



WELL INFORMATION - ROCK WELLS

Layne®-Western

a division of Layne Christensen Company
PROFESSIONAL SERVICES FOR WATER SYSTEMS

721 West Illinois Avenue • Aurora, Illinois 60506-2892 • Phone 630/897-6941
229 West Indiana Avenue • Beecher, Illinois 60401 • Phone 708/946-2244

information e-mailed to Greg Buffington on 3/2/07 and 3/7/07

Name Of Job Des Moines Water Works Date December 22, 2006

City Cumming State Iowa

Well No. Maffitt ASR Drillers Stanley Alwardt/Derek Good and Greg Thomas

Well Location ft. () and ft. () of the corner of the 1/4 of Section ,Twp. (), Range () Polk County

Otherwise located as Maffitt Water Treatment Plant, 12223 Maffitt Lake Road, Cumming, Iowa 50061

Work Began: 8-22-06 Work Completed: 12-22-06

Table with 4 columns: Amount, Dia., Wt. or Thickness, Material. Rows include casing details like 36' 36" OD 1/2" Steel with Welded joints from 0 to 36'.

Hole Record table with 2 columns: Diameter (e.g., 42 inch, 34 inch, 28 inch, 22 3/4 inch, 14 3/4 inch) and Depth (e.g., 0 to 36', 36' to 422', 422' to 660', 660' to 2147', 2147' to 2518').

Cementing Record: Pressure grouted casings with Portland cement Type I/II from bottom to top:

30" OD pipe 0-422' cemented and 24" OD pipe - 0-648' X 18" OD pipe from 648'-2147'

Well Test Data: Static Level 274' ; pumping level 333' after 72 hours pumping at 2112 g.p.m.

Length of test 72 hrs. See Well Test Data Sheet Dated December 14-17, 2006

Remarks Elevation 852' ±

Layne Job No. 169705B Well Permit No.: 2006-373W

WELL LOG

Feet	Feet	Description	System	Group/Formation
0	to 40	Clay		
40	to 50	Clay with shale	Quaternary	Pleistocene
50	to 285	Gray shale	Pennsylvanian	
285	to 290	Sandstone and shale	Pennsylvanian	
290	to 375	Gray shale	Pennsylvanian	
375	to 475	Gray lime	Mississippian	
475	to 570	Dark lime with chert	Mississippian	
570	to 650	Shale-lime mix	Mississippian	
650	to 860	Gray lime	Mississippian	
860	to 945	White and gray lime	Devonian	
945	to 1000	Dark gray lime with shale	Devonian	
1000	to 1120	White lime with gray lime	Devonian	
1120	to 1180	Brown lime	Devonian	
1180	to 1295	White lime	Devonian	
1295	to 1450	Brown lime	Silurian	
1450	to 1460	Gray lime and shale	Ordovician	
1460	to 1555	Red shale and lime	Ordovician	
1555	to 1715	Gray lime	Ordovician	
1715	to 1795	Sandstone with shale and lime	Ordovician	
1795	to 1950	White lime with sand	Ordovician	
1950	to 2015	Gray-brown lime	Ordovician	
2015	to 2065	White sandstone	Ordovician	St. Peter
2065	to 2155	Gray lime	Ordovician	Shakopee
2155	to 2405	White lime	Ordovician	Oneota
2405	to 2450	White lime shale	Ordovician	
2450	to 2495	Jordan sandstone	Cambrian	Jordan
2495	to 2525	Gray lime	Cambrian	St. Lawrence
	to			
	to			
	to	Above are Rotary Table Level Depths = +7'		

information e-mailed to Greg Buffington on 3/2/07 and 3/7/07
WELL RECORD

Iowa Department of Natural Resources - Geological Survey
 109 Trowbridge Hall, Iowa City, IA 52242-1319 PH (319) 335-1575

PWTS Well No. _____

PWTS Permit No. 2006-373W

County Permit No. _____

Site identification Property Owner <u>Des Moines Water Works</u> Other ID <u>Maffitt ACR</u> Address <u>12223 Maffitt Lake Road, Curming IA 50061</u> Tenant _____ Well Depth <u>2518</u> ft Date completed <u>12</u> / <u>20</u> / <u>06</u>					Drill method <input checked="" type="checkbox"/> rotary <input type="checkbox"/> auger <input type="checkbox"/> cable <input type="checkbox"/> other _____																													
Location County <u>Polk</u> _____ mi. N and _____ mi. E of intersection of _____ and _____ _____ 1/4 of the _____ 1/4 of the _____ 1/4 of _____ Sec _____ TWP _____ RNG _____ E _____ W _____ GPS Coordinates (NAD83 datum only) decimal degrees: _____ N. Latitude _____ W. Longitude.					Hole size <table border="1"> <tr> <td colspan="2">34 inch from 0 ft to 422 ft</td> <td colspan="3">hole size continued</td> </tr> <tr> <td>23 inch from 660 ft to 2147 ft</td> <td>29 inch from 422 ft to 660 ft</td> <td>15 inch from 2147 ft to 2518 ft</td> <td colspan="2"></td> </tr> </table> Record all depth measurements from ground level (GL). Use (+) for above GL measurements.					34 inch from 0 ft to 422 ft		hole size continued			23 inch from 660 ft to 2147 ft	29 inch from 422 ft to 660 ft	15 inch from 2147 ft to 2518 ft																	
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Show exact location of well in section grid with a dot (•). Sketch map of well location on property.					Casing Drive shoe <input checked="" type="checkbox"/> (yes) no) Piless adapter <input type="checkbox"/> (yes) no)																													
					<table border="1"> <tr> <th>Size (ID/OD)</th> <th>Type / Wt</th> <th>Depth top</th> <th>Depth bottom</th> <th>Amount (length)</th> </tr> <tr> <td>36" OD</td> <td>StL. 1/2"</td> <td>0</td> <td>36</td> <td>36</td> </tr> <tr> <td>30" OD</td> <td>StL. 1/2"</td> <td>0</td> <td>422</td> <td>422</td> </tr> <tr> <td>24" OD</td> <td>StL. 1/2"</td> <td>+4</td> <td>648</td> <td>652</td> </tr> <tr> <td>18" OD</td> <td>StL. 1/2"</td> <td>648</td> <td>2147</td> <td>1495</td> </tr> </table>					Size (ID/OD)	Type / Wt	Depth top	Depth bottom	Amount (length)	36" OD	StL. 1/2"	0	36	36	30" OD	StL. 1/2"	0	422	422	24" OD	StL. 1/2"	+4	648	652	18" OD	StL. 1/2"	648	2147	1495
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Perforated or slotted casing? (yes) <input type="checkbox"/> (no) <input checked="" type="checkbox"/> Perforated / slotted from _____ ft to _____ ft Perforated / slotted from _____ ft to _____ ft					Casing grouted? (yes) <input type="checkbox"/> (no) <input checked="" type="checkbox"/> Placement method <u>Brandenhed 2 1/2" tubing</u>																													
<input type="checkbox"/> upland <input type="checkbox"/> hillside <input type="checkbox"/> valley <input checked="" type="checkbox"/> level surface Elevation (if known) <u>852</u>					<table border="1"> <tr> <th>Type</th> <th>Depth top</th> <th>Depth bottom</th> <th>Amount (vol/wt)</th> </tr> <tr> <td>Portland Type II</td> <td>30":0</td> <td>422</td> <td></td> </tr> <tr> <td>Portland Type II</td> <td>24/18":0</td> <td>2147</td> <td></td> </tr> </table>					Type	Depth top	Depth bottom	Amount (vol/wt)	Portland Type II	30":0	422		Portland Type II	24/18":0	2147														
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Formation log From _____ To _____ Color _____ Hardness _____ Formation description _____ See attached Layne Well Information Rock Well Report					Well screen? (yes) <input type="checkbox"/> (no) <input checked="" type="checkbox"/> <table border="1"> <tr> <th>Diameter</th> <th>Slot size</th> <th>Depth top</th> <th>Depth bottom</th> <th>Length</th> <th>Material</th> </tr> <tr> <td></td> <td>0. _____</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>0. _____</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> Bottom capped (yes / no) with _____ Seals / Packers (yes / no) kind _____ depth _____ ft Gravel packed (yes / no) from _____ ft to _____ ft type _____ amount _____					Diameter	Slot size	Depth top	Depth bottom	Length	Material		0. _____						0. _____											
Diameter	Slot size	Depth top	Depth bottom	Length	Material																													
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Well developed? (yes / no) Explain <u>Air drilled open hole-4500 cfm @ 1200 psi</u> (pumped, <u>airlifted</u> , bailed) for <u>24</u> hrs at <u>10,000+</u> GPM					Pump installed? (yes) <input type="checkbox"/> (no) <input checked="" type="checkbox"/> Date _____ / _____ / _____ Installer's name _____ Type of pump _____ Depth to intake _____ ft Pump diameter _____ Rated capacity _____ GPM																													
use additional sheets as needed					Water information Aquifer: <input type="checkbox"/> sand / gravel <input type="checkbox"/> limestone <input checked="" type="checkbox"/> sandstone Main water-supply zone from <u>2147</u> ft to <u>2495</u> ft <input type="checkbox"/> seepage well Static water level <u>274</u> ft (below / above) GL: <input type="checkbox"/> tape <input checked="" type="checkbox"/> airline <input checked="" type="checkbox"/> E-line <input type="checkbox"/> estimate Pumping water level <u>333</u> ft below GL: <input type="checkbox"/> tape <input checked="" type="checkbox"/> airline <input checked="" type="checkbox"/> E-line <input type="checkbox"/> estimate At yield of <u>2112</u> GPM; <input checked="" type="checkbox"/> orifice <input checked="" type="checkbox"/> volumetric <input type="checkbox"/> estimate for <u>72</u> hours Measurements taken at <u>8:00</u> (AM) (PM) Date <u>12</u> / <u>17</u> / <u>06</u>																													
Remarks (including depth of lost drilling fluids, materials, or tools)					Water quality test? (yes) <input type="checkbox"/> (no) <input checked="" type="checkbox"/> Date tested <u>12</u> / <u>17</u> / <u>06</u> Tested by <u>University of IA Hygienic Lab</u>																													
Well use <input type="checkbox"/> Domestic <input type="checkbox"/> Heat pump <input type="checkbox"/> Commercial <input type="checkbox"/> Livestock <input checked="" type="checkbox"/> Municipal <input type="checkbox"/> Monitoring <input type="checkbox"/> Test well <input type="checkbox"/> Public supply <input checked="" type="checkbox"/> Other <u>Aquifer Storage and Recovery</u> <input type="checkbox"/> Irrigation					Contractor <u>Layne-Western</u> Address <u>721 W. Illinois Avenue, Aurora, IL 60505</u> Driller <u>Derek Good/Greg Thomas</u> Certification no. <u>8012/8011</u>																													