, non-plastic, (0/0/100). [Loess]		
5			0	Poorly Graded Sand (SP): yellowish brown (10YR 5/4), well-rounded, granite and basalt gravel, (10/90/0). [Outwash]	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-65'**	935
		2	0		GROUT Type: **High Solids Bentonite** Interval: **4-59'**	
			0			930
10				Moist.	SEAL Type: **Bentonite** Interval: **59-61'** SANDPACK Type: **Red Flint, 40-pack** Interval: **61-75'**	
15		3			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **64-74'** BOREHOLE Diameter: **6"**	925
20				Lean Clay (CL): dark gray (2.5Y 4/1) with coarse-grained carbonate sand, (1/5/94), moist, medium plasticity. [Diamicton]		920
				Lean Clay (CL): yellowish brown (10YR 5/6) with medium to coarse-grained carbonate sand, (1/5/94), stiff, moist, low plasticity, oxidation clasts. [Diamicton]		915
25				40% gravel with black clay laminations up to 1" thick. [Lacustrine]		
				Silty Gravel (GM): yellowish brown (10YR 6/6) with sand, (40/30/30), dry, some cementation of sand and gravel. [Alluvium]		
				Gravelly Lean Clay (CL): light olive brown (2.5Y 5/4) with sand, (25/15/60), moist, low plasticity (25/15/60). Basalt, carbonate and granite gravel mineralogies; gray mottling and oxidation halos abundant. [Diamicton]		910
				Sandstone: white (2.5Y 5/1), fine to medium-grained sand, medium dense, moist, homogeneous. [St. Peter Sandstone]		

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769429.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E2-305

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/30/09 Ended 1/30/09 | Elevation 939.0

Location 184388.28'N, 557403.68'E | Logged By EJC | Total Depth 75.0

Screened Interval 64-74'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		4				
35						905
40						900
45		5		41-42': Very fine-grained powdery sand.		895
50				49-50': Color changes to yellow (10YR 7/6).		890
55		6				885
						880

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769429.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E2-305

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/30/09 Ended 1/30/09 | Elevation 939.0

Location 184388.28'N, 557403.68'E | Logged By EJC | Total Depth 75.0

Screened Interval 64-74'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sandstone: white (2.5Y 5/1), fine to medium-grained sand, medium dense, wet, homogeneous. [St. Peter Sandstone]		
65		7				875
70						870
75				End of Boring - 75 feet		865
80						860
85						855
						850

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769429.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF WELL MW-A6-006

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Mud Rotary

Number 23/19-0B05 | Drilling Started 1/20/09 Ended 1/20/09 | Elevation 933.6

Location 195438.37'N, 565915.79'E | Logged By EJC | Total Depth 115.0

Screened Interval 102-112'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Silt and Clay (CL-ML) [Loess]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	930
5				Sand (SP): brown, medium-grained. [Outwash]	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-102'**	
					GROUT Type: **High Solids Bentonite** Interval: **4-95'**	925
10					SEAL Type: **Bentonite** Interval: **95-97'**	
					SANDPACK Type: **Red Flint, 40-pack** Interval: **97-115'**	920
15					SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **102-112'**	
					BOREHOLE Diameter: **6"**	915
20						
						910
25						
						905
				(continued)		

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Remarks:
Drilled with bentonite mud using 6" diameter tricone bit. Pressure grouted with high solids bentonite grout. Unique ID # 769491.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-A6-006

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 195438.37'N, 565915.79'E

Drill Contractor Traut
Drill Method Mud Rotary
Drilling Started 1/20/09 Ended 1/20/09
Logged By EJC

Elevation 933.6
Total Depth 115.0
Screened Interval 102-112'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sand (SP): brown, medium-grained. [Outwash] *(continued)*		
35						900
40						895
45				45-49': Bit chattering, moderate loss of drilling fluid probably due to cobbles.		890
				Lean Clay (CL): gray with gravel. [Diamicton]		885
50						880
55				*(continued)*		875

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Remarks:
Drilled with bentonite mud using 6" diameter tricone bit. Pressure grouted with high solids bentonite grout. Unique ID # 769491.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-A6-006

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 195438.37'N, 565915.79'E

Drill Contractor Traut
Drill Method Mud Rotary
Drilling Started 1/20/09 Ended 1/20/09
Logged By EJC

Elevation 933.6
Total Depth 115.0
Screened Interval 102-112'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Lean Clay (CL): gray with gravel. [Diamicton] *(continued)*		
65						870
70						865
75						860
80						855
85						850
				(continued)		845

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Remarks:
Drilled with bentonite mud using 6" diameter tricone bit. Pressure grouted with high solids bentonite grout. Unique ID # 769491.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-A6-006

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Mud Rotary

Number 23/19-0B05 | Drilling Started 1/20/09 Ended 1/20/09 | Elevation 933.6

Location 195438.37'N, 565915.79'E | Logged By EJC | Total Depth 115.0

Screened Interval 102-112'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Lean Clay (CL): gray with gravel. [Diamicton] *(continued)*		
				Sand (SP): brown, medium-grained. [Outwash]		840
95						
						835
100						
						830
105						
						825
110						
						820
115				End of Boring - 115 feet		
						815

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Remarks:
Drilled with bentonite mud using 6" diameter tricone bit. Pressure grouted with high solids bentonite grout. Unique ID # 769491.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-D3-007

Client University of Minnesota | Drill Contractor Traut | SHEET 1 OF 3

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/7/09 Ended 1/7/09 | Elevation 943.6

Location 186970.60'N, 559064.56'E | Logged By EJC | Total Depth 70.0 | Screened Interval 60-70'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
			0	Organic-rich Soil (OL): dark brown (10YR 3/3), frozen, low plasticity, (0/0/100). [Topsoil]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	
		1	0	Silt (ML): dark yellowish brown (10YR 4/6), blocky, dry, non-plastic, (0/0/100). [Loess]		940
5			0.1	Well Graded Sand (SW): dark yellowish brown (10YR 4/6), coarse-grained, (10/90/0), moist, granite and basalt gravel and cobbles, subangular to subrounded.	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-60'**	
		2	0		GROUT Type: **High Solids Bentonite** Interval: **4-54'**	935
10			0		SEAL Type: **Bentonite** Interval: **54-57'**	
					SANDPACK Type: **Red Flint, 40-pack** Interval: **57-70'**	930
15		3			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **60-70'**	
					BOREHOLE Diameter: **6"**	925
20				Medium-grained.		
						920
25						
						915

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769490.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-D3-007

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/7/09 Ended 1/7/09 | Elevation 943.6

Location 186970.60'N, 559064.56'E | Logged By EJC | Total Depth 70.0 | Screened Interval 60-70'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		4		Well Graded Sand (SW): dark yellowish brown (10YR 4/6), coarse-grained, (10/90/0), moist, granite and basalt gravel and cobbles, subangular to subrounded. *(continued)*		
35						910
				Gravel (GP)		905
40				Well Graded Sand (SW): dark yellowish brown (10YR 4/6), coarse-grained, (10/90/0), moist, granite and basalt gravel and cobbles, subangular to subrounded.		
45						900
50		5				895
55						890
				Wet?		885
				(continued)		

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769490.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF WELL MW-D3-007

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/7/09 Ended 1/7/09 | Elevation 943.6

Location 186970.60'N, 559064.56'E | Logged By EJC | Total Depth 70.0

Screened Interval 60-70'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
65		6		Well Graded Sand (SW): dark yellowish brown (10YR 4/6), coarse-grained, (10/90/0), moist, granite and basalt gravel and cobbles, subangular to subrounded. *(continued)*		880
70				End of Boring - 70 feet		875
75						870
80						865
85						860
						855

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769490.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF WELL MW-D5-308

Client University of Minnesota | Drill Contractor Traut | SHEET 1 OF 3

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/6/09 Ended 1/6/09 | Elevation 935.0

Location 187762.84'N, 565044.66'E | Logged By JME | Total Depth 75.0 | Screened Interval 65-75'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		1	0	Fill/Topsoil: black, clayey, roots.	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	
			0	Silt (ML): dark yellowish brown (10YR 4/4), moist, 100% non-plastic fines, trace sand, soft, weak reaction to HCl. [Loess]	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-65'**	
5						930
		2		Poorly Graded Sand with Gravel (SP): brown (10YR 3/4), dry, 60% medium sand, 40% gravel. [Outwash]	GROUT Type: **High Solids Bentonite** Interval: **4-60'**	
10					SEAL Type: **Bentonite** Interval: **60-62'**	925
					SANDPACK Type: **Red Flint, 40-pack** Interval: **62-75'**	
15		3			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **65-75'**	920
				Poorly Graded Sand (SP): brown (10YR 4/3), dry, 95% medium sand, 5% fine gravel, trace fines. [Outwash]	BOREHOLE Diameter: **6"**	
20						915
25						910
				Abundant cobble above diamicton.		
				Lean Clay with Sand (CL): very dark greenish gray (10Y 2.5/1), moist, 70-80% fines, 20-30% sand and gravel, firm to hard, massive, moderate reaction to HCl. [Diamicton]		
				(continued)		

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Remarks:
11:45 ~WL=25' bgs, TD=70', casing=69'; 12:45 ~WL=25' bgs. Pressure grouted with high solids bentonite grout. Unique ID # 769486.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-D5-308

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/6/09 Ended 1/6/09 | Elevation 935.0

Location 187762.84'N, 565044.66'E | Logged By JME | Total Depth 75.0

Screened Interval 65-75'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		4		Lean Clay with Sand (CL): very dark greenish gray (10Y 2.5/1), moist, 70-80% fines, 20-30% sand and gravel, firm to hard, massive, moderate reaction to HCl. [Diamicton] *(continued)*		
35						900
40				Sandy Lean Clay (CL): brown (10YR 4/3), moist, 70% fines, 30% sand and gravel, abundant zones of dark yellowish brown (10YR 4/6) matrix, firm to hard, massive, weak reaction to HCl. [Diamicton]		895
				Lean Clay (CL)/Silt (ML): brownish yellow (10YR 6/6), moist, 90% fines, 10% fine to medium sand and fine gravel. [Diamicton]		
45						890
50		5				885
				Well Graded Sand (SW): dark yellowish brown (10YR 4/4), dry, 80% sand, 20% gravel.		
55				Lean Clay with Sand (CL): yellowish brown (10YR 5/4), moist, 90% fines, 10% fine sand, trace fine gravel, soft, massive, no reaction to HCl. [Diamicton]		880
				(continued)		

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Remarks:
11:45 ~WL=25' bgs, TD=70', casing=69'; 12:45 ~WL=25' bgs. Pressure grouted with high solids bentonite grout. Unique ID # 769486.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-D5-308

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/6/09 Ended 1/6/09 | Elevation 935.0

Location 187762.84'N, 565044.66'E | Logged By JME | Total Depth 75.0

Screened Interval 65-75'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sandstone: pale yellow (5Y 7/3) grading to white (5Y 8/1) with depth, weakly cemented, cohesive sample to 66.5'. *(continued)*		
65				Wet, weak iron mottling/zonation - increasing with depth.		870
				Horizontal zones of iron discoloration.		
				Pulverize sample, abundant clasts of sandstone. Iron discoloration increasing with depth.		
70		6				865
		7				
				74-74.25': Cemented lens, hard, gray, iron staining along bedding plan, no reaction to HCl.		
75				Abundant iron discoloration and shaley texture.		860
				End of Boring - 75 feet		
80						855
85						850

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Remarks:
11:45 ~WL=25' bgs, TD=70', casing=69'; 12:45 ~WL=25' bgs. Pressure grouted with high solids bentonite grout. Unique ID # 769486.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E2-009

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/20/08 Ended 12/21/08 | Elevation 947.8

Location 186933.78'N, 555370.86'E | Logged By EJC | Total Depth 71.0

Screened Interval 57.7-67.7'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
0			0	Organic Soil (OL): very dark grayish brown (10YR 3/2), frozen, low plasticity, granular, massive, soft, (0/0/100). [Topsoil]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	945
		1	0	Silt (ML): yellowish brown (10YR 5/4), non-plastic, blocky, dry, medium consistency, (0/0/100). [Loess]		
5			0	Well Graded Sand (SW): yellowish brown (10YR 5/4) with trace silt and gravel, sub to well-rounded, moist, massive, dry.	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-57.7'**	
		2	0		GROUT Type: **High Solids Bentonite** Interval: **4-53.7'**	940
10			0		SEAL Type: **Bentonite** Interval: **53.7-55.7'**	
					SANDPACK Type: **Red Flint, 40-pack** Interval: **55.7-71'**	935
15		3			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **57.7-67.7'**	930
20					BOREHOLE Diameter: **6"**	
						925
25						
						920

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769488.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E2-009

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/20/08 Ended 12/21/08 | Elevation 947.8

Location 186933.78'N, 555370.86'E | Logged By EJC | Total Depth 71.0

Screened Interval 57.7-67.7'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		4		Well Graded Sand (SW): yellowish brown (10YR 5/4) with trace silt and gravel, sub to well-rounded, moist, massive, dry. *(continued)*		
35						915
						910
40				Poorly Graded Sand (SP): brown (10YR 5/3), fine to medium-grained, (0/100/0), moist.		
						905
45						
						900
50		5				
						895
55						
						890
				(continued)		

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769488.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E2-009

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/20/08 Ended 12/21/08 | Elevation 947.8

Location 186933.78'N, 555370.86'E | Logged By EJC | Total Depth 71.0

Screened Interval 57.7-67.7'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
65		6		Poorly Graded Sand (SP): brown (10YR 5/3), wet, fine to medium-grained, (0/100/0).		885
70		7		70-71': No recovery.		880
				End of Boring - 71 feet		875
75						870
80						865
85						860

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769488.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF WELL MW-E2-209

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/14/09 Ended 1/27/09 | Elevation 947.2

Location 186932.91'N, 555352.64'E | Logged By EJC | Total Depth 126.0

Screened Interval 116-126'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Blind drilled to 70' bgs; see description from MW-E2-009.	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'** RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-116'** GROUT Type: **High Solids Bentonite** Interval: **4-110'** SEAL Type: **Bentonite** Interval: **110-113'** SANDPACK Type: **Red Flint, 40-pack** Interval: **113-126'** SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **116-126'** BOREHOLE Diameter: **6"**	945 940 935 930 925 920

5 10 15 20 25

(continued)

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Fax: 952-832-2601

Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769483.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E2-209

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 186932.91'N, 555352.64'E

Drill Contractor Traut
Drill Method Rotasonic (4"x6")
Drilling Started 1/14/09 Ended 1/27/09
Logged By EJC

Elevation 947.2
Total Depth 126.0
Screened Interval 116-126'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
35						915
40						910
45						905
50						900
55						895
						890

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769483.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF WELL MW-E2-209

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/14/09 Ended 1/27/09 | Elevation 947.2

Location 186932.91'N, 555352.64'E | Logged By EJC | Total Depth 126.0

Screened Interval 116-126'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Poorly Graded Sand (SP): brown (10YR 4/3), loose, wet, medium to coarse-grained, (10/90/0), sub to well-rounded granite and basalt gravel and cobbles. [Outwash]		885
65						880
70						875
75						870
80						865
85						860

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769483.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E2-209

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/14/09 Ended 1/27/09 | Elevation 947.2

Location 186932.91'N, 555352.64'E | Logged By EJC | Total Depth 126.0

Screened Interval 116-126'

DEPTH FEET	SAMP. LENGTH & RECOVERY / SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
			Poorly Graded Sand (SP): brown (10YR 4/3), loose, wet, medium to coarse-grained, (10/90/0), sub to well-rounded granite and basalt gravel and cobbles. [Outwash] *(continued)*		855
95					850
100			Lean Clay (CL): dark gray (10YR 4/1) with gravel, (20/0/80), medium consistency, moist, low plasticity, well-rounded granite and basalt cobbles. [Diamicton]		845
105			Low recovery due to a basalt cobble boulder. Driller reports that the entire length drilled the same.		840
110					835
115			Poorly Graded Sand (SP): grayish brown (2.5Y 5/2), medium-grained, medium dense, wet, subangular to well-rounded. [Outwash]		830
			(continued)		

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769483.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF WELL MW-E2-209

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 186932.91'N, 555352.64'E

Drill Contractor Traut
Drill Method Rotasonic (4"x6")
Drilling Started 1/14/09 Ended 1/27/09
Logged By EJC

Elevation 947.2
Total Depth 126.0
Screened Interval 116-126'

DEPTH FEET	SAMP. LENGTH & RECOVERY / SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
			Lean Clay (CL): very dark grayish brown (2.5Y 3/2) with sand, (5/30/65), hard, moist, low plasticity. Well-rounded to subrounded gravel, sand medium to coarse-grained. [Diamicton] *(continued)*		
			Limestone recovered as angular gravel and cobbles. No to very weak reaction on fresh faces, strong reaction on exposed faces.	This limestone was interpreted as bedrock based on field description and drilling observations. Based on review of site data, this interval was re-interpreted as limestone boulder in till. Well is completed within an intra-till sand.	825
125			125-126': No recovery.		
			End of Boring - 126 feet		820
130					815
135					810
140					805
145					800

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769483.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E4-010

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/8/09 Ended 1/9/09 | Elevation 938.6

Location 184326.24'N, 560351.50'E | Logged By EJC | Total Depth 72.0 | Screened Interval 62-72'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
0			0	Organic-rich Soil (OL): very dark grayish brown (10YR 3/2), frozen, low plasticity, (0/0/100). [Topsoil]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4'**	935
		1	0	Silt (ML): dark yellowish brown (10YR 4/6), moist, blocky, non-plastic, (0/0/100). [Loess]		
5			0	Well Graded Sand (SW): light yellowish brown (10YR 6/4) with well-rounded granite cobbles, (5/95/0), medium to coarse-grained, dry. [Outwash]	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-62'** GROUT Type: **High Solids Bentonite** Interval: **4-56'**	930
		2	0			
10			0		SEAL Type: **Bentonite** Interval: **56-59'** SANDPACK Type: **Red Flint, 40-pack** Interval: **59-72'**	925
15		3			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **62-72'** BOREHOLE Diameter: **6"**	920
20						915
25						910

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769487.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E4-010

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/8/09 Ended 1/9/09 | Elevation 938.6

Location 184326.24'N, 560351.50'E | Logged By EJC | Total Depth 72.0

Screened Interval 62-72'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		4		Well Graded Sand (SW): light yellowish brown (10YR 6/4) with well-rounded granite cobbles, (5/95/0), medium to coarse-grained, dry. [Outwash] *(continued)*		
35						905
40						900
						895
45				Poorly Graded Sand (SP): medium-grained, (0/100/0), moist. [Outwash]		
						890
50		5				
						885
55						
						880
				(continued)		

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769487.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-E4-010

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 184326.24'N, 560351.50'E

Drill Contractor Traut
Drill Method Rotasonic (4"x6")
Drilling Started 1/8/09 Ended 1/9/09
Logged By EJC

Elevation 938.6
Total Depth 72.0
Screened Interval 62-72'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
65		6		Well Graded Sand (SW): medium to coarse-grained, (0/100/0), saturated. [Outwash]		875
70		7		End of Boring - 72 feet		870
75						865
80						860
85						855
						850

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769487.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C4-311

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/29/09 Ended 1/29/09 | Elevation 934.3

Location 190788.86'N, 561893.27'E | Logged By EJC | Total Depth 93.0 | Screened Interval 82-92'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Organic-rich Soil (OL): dark brown (10YR 3/3), frozen, soft, blocky, low plasticity, (0/15/85). [Topsoil]	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **0-4"**	
		1		Well Graded Sand with Silt and Gravel (SW-SM): dark yellowish brown (10YR 4/4), moist, no plasticity, (15/65/20). [Fill]	RISER CASING Diameter: **2"** Type: **Black Steel** Interval: **0-82'**	930
5					GROUT Type: **High Solids Bentonite** Interval: **4-77'**	
		2				925
10				Poorly Graded Sand (SP): brown(10YR 5/3), medium grained, (5/95/0), dry, granite and basalt gravel, sub to well-rounded. [Outwash]	SEAL Type: **Cement** Interval: **77-80'**	
					SANDPACK Type: **Red Flint, 40-pack** Interval: **80-92'**	920
15		3			SCREEN Diameter: **2"** Type: **10 Slot, Stainless Steel** Interval: **82-92'**	
					BOREHOLE Diameter: **6"**	915
20						
						910
25						
						905

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769485.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C4-311

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 190788.86'N, 561893.27'E

Drill Contractor Traut
Drill Method Rotasonic (4"x6")
Drilling Started 1/29/09 Ended 1/29/09
Logged By EJC

Elevation 934.3
Total Depth 93.0
Screened Interval 82-92'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
		4		Poorly Graded Sand (SP): brown(10YR 5/3), medium grained, (5/95/0), dry, granite and basalt gravel, sub to well-rounded. [Outwash] *(continued)*		
35						900
40				Lean Clay (CL): yellowish brown (10YR 5/4) with silt and sand, (0/30/70), hard, dry, very tough, low plasticity, fine to coarse-grained sand (generally carbonate), trace oxidation staining, weak to moderate reaction with HCl. [Diamicton]		895
45						890
50		5				885
55						880
				(continued)		875

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769485.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF WELL MW-C4-311

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/29/09 Ended 1/29/09 | Elevation 934.3

Location 190788.86'N, 561893.27'E | Logged By EJC | Total Depth 93.0 | Screened Interval 82-92'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				60-79': grades from yellowish brown to dark gray.		
65						870
70		6				865
75						860
80				Lean Clay (CL): dark yellowish brown (10YR 4/6) with silt and sand, (0/15/85), moist, very stiff, black mottling, coarse-grained carbonate sand, moderate reaction with HCl, silty laminations. [Diamicton]		855
				Sandstone: light yellowish brown, well-cemented, no reaction with HCl. Recovered as angular shards.		
85		7				850
						845

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769485.

BGS = "below ground surface"
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LOG OF WELL MW-C4-311

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/29/09 Ended 1/29/09 | Elevation 934.3

Location 190788.86'N, 561893.27'E | Logged By EJC | Total Depth 93.0 | Screened Interval 82-92'

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL AND DRILLING REMARKS	ELEV. FEET
				Sandstone: light yellowish brown, well-cemented, no reaction with HCl. Recovered as angular shards. *(continued)*		
				End of Boring - 93 feet		
95						840
100						835
105						830
110						825
115						820
						815

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Remarks:
Pressure grouted with high solids bentonite grout. Unique ID # 769485.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF Boring A6-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/12/09 Ended 1/13/09 | Elevation 934.0

Location 195437.33'N, 565908.13'E | Logged By EJC | Total Depth 162.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
			0	Organic Soil (OL): very dark grayish brown (10YR 3/2), frozen, soft, low plasticity, granular, (0/0/100). [Topsoil]	
			0	Silty Sand (SM): dark yellowish brown (10YR 4/4) well-graded sand with fines, (5/85/10), moist, subangular to angular, fine to coarse-grained. [Fill]	
		1	0	Silt (ML): dark yellowish brown (10YR 4/4), moist, soft, non-plastic, (0/0/100). [Loess]	930
5			0	Poorly Graded Sand (SP): yellowish brown (10YR 5/4), moist, medium-grained, (5/95/0), subrounded with subangular to subrounded, fine to coarse-grained granite and basalt gravel and cobbles. [Outwash]	
		2	0		925
10			0		
					920
15		3			
					915
20					
					910
25					
					905

(continued)

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Remarks:
DTW=88' bgs on 1/13/09. Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring A6-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/12/09 Ended 1/13/09 | Elevation 934.0

Location 195437.33'N, 565908.13'E | Logged By EJC | Total Depth 162.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		4		Poorly Graded Sand (SP): yellowish brown (10YR 5/4), moist, medium-grained, (5/95/0), subrounded with subangular to subrounded, fine to coarse-grained granite and basalt gravel and cobbles. [Outwash] *(continued)*	
35				Fine to medium-grained from 36 to 40'.	900
40					895
45					890
50		5		60% well-rounded cobbles and gravel from 52 to 53'.	885
55				Lean Clay (CL): very dark gray (10YR 3/1), moist, stiff, low plasticity with granite and carbonate, fine-grained gravel, (2/2/96), sub to well-rounded. [Diamicton]	880
				(continued)	875

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Remarks:
DTW=88' bgs on 1/13/09. Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring A6-Pilot

Client University of Minnesota
Project Name UMA Groundwater Assessment
Number 23/19-0B05
Location 195437.33'N, 565908.13'E

Drill Contractor Traut
Drill Method Rotasonic (4"x6")
Drilling Started 1/12/09 Ended 1/13/09
Logged By EJC

Elevation 934.0
Total Depth 162.0
Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
65				Lean Clay (CL): very dark gray (10YR 3/1), moist, stiff, low plasticity with granite and carbonate, fine-grained gravel, (2/2/96), sub to well-rounded. [Diamicton] *(continued)*	870
70		6			865
75					860
80					855
85				Well Graded Sand with Silt (SW-SM): yellowish brown (10YR 5/6), moist, subangular to subrounded with granite gravel, (5/85/10).	850
					845

(continued)

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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring A6-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/12/09 Ended 1/13/09 | Elevation 934.0

Location 195437.33'N, 565908.13'E | Logged By EJC | Total Depth 162.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		7		Well Graded Sand with Silt (SW-SM): yellowish brown (10YR 5/6), moist, subangular to subrounded with granite gravel, (5/85/10). *(continued)*	
95				Six inch lens of very fine-grained silty sand at 96' bgs.	840
				Thin clay lens at 99' bgs.	835
100				Well Graded Sand (SW): wet, (5/90/5).	
105					830
110		8			825
115					820
					815
				(continued)	

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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring A6-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/12/09 Ended 1/13/09 | Elevation 934.0

Location 195437.33'N, 565908.13'E | Logged By EJC | Total Depth 162.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
				Silty Sand (SM): fine to very fine-grained, (0/80/20).	
125					810
130		9			805
135					800
140					795
145				144-146': silty clay.	790
					785

(continued)

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DTW=88' bgs on 1/13/09. Pressure grouted with high solids bentonite grout.

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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring A6-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 1/12/09 Ended 1/13/09 | Elevation 934.0

Location 195437.33'N, 565908.13'E | Logged By EJC | Total Depth 162.0 | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		10		Well Graded Sand with Silt (SW-SM): yellowish brown (10YR 5/6), moist, subangular to subrounded with granite gravel, (5/85/10).	780
155				Lean Clay (CL): yellowish brown (10YR 5/4) with fine-grained carbonate gravel, (5/90/5), very hard, moist, low plasticity. [Diamicton]	
				Poorly Graded Gravel with Sand (GP): yellowish brown (10YR 5/4), generally granitic, (60/35/5).	775
160		11		Limestone: light grayish brown, recovered as angular gravel, cobble and clayey matrix. [Prairie du Chien]	
				End of Boring - 162 feet	770
165					
					765
170					
					760
175					
					755

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BGS = "below ground surface"
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LOG OF Boring B2-Pilot

Client University of Minnesota | Drill Contractor Traut | SHEET 1 OF 5

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/17/08 Ended 12/17/08 | Elevation 951.3 | Total Depth 140.0

Location 193288.82'N, 556259.30'E | Logged By EJC | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
			0	Organic Soil (OL): very dark grayish brown (10YR 3/2) with trace sand, coarse-grained, frozen, medium plasticity, soft to medium consistency, granular texture. [Topsoil]	950
		1	0	Lean Clay (CL): yellowish brown (10YR 3/4), dry, low plasticity, blocky and massive, very stiff, trace gray mottling and red oxidation clasts, small roots.	
5			0	Sandy Silt (ML): yellowish brown (10YR 3/4), dry, no plasticity, very soft, noncohesive, granular. [Loess]	945
		2	0	Well Graded Sand (SW): light yellowish brown (10YR 6/4), dry, angular, medium to coarse-grained with trace gravel, (10/85/5). [Outwash]	
10			0		940
15		3			935
20				Poorly Graded Sand (SP): yellowish brown (10YR 5/4), rounded, dry, fine to medium-grained. [Outwash]	930
25					925

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. DTW=45' bgs on 1/17/09 (casing set in clay).

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring B2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/17/08 Ended 12/17/08 | Elevation 951.3

Location 193288.82'N, 556259.30'E | Logged By EJC | Total Depth 140.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		4		Poorly Graded Sand (SP): yellowish brown (10YR 5/4), rounded, dry, fine to medium-grained. [Outwash] *(continued)*	920
35					915
40				40-50': Medium to coarse-grained.	910
45		5		48-50': Abundant well-rounded coarse gravel.	905
50				Lean Clay (CL): dark gray (5Y 4/1) with trace sub to well-rounded gravel and cobbles (limestone and chert), (5/0/95), stiff, massive, moderate to strong reaction with HCl, moist, (5/0/95). [Diamicton]	900
55		6		*(continued)*	895

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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring B2-Pilot

Client University of Minnesota | Drill Contractor Traut | SHEET 3 OF 5

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/17/08 Ended 12/17/08 | Elevation 951.3

Location 193288.82'N, 556259.30'E | Logged By EJC | Total Depth 140.0 | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
				Lean Clay (CL): dark gray (5Y 4/1) with trace sub to well-rounded gravel and cobbles (limestone and chert), (5/0/95), stiff, massive, moderate to strong reaction with HCl, moist, (5/0/95). [Diamicton] *(continued)*	890
				Weak to moderate reaction with HCl.	
65					885
70		7			880
75					875
80					870
85					865

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout. DTW=45' bgs on 1/17/09 (casing set in clay).

BGS = "below ground surface"
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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring B2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/17/08 Ended 12/17/08 | Elevation 951.3

Location 193288.82'N, 556259.30'E | Logged By EJC | Total Depth 140.0 | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		8		Lean Clay (CL): dark gray (5Y 4/1) with trace sub to well-rounded gravel and cobbles (limestone and chert), (5/0/95), stiff, massive, moderate to strong reaction with HCl, moist, (5/0/95). [Diamicton] *(continued)*	860
95					855
100				No reaction with HCl.	850
105					845
110		9			840
115					835
				Silty Sand (SM): yellowish brown (10YR 5/6), medium to coarse-grained, (0/80/20), subangular, wet. *(continued)*	

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Remarks:
Pressure grouted with high solids bentonite grout. DTW=45' bgs on 1/17/09 (casing set in clay).

BGS = "below ground surface"
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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring B2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/17/08 Ended 12/17/08 | Elevation 951.3

Location 193288.82'N, 556259.30'E | Logged By EJC | Total Depth 140.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
				Silty Sand (SM): yellowish brown (10YR 5/6), medium to coarse-grained, (0/80/20), subangular, wet. *(continued)*	830
125		10			825
130				Poorly Graded Sand (SP): yellowish brown (10YR 5/6), wet, medium-grained, (0/95/5), few iron stains.	820
135		11			815
				Sandy Silt (ML): yellowish brown (10YR 5/6), thinly bedded, alternating gray, orange, yellow and white, (0/95/5).	
140				140': Very hard, yellowish brown (10YR 5/6) sandstone. [St. Peter] End of Boring - 140 feet	810
145					805

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BGS = "below ground surface"
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LOG OF Boring C2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/18/08 Ended 12/19/08 | Elevation 950.4

Location 190174.05'N, 556863.16'E | Logged By EJC | Total Depth 165.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
			0	Organic Soil (OL): very dark grayish brown (10YR 3/2), soft, low plasticity, massive, granular, frozen, (0/0/100). [Topsoil]	950
				Lean Clay with Silt (CL): yellowish brown (10YR 5/6), medium consistency, low plasticity, blocky, dry, (0/0/100). [Loess]	
		1	0	Well Graded Sand with Silt (SW-SM): dark yellowish brown (10YR 4/6), fine to coarse-grained, (0/90/10), angular, dry. [Outwash]	
5			0		945
		2	0		
			0		
10				Poorly Graded Sand (SP): light yellowish brown (10YR 6/4), fine to coarse-grained, subrounded, moist.	940
				Lean Clay (CL): yellowish brown (10YR 5/6), fine-grained, (2/0/98), trace gravel, low plasticity, soft, laminated with black mottling. [Diamicton]	
				Clayey Sand (SC): yellowish brown (10YR 5/6), very fine-grained, (0/80/20), very soft, massive, moist.	
15		3		Silty Sand (SM): yellowish brown (10YR 5/6), fine-grained, (0/80/20), massive, moist. [Outwash]	935
20					930
				Lean Clay (CL): dark yellowish brown (10YR 4/6) with trace sand, (0/5/95), massive, medium consistency, weak reaction to HCl, some iron staining, moist. [Diamicton]	
25					925
				Silty Sand (SM): dark yellowish brown (10YR 4/6), fine-grained, (0/80/20), moist.	
				Lean Clay (CL): dark yellowish brown (10YR 4/6) to dark gray (5Y 4/1) with coarse-grained sand, (0/5/95), low plasticity, massive, very stiff, moist, weak reaction with HCl. [Diamicton]	

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring C2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/18/08 Ended 12/19/08 | Elevation 950.4

Location 190174.05'N, 556863.16'E | Logged By EJC | Total Depth 165.0 | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		4			920
35					915
40					910
45				Grayish brown (2.5Y 5/2) with medium to coarse-grained sand, (0/10/90), abundant iron staining, massive, medium consistency, moist, weak reaction with HCl. [Diamicton]	905
50		5			900
				Olive gray (5Y 4/2) lean clay with very fine-grained sand, (0/25/75), trace iron staining, strong reaction with HCl, massive, very stiff, moist. [Diamicton]	
55					895

(continued)

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BGS = "below ground surface"
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SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring C2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/18/08 Ended 12/19/08 | Elevation 950.4

Location 190174.05'N, 556863.16'E | Logged By EJC | Total Depth 165.0 | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
				Dark gray (5Y 4/1) with fine-grained gravel and medium to coarse-grained sand, (5/5/90), hard, broken along horizontal planes, very strong reaction with HCl, moist. [Diamicton]	890
65		6			885
70					880
75					875
80		7			870
85					865

(continued)

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Remarks:
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BGS = "below ground surface"
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LOG OF Boring C2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/18/08 Ended 12/19/08 | Elevation 950.4

Location 190174.05'N, 556863.16'E | Logged By EJC | Total Depth 165.0 | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
					860
				Alternating beds (3" to 12" thick) of: Lean Clay (CL): yellowish brown (10YR 5/8) with trace fine-grained sand, (0/5/95). Silty Sand (SM): olive gray (5Y 5/2), (0/80/20). Silt (ML): yellowish brown (10YR 5/8). Abundant iron staining throughout, medium to stiff consistency. [Lacustrine]	
95		8			855
100				Poorly Graded Sand with Silt (SP-SM): yellowish brown (10YR 5/6), fine-grained, (0/90/10), iron staining, moist.	850
105					845
				Lean Clay (CL): yellowish brown (10YR 5/6) with gravel, (10/0/90), sub to well-rounded gravel, massive, very stiff, black staining and iron mottling. [Diamicton]	
110		9		Lean Clay (CL): very dark grayish brown (10YR 3/2) with fine gravel and coarse sand, (10/5/85), hard, weak lamination, weak reaction with HCl. [Diamicton]	840
115					835

(continued)

Barr Engineering Co.
4700 W. 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-832-2601

Remarks:
Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring C2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/18/08 Ended 12/19/08 | Elevation 950.4

Location 190174.05'N, 556863.16'E | Logged By EJC | Total Depth 165.0 | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
				Lean Clay (CL): very dark grayish brown (10YR 3/2) with fine gravel and coarse sand, (10/5/85), hard, weak lamination, weak reaction with HCl. [Diamicton] *(continued)*	830
125		10			825
130					820
135		11			815
140					810
				Well Graded Sand (SW): dark yellowish brown (10YR 4/6), medium to coarse-grained, (0/95/5), sub to well-rounded, wet. [Outwash]	
145		12			805
				(continued)	

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Remarks:
Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF Boring C2-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/18/08 Ended 12/19/08 | Elevation 950.4

Location 190174.05'N, 556863.16'E | Logged By EJC | Total Depth 165.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
				Well Graded Sand (SW): dark yellowish brown (10YR 4/6), medium to coarse-grained, (0/95/5), sub to well-rounded, wet. [Outwash] *(continued)*	800
155		13			795
160		14		Limestone: light olive gray (10YR 6/2), angular limestone gravel and cobbles in a soft clayey matrix with low plasticity. Reacts strongly with HCl. [Prairie du Chien - weathered]	790
165				End of Boring - 165 feet	785
170					780
175					775

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Remarks:
Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring E1-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/19/08 Ended 12/20/08 | Elevation 950.4

Location 184792.56'N, 553205.91'E | Logged By EJC | Total Depth 162.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
			0	Organic Soil (OL): very dark grayish brown (10YR 3/2), very soft, massive, frozen, (0/0/100). [Topsoil]	950
		1	0	Silt (ML): yellow (10YR 7/6), massive, blocky, medium consistency, dry, (0/0/100). [Loess]	
5			0	Silty Sand (SM): yellow (10YR 7/6), well-graded, (2/80/18), sub to well-rounded, dry.	945
		2	0		
			0		
10					940
15		3			935
20					930
25					925

(continued)

Barr Engineering Co.
4700 W. 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-832-2601

Remarks:
Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

LOG OF Boring E1-Pilot

Client University of Minnesota | Drill Contractor Traut | SHEET 2 OF 6

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/19/08 Ended 12/20/08 | Elevation 950.4 | Total Depth 162.0

Location 184792.56'N, 553205.91'E | Logged By EJC | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		4		Silty Sand (SM): yellow (10YR 7/6), well-graded, (2/80/18), sub to well-rounded, dry. *(continued)*	920
35					915
40				Poorly Graded Sand (SP): yellowish brown, (10YR 5/4), moist, fine to medium-grained, (0/100/0).	910
				Well-graded sand, medium to coarse-grained, (30/70/0), well-rounded gravel, basalt and granite.	
45					905
50		5			900
55					895
				Lean Clay (CL): dark gray (5Y 4/1) with trace angular, coarse-grained sand, (0/2/98), massive, medium consistency, black mottling in sub-horizontal orientation, weak reaction to HCl, moist. [Diamicton]	
				(continued)	

Barr Engineering Co.
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Telephone: 952-832-2600
Fax: 952-832-2601

Remarks:
Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring E1-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/19/08 Ended 12/20/08 | Elevation 950.4

Location 184792.56'N, 553205.91'E | Logged By EJC | Total Depth 162.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
				Lean Clay (CL): dark gray (5Y 4/1) with trace angular, coarse-grained sand, (0/2/98), massive, medium consistency, black mottling in sub-horizontal orientation, weak reaction to HCl, moist. [Diamicton] *(continued)*	890
65					885
70		6		71-73': Lenses of fine-grained sand, less than one inch thick.	880
75					875
80					870
85					865

(continued)

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Remarks:
Pressure grouted with high solids bentonite grout.

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Additional data may have been collected in the field which is not included on this log.

LOG OF Boring E1-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/19/08 Ended 12/20/08 | Elevation 950.4

Location 184792.56'N, 553205.91'E | Logged By EJC | Total Depth 162.0 | Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		7		Lean Clay (CL): dark gray (5Y 4/1) with trace angular, coarse-grained sand, (0/2/98), massive, medium consistency, black mottling in sub-horizontal orientation, weak reaction to HCl, moist. [Diamicton] *(continued)*	860
				Silty Sand (SM)	
				Lean Clay (CL): dark gray (5Y 4/1) with trace angular, coarse-grained sand, (0/2/98), massive, medium consistency, black mottling in sub-horizontal orientation, weak reaction to HCl, moist. [Diamicton]	
95					855
100					850
105				105-115': Lenses silty sand (SM) spaced six inches part, less than one inch thick.	845
110		8			840
115				Silty Sand (SM)	835
				Lean Clay (CL): dark gray (5Y 4/1) with trace angular, coarse-grained sand, (0/2/98), massive, medium consistency, black mottling in sub-horizontal orientation, weak reaction to HCl, moist. [Diamicton]	
				(continued)	

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Remarks:
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LOG OF Boring E1-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/19/08 Ended 12/20/08 | Elevation 950.4

Location 184792.56'N, 553205.91'E | Logged By EJC | Total Depth 162.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
				120-140': Lenses of medium-grained sand spaced two to three inches apart throughout. Sand content increasing: 15% fine to medium-grained and 2% coarse-grained.	830
125					825
130		9			820
135					815
140				Poorly Graded Sand (SP): light gray (5Y 7/2), fine-grained, (0/100/0), trace oxidation stains throughout. Stained dark yellowish to reddish brown over lower four inches, wet. [Reworked St. Peter Sandstone]	810
145					805
				Silty Sand (SM): dark gray (5Y 4/1), fine-grained, (0/40/60), laminated, soft, wet. [Lacustrine]	

(continued)

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Telephone: 952-832-2600
Fax: 952-832-2601

Remarks:
Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

SIMPLE ENVIRO LOG 5 23190B05.GPJ BARRLOG6_28.GDT 5/7/09

LOG OF Boring E1-Pilot

Client University of Minnesota | Drill Contractor Traut

Project Name UMA Groundwater Assessment | Drill Method Rotasonic (4"x6")

Number 23/19-0B05 | Drilling Started 12/19/08 Ended 12/20/08 | Elevation 950.4

Location 184792.56'N, 553205.91'E | Logged By EJC | Total Depth 162.0

Screened Interval NA

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Headspace ppm	DESCRIPTION	ELEV. FEET
		10		Silty Sand (SM): dark gray (5Y 4/1), fine-grained, (0/40/60), laminated, soft, wet. [Lacustrine] *(continued)*	800
				Well Graded Sand (SW): yellowish brown (10YR 5/6) with gravel, medium to coarse-grained, (20/75/5), sub to well-rounded, some oxidation staining, wet.	
155					795
				Limestone: weathered, composed of angular cobbles and gravel, possibly brecciated, weak reaction to HCl. Reddish staining on exposed faces, fresh faces are light gray. [Prairie du Chien]	
160		11			790
				End of Boring - 162 feet	
165					785
170					780
175					775

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Telephone: 952-832-2600
Fax: 952-832-2601

Remarks:
Pressure grouted with high solids bentonite grout.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769482

WELL OR BORING LOCATION

County Name: Dakota

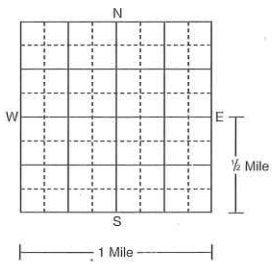
Township Name	Township No.	Range No.	Section No.	Fraction
Rosemount	115N	19W	33	SE ¼ SE ¼ SE ¼

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds ____ Longitude ____ degrees ____ minutes ____ seconds ____

House Number, Street Name, City, and Zip Code of Well Location: 160th St. & Station Trail Rosemount

or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.

PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room W-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: University of MN

Well/boring owner's mailing address if different than property owner's address indicated above.

501 23rd Ave SE
Minneapolis, MN 55414

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Clay	Brown	M	0	4
Snd, Gvl, Rck	Brown	S	4	145
Clay	Gray	M	145	147
Limestone	Tan	H	147	

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

C2-202
PW - ~~EZ-209~~
Drilled near ~~MW-C2-004~~
MW-C2-202

MINN. DEPT. OF HEATLH COPY 769482

WELL/BORING DEPTH (completed): 145 ft.

DATE WORK COMPLETED: 1-27-09

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☒ Rotary ☐ Jetted ☐ ____

DRILLING FLUID: Bentonite

WELL HYDROFRACTURED? ☐ Yes ☒ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☐ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☒ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☒ Test well

CASING MATERIAL: ☒ Steel ☐ Plastic — Drive Shoe? ☐ Yes ☒ No — ☐ Threaded ☐ Welded ☐ ____

CASING Diameter / Weight / Specifications

				HOLE DIAM.	
6 in. to 125 ft.	18.97 lbs./ft.			10 in. to 145 ft.	
____ in. to ____ ft.	____ lbs./ft.			____ in. to ____ ft.	
____ in. to ____ ft.	____ lbs./ft.			____ in. to ____ ft.	

SCREEN
Make: Johnson
Type: Stainless Steel — Diam.: 6" PS
Slot/Gauze: 30 — Length: 20'
Set between: 125 ft. and 145 ft. — FITTINGS:

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: 67 ft. ☒ Below ☐ Above land surface — Measured from: ____ — Date measured: 1-27-09

PUMPING LEVEL (below land surface): 88.9 ft. after 9.5 hrs. pumping 250 g.p.m.

WELLHEAD COMPLETION
☐ Pitless/adapter manufacturer: ____ Model: ____
☐ Casing Protection: ____ ☒ 12 in. above grade
☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
Well grouted ☒ Yes ☐ No
Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____

From 0 To 115 ft.	12	☐ Yds.	☒ Bags	
From ____ To ____ ft.	____	☐ Yds.	☐ Bags	
From ____ To ____ ft.	____	☐ Yds.	☐ Bags	

NEAREST KNOWN SOURCE OF CONTAMINATION: N/A feet ____ direction ____ type

Well disinfected upon completion? ☒ Yes ☐ No

PUMP
☒ Not installed Date installed: ____
Manufacturer's name: ____
Model Number: ____ HP: ____ Volts: ____
Length of drop pipe: ____ ft. Capacity: ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE
Was a variance granted from the MDH for this well? ☐ Yes ☒ No TN#: ____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. — 1404
Licensee Business Name — Lic. or Reg. No.

589
Certified Representative Signature — Certified Rep. No. — Date

Perry Storkamp — 1-27-09
Name of Driller

IC 140-0020

UMP005236

HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769483

WELL OR BORING LOCATION

County Name: Dakota

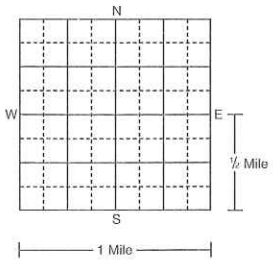
Township Name	Township No.	Range No.	Section No.	Fraction
Empire	114N	19W	4	NW¼ NW¼ SE¼

GPS LOCATION: N Latitude 44 degrees 42. minutes 613 seconds ____
W Longitude 093 degrees 06. minutes 230 seconds ____

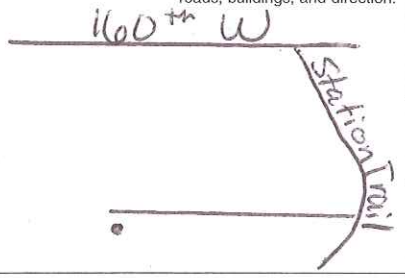
House Number, Street Name, City, and Zip Code of Well Location: SW of Staion Trail & 160th St. W

or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.
Boyton Health Center
Room W-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top soil	Black	M	0	1
Silty Sand	Brown	M	1	5
Sand & Gravel	Brown	M	5	40
Sand	Brown	M	40	100
Rock	Black	H	100	110
Silty Sand & Clay	Gray	M	110	116
Gravel	Brown	M	116	119
Silty Caly	Brown	M	119	121
Gravel	Brown	M	121	122
Sandstone	Gray	M	122	126

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW - E2-209

Permitted as industrial well, but monitor well installed.

MINN. DEPT. OF HEATLH COPY 769483

WELL/BORING DEPTH (completed): 126 ft. | DATE WORK COMPLETED: 1-27-09

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☐ Rotary ☐ Jetted ☒ Sonic

DRILLING FLUID: H20 | WELL HYDROFRACTURED? ☐ Yes ☐ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic | Drive Shoe? ☐ Yes ☐ No ☒ Threaded ☐ Welded ☐ ____

CASING

Diameter		Weight	Specifications
2 in. to 116 ft.		3.65 lbs./ft.	
____ in. to ____ ft.		____ lbs./ft.	
____ in. to ____ ft.		____ lbs./ft.	

HOLE DIAM.

7 in. to 126 ft.	
____ in. to ____ ft.	
____ in. to ____ ft.	

SCREEN
Make: Johnson
Type: Stainless Steel Diam.: 2"
Slot/Gauze: 10 Length: 10'
Set between: 116 ft. and 126 ft. FITTINGS: T&C

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: 60 ft. ☒ Below ☐ Above land surface Measured from ____ Date measured ____

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION
☐ Pitless/adapter manufacturer ____ Model ____
☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
Well grouted ☒ Yes ☐ No
Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____

From 0 To 113 ft.	11	☐ Yds.	☒ Bags
From ____ To ____ ft.	____	☐ Yds.	☐ Bags
From ____ To ____ ft.	____	☐ Yds.	☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☒ Not installed Date installed ____
Manufacturer's name ____
Model Number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

VARIANCE
Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# ____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404
Licensee Business Name Lic. or Reg. No.

589
Certified Representative Signature Certified Rep. No. Date

Mike Anderson
Name of Driller

IC 140-0020

UMP005237

HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO.: 769484

WELL OR BORING LOCATION

County Name: Dakota

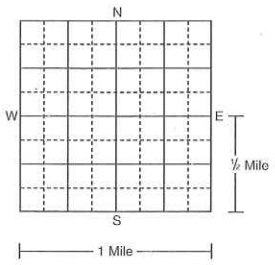
Township Name	Township No.	Range No.	Section No.	Fraction
Rosemount	115N	19W	36	SE ¼ NE ¼ SW ¼

GPS LOCATION: N Latitude 44 degrees 43 minutes 341 seconds; W Longitude 093 degrees 03 minutes 291 seconds

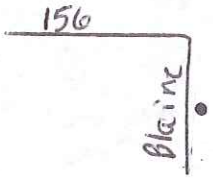
House Number, Street Name, City, and Zip Code of Well Location: SW of 156th St. E. & Blaine Ave.

or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room w-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	2
Silty Sand	Brown	M	2	6
Sand & Gravel	Brown	M	6	80
Silty Sand & Clay	Brown	M	80	90

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.: MW-07-004

MINN. DEPT. OF HEATLH COPY 769484

WELL/BORING DEPTH (completed): 90 ft. DATE WORK COMPLETED: 1-13-09

DRILLING METHOD: [ ] Cable Tool [ ] Driven [ ] Dug [ ] Auger [ ] Rotary [ ] Jetted [X] Sonic

DRILLING FLUID: H20

WELL HYDROFRACTURED? [ ] Yes [X] No From ____ ft. To ____ ft.

USE: [ ] Domestic [X] Monitoring [ ] Heating/Cooling [ ] Noncommunity PWS [ ] Environ. Bore Hole [ ] Industry/Commercial [ ] Community PWS [ ] Irrigation [ ] Remedial [ ] Elevator [ ] Dewatering [ ] ____

CASING MATERIAL: [X] Steel [ ] Plastic; Drive Shoe? [ ] Yes [ ] No; [X] Threaded [ ] Welded [ ] ____

HOLE DIAM.

CASING

Diameter	Weight	Specifications	HOLE DIAM.
2 in. to 80 ft.	3.65 lbs./ft.		7 in. to 90 ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.

SCREEN: Make Johnson; Type Stainless Steel; Diam. 2"; Slot/Gauze 10; Length 10'; Set between 80 ft. and 90 ft.; FITTINGS ____

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: 69.7 ft. [X] Below [ ] Above land surface; Measured from ____; Date measured 1-22-09

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION: [ ] Pitless/adapter manufacturer ____ Model ____; [X] Casing Protection Protop [ ] 12 in. above grade; [ ] At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted [X] Yes [ ] No; Grout materials [ ] Neat cement [X] Bentonite [ ] Concrete [ ] Other ____

From 0 To 74 ft. 6 [ ] Yds. [X] Bags
From ____ To ____ ft. ____ [ ] Yds. [ ] Bags
From ____ To ____ ft. ____ [ ] Yds. [ ] Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? [ ] Yes [ ] No

PUMP: [X] Not installed Date installed ____; Manufacturer's name ____; Model Number ____ HP ____ Volts ____; Length of drop pipe ____ ft. Capacity ____ g.p.m.; Type: [ ] Submersible [ ] L.S. Turbine [ ] Reciprocating [ ] Jet [ ] ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? [ ] Yes [ ] No

VARIANCE: Was a variance granted from the MDH for this well? [ ] Yes [ ] No TN# ____

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404
Licensee Business Name — Lic. or Reg. No.

589
Certified Representative Signature — Certified Rep. No. — Date

Mike Anderson
Name of Driller

UMP005238

IC 140-0020 HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769485

WELL OR BORING LOCATION

County Name: Dakota

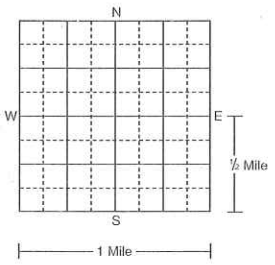
Township Name	Township No.	Range No.	Section No.	Fraction
Rosemount	115N	19W	34	NW ¼ SE ¼ SE ¼

GPS LOCATION: N Latitude 44 degrees 43. minutes 242 seconds ____ ; W Longitude 093 degrees 04. minutes 714 seconds ____

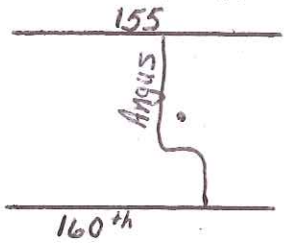
House Number, Street Name, City, and Zip Code of Well Location: Angus Ave & 160th St. Rosemount

or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Centter
Room W-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	2
Silty Sand & Clay / Rocks	Brown	M	2	10
Sand & Gravel	Brown	M	10	41
Silty Sand & Clay	Brown	M	41	44
Silty Sand	Brown	M	44	68
Silty Sand & Clay	Gray	M	68	79
Silt & Rock	Brown	M	79	80
Sandstone	Brown	H	80	92

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.: MW-C4-311

MINN. DEPT. OF HEATLH COPY 769485

WELL/BORING DEPTH (completed): 92 ft. | DATE WORK COMPLETED: 1-29-09

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☐ Rotary ☐ Jetted ☒ Sonic

DRILLING FLUID: H20 | WELL HYDROFRACTURED? ☐ Yes ☒ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic | Drive Shoe? ☐ Yes ☐ No | ☒ Threaded ☐ Welded ☐ ____

HOLE DIAM.

CASING Diameter / Weight / Specifications

Diameter	Weight	Specifications	HOLE DIAM.
2 in. to 82 ft.	3.65 lbs./ft.		7 in. to 92 ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.

SCREEN: Make Johnson; Type Stainless Steel; Diam. 2"; Slot/Gauze 10; Length 10'; Set between 82 ft. and 92 ft.; FITTINGS T&C

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: ____ ft. ☐ Below ☐ Above land surface | Measured from ____ | Date measured ____

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION: ☐ Pitless/adapter manufacturer ____ Model ____ ; ☒ Casing Protection Protop 8" ☐ 12 in. above grade ; ☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted ☒ Yes ☐ No; Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____

From	To	ft.		
0	80	7	☐ Yds.	☒ Bags
____	____	____	☐ Yds.	☐ Bags
____	____	____	☐ Yds.	☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☒ Not installed Date installed ____ ; Manufacturer's name ____ ; Model Number ____ HP ____ Volts ____ ; Length of drop pipe ____ ft. Capacity ____ g.p.m. ; Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# ____

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. — Licensee Business Name — 1404 Lic. or Reg. No.

589 — Certified Representative Signature — Certified Rep. No. — Date

Mike Anderson — Name of Driller

UMP005239

IC 140-0020 HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769486

WELL OR BORING LOCATION

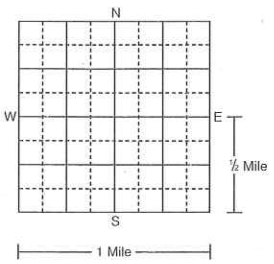
County Name: Dakota

Township Name: Empire | Township No.: 114N | Range No.: 19W | Section No.: 2 | Fraction: NE¼ SW¼ NW¼

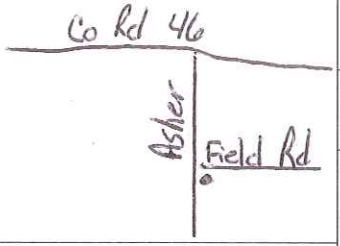
GPS LOCATION: N Latitude 44 degrees 42. minutes 743 seconds ____ ; W Longitude 093 degrees 03. minutes 992 seconds ____

House Number, Street Name, City, and Zip Code of Well Location: Asher Ave & 164th St. E Rosemount | or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room w-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	2
Silty Sand	Brown	M	2	7
Snd & Gvl & Rcks	Brown	M	7	29
Silty Clay	Gray	M	29	41
Silty Cly & Rck	Brown	M	41	51
Gravel	Brown	M	51	55
Silty Sand & Rock	Brown	M	55	60
Fine sandstone	Tan	M	60	75

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-05-308

~~D5-0011 num change to 008~~

MINN. DEPT. OF HEATLH COPY 769486

WELL/BORING DEPTH (completed): 75 ft. | DATE WORK COMPLETED: 1-6-09

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☐ Rotary ☐ Jetted ☒ Sonic

DRILLING FLUID: H20 | WELL HYDROFRACTURED? ☐ Yes ☐ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic | Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐ ____

CASING Diameter	Weight	Specifications	HOLE DIAM.
2 in. to 65 ft.	3.65 lbs./ft.		7 in. to 75 ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.

SCREEN: Make Johnson; Type Stainless Steel; Diam. 2"; Slot/Gauze 10; Length 10'; Set between 65 ft. and 75 ft.; FITTINGS ____

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: 63 ft. ☒ Below ☐ Above land surface | Measured from ____ | Date measured 1-7-09

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION: ☐ Pitless/adapter manufacturer ____ Model ____ ☒ Casing Protection Protop ☐ 12 in. above grade ☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted ☒ Yes ☐ No | Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____

From 0 To 59 ft. 5 ☐ Yds. ☒ Bags

From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☒ Not installed Date installed ____

Manufacturer's name ____

Model Number ____ HP ____ Volts ____

Length of drop pipe ____ ft. Capacity ____ g.p.m.

Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# ____

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. — Licensee Business Name | 1404 — Lic. or Reg. No.

589 — Certified Representative Signature | Certified Rep. No. | Date

Mike Anderson — Name of Driller

UMP005240

IC 140-0020

HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769487

WELL OR BORING LOCATION

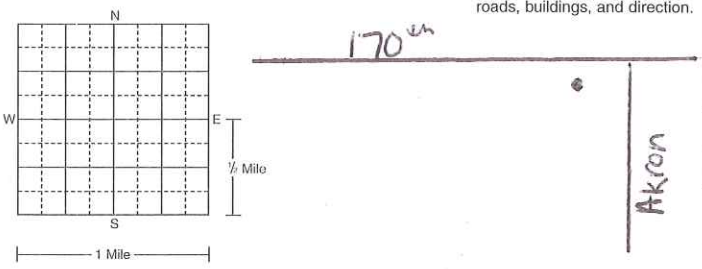
County Name: Dakota

Township Name: Empire | Township No.: 114N | Range No.: 19W | Section No.: 3 | Fraction: SE ¼ SE ¼ SW ¼

GPS LOCATION: N W Latitude 44 degrees 42. minutes 180 seconds ____ Longitude 093 degrees 05. minutes 075 seconds ____

House Number, Street Name, City, and Zip Code of Well Location: NW Corner of Akron & 170th St. W | or Fire Number: Rosemount

Show exact location of well/boring in section grid with "X." Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room w-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	2
Silty Sand&Rocks	Brown	M	2	4
Sand & Gravel	Brown	M	4	73

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-E4-010

MINN. DEPT. OF HEATLH COPY 769487

WELL/BORING DEPTH (completed): 72 ft. | DATE WORK COMPLETED: 1-9-08

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☐ Rotary ☐ Jetted ☒ Sonic

DRILLING FLUID: H20 | WELL HYDROFRACTURED? ☐ Yes ☐ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic | Drive Shoe? ☐ Yes ☐ No ☒ Threaded ☐ Welded ☐ ____

CASING Diameter	Weight	Specifications	HOLE DIAM.
2 in. to 62 ft.	3.65 lbs./ft.		7 in. to 72 ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.

SCREEN: Make Johnson; Type Stainless Steel; Diam. 2"; Slot/Gauze 10; Length 10'; Set between 62 ft. and 72 ft.; FITTINGS ____

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: 55 ft. ☒ Below ☐ Above land surface | Measured from ____ | Date measured ____

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION: ☐ Pitless/adapter manufacturer ____ Model ____ ☒ Casing Protection Protop ☐ 12 in. above grade ☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted ☒ Yes ☐ No | Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____

From 0 To 56 ft. 6 ☐ Yds. ☒ Bags

From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☒ Not installed Date installed ____

Manufacturer's name ____

Model Number ____ HP ____ Volts ____

Length of drop pipe ____ ft. Capacity ____ g.p.m.

Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# ____

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404

Licensee Business Name | Lic. or Reg. No.

589

Certified Representative Signature | Certified Rep. No. | Date

Mike Anderson

Name of Driller

UMP005241

IC 140-0020

HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769488

WELL OR BORING LOCATION

County Name: Dakota

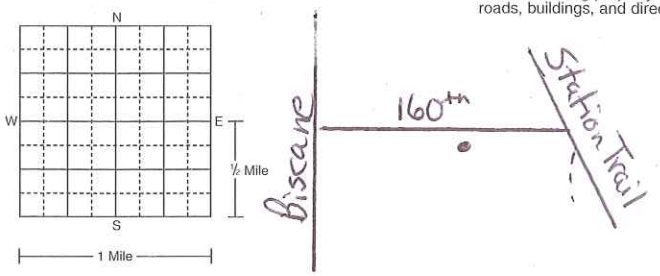
Township Name	Township No.	Range No.	Section No.	Fraction
Empire	114N	19W	4	NW ¼ NW ¼ SE ¼

GPS LOCATION: N Latitude 44 degrees 42. minutes 113 seconds ____ ; W Longitude 093 degrees 06. minutes 224 seconds ____

House Number, Street Name, City, and Zip Code of Well Location: Station Trail & 160th Rosemount

or Fire Number:

Show exact location of well/boring in section grid with "X." Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room W-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	1
Silty Sand	Brown	M	1	5
Sand & Gravel	Brown	M	5	40
Sand	Brown	M	40	70

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-E2-009

MINN. DEPT. OF HEATLH COPY 769488

WELL/BORING DEPTH (completed): 67.7 ft. DATE WORK COMPLETED: 12-21-08

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☐ Rotary ☐ Jetted ☒ Sonic

DRILLING FLUID: H20 WELL HYDROFRACTURED? ☐ Yes ☐ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic Drive Shoe? ☐ Yes ☐ No ☒ Threaded ☐ Welded ☐ ____

CASING Diameter / Weight / Specifications:
2 in. to 57.7 ft. 3.65 lbs./ft. ____
____ in. to ____ ft. ____ lbs./ft. ____
____ in. to ____ ft. ____ lbs./ft. ____

HOLE DIAM.:
7 in. to 70 ft.
____ in. to ____ ft.
____ in. to ____ ft.

SCREEN: Make Johnson; Type Stainless Steel; Diam. 2" PS; Slot/Gauze .010; Length 10'; Set between 57.7 ft. and 67.7 ft. FITTINGS ____

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: 57 ft. ☒ Below ☐ Above land surface Measured from ____ Date measured 12-21-08

PUMPING LEVEL (below land surface): -- ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION: ☐ Pitless/adapter manufacturer ____ Model ____ ☒ Casing Protection 8" Protop ☐ 12 in. above grade ☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted ☒ Yes ☐ No
Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____
From 0 To 58.7 ft. 6 ☐ Yds. ☒ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☒ No

PUMP: ☒ Not installed Date installed ____
Manufacturer's name ____
Model Number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☒ No TN# ____

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404
Licensee Business Name — Lic. or Reg. No.

589
Certified Representative Signature — Certified Rep. No. — Date

MIke ANderson
Name of Driller

UMP005242

IC 140-0020 HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769489

WELL OR BORING LOCATION

County Name: Dakota

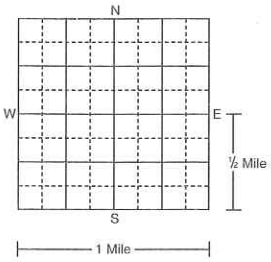
Township Name	Township No.	Range No.	Section No.	Fraction
Rosemount	115N	19W	33	SE ¼ SE ¼ SE ¼

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds ____ Longitude ____ degrees ____ minutes ____ seconds ____

House Number, Street Name, City, and Zip Code of Well Location: 160th St. & Station Trail Rosemount

or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.

PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room W-140
410 Church St.
Minneapolis, Mn 55455

WELL OWNER'S NAME/COMPANY NAME

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Clay	Brown	M	0	4
Sand, grvl, rocks	Brown	S	4	147
Limestone	Tan	H	147	

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-C2-202

~~MW-C2-004~~

MINN. DEPT. OF HEATLH COPY 769489

WELL/BORING DEPTH (completed): 147 ft.

DATE WORK COMPLETED: 1-22-09

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☒ Rotary ☐ Jetted ☐ ____

DRILLING FLUID: Bentonite

WELL HYDROFRACTURED? ☐ Yes ☒ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic

Drive Shoe? ☐ Yes ☒ No ☒ Threaded ☐ Welded ☐ ____

HOLE DIAM.

CASING Diameter	Weight	Specifications	HOLE DIAM.
2 in. to 137 ft.	3.65 lbs./ft.		6 in. to 147 ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.

SCREEN
Make: Johnson
Type: Stainless Steel Diam.: 2"
Slot/Gauze: 10 Length: 10'
Set between: 137 ft. and 147 ft. FITTINGS:

OPEN HOLE From ____ ft. To ____ ft.

STATIC WATER LEVEL: 67 ft. ☒ Below ☐ Above land surface Measured from: Date measured: 1-22-09

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION
☐ Pitless/adapter manufacturer ____ Model ____
☐ Casing Protection ____ ☒ 12 in. above grade
☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
Well grouted ☒ Yes ☐ No
Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____
From 0 To 134 ft. ____ ☐ Yds. ☐ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: N/A feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☒ No

PUMP
☐ Not installed Date installed ____
Manufacturer's name ____
Model Number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE
Was a variance granted from the MDH for this well? ☐ Yes ☒ No TN# ____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404
Licensee Business Name Lic. or Reg. No.

589
Certified Representative Signature Certified Rep. No. Date

Perry Storkamp 1-22-09
Name of Driller

UMP005243

IC 140-0020 HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769490

WELL OR BORING LOCATION

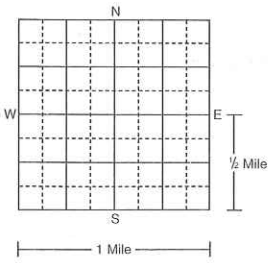
County Name: Dakota

Township Name	Township No.	Range No.	Section No.	Fraction
Empire	114N	19W	3	NW ¼ NE ¼ NW ¼

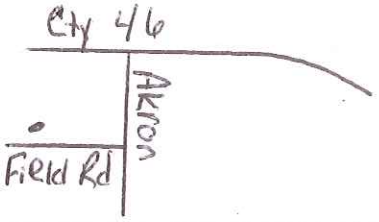
GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds ____
Longitude ____ degrees ____ minutes ____ seconds ____

House Number, Street Name, City, and Zip Code of Well Location: Akron Ave & 164th St. W Rosemount
or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.
Boyton Health Center
Room W-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	1
Silty Sand	Brown	M	1	3
Sand & Gravel	Brown	M	3	70

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
MW-D3-007

MINN. DEPT. OF HEATLH COPY 769490

WELL/BORING DEPTH (completed): 70 ft.
DATE WORK COMPLETED: 1-7-09

DRILLING METHOD
☐ Cable Tool ☐ Driven ☐ Dug
☐ Auger ☐ Rotary ☐ Jetted
☒ Sonic

DRILLING FLUID: H20
WELL HYDROFRACTURED? ☐ Yes ☐ No From ____ ft. To ____ ft.

USE
☐ Domestic ☒ Monitoring ☐ Heating/Cooling
☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial
☐ Community PWS ☐ Irrigation ☐ Remedial
☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL
☒ Steel ☐ Plastic
Drive Shoe? ☐ Yes ☐ No
☒ Threaded ☐ Welded ☐ ____

CASING

Diameter		Weight	Specifications
2 in. to 60 ft.		3.65 lbs./ft.	
____ in. to ____ ft.		____ lbs./ft.	
____ in. to ____ ft.		____ lbs./ft.	

HOLE DIAM.

7 in. to 70 ft.	
____ in. to ____ ft.	
____ in. to ____ ft.	

SCREEN
Make: Johnson
Type: Stainless Steel
Slot/Gauze: 10
Set between: 60 ft. and 70 ft.

OPEN HOLE
From ____ ft. To ____ ft.
Diam. 2"
Length 10'
FITTINGS T&C

STATIC WATER LEVEL: 58 ft. ☒ Below ☐ Above land surface
Measured from ____ Date measured ____

PUMPING LEVEL (below land surface)
____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION
☐ Pitless/adapter manufacturer ____ Model ____
☐ Casing Protection ____ ☐ 12 in. above grade
☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
Well grouted ☒ Yes ☐ No
Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____

From 0	To 54 ft.	4	☐ Yds.	☒ Bags
From ____	To ____ ft.	____	☐ Yds.	☐ Bags
From ____	To ____ ft.	____	☐ Yds.	☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION
____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☒ Not installed Date installed ____
Manufacturer's name ____
Model Number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

VARIANCE
Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# ____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404
Licensee Business Name Lic. or Reg. No.

589
Certified Representative Signature Certified Rep. No. Date

Mike Anderson
Name of Driller

IC 140-0020

UMP005244

HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769491

WELL OR BORING LOCATION

County Name: Dakota

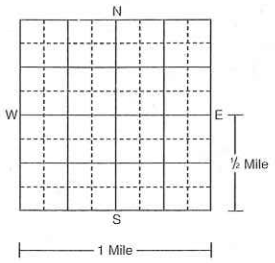
Township Name	Township No.	Range No.	Section No.	Fraction
Rosemount	115N	19W	26	SW¼ SW¼ SE¼

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds ____ Longitude ____ degrees ____ minutes ____ seconds ____

House Number, Street Name, City, and Zip Code of Well Location: 152nd St E & Blaine Ct Rosemount

or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.

PROPERTY OWNER'S NAME/COMPANY NAME: University of MN Boyton Health Center

Property owner's mailing address if different than well location address indicated above.
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Clay	Brown	M	0	5
Sand	Brown	S	5	49
Clay	Brown	M	49	52
Clay	Gray	H	52	92
Sand	Brown	S	92	112

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
MW-A6-006

MINN. DEPT. OF HEATLH COPY 769491

WELL/BORING DEPTH (completed): 112 ft.

DATE WORK COMPLETED: 1-20-09

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☒ Rotary ☐ Jetted ☐ ____

DRILLING FLUID: Bentonite

WELL HYDROFRACTURED? ☐ Yes ☒ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic

Drive Shoe? ☐ Yes ☒ No ☒ Threaded ☐ Welded ☐ ____

HOLE DIAM.

CASING Diameter / Weight / Specifications

Diameter	Weight	Specifications	HOLE DIAM.
2 in. to 102 ft.	3.65 lbs./ft.		6 in. to 112 ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.

SCREEN
Make: Johnson
Type: Stainless Steel Diam.: 2"
Slot/Gauze: 10 Length: 10'
Set between 102 ft. and 112 ft. FITTINGS:

OPEN HOLE From ____ ft. To ____ ft.

STATIC WATER LEVEL: 87 ft. ☒ Below ☐ Above land surface Measured from: ____ Date measured: 1-20-09

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION
☐ Pitless/adapter manufacturer ____ Model ____
☐ Casing Protection ____ ☒ 12 in. above grade
☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
Well grouted ☒ Yes ☐ No
Grout materials ☐ Neat cement ☒ Bentonite ☐ Concrete ☐ Other ____

From	To			
0	99 ft.	9	☐ Yds.	☒ Bags
____	____ ft.	____	☐ Yds.	☐ Bags
____	____ ft.	____	☐ Yds.	☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: N/A feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☒ No

PUMP
☒ Not installed Date installed ____
Manufacturer's name ____
Model Number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE
Was a variance granted from the MDH for this well? ☐ Yes ☒ No TN# ____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404
Licensee Business Name Lic. or Reg. No.

589
Certified Representative Signature Certified Rep. No. Date

Perry Storkamp 1-20-09
Name of Driller

UMP005245

IC 140-0020 HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO.: 769493

WELL OR BORING LOCATION

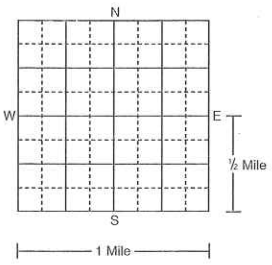
County Name: Dakota

Township Name: Rosemount | Township No.: 115 | Range No.: 19W | Section No.: 33 | Fraction: SE ¼ SE ¼ SE ¼

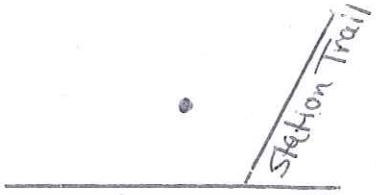
GPS LOCATION: N Latitude 44 degrees 43. minutes 109 seconds ____ W Longitude 093 degrees 06. minutes 214 seconds ____

House Number, Street Name, City, and Zip Code of Well Location: West of Station Trail & North of 160th W | or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room W-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top SOil	Black	M	0	2
Silty Sand	Brown	M	2	5
Sand with Gravel	Brown	M	5	75

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.: MW-C2-002

MINN. DEPT. OF HEATLH COPY 769493

WELL/BORING DEPTH (completed): 75 ft. | DATE WORK COMPLETED: 1-28-09

DRILLING METHOD: [X] Sonic | [ ] Cable Tool [ ] Auger [ ] Driven [ ] Rotary [ ] Dug [ ] Jetted

DRILLING FLUID: H20 | WELL HYDROFRACTURED? [ ] Yes [ ] No From ____ ft. To ____ ft.

USE: [ ] Domestic [X] Monitoring [ ] Heating/Cooling [ ] Noncommunity PWS [ ] Environ. Bore Hole [ ] Industry/Commercial [ ] Community PWS [ ] Irrigation [ ] Remedial [ ] Elevator [ ] Dewatering [ ] ____

CASING MATERIAL: [X] Steel [ ] Plastic | Drive Shoe? [ ] Yes [ ] No | [X] Threaded [ ] Welded [ ] ____

HOLE DIAM.

CASING Diameter	Weight	Specifications	HOLE DIAM.
2 in. to 65 ft.	3.65 lbs./ft.		7 in. to 75 ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.

SCREEN: Make JOhnson | Type Stainless Steel | Diam. 2" | Slot/Gauze 10 | Length 10' | Set between 65 ft. and 75 ft. | FITTINGS T&C

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: ____ ft. [ ] Below [ ] Above land surface | Measured from ____ | Date measured ____

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION: [ ] Pitless/adapter manufacturer ____ Model ____ | [X] Casing Protection Steel | [X] 12 24 in. above grade | [ ] At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted [X] Yes [ ] No | Grout materials [ ] Neat cement [X] Bentonite [ ] Concrete [ ] Other ____

From 0 To 62 ft. 5 [ ] Yds. [X] Bags
From ____ To ____ ft. ____ [ ] Yds. [ ] Bags
From ____ To ____ ft. ____ [ ] Yds. [ ] Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? [ ] Yes [ ] No

PUMP: [X] Not installed | Date installed ____ | Manufacturer's name ____ | Model Number ____ HP ____ Volts ____ | Length of drop pipe ____ ft. Capacity ____ g.p.m. | Type: [ ] Submersible [ ] L.S. Turbine [ ] Reciprocating [ ] Jet [ ] ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? [ ] Yes [ ] No

VARIANCE: Was a variance granted from the MDH for this well? [ ] Yes [ ] No TN# ____

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404
Licensee Business Name | Lic. or Reg. No.

589
Certified Representative Signature | Certified Rep. No. | Date

Mike Anderson
Name of Driller

UMP005246

IC 140-0020 HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769492

WELL OR BORING LOCATION

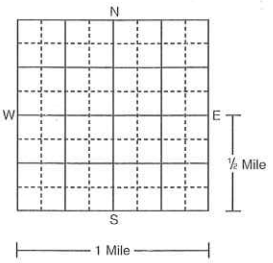
County Name: Dakota

Township Name: Empire | Township No.: 114N | Range No.: 19W | Section No.: 4 | Fraction: ¼ ¼ ¼

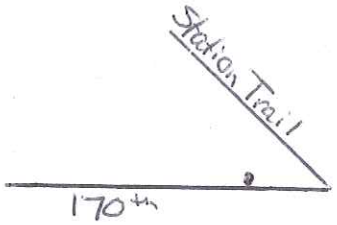
GPS LOCATION: N Latitude 44 degrees 42. minutes 193 seconds ____
W Longitude 093 degrees 05. minutes 755 seconds ____

House Number, Street Name, City, and Zip Code of Well Location: 170th & Station Trail | or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room w-140
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	1
Silty Sand	Brown	M	1	5
Sand & Gravel	Brown	M	5	20
Silt & Clay	Gray	M	20	24
Silt & Clay	Brown	M	24	28
Sandstone	Tan	M	28	75

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-E2-305

MINN. DEPT. OF HEATLH COPY 769492

WELL/BORING DEPTH (completed): 75 ft. | DATE WORK COMPLETED: 1-30-09

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☐ Rotary ☐ Jetted ☒ Sonic

DRILLING FLUID: H20 | WELL HYDROFRACTURED? ☐ Yes ☐ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic | Drive Shoe? ☐ Yes ☐ No | ☒ Threaded ☐ Welded ☐ ____

CASING Diameter	Weight	Specifications	HOLE DIAM.
2 in. to 65 ft.	3.65 lbs./ft.		7 in. to 75 ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.		____ in. to ____ ft.

SCREEN: Make Johnson | Type Stainless Steel | Diam. 2" | Slot/Gauze 10 | Length 10' | Set between 65 ft. and 75 ft. | FITTINGS T&C

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: ____ ft. ☐ Below ☐ Above land surface | Measured from ____ | Date measured ____

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION: ☐ Pitless/adapter manufacturer ____ Model ____
☒ Casing Protection Protop ☐ 12 in. above grade
☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted ☐ Yes ☐ No
Grout materials ☒ Neat cement ☐ Bentonite ☐ Concrete ☐ Other ____
From 0 To 62 ft. 6 ☐ Yds. ☐ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☒ Not installed Date installed ____
Manufacturer's name ____
Model Number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# ____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut WElls, Inc. 1404
Licensee Business Name | Lic. or Reg. No.

589
Certified Representative Signature | Certified Rep. No. | Date

Mike ANderson
Name of Driller

UMP005247

IC 140-0020 HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO.: 769494

WELL OR BORING LOCATION

County Name: Dakota

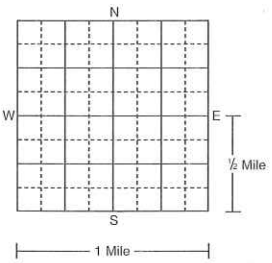
Township Name	Township No.	Range No.	Section No.	Fraction
Rosemount	115N	19W	27	NE ¼ SE ¼ SE ¼

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds ____ Longitude ____ degrees ____ minutes ____ seconds ____

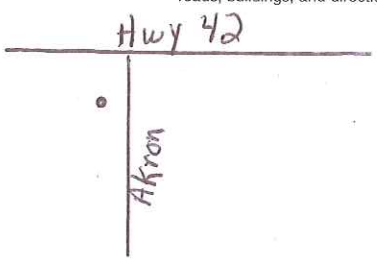
House Number, Street Name, City, and Zip Code of Well Location: SW of Akron Ave & 145th St. SW Rosemount

or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.

Boyton Health Center
Room W-140
410 CHurch St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	5
Sand & Rocks	Brown	M	5	77
Silty Sand	Brown	M	77	82

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-A3-003

MINN. DEPT. OF HEATLH COPY 769494

WELL/BORING DEPTH (completed): 82 ft.

DATE WORK COMPLETED: 1-5-09

DRILLING METHOD: [ ] Cable Tool [ ] Driven [ ] Dug [ ] Auger [ ] Rotary [ ] Jetted [X] Sonic

DRILLING FLUID: H20

WELL HYDROFRACTURED? [ ] Yes [ ] No From ____ ft. To ____ ft.

USE: [ ] Domestic [X] Monitoring [ ] Heating/Cooling [ ] Noncommunity PWS [ ] Environ. Bore Hole [ ] Industry/Commercial [ ] Community PWS [ ] Irrigation [ ] Remedial [ ] Elevator [ ] Dewatering [ ] ____

CASING MATERIAL: [X] Steel [ ] Plastic Drive Shoe? [ ] Yes [ ] No [ ] Threaded [ ] Welded [ ] ____

HOLE DIAM.

CASING

Diameter		Weight		Specifications	HOLE DIAM.	
2 in. to	72 ft.	3.65 lbs./ft.			7 in. to	82 ft.
____ in. to	____ ft.	____ lbs./ft.			____ in. to	____ ft.
____ in. to	____ ft.	____ lbs./ft.			____ in. to	____ ft.

SCREEN: Make Johnson; Type Stainless Steel; Diam. 2"; Slot/Gauze 10; Length 10'; Set between 72 ft. and 82 ft.; FITTINGS T&C

OPEN HOLE: From ____ ft. To ____ ft.

STATIC WATER LEVEL: 69 ft. [X] Below [ ] Above land surface; Measured from Grade; Date measured 1-6-09

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION: [ ] Pitless/adapter manufacturer ____ Model ____ [X] Casing Protection Protop [ ] 12 in. above grade [ ] At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted [X] Yes [ ] No; Grout materials [ ] Neat cement [X] Bentonite [ ] Concrete [ ] Other ____

From 0	To 67 ft.	6	[ ] Yds.	[X] Bags
From ____	To ____ ft.	____	[ ] Yds.	[ ] Bags
From ____	To ____ ft.	____	[ ] Yds.	[ ] Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? [ ] Yes [ ] No

PUMP: [X] Not installed Date installed ____

Manufacturer's name ____

Model Number ____ HP ____ Volts ____

Length of drop pipe ____ ft. Capacity ____ g.p.m.

Type: [ ] Submersible [ ] L.S. Turbine [ ] Reciprocating [ ] Jet [ ] ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? [ ] Yes [ ] No

VARIANCE: Was a variance granted from the MDH for this well? [ ] Yes [ ] No TN# ____

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404

Licensee Business Name / Lic. or Reg. No.

589

Certified Representative Signature / Certified Rep. No. / Date

Mike Anderson

Name of Driller

UMP005248

IC 140-0020

HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 769496

WELL OR BORING LOCATION

County Name: Dakota

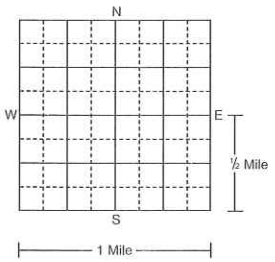
Township Name	Township No.	Range No.	Section No.	Fraction
Rosemount	115N	19W	33	NW ¼ NW ¼ NW ¼

GPS LOCATION: N Latitude 44 degrees 43. minutes 855 seconds ____ ; W Longitude 093 degrees 06. minutes 698 seconds ____

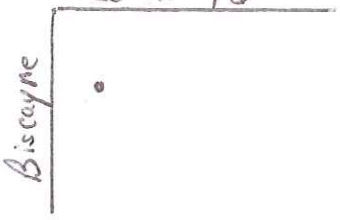
House Number, Street Name, City, and Zip Code of Well Location: Biscayne & Co Rd 42 Rosemount

or Fire Number:

Show exact location of well/boring in section grid with "X."



Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above.
Boyton Health Center
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well/boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Top Soil	Black	M	0	2
Silty Sand & Clay	Brown	M	2	8
Sand & Gravel	Brown	M	8	62
Fine Sand	Brown	M	62	72
Silty Sand	Brown	M	72	75

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.: MW-B1-001

MINN. DEPT. OF HEATLH COPY 769496

WELL/BORING DEPTH (completed): 71 ft. DATE WORK COMPLETED: 1-8-09

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☐ Rotary ☐ Jetted ☒ Sonic

DRILLING FLUID: H20 WELL HYDROFRACTURED? ☐ Yes ☐ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☒ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☐ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic Drive Shoe? ☐ Yes ☐ No ☒ Threaded ☐ Welded ☐ ____

HOLE DIAM.

CASING Diameter / Weight / Specifications

____ in. to ____ ft. ____ lbs./ft. ____ ____ in. to ____ ft.
____ in. to ____ ft. ____ lbs./ft. ____ ____ in. to ____ ft.
____ in. to ____ ft. ____ lbs./ft. ____ ____ in. to ____ ft.

SCREEN: Make Johnson Type Stainless Steel Slot/Gauze 10 Set between 61 ft. and 71 ft.
Diam. 2" Length 10' FITTINGS ____

OPEN HOLE From ____ ft. To ____ ft.

STATIC WATER LEVEL: 62 ft. ☒ Below ☐ Above land surface Measured from ____ Date measured ____

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELLHEAD COMPLETION
☐ Pitless/adapter manufacturer ____ Model ____
☒ Casing Protection Protop ☐ 12 in. above grade
☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
Well grouted ☒ Yes ☐ No
Grout materials ☐ Neat cement ☐ Bentonite ☐ Concrete ☐ Other ____
From 0 To 55 ft. 6 ☐ Yds. ☒ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☒ Not installed Date installed ____
Manufacturer's name ____
Model Number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

VARIANCE
Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# ____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. 1404
Licensee Business Name Lic. or Reg. No.

589
Certified Representative Signature Certified Rep. No. Date

Mike Anderson
Name of Driller

UMP005249

IC 140-0020 HE-01205-11 (Rev. 3/07)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. H 277821
Minnesota Unique Well No. or W-series No. (Leave blank if not known)

WELL OR BORING LOCATION

County Name: Dsakota

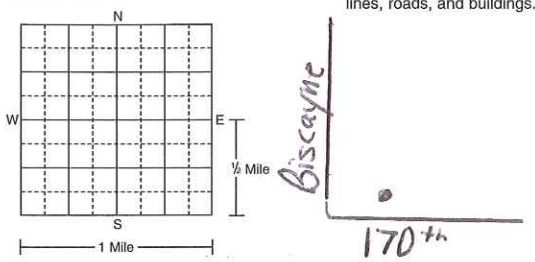
Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Empire	114	19W	4	SE¼ SW SW

GPS LOCATION: N Latitude 44 degrees 42 minutes 259 seconds; W Longitude 093 degrees 06 minutes 725 seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: NE Corner of Bicayne & 170th St. W

Show exact location of well or boring in section grid with "X." Rosemount

Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: University of MN

Property owner's mailing address if different than well location address indicated above:

Boyton Health Center
410 Church St.
Minneapolis, MN 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well owner's mailing address if different than property owner's address indicated above:

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Top Soil	Black	M	0	2
Fine Silty Sand	Brown	M	2	5
Sand & Gravel	Brown	M	5	58
Silty Clay	Gray	M	58	140
Reworked Sandstone	Tan	M	140	147
Silty Clay	Gray	M	147	152
Sand & Gravel	Brown	M	152	159
Limestone	Brown	H	159	162

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

~~E1=205~~ E1 - Pilot Boring

MINN. DEPT OF HEALTH COPY H 277821

Date Sealed: 12-20-08

Date Well or Boring Constructed: 12-19&20-08

Depth Before Sealing: 162 ft.

Original Depth: 162 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer

WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measured ____ ft. ☐ below ☐ above land surface

CASING TYPE(S): ☐ Steel ☐ Plastic ☐ Tile ☐ Other N/A

WELLHEAD COMPLETION

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other N/A

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
NA in.	from ____ to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in.	from ____ to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in.	from ____ to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from N/A to ____ ft. Open Hole from ____ to ____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe): ____

Obstructions removed? ☐ Yes ☐ No Describe: ____

PUMP: Type NA

☐ Removed ☐ Not Present ☐ Other ____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

Type of Perforator: ____

☐ Other ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material	from	to	ft.	yards	bags
Bentonite	0	162		14	

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☐ No How many? ____

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J. Traut Wells, Inc. — Licensee Business Name — License or Registration No. 1404

Certified Representative Signature — Certified Rep. No. 589 — Date

Mike Anderson — Name of Person Sealing Well or Boring

HE-01434-11 IC# 140-0423 2/08R

UMP005250

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No.
Minnesota Unique Well No. or W-series No.
(Leave blank if not known)

H 277822

WELL OR BORING LOCATION

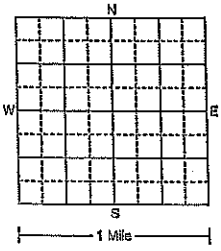
County Name: Dakota

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Rosemount	115	19W	33	SE¼ SE¼ SE¼

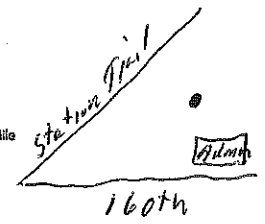
GPS LOCATION: V Latitude 44 degrees 43e minutes 144 seconds; W Longitude 093 degrees 05. minutes 876 seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: Station Trail & 160th West.

Show exact location of well or boring in section grid with "X."



Sketch map of well or boring location, showing property lines, roads, and buildings.



Date Sealed: 12-19-08

Date Well or Boring Constructed: 12-18-19-08

Depth Before Sealing: 165 ft.

Original Depth: 165 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measured ____ ft. ☐ below ☐ above land surface

WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other ____

CASING TYPE(S): NA

☐ Steel ☐ Plastic ☐ Tile ☐ Other ____

WELLHEAD COMPLETION: NA

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other ____

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other ____

PROPERTY OWNER'S NAME/COMPANY NAME: University of Mn

Property owner's mailing address if different than well location address indicated above:
Boynton Health Center
Room W-140
410 Church St.
Minneapolis Mn 55455

WELL OWNER'S NAME/COMPANY NAME

Well owner's mailing address if different than property owner's address indicated above

CASING(S): NA

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: NA

Screen from ____ to ____ ft. Open Hole from ____ to ____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe) ____

Obstructions removed? ☐ Yes ☐ No Describe ____

PUMP: NA

Type ____

☐ Removed ☐ Not Present ☐ Other ____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

Type of Perforator ____

☐ Other ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material: Bentonite from 0 to 165 ft. ____ yards 14 bags

____ from ____ to ____ ft. ____ yards ____ bags

____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? ☐ Yes ☐ No How many? ____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Top Soil	Blk	M	0	2
Sand & Gravel	Brn	M	2	12
Silty Clay	Brn	M	12	14
Fine Sand	Brn	M	14	20
Silty Clay	Brn	M	20	27
Fine Sand	Brn	M	27	30
Silty Clay	Gray	M	30	45
Silty Clay	Tan	M	45	53
Silty Clay & Rocks	Gray	M	53	94
Silty Sand & Clay	Brn	M	94	100
Fine Sandy	Brn	M	100	106
Silty Clay	Gray	M	106	144
Sand & Gravel	Brn	M	144	162
Limestone	Gray	H	162	165

C2 - Pilot Boring

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Contractor Business Name ____ License or Registration No. ____

Certified Representative Signature ____ Certified Rep. No. ____ Date ____

Mike Anderson

Name of Person Sealing Well or Boring

MINN. DEPT. OF HEALTH COPY H

HE-01434-09 IC# 140-0423

WELL OR BORING LOCATION

County Name: Dakota

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 1031

Minnesota Well and Boring Sealing No.
Minnesota Unique Well No. or W-series No. (Leave blank if not known)

H 277823

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Rosemount	115 N	19 W	26	SW¼ SW¼ SE¼

Date Sealed: 1-13-09

Date Well or Boring Constructed: 1-12-13-2009

GPS LOCATION: N Latitude 44 degrees 44 minutes 008 seconds; W Longitude 093 degrees 03 minutes 283 seconds

Depth Before Sealing: 182 ft. Original Depth: 182 ft.

Numerical Street Address or Fire Number and City of Well or Boring Location: 152nd & Biardon Ave

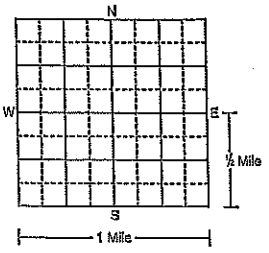
AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer

STATIC WATER LEVEL: ☒ Measured ☐ Estimated Date Measured 1-13-09

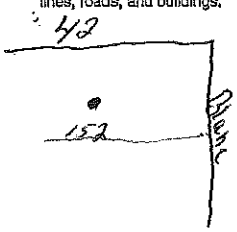
WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☐ Env. Bore Hole ☐ Other

85 ft. ☒ below ☐ above land surface

Show exact location of well or boring in section grid with "X."



Sketch map of well or boring location, showing property lines, roads, and buildings.



CASING TYPE(S): NA

☐ Steel ☐ Plastic ☐ Tile ☐ Other

WELLHEAD COMPLETION: NA

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other

PROPERTY OWNER'S NAME/COMPANY NAME: University of Mn

Property owner's mailing address if different than well location address indicated above:
Boynton Health Center
Room W-140
410 Church Street
Minneapolis Mn 55455

WELL OWNER'S NAME/COMPANY NAME: Same

Well owner's mailing address if different than property owner's address indicated above

CASING(S): NA

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
in. from	to ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
in. from	to ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
in. from	to ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: NA

Screen from ft. to ft. Open Hole from ft. to ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe)

Obstructions removed? ☐ Yes ☐ No Describe

PUMP: NA

Type

☐ Removed ☐ Not Present ☐ Other

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand & Gravel	Brn	m	0	51
Silty Clay	Gray	m	51	84
Sand	Brn	m	84	120
Fine Sand	Brn	m	120	132
Silty Sand	Brn	m	132	150
Loam	Brn	m	150	155
Silty Sand & Rocks	Brn	m	155	180
Limestone	Brn	H	180	182

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

in. from to ft. ☐ Perforated ☐ Removed

in. from to ft. ☐ Perforated ☐ Removed

Type of Perforator

☐ Other

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material: Bentonite from 0 to 182 ft. yards 9 bags

from to ft. yards bags

from to ft. yards bags

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? ☐ Yes ☐ No How many?

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

~~MW-A6-006~~

~~A6~~ Boring

A6 - Pilot Boring

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Contractor Business Name — License or Registration No.

Certified Representative Signature — Certified Rep. No. — Date

Mike Anderson

Name of Person Sealing Well or Boring

MINN. DEPT OF HEALTH COPY H

HE-01434-09 IC# 140-0423

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): H 277824

WELL OR BORING LOCATION

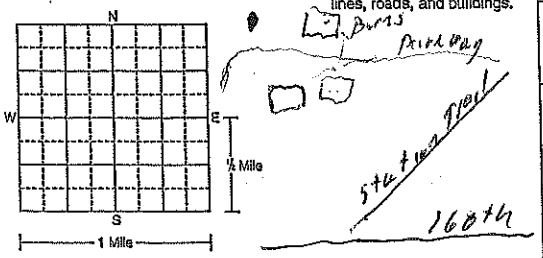
County Name: Dakota

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Rosemount	115	19W	33	NW¼ SE¼ NE¼

GPS LOCATION: V / W — Latitude 44 degrees 43 minutes 659 seconds; Longitude 093 degrees 06 minutes 014 seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 15474 St W

Show exact location of well or boring in section grid with "X." Sketch map of well or boring location, showing property lines, roads, and buildings.



Date Sealed: 12-17-08

Date Well or Boring Constructed: 12-17-08

Depth Before Sealing: 140 ft.

Original Depth: 140 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measured _____ ft. ☐ below ☐ above land surface

WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other _____

CASING TYPE(S): NA — ☐ Steel ☐ Plastic ☐ Tile ☐ Other _____

WELLHEAD COMPLETION: NA

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other _____

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other _____

PROPERTY OWNER'S NAME/COMPANY NAME: University of Mn

Property owner's mailing address if different than well location address indicated above:
Boynton Health Center
Room W-140
410 Church St.
Minneapolis Mn 55455

WELL OWNER'S NAME/COMPANY NAME:

Well owner's mailing address if different than property owner's address indicated above:

CASING(S): NA

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
_____ in. from _____	to _____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
_____ in. from _____	to _____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
_____ in. from _____	to _____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: NA

Screen from _____ to _____ ft. Open Hole from _____ to _____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe) _____

Obstructions removed? ☐ Yes ☐ No Describe _____

PUMP: NA

Type _____ ☐ Removed ☐ Not Present ☐ Other _____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

_____ in. from _____ to _____ ft. ☐ Perforated ☐ Removed

_____ in. from _____ to _____ ft. ☐ Perforated ☐ Removed

Type of Perforator _____

☐ Other _____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material Bentonite from 0 to 140 ft. _____ yards 12 bags

_____ from _____ to _____ ft. _____ yards _____ bags

_____ from _____ to _____ ft. _____ yards _____ bags

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? ☐ Yes ☐ No How many? _____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Top Soil	Blk	M	0	2
Sand & Gravel	Brn	M	2	50
Silty Sand & Clay	Gray	M	50	119
Sand	Brn	M	119	140

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

B2 - ~~Boring~~ Pilot Boring

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Contractor Business Name: Dan Stevens — License or Registration No.

Certified Representative Signature — Certified Rep. No. — Date

Name of Person Sealing Well or Boring: Mike Anderson

MINN. DEPT OF HEALTH COPY | H

HE-01434-09 IC# 140-0423 6/08R

UMP005253

Figures B-1, B-2, and B-3

Example Photos of Outwash, Till, and St. Peter Sandstone
UMore Park

Figure 1 Outwash deposits at MW-C2-002

Figure 2 St. Peter Sandstone at MW-E2-305

Figure 3 Till deposits at C2-Pilot