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

WELL RECORD #40317

Permit No. Permitted by Veenstra+Kimm, Inc.

Site identification

Property Owner W. Des Moines Water Works Well Number 18
Address 1505 Railroad Ave, W. Des Moines, IA 50265
Tenant W. Des Moines Water Works
Well Depth 44 ft Date Completed 01 / 24 / 96
From Final Casing Elevation

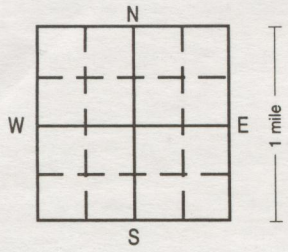
Location

County Polk

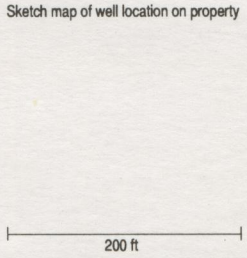
____mi. N/S and ____mi. E/W of intersection of _____ and _____

____1/4 of the ____1/4 of the ____1/4 of Sec ____ TWP ____ RNG ____ E/W

Show exact location of well in section grid with a dot (●).



Sketch map of well location on property



☐ upland ☐ hillside ☒ valley Elevation (if known) _____

Formation log

From	To	Color	Hardness	Formation description
0	5	Brown		Sticky clay
5	7	Black		Clay
7	17	Gray		Clay
17	40.5	"		Sand, gravel + cobbles
40.5	42	"		Clay w/cobbles

use additional sheets as needed

Remarks (including depth of lost drilling fluids, materials, or tools)

Well use

☐ Domestic ☒ Municipal ☐ Industrial
☐ Livestock ☐ Public Supply ☐ Monitoring
☐ Test Well ☐ Irrigation ☐ Other _____ (explain)

Drill method

☒ rotary ☐ auger ☐ cable other _____

Hole size

52 inch from 0 ft to 41 ft
___ inch from ___ ft to ___ ft

hole size continued
___ inch from ___ ft to ___ ft
___ inch from ___ ft to ___ ft

Record all depth measurements from ground level (GL). Use (+) for above GL measurements.

Casing

Drive shoe (yes / no) Pitless adaptor (yes / no)

Size (ID/OD)	Type / Wt	Depth top	Depth bottom	Amount (length)
20"	0.500"	+3'	31'	34'

Perforated or slotted casing? (yes / no)

Perforated / slotted from _____ ft to _____ ft
Perforated / slotted from _____ ft to _____ ft

Casing grouted? (yes / no)

Type	Depth Top	Depth Bottom	Amount
Neat Cement	0'	10'	6 yds.

Well screen? (yes / no)

Diameter	Slot size	Depth Top	Depth Bottom	Length	Material
20"	0.055"	31'	41'	10'	SST.

Bottom capped (yes / no) with SST. Plate
Seals / Packers (yes / no) kind Bentonite depth 10-18 ft
Gravel packed (yes / no) from 18 ft to 41 ft
type Lyman-Richey "A-B" amount 16 Tons

Well developed? (yes / no)

Explain Surge block, bailer + pump

Pump installed? (yes / no) Date 06 / 14 / 96

Installer's name Joe Dooling
Type of pump Vertical Turbine Depth to intake 41 ft
Pump diameter 10" Rated capacity 550 GPM
From Top of Casing

Water information

Aquifer: ☒ sand/gravel ☐ limestone ☐ sandstone
Main water-supply zone from 31 ft to 41 ft
Final water level (static water level) 15 ft (below / above) GL.
Pumping water level 26 ft below GL; ☐ tape ☐ airline ☒ E-line
At yield of 540 GPM; ☒ orifice ☐ volumetric ☐ estimate Date 1/24/96

Water quality test? (yes / no) Date tested ___ / ___ / ___

Tested by West Des Moines Water Works
Test results _____

Contractor Layne-Western
Address 912 S. 14th Ave, Marshalltown, IA 50158
Driller Dave Beaver Certification no. 40259

white copy - **Iowa DNR, Geological Survey Bureau** blue copy - **Well Contractor** pink copy - **Customer** yellow copy - **County Health Officer**

WELL INSTALLATION REPORT
LAYNE-WESTERN

1. **CONTRACT WITH:** West Des Moines Water Works **DATE:** 11-16-95
2. **CITY AND STATE:** West Des Moines, Iowa **DRILLER:** Dave Deaver
3. **WELL NO:** 18 **AT TEST HOLE NUMBER** 18 **WELL LOCATION:** Raccoon River Park.
4. **WORK COMPLETED:** **TOTAL MAN HOURS CHARGED TO JOB:**

5. **MATERIAL:**

	LENGTH	DIA.	GAUGE OR THICKNESS	MATERIAL	TYPE	SLOT SIZE
6. **SCREEN:**	10.3'	20"	Std.	SST.	W.W.	0.055"
7. **INNER CASING:**	33.7'	20"	0.500"	Steel	Blank	
8. **OUTER CASING:**						

9. 16 **TONS OF GRAVEL PACK USED IN THE WELL. SIZE:** Luther Maddox "A-B"
10. **TEST OF WELL: TEST PUMP OR PERMANENT PUMP:** Test **BOWL SIZE** **STAGES**
11. **SIZE OF ORIFICE:** 6" x 5" **ORIFICE TUBE READING:**

12. **PUMPING TEST - MEASUREMENTS FROM GROUND LEVEL:**

TIME	GPM	STATIC	DRAWDOWN	PUMPING LEVEL
See enclosed pumping test results.				

13. **RECOVERY IN 5 MINUTES:** , **IN 30 MINUTES:**
14. **DID YOU SEAL BOTTOM OF WELL** Yes **THICKNESS:** Std. **MATERIAL:** SST.
15. **WELL UNDERREAMED?** No **FROM** **TO** , **FROM** **TO**
16. **IF ALL SCREEN WAS NOT PLACED AT BOTTOM, STATE HOW IT WAS PLACED?**
    FROM **TO** ; **FROM** **TO** ; **FROM** **TO**
17. **DEPTH OF WELL FROM GROUND LEVEL** 41' **SIZE OF DRILL HOLE:** 52"
18. **WAS CEMENT PLACED AROUND OR BETWEEN ANY OF THE CASINGS?** Yes
19. **IF SO, STATE INTERVALS, QUANTITY, AND METHOD USED:** From 0-10', 6 yards

WELL INSTALLATION REPORT (PAGE 2)

LAYNE-WESTERN

CONTRACT WITH: West Des Moines Water Works **WELL NO:** 18

LOG OF WELL FROM GROUND LEVEL:

FEET		FEET	FORMATION
0	to	5	Sticky brown clay
5	to	7	Black clay
7	to	17	Gray clay
17	to	40.5	Sand & gravel with cobbles
40.5	to	42	Gray clay with cobbles
	to		
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	to		
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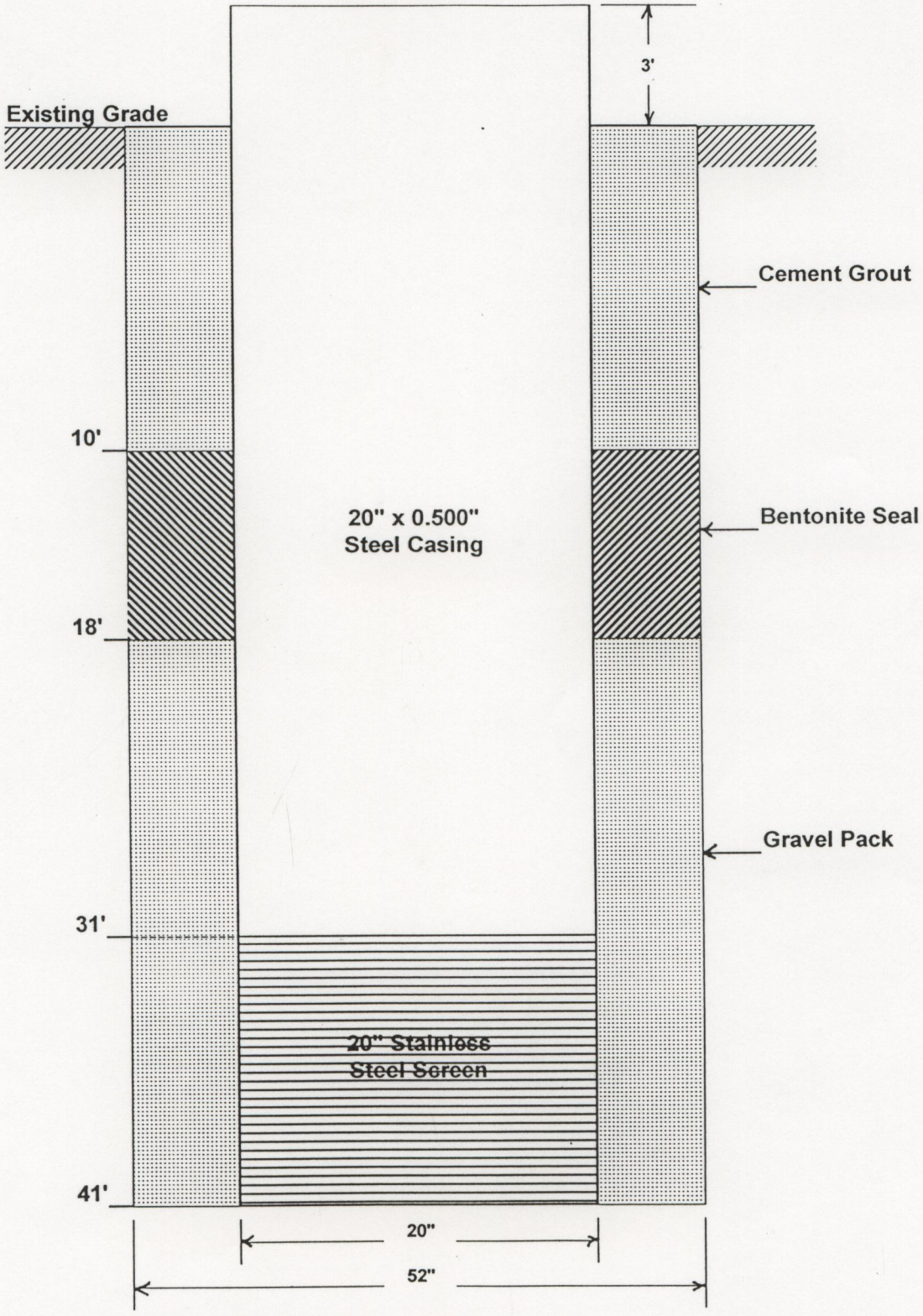
Layne

WELL CONSTRUCTION DIAGRAM
WEST DES MOINES WATER WORKS
WELL #18



NOT TO SCALE

Layne

VERTICAL TURBINE

PUMP INSTALLATION REPORT

Layne-Western

JOB NAME: West Des Moines Water Works
Address: 1505 Railroad Ave., P.O. Box 65610
City, State: West Des Moines, Iowa 50265-0610

DATE: 6-14-96 Job Completion

Oil - (Water Lube)

PUMP NO: 96-09891-4 (New) Repair

Pump Trouble: New Installation

PUMP SIZE	DIAMETER		LENGTHS
Discharge	6"	(Above) Below	
Column	6"	(Screw) Flange	3 x 5' 2 x 10'
Tubing			
Shaft	1"	Stainless (Carbon)	3 x 5' 2 x 10'

Column setting to bowl: 35 ft.

BOWL:

Manufacturer: Layne
Diameter: 10" Shaft Diameter: 1-1/2"
Type: RKHC Stages: 3
Material: C.I. Bowl Length: 40"
Suction Diam: 6" Suct. Length: 3'
Special Paint, Coatings, Sleeves, etc:
Column: Epoxy coated column & bowl
Tubing:

MOTOR OR GEAR DRIVE:

Make: G.E. HP: 20
Speed: 1760 rpm Volts: 460
Frame: 256TP12 CD: 23.9"
BD: 12" Non-reverse: (Yes) / No
Serial # RKD5904018
Running Amps:
Running Volts: 480
Gear Drive Ratio: None Standard / Comb.

WELL:

No: 18 Year Drilled: 1995
Location: West of Well No. 17
Diameter: 20" Depth: 44'
Measured from top of 20 inch diameter casing which is 3 feet above ground
Tape to water: 22'
Airline length: 35' A.L. Material: ¼" PVC

Static Gauge: 13' Static Level: 22'
Pumping Gauge: Pumping Level:
Disch. Pressure: psi when pumping into system at gpm.

INSTALLER: Joe Dooling
Rig Used: R12 Pump Rig

PUMP REPAIR

CONDITION OF PUMP WHEN PULLED	NEW PARTS INSTALLED
Column:	Column: New Installation
Tubing:	Tubing:
Shafting:	Shafting:
Bowl:	Bowl:
Suction:	Suction:
MACHINE WORK:	1. DRAIN PORTS OPEN — Yes (No) 2. CHLORINATE WELL — (Yes) No 3. ALIGN PUMP HEAD WITH DIAL INDICATOR — (Yes) No 4. GROUTED HEAD-BASE PLATE — (Yes) No 5. PUMP RUNS — (Good) / Fair / Bad

WELL TEST DATA REPORT

LAYNE-WESTERN COMPANY

PROJECT: West Des Moines Water Works
LOCATION: West Des Moines, Iowa
WELL NO: 18
WELL DIAMETER: 20 inches
WELL DEPTH: 43 feet - from top of casing
TOP OF SCREEN: 33 feet - from top of casing
STATIC LEVEL: 17.9 feet - from top of casing
ORIFICE SIZE: 6" x 5"

DATE TESTED: 1/22/96 - 1/24/96
TESTED BY: Jim Hurd
DRIVER: Submersible motor
COLUMN AND SHAFT: 6" drop pipe
BOWL SIZE & MAKE:
MANUFACTURER: Grundfos
SERIAL NUMBER:

TIME	PIEZ. READ. (IN)	FLOW RATE (GPM)	AIRLINE READING (FEET)	WATER LEVEL (FEET)	DRAW DOWN (FEET)	DISCHARGE PRESSURE (LBS.)	DISCHARGE PRESSURE (FEET)	SPEC. CAPACITY (GPM/FT)	REMARKS
1 min.		329		21.2	3.3			98.7	Test was started
2		329		21.2	3.3			98.7	at 11:10 a.m.
3		329		21.2	3.3			98.7	
4		329		21.2	3.3			98.6	
5		329		21.3	3.4			97.9	
6		329		21.3	3.4			97.3	
7		329		21.5	3.6			92.5	
8		329		21.5	3.6			91.7	
9		329		21.5	3.6			91.3	
10		329		21.6	3.7			89.4	
11		329		21.6	3.7			88.8	
12		329		21.6	3.7			88.2	
13		329		21.7	3.8			87.3	
14		329		21.7	3.8			86.4	
15		329		21.7	3.8			86.2	
18		329		21.8	3.9			85.3	
21		329		21.8	3.9			84.4	
24		329		21.8	3.9			83.6	
27		329		21.9	4.0			83.1	
30		413		21.9	4.0			103.7	
35		413		21.9	4.0			102.8	
40		413		21.9	4.0			102.1	
45		413		22.0	4.1			100.1	
50		413		22.1	4.2			99.3	
55		413		22.1	4.2			99.1	

WELL TEST DATA REPORT

LAYNE-WESTERN COMPANY

PROJECT:	West Des Moines Water Works	DATE TESTED:	1/22/96 - 1/24/96
LOCATION:	West Des Moines, Iowa	TESTED BY:	Jim Hurd
WELL NO:	18	DRIVER:	Submersible motor
WELL DIAMETER:	20 inches	COLUMN AND SHAFT:	6" drop pipe
WELL DEPTH:	43 feet - from top of casing	BOWL SIZE & MAKE:	
TOP OF SCREEN:	33 feet - from top of casing	MANUFACTURER:	Grundfos
STATIC LEVEL:	17.9 feet - from top of casing	SERIAL NUMBER:	
ORIFICE SIZE:	6" x 5"		

TIME	PIEZ. READ. (IN)	FLOW RATE (GPM)	AIRLINE READING (FEET)	WATER LEVEL (FEET)	DRAW DOWN (FEET)	DISCHARGE PRESSURE (LBS.)	DISCHARGE PRESSURE (FEET)	SPEC. CAPACITY (GPM/FT)	REMARKS
1 hr.		413		22.1	4.2			98.3	
1:10		413		22.2	4.3			96.7	
1:20		413		22.2	4.3			95.3	
1:30		413		22.3	4.4			94.6	
1:40		413		22.3	4.4			94.3	
1:50		413		22.3	4.4			93.6	
2:00		413		22.3	4.4			92.9	
2:10		413		22.3	4.4			92.9	
2:20		413		22.3	4.4			92.9	
2:30		413		22.4	4.5			92.1	
2:40		413		22.5	4.6			90.0	
2:50		413		22.5	4.6			90.7	
3:00		413		22.5	4.6			90.0	
4 hrs.		413		22.6	4.7			87.6	
5		413		22.7	4.8			86.2	
6		413		22.8	4.9			84.8	
7		413		22.8	4.9			83.9	
8		413		22.9	5.0			83.1	
9		413		22.9	5.0			82.1	
10		413		23.0	5.1			81.6	
11		413		23.0	5.1			81.3	
12		413		23.0	5.1			80.6	
13		413		23.1	5.2			80.1	
14		413		23.1	5.2			79.6	
15		413		23.1	5.2			79.6	

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TESTED BY: Jim Hurd
DRIVER: Submersible motor
COLUMN AND SHAFT: 6" drop pipe
BOWL SIZE & MAKE:
MANUFACTURER: Grundfos
SERIAL NUMBER:

TIME	PIEZ. READ. (IN)	FLOW RATE (GPM)	AIRLINE READING (FEET)	WATER LEVEL (FEET)	DRAW DOWN (FEET)	DISCHARGE PRESSURE (LBS.)	DISCHARGE PRESSURE (FEET)	SPEC. CAPACITY (GPM/FT)	REMARKS
16 hrs.		384		23.1	5.2			73.3	
17		384		23.2	5.3			73.1	
18		440		26.1	8.2			53.6	
19		440		26.2	8.3			53.1	
20		440		27.3	9.4			46.8	
21		440		27.6	9.7			45.4	
22		440		27.6	9.7			45.3	
23		440		27.7	9.8			44.8	
24		564		29.2	11.3			49.7	
25		564		29.2	11.3			49.8	
26		564		29.2	11.3			49.8	
27		564		29.2	11.3			49.8	
28		564		29.2	11.3			49.8	
29		564		29.2	11.3			49.8	
30		564		29.2	11.3			49.8	
31		564		29.3	11.4			49.7	
32		564		29.3	11.4			49.5	
33		564		29.3	11.4			49.4	
34		564		29.4	11.5			49.1	
35		564		29.4	11.5			48.9	
36		564		29.5	11.6			48.7	
37		564		29.5	11.6			48.5	
38		543		29.6	11.7			46.5	
39		543		29.5	11.6			46.9	
40		543		29.3	11.4			47.7	

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ORIFICE SIZE:	6" x 5"		

TIME	PIEZ. READ. (IN)	FLOW RATE (GPM)	AIRLINE READING (FEET)	WATER LEVEL (FEET)	DRAW DOWN (FEET)	DISCHARGE PRESSURE (LBS.)	DISCHARGE PRESSURE (FEET)	SPEC. CAPACITY (GPM/FT)	REMARKS
41 hrs.		543		29.2	11.3			48.0	
42		543		29.2	11.3			48.1	
43		543		29.2	11.3			48.0	
44		543		29.2	11.3			47.9	
45		543		29.2	11.3			47.8	
46		543		29.3	11.4			47.7	
47		543		29.3	11.4			47.6	
48		543		29.3	11.4			47.6	