

pumps were operated manually by the City. The system is now automated so that at a certain elevation in the water tank pumps will automatically turn on to fill the tank.

Correspondence from the City's engineer indicates that Wells 7 to 12 are currently shut down in winter to prevent freezing. At times Well 5 is also shut down in the winter due to decreased municipal demand. Well 5 and Wells 7 to 12 are primarily used in the summer to meet additional demands (typically lawn and garden irrigation).

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.3.G Historic Use**

*What is the duration of each diversion?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

The duration of each diversion has not been measured. System automation and storage tanks in the City provide a continuous source of municipal water and prevent cycling of the well pumps. Based on the total historic volume diverted shown in Table NIR.3.B-2, Wells 1 to 6 would have had to operate just over 11 hours per day at their listed flow rate to pump the required maximum historic volume. Wells 7 to 13 are supplemental and used primarily in the summer to meet increased demands. These wells decrease the overall time that each well must be pumped.

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.3.H Historic Use**

*If wastewater is discharged, what amount of water is discharged?*

Wastewater is collected via a municipal wastewater collection system and conveyed to the City's wastewater treatment facility. The 1988 Reservation Application describes a facultative sewage lagoon system located along Medicine Rock Coulee southeast of the City, which is tributary to the Marias River. The 1988 Reservation Application reports an average effluent flow of 0.33 million gallons per day. The Reservation Application goes on to report that very little to no flow was discharged from the lagoon during the summer months of July and August. The Application states that most flow during other months is depleted by evaporation in the lagoons or by evapo-transpiration by vegetation in Medicine Rock Coulee and that discharges generally do not reach the Marias River.

Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.3.I**

*Do you measure water near the existing point of diversion or near/at your place of use? If yes, what type of measuring device do you use?*

Historically water diversions were measured but do not appear to be recorded until the early 1980s. The 1961 PER indicates that the terminal storage tank, which was a 1 million gallon concrete tank at the south side of Shelby, had a propeller water meter, but it was not accurately measuring and recording flow. The PER indicated that the meter was likely worn and underestimating the amount of flow. Actual flow records do not appear to be available in the PER. The 1988 water reservation application completed by Aquoneering describes a master meter installed in the manifold piping which combines the flows from the entire well field. The water reservation application states that operators have kept reliable and accurate records for several years and tabulates monthly water use for the years 1982 to 1986 from the entire well field.

Currently a master water meter that measures all water diverted from the well field is located near the storage tank on the south side of Shelby. Other water meters maintained by the City measure or will measure water going to the service areas proposed in this application. A map of all current and proposed water meters is provided on the Water Meter Location Map NIR.5.C. The City currently maintains the water meters shown in Table NIR.3.I.

**Table NIR.3.I City of Shelby Water Meters**

Meter Location/Service Area	Meter Type
Transmission Main Master Meter	Seametrics EX215, Insertion Electromagnetic Meter
Big Rose	4-inch Badger Meter
Ethridge	4-inch Neptune T10
Cut Bank	6-inch Badger Meter
Prison	4-inch Neptune T10
Devon-Dunkirk	4-inch Neptune T10

Individual residential water meters (Neptune T10) are present at service connections in the City. Most of the water main meters and all residential meters are radio-read, allowing the City to simply drive by the meter to pick up the output. Meters are read by the City once per month for total volume. The City also monitors and records peak day water use in the transmission main master meter.

### **NIR.3.J Historic Use**

*Do you have water commissioner, water measurement records available, or other documents that support the amount of water you have historically diverted or used?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

Water measurement records are not available to document the historic diverted volume. Water use records for the entire well field do exist in the 1988 Reservation Application and the 2010 PER. Records of current water use are maintained by the City. These water use records may

not be representative of historic use since many water system improvements have occurred including replacement of a wooden transmission line and leaky storage tanks. The wooden transmission line and terminal storage tank documented in the 1961 PER indicates that water leakage from these sources would have increased the overall per capita historic water use.

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.3.K Historic Use**

*Do you supplement your water usage with water from another water right? If yes, attach an explanation of that water right and how and when it is used to supplement this water right.*

Yes. Wells 1 and 3 (water rights 41P 192877 00 and 41P 192879 00) are part of the City's well field, but have periods of use from May 1 to October 31 listed on the water rights. The historic use of these wells is described above. These wells will be changed under change application number 2. Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.4 Adverse Effect – ARM 36.12.1903**

#### **NIR.4.A Adverse Effect**

*Attach an explanation of how all points of diversion will be operated in order to not exceed historical diverted flow rate?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

The City would operate all points of diversion associated with their municipal water rights as they have operated historically. Together the well field would divert no more than the historic volume shown in Table NIR.3.B-3 along with the additional volume provided in the City's water reservation. Consistent with current operations, water would be diverted from each well and pumped into the clear well where it comingles with water from other wells (all from the same groundwater source) and then pumped in a single transmission line through the water treatment system to the south side of Shelby. From there Shelby water would be stored in tanks and distributed throughout the City or distributed in pipelines to the outlying communities within the service area. The following is a summary of the well operation and supplementary plumbing:

- Well 1 pumps into the 100,000 gallon clear well, Well 9 pumps into Well 1
- Well 2 pumps into the 100,000 gallon clear well
- Well 3 pumps into the 100,000 gallon clear well, Well 10 pumps into Well 3
- Well 4 is currently offline, piping is being redone
- Well 5 pumps into the 100,000 gallon clear well, Well 6 and Well 11 pump into Well 5
- Well 6 pumps into Well 5, but has been offline since 2009
- Well 7 pumps into the 100,000 gallon clear well, Well 12 pumps into Well 7
- Well 8 pumps into the 100,000 gallon clear well
- Well 9 pumps into the casing of Well 1
- Well 10 pumps into the casing of Well 3
- Well 11 pumps into the casing of Well 5
- Well 12 pumps into the casing of Well 7
- Well 13 pumps into the 100,000 gallon clear well

Wells 1 and 3 will also be used throughout their period of use from May 1 through October 31 to supplement higher summer time water use.

Based on existing water use records, water use planning factors, and water use agreements the City has with communities in the proposed service area, the expected flow rate and volume to be diverted by the City's municipal well field is estimated below. Actual water use will vary year to year for each community, and would be metered to ensure the historic volume plus water reservation is not exceeded.

**Proposed water use:**

**City of Shelby**

Current Population	3,304	Source: 2015 DEQ Public Water Supply (PWS) records
Use	Municipal (domestic, commercial, industrial, lawn and garden)	
Average Day Demand (gpd)	631,064	
Average Day Demand (gpd)	438	
Use per person (gpcd)	191	Source: 2010 PER (KLJ)
Annual Demand (ac-ft)	706.88	
Peak Day Demand (gpd)	1,672,320	Peaking Factor of 2.65 source: KLJ 2012 water use data
Peak Day Demand (gpm)	1,161	

**Prison**

Current Population	783	623 inmates and 160 daily staff (City economic impact report, 2009)
Use	Commercial/Industrial/Institutional	
Date First Served by Shelby	1999	
Average Day Demand (gpd)	65,682	Source: KLJ 2012 water use data
Average Day Demand (gpd)	46	
Use per person (gpcd)	84	
Annual Demand (ac-ft)	73.57	
Peak Day Demand (gpd)	173,755	Source: KLJ 2012 water use data
Peak Day Demand (gpm)	121	

**Ethridge**

Current Population	70	Source: 2015 DEQ PWS records
Use	Domestic/Lawn and Garden	
Date First Served by Shelby	Pipeline constructed in 2003; water was truck from Shelby earlier	
Average Day Demand (gpd)	13,345	Source: KLJ 2012 water use data
Average Day Demand (gpm)	9	
Use per person (gpcd)	191	Average Day Demand / Current population
Annual Demand (ac-ft)	14.95	
Peak Day Demand (gpd)	35,304	Source: KLJ 2012 water use data
Peak Day Demand (gpm)	25	

**Big Rose Colony**

Current Population	60	Source: Personal communication, KLJ 1/12/2015
Use	Domestic/Lawn and Garden	
Date First Served by Shelby	Pipeline constructed in 2004, water was truck from Shelby earlier	
Average Day Demand (gpd)	3,874	Source: Personal communication, KLJ 11/11 2014
Average Day Demand (gpm)	3	
Use per person (gpcd)	65	Average Day Demand/Current Population
Annual Demand (ac-ft)	4.34	
Peak Day Demand (gpd)	11,235	Peaking Factor of 2.9 based 2010 PER (KLJ)
Peak Day Demand (gpm)	8	

**Devon and Dunkirk**

Current Population	75	Based on MT DEQ PWS records, 2015; 25 households (Devon Water Inc.)
Use	Domestic/Lawn and Garden/Agricultural Crop Spraying	
Date First Served by Shelby	Not yet served	
Average Day Demand (gpd)	33,225	Source: average current use 2006-2012 records (personal communication, Roy Benjamin, Devon Water Inc., 2/4/2015)
Average Day Demand (gpm)	57.7	Orifice limiting system at 2.3 gpm/connection (personal correspondence, Mike O'Brien, TD&H, January 19, 2015)
Use per person (gpcd)	443	
Annual Demand (ac-ft)	37.22	
Peak Day Demand (gpd)	96,353	Based on peaking factor of 2.9; maximum established in agreement with Shelby is 120,000 gpd
Peak Day Demand (gpm)	57.7	

**Cut Bank**

Current Population	3,105	Source: 2015 DEQ PWS records
Use	Supplemental municipal (domestic, commercial, industrial, lawn and garden)	
Date First Served by Shelby	Not yet served	
Average Day Demand (gpd)	349,650	Calculated from requested peak day demand with peaking factor of 2.86
Average Day Demand (gpm)	243	
Use per person (gpcd)	113	
Annual Demand (ac-ft)	391.66	
Peak Day Demand (gpd)	1,000,000	Maximum requested amount established with Shelby
Peak Day Demand (gpm)	694	

**Total Estimated Water Use Summary**

	City of Shelby	Prison	Ethridge	Big Rose	Devon/Dunkirk	Cut Bank	Total
Current Population	3,304	783	70	60	75	3,105 (supplemental)	<b>7,397</b>
Average Day Demand (gpd)	631,064	65,682	13,345	3,874	33,225	349,650	<b>1,096,840</b>
Average Day Demand (gpm)	438	46	9	3	58	243	<b>796</b>
Annual Demand (ac-ft)	706.88	73.57	14.95	4.34	37.22	391.66	<b>1,228.62</b>
Peak Day Demand (gpd)	1,672,320	173,755	35,304	11,235	96,353	1,000,000	<b>2,988,966</b>
Peak Day Demand (gpm)	1,161	121	25	8	58	694	<b>2,066</b>

The total historic diverted volume as presented above in Table NIR.3.B-2 is 1,124.90 acre-feet. This historic use includes Wells 1 and 3, which are being changed under a separate application, but are analyzed together since they are all part of the same well field. The water reservation adds an additional 161 acre-feet of volume available to the City for a total of 1,285.90 acre-feet. As shown above in the total estimated water use summary the annual demand is expected to be 1,228.62 acre-feet, which is less than the total volume available. The estimated total average day demand flow rate and peak day demand flow rate are both less than the sum of the flow rates of the water rights being changed under both applications. The proposed change will cause no adverse effect since the proposed use would be less than the total historic use plus the City's water reservation.

Historical diverted flow of the existing water rights plus the water reservation will not be exceeded under this proposed change and the change of Wells 1 and 3. Flow meters are present on the City of Shelby and other distribution points to each place of use so that diverted flow is monitored. During winter months total diverted flow rate cannot exceed the sum maximum flow rate for water rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, 41P 58129 00, and reservation 41P 71891 00 of 3,653.23 gpm. During summer months diverted flow rate can increase another 600 gpm with the addition of Wells 1 and 3. If the Shelby water service area experiences significant population growth or changes to existing water use patterns, or expects estimated water use to exceed historical volumes, new sources of water would need to be appropriated. The City has water service agreements with each of the communities served. These agreements serve as caps to ensure no community will receive more water than what they have purchased.

The legal descriptions of the proposed water service area (place of use) for the change are described below.

**Proposed Place of Use:**

Shelby		
Township	Range	Section
31N	02W	4, 9, 16, 21
32N	02W	5, 6, 8, 9, 14, 15, 16, 20, 21, 22, 23, 26, 27, 28, 29, 32, 33, 34, 35, 36
32N	04W	5, 6
33N	02W	6, 7, 18, 19, 30, 31
33N	03W	1, 12, 13, 24, 25, 36
33N	04W	31, 32
33N	05W	26, 27, 35, 36
34N	02W	30, 31
34N	03W	25, 36

Ethridge		
Township	Range	Section
31N	02W	7
31N	03W	1
32N	02W	18, 19, 30
32N	03W	4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 17, 18, 20, 21, 22, 23, 24, 25, 36
32N	04W	1, 2, 4, 9, 10, 11, 12
33N	03W	17, 18, 19, 21, 27, 28, 33, 34
33N	04W	13, 22, 23, 24, 25, 26, 27, 34, 35, 36

Big Rose		
Township	Range	Section
34N	02W	19
34N	03W	24

Devon Dunkirk		
Township	Range	Section
30N	01E	1-36
30N	01W	1-36
30N	02E	1-36
30N	03E	1-36
31N	01E	1-36
31N	01W	1-36
31N	02E	1-36
31N	03E	1-36
32N	01E	1-36
32N	01W	1-36
32N	02E	1-36
32N	03E	1-36

Cut Bank		
Township	Range	Section
33N	05W	2, 3, 4, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24
33N	06W	1, 2, 10, 11, 12, 13
34N	05W	1, 2, 3, 4, 5, 6, 7, 8, 17, 18, 19, 30, 31, 33, 34, 35
34N	06W	2, 3, 10, 11, 13, 14, 15, 24, 25, 36
35N	05W	20, 29, 32, 33

The water reservation has not yet been put to use, so therefore the historic diverted flow rate or volume of the reservation will not be exceeded. No changes to the operational function of the existing points of diversion will be made. The water reservation volume will be distributed among the 13 wells and will increase the amount of water pumped from each well by approximately 8 gallons per minute. The Findings of Fact for the City of Shelby water reservation states the following:

*F. OTHER FINDINGS RELATED TO BOARD DECISION (Montana Code Annotated §85-2-316(3)(B), (4) (a) (iv) (b), (5), (6), and (9) (e) (1991); ARM 36.16.107B(5) through (8).)*

*Number 30. As conditioned, the City of Shelby's water reservation will not adversely affect any senior water rights (ARM 36.16.107B(8).)*

#### **NIR.4.B Adverse Effect**

*Attach an explanation of what your plan is to not create an adverse effect to existing water rights, certificates, permits, and water reservations?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

The City would operate all points of diversion associated with their municipal water rights as they have operated historically. Together the well field would divert no more than the historic volume shown in Table NIR.3.B-3 along with the additional volume provided in the City's water reservation. The seasonal and daily timing of diversions from the source aquifer would remain the same as historic diversion. Since the proposed use is less than the historical diverted flow of the existing water rights plus the water reservation under this proposed change and the change of wells 1 and 3, no adverse effect will be experienced by other water users. There is no adverse effect to existing water users from continuing to use this municipal water right. The amount of water that is diverted by the City of Shelby will be measured and recorded as part of the agreement the City has with each community. The City of Shelby and all proposed service areas will have flow meters installed on the primary distribution lines so that the volume of water provided to all service areas will be accurately monitored and recorded.

#### **Water Reservation:**

The water reservation has not yet been put to use. No changes to the operational function of the existing points of diversion will be made. The water reservation volume will be distributed among the 13 wells and will increase the amount of water pumped from each well by approximately 8 gallons per minute. The Findings of Fact for the City of Shelby water reservation states the following:

*F. OTHER FINDINGS RELATED TO BOARD DECISION (Montana Code Annotated §85-2-316(3)(B), (4) (a) (iv) (b), (5), (6), and (9) (e) (1991); ARM 36.16.107B(5) through (8).)*

*Number 30. As conditioned, the City of Shelby's water reservation will not adversely affect any senior water rights (ARM 36.16.107B(8).)*

#### **NIR.4.C Adverse Effect**

*Attach an explanation of when the last time water was appropriated and used beneficially to the extent identified in your water right? If there has been a period of non-use, explain why the water right was not used, and explain why a resumption of use will not adversely affect other water users.*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

Water from the City's well field has continually been put to beneficial use by the City of Shelby since the first wells were put into service around 1940. Each well in the well field diverts a portion of the City's daily and annual municipal water demand. There has been no period of non-use. As documented in the 1988 Reservation Application the City has a history of also supplying water outside of their designated place of use. Some operational problems have resulted in temporary suspensions of two wells in the City's well field. Well Number 6 has been out of service since 2009 due to vandalism. The pump was turned on and ran continual when water level was lower than the pump intake and the motor burned out. Well Number 4 has been out of service since 2003. Undercutting of the river bank of the Marias River decreased the distance from the well to surface water and resulted in failure of the Microscopic Particulate Analysis (MPA) test. Since then, increased deposition along that bank has increased the distance from the well to the surface water. MPA testing will be conducted to evaluate if the well can be brought back on-line.

**Water Reservation:** Since the water reservation has not yet been put to use, there has been no period of beneficial use that can be analyzed.

#### **NIR.5 Adequate Diversion Means and Operation – ARM 36.12.1904**

##### **NIR.5.A Adequate Diversion Means and Operation**

*Is the means of diversion a well? If yes, provide a copy of the well log. If the well log is not available, who drilled the well?*

All points of diversion are wells. A copy of each well log is attached. There is no well log for the water reservation.

##### **NIR.5.B Adequate Diversion Means and Operation**

*Is another agency requiring you to measure your water use?*

Montana Department of Environmental Quality may require public water supply usage to be measured.

##### **NIR.5.C Adequate Diversion Means and Operation**

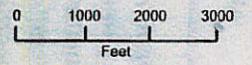
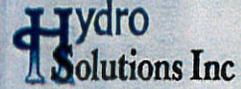
*Do you have any plans to measure your diversion and use? If yes, attach a description of the plan and the type of measurements you will take.*

**Water Reservation and Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

Water will be measured at multiple points throughout the City's transmission and pipeline systems. Water meter locations are shown on Map NIR.5.C.



Map NIR.5.C  
City of Shelby  
Water Distribution and  
Meter Location Map



Prepared By: R.Svingen  
File Name: COS\_WaterMeterLocations  
Production Date: 2/17//2015  
Reference: KLJ, Shelby Water Rights, Water Meter Locations, 1/29/15.

Water use to each community served in the proposed service area will be metered. A master water meter that meters all diverted flow is located on the south end of Shelby. The City of Shelby keeps accurate records of the quantity of water diverted and supplied to other service areas. The City records daily water use, peak flow rates, and totalized monthly and annual volumes for the total diverted flow. The total monthly volume is metered and recorded to each community in the proposed service area and for residential use in the City. Service area water is tracked for water use agreement purchases. A portion of the water reservation point of diversion will be assigned to each well located in the well field. No new measurement plans will be necessary for the water reservation.

Currently a master water meter that measures all water diverted from the well field is located near the storage tank on the south side of Shelby. Other water meters maintained by the City measure or will measure water going to the service areas proposed in this application. A map of all current and proposed water meters is provided on the Water Meter Location Map NIR.5.C. The City currently maintains the water meters described in Table NIR.3.I.

#### **NIR.5.D Adequate Diversion Means and Operation**

*For applications that propose new conveyance facilities, provide preliminary design plans and specifications for the proposed diversion and conveyance facilities and the equipment used to put the water to beneficial use.*

***Water Reservation and Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:***

No new diversion facilities are needed to complete the proposed change for the water rights, and no new wells will be drilled to initiate use of the water reservation. The City's engineer conducted a well field pumping test to evaluate the current total yield of the well field. The pumping test was conducted on Wells 1, 2, 3, 5, 7, 8, 9, 10, 11, 12, and 13 on October 2-3, 2013. As described in NIR.4.C, Wells 4 and 6 are currently not operational. The well field pumping test found a total maximum pumping rate of 2,079 gpm and 2,993,760 gpd. These totals are greater than the total peak day demand estimated in NIR.4.A; therefore, the existing diversion facilities are adequate for the proposed change applications (all wells and reservation). The well field pumping test report is attached to this application package.

The City's engineer also completed a water system model to assess the capability of the City's water system to handle the additional demands. This report is attached to this application. The report includes description of well pump modeling, clear well and booster stations, water storage tanks, and the modeled demands. From the report:

*'Water is pumped into the clear well from all points of diversion according to their individual pumping schedules. From the clear well, four booster pumps pump the water through the water treatment system where it is disinfected. From the treatment plant, water is pumped to the south side of Shelby and the volume is recorded at the location of the master water meter. From here water is pumped, aided by several booster pumps, to the south tank, airport tank, shop tank, and prison tank. Check valves are located along the lines at selected locations to prevent backflow. Water meters are located at selected locations, as shown on Map Figure NIR.5.C to record the amount of water distributed the Prison, Ethridge, Big Rose Colony, Cut Bank, and Devon'.*

Conveyance facilities are built or are being designed for each of the proposed water service areas. Existing conveyance facilities are already in place to the prison, Ethridge, and Big Rose Colony. Conveyance facilities to Cut Bank and Devon and Dunkirk are in the design process.

#### **Prison**

There are three booster pumps that deliver water from the City's water tank on the south side of Shelby to the prison via a 12-inch PVC line. A 500,000 gallon water tank stores water at the prison. A water meter exists at the prison near the water tank. A 12-inch PVC line extends north from the prison to serve Ethridge and Cut Bank. Record drawings exist for the infrastructure improvements that were completed in 1999. The alignment of this pipeline is shown on a plan view record drawing sheet attached to this application.

#### **Ethridge**

The Ethridge service area is served from a 4-inch main line that is connected to the 12-inch waterline extending north from the prison. Water distribution lines within the Ethridge service area also include 1, 2, and 3-inch lines. A water meter exists where the system connects to the City's pipeline north of the prison. Record drawings exist for the infrastructure improvements that were completed in 2003. The alignment of this pipeline is shown on a plan view record drawing sheet attached to this application.

#### **Big Rose Colony**

An existing water pipeline extends north of Shelby to Big Rose Colony. The pipeline was constructed in 2004 and water use is metered by the City. A water meter exists where the system connects to the City's pipeline on the north side of the City. The City and the City's engineer could not locate record drawings or other information for this pipeline.

#### **Cut Bank**

Design drawings for the NCMRWA pipeline from Shelby to Cut Bank have recently been completed. The pipeline will be a 16-inch pipeline extending from Shelby to Cut Bank as shown on Map NIR.2.D. The pipeline would connect into the City's existing 12-inch waterline north of the prison, where water would be metered. The proposed pipeline would parallel the existing Ethridge pipeline and then continue northwest to Cut Bank where it would connect into Cut Bank's existing water distribution system. The alignment of this pipeline is shown on a plan view design drawing attached to this application.

#### **Devon-Dunkirk**

Design drawings for the pipeline from Shelby to the Devon-Dunkirk service area have recently been completed. The proposed pipeline alignment is shown on Map NIR.2.D. The pipeline would be a 4-inch waterline serving a total of 25 connections. The system is designed to be orifice limited to provide a maximum of 2.3 gpm per service connection (personal communication, Mike O'Brien, TD&H, January, 19, 2015). The constant flow rate would be fed into an existing distribution system of cisterns at each service connection. Existing cisterns vary in size from 500 gallons to 10,000 gallons, with the average cistern having a capacity of 3,000 gallons. Water use would include a community water depot where water could be trucked throughout the proposed service area. In addition to domestic and lawn and garden water use, water would be used to satisfy agricultural spraying demands. Agricultural spraying requires potable water to be mixed with chemicals at rates of 5 to 10 gallons of water per acre. Each farmer within the proposed service area treats on average 6,000 acres of dry-land crops multiple times per year through aerial application (personal communication, Roy Benjamin, Devon Water Inc., February 3, 2015). Water use would be metered by the City where the proposed Devon pipeline would connect to the City's distribution system. The alignment of the proposed pipeline is shown on a plan view design drawing attached to this application.

**TEMPORARY CHANGE ADDENDUM  
FORM 606-TCA**

**APPLICATION FOR CHANGE OF A WATER RIGHT  
TEMPORARY CHANGE ADDENDUM**

§ 85-2-407; § 85-2-408; § 85-2-436, MCA  
ARM 36.12.1901

This addendum must be completed and the required information attached to a change application when a temporary change is requested under the statutes shown above. A temporary change can be made to a point of diversion, place of use, purpose of use, or place of storage of a water right. Complete an addendum for each water right that is proposed to be temporarily changed

On a separate attachment provide the following information. Attachments must be labeled as shown in the sections below. (i.e. TCA.1.a) If a section is not applicable, label the section as Not Applicable or NA. Improperly labeled attachments will not be considered. Conclusions, calculations, references, data, and assumptions used must be included in the application materials.

Water Right No. 41P 192878 00 (Well 2) See attachment

Complete this form for each water right being changed.

**Section 1. Temporary Change Details**

TCA.1.a Who is the owner of the water right?  
City of Shelby

TCA.1.b Yes  No  Is the owner of record changing the water right for another's use? If no, explain whose use is it being changed for?  
The water right use will remain as municipal beneficial use. The water right will be changed to change the places of use (service area) and points of diversion.

TCA.1.c How many years will the water right will be temporarily changed? 10 years

TCA.1.d Yes  No  Will the temporary change will be intermittent over the years? If yes, explain how it will be used.  
\_\_\_\_\_  
\_\_\_\_\_

TCA.1.e For what purpose will the water right be temporarily used?  
Municipal water supply until the North Central Montana Regional Water System is operational

TCA.1.f Yes  No  Is the quantity of water subject to the temporary change being made available from the development of a new water conservation or storage project? If yes explain the water conservation or storage project  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This Temporary Change Addendum includes 41P 192878 00 (Well 2) as well as the following water rights. The Temporary change details are all the same.

<b>Water Right</b>	<b>Well Number</b>
41P 192880 00	4
41P 192881 00	5
41P 192882 00	6
41P 4489 00	7
41P 4490 00	8
41P 58129 00	9,10,11,12,13
41P 71891 00	None

**WELL LOGS**

TRIPPLICATE

101 31N 02W 21020B  
Toole  
Montana Bureau of  
Mining and Geology

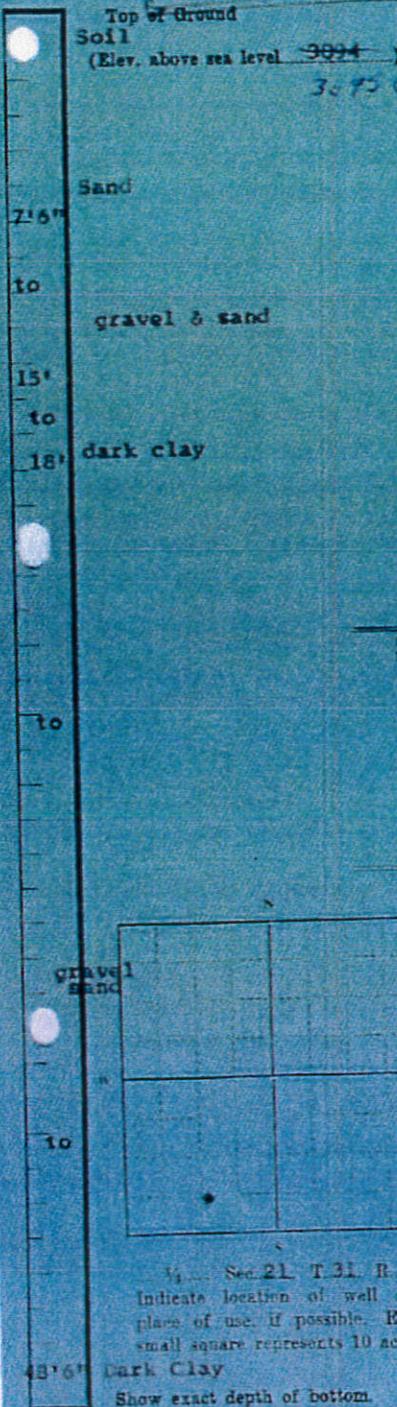
19T 311 R 2 W 21  
TOOLE CO. B

WELL NO. 1

STATE OF MONTANA  
ADMINISTRATOR OF GROUNDWATER CODE  
OFFICE OF STATE ENGINEER

Notice of Completion of Groundwater  
Appropriation by Means of Well

(Under Chapter 237, Montana Session Laws, 1961)



Owner City of Shelby #1 Address Box 743 Shelby, Montana  
Driller M. M. Ulrich Address Unknown

Date of Notice of Appropriation of Groundwater \_\_\_\_\_  
Date well started May 29, 1940 Date Completed June 6, 1940

Type of well Drilled Equipment Used Drilling rig  
(dug, driven, bored or drilled) (Churn, drill, rotary or other)

Water Use: Domestic  Municipal  Other  Irrigation   
Industrial  Drainage  Stock

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS		
				Kind	From (Feet)	To (Feet)
	15 1/2" I.D.	above surface	25'	Johnson Screen	26'	36'

Static Water Level for non-flowing Well 17' 9" feet.

Shut-in Pressure for Flowing Well Not known

Pumping Water Level 36 feet at 300 gal. per minute.

Discharge in gal. per min. of flowing well Not known

How Tested Not known Length of Test Not known

Remarks: (Gravel packing, cementing, packers, type of shutoff, location of place of use of groundwater if not at well, and any other similar pertinent information, including number of acres irrigated, if used for irrigation.)

Not known  
Driller's License Number  
M. M. Ulrich  
Driller's Signature

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

M: 87581

31 N Q2W 21CD

Copy of log of Shelby No. 5 well

MONTANA STATE BOARD OF HEALTH  
Water and Sewage Division  
WELL DRILLER'S REPORT

Top of Ground  
(Elev. above sea level)  
0  
to  
1 ft.- Soil  
to  
7 ft. 6 in.-Sand  
to  
15 ft.-Gravel & Sand  
to  
18 ft.- Dark Clay  
to  
36 ft.-Gravel & Sand  
to  
48 ft. 6 in.-Dark Clay

*not coded*  
*coded*

Registration No. 16

Driller M.M. Ulrich Address Missoula, Montana

Owner of Well City of Shelby

Exact Location of Well On river bottom about 200 feet from the other well

Water to Be Used for Domestic

Drilling Begun May 29, 1940 Well Finished June 6, 1940

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Casing Record

Size of Pipe	Kind and Weight of Material Used	From (Feet)	to (Feet)	PERFORATIONS		
				Kind Size	From (Feet)	to (Feet)
10 1/2	L.D. 70 lb. oil well casing	4 Ft. above surface	26 Ft. 2 in. below surface	Screen <del>2 1/2 inch</del>	26 ft.	36 ft.

#5  
by Voorhees

Describe the type of joints in casing Screw

Describe any screens used 6 ft. of 12 1/2 inch pipe above screen- 12 1/2 ft. of 12 1/2 inch pipe below screen. The screen is a Johnson Copper screen

Capacity of Well 500 to 600 G.P.M.  
(In Gallons or Barrels)

How Determined Will be tried out with a pump  
(Pump, Sailer, Weir, Etc.)

Signed M.M. Ulrich

Date June 10, 1940

(Law and Regulations on Reverse Side)

Show exact depth of bottom.

File No. 101 31N 02W 2100CB

WELL NO. 2

31 N 2 W  
CB

TRIPLICATE Toole

County Toole

STATE OF MONTANA  
ADMINISTRATOR OF GROUNDWATER CODE  
OFFICE OF STATE ENGINEER

Top of Ground

(Elev. above sea level 3000)

**Notice of Completion of Groundwater Appropriation by Means of Well**

(Under Chapter 27, Montana Session Laws, 1961)

to 8' clay

to 18' clay and gravel

to 15' gravel sand & water

to 18' clay & gravel

to 20' some water

to 24' loose gravel & water

to 29' tight gravel, clay & seepage

to 32' loose gravel some clay

to 48' shale

Owner City of Shelby #2 Address Box 743, Shelby, Montana

Driller J. M. Ulrich Address Unknown

Date of Notice of Appropriation of Groundwater \_\_\_\_\_

Date well started 9/11/46 Date Completed 10/1/46

Type of well Drilled Equipment Used Drill Rig  
(dug, driven, bored or drilled) (Churn, drill, rotary or other)

Water Use: Domestic  Municipal  Other  Irrigation   
Industrial  Drainage  Stock

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS		
				Kind and Size	From (Feet)	To (Feet)
	15 1/2" I. D.	0	34	5/8" x 1 5/8" slots	13'	13'
	12 1/2" I. D.	32'	46		19'	32'

Static Water Level for non-flowing Well 15 feet

Shut-in Pressure for Flowing Well \_\_\_\_\_

Pumping Water Level 30 feet at 300 gal. per minute.

Discharge in gal. per min. of flowing well Not known

How Tested gauge Length of Test Not known

Remarks: (Gravel packing, cementing, packers, type of shutoff, location of place of use of groundwater if not at well, and any other similar pertinent information, including number of acres irrigated, if used for irrigation)



Sec 21 T. 31 R. 2  
Indicate location of well and place of use, if possible. Each small square represents 10 acres.  
to 48' shale  
Show exact depth of bottom.

Not known  
Driller's License Number

J. M. Ulrich  
Driller's Signature

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triuplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

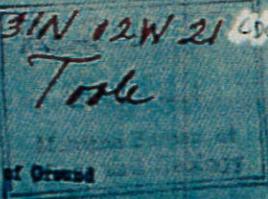
M: 87577

101 31N 12W 21 CDCB

WELL NO. 3

1017 31 N R 2 W CDCB

TRIPPLICATE



County Toole

STATE OF MONTANA ADMINISTRATOR OF GROUNDWATER CODE OFFICE OF STATE ENGINEER

Top of Ground (Elev. above sea level -3094)

Notice of Completion of Groundwater Appropriation by Means of Well

(Under Chapter 237, Montana Session Laws, 1961)

Owner City of Shelby #3 Box 743 Address Shelby, Montana

Driller J. M. Ulrich Address Unknown

Date of Notice of Appropriation of Groundwater Unknown

Date well started 5/27/39 Date Completed 7/7/39

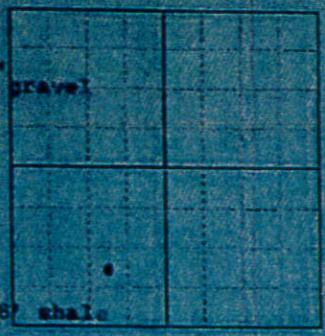
Type of well Drilled Equipment Used Spudder

Water Use: Domestic, Municipal, Other, Irrigation, Industrial, Drainage, Stock

Indicates on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc.

- 7' top soil
water at 10'
sand & gravel 22
23 sand & clay with some gravel
27 gravel & sand
30' sand & little fine gravel
34' sand & gravel
48' shale

Table with columns: Size of Drilled Hole, Size and Weight of Casing, From (Feet), To (Feet), PERFORATIONS (Screen Size, From (Feet), To (Feet)).



Static Water Level for non-flowing Well Not known feet

Shut-in Pressure for Flowing Well Not known

Pumping Water Level Not known feet at Not known gal per minute

Discharge in gal per min of flowing well Not known

How Tested Not known Length of Test Not known

Remarks: (Gravel packing, cementing, packers, type of shaft, location of place of use of groundwater if not at well, and any other similar pertinent information, including number of acres irrigated, if used for irrigation)

1/4 Sec. 21 T. 31 R. 2 Indicate location of well and place of use, if possible. Each small square represents 10 acres.

Show exact depth of bottom.

Not known Driller's License Number

J. M. Ulrich Driller's Signature

ELEV: 3100

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

M: 37576



File N 101 31N. 02W 21CDBC  
WELL NO. 4

10/ T 31/ R 2 V/

TRIPPLICATE

Toole

County Toole

CDBC

STATE OF MONTANA  
ADMINISTRATOR OF GROUNDWATER CODE  
OFFICE OF STATE ENGINEER

Notice of Completion of Groundwater  
Appropriation by Means of Well

(Under Chapter 231, Montana Session Laws, 1961)

Owner City of Shelby #4 Box 743  
Address Shelby, Montana

Driller J. M. Ulrich Address Not known

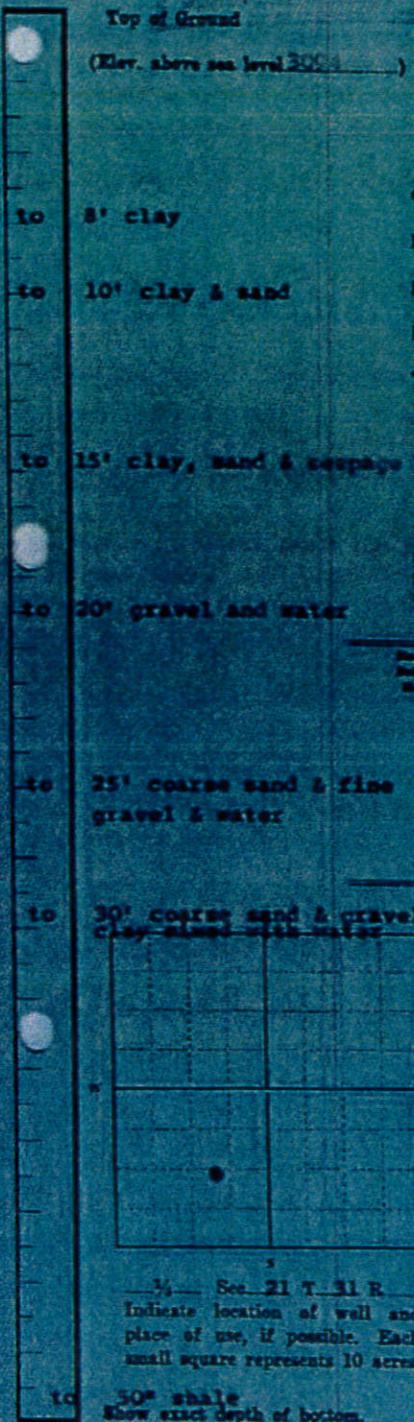
Date of Notice of Appropriation of Groundwater \_\_\_\_\_

Date well started 10/3/46 Date Completed 10/12/46

Type of well Drilled Equipment Used spudder  
(e.g. driven, bored or drilled) (Cable, drill, rotary or other)

Water Use: Domestic  Municipal  Other  Irrigation   
Industrial  Drainage  Stock

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which water rises in the well.



Diameter of Hole	Diameter and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS		
				Kind	From (Feet)	To (Feet)
	15 1/2" ID	0	33'	5/8x3/8	15'	30'
	12 1/2" ID	31'	49' 6"			

Static Water Level for non-flowing Well 19' 6" feet

Shut-in Pressure for Flowing Well Not known

Pumping Water Level 29' feet at 300 gal. per minute

Discharge in gal. per min. of flowing well Not known

How Tested Not known Length of Test Not known

Remarks: (Gravel packing, cementing, packers, type of shut-off, location of place of use of groundwater if not at well, and any other similar pertinent information, including number of acres irrigated, if used for irrigation)

Sec. 21 T. 31 R. 2  
Indicate location of well and place of use, if possible. Each small square represents 10 acres.

50' shale  
Show exact depth of bottom.

Not known  
Driller's License Number

J. M. Ulrich  
Driller's Signature

ELEV: 3/4 (3)

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

M: 87578

File No. 101 31N 02W 2100B

WELL NO. 5

31 N R 2 E

TRIPLICATE Toole

County Toole

CDG

STATE OF MONTANA  
ADMINISTRATOR OF GROUNDWATER CODE  
OFFICE OF STATE ENGINEER

Notice of Completion of Groundwater  
Appropriation by Means of Well

(Under Chapter 237, Montana Session Laws, 1951)

0' Top of Ground

(Elev. above sea level 3094)

Fill Rock & Gravel 31' 0"

8"

Owner City of Shelby #5 Address Shelby, Montana  
Box 743

Driller Layne-Minnesota Address Minneapolis, Minn.

Coarse gravel

Date of Notice of Appropriation of Groundwater

Date well started 1952 Date Completed 1952

16'

Type of well Gravel well Equipment Used Caisson  
(dug, driven, bored or drilled) (Crown, drill, rotary or other)

Sand, gravel, rock

Water Use: Domestic  Municipal  Other  Irrigation   
Industrial  Drainage  Stock

23'

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which water rises in the well.

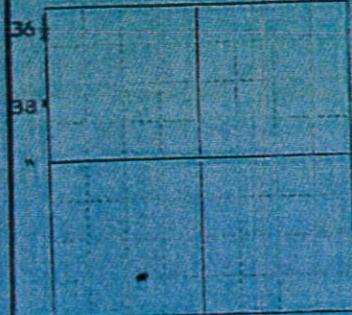
Sand, gravel, rock & hard clay

27'

Fine sand, rock, clay

Size of Drilled Hole	Size and Weight of Casing	From (Feet)		PERFORATIONS		
		To (Feet)	Kind Size	From (Feet)	To (Feet)	
60"	38"	5	4'0"			
38"		"	21'			
24"		"	34'2"			
24"	34'2"		44'2"	5	34'2"	44'2"

Sand, gravel, rock & Shale



Sec 21 T31 R 2  
Indicate location of well and place of use, if possible. Each small square represents 10 acres.

Show exact depth of bottom.

Static Water Level for non-flowing Well 19' 11" feet

Shut-in Pressure for Flowing Well Not known

Pumping Water Level 34' feet at 350 gal per minute

Discharge in gal. per min. of flowing well Not known

How Tested Turbine Pump Length of Test 8 hrs.

Remarks: (Gravel packing, cementing, packers, type of shutoff, location of place of use of groundwater if not at well, and any other similar pertinent information, including number of acres irrigated, if used for irrigation)

Double gravel wall - 52" dia. to 24" screen, 38" casing cemented in 60" hole, 1" PVC treatment coil around screen

208

Driller's License Number

Layne-Minnesota Company  
Driller's Signature

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

M: 8\*7579

File N 101 31N 02W 110 BC

101 31 NLR 2W

TRIPLICATE

Toole

WELL NO. 6

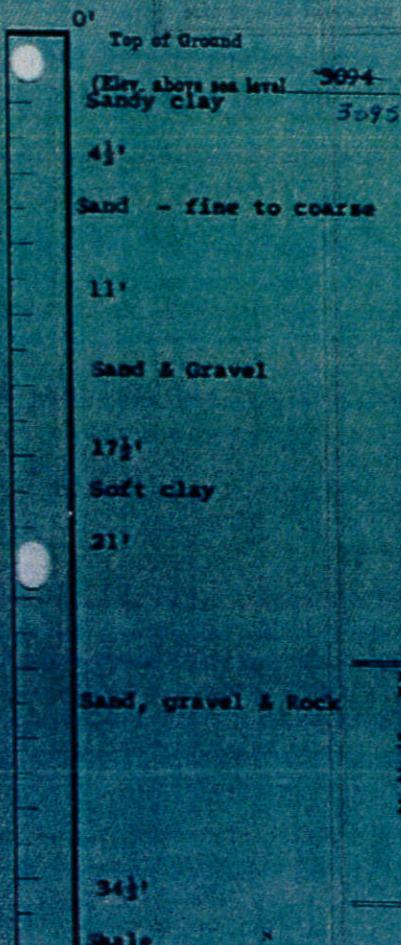
County Toole

CD BC

STATE OF MONTANA Well 2  
ADMINISTRATOR OF GROUNDWATER CODE  
OFFICE OF STATE ENGINEER

Notice of Completion of Groundwater  
Appropriation by Means of Well

(Under Chapter 237, Montana Session Laws, 1961)



Owner City of Shelby #6 Address Shelby, Montana  
Box 743

Driller Layne-Minnesota Address Minneapolis, Minn.

Date of Notice of Appropriation of Groundwater \_\_\_\_\_

Date well started 6/22/62 Date Completed 8/4/62

Type of well Gravel wall Equipment Used Caisson

(aug, driven, bored or drilled) (Caisson, drill, rotary or other)

Water Use: Domestic  Municipal  Other  Irrigation   
Industrial  Drainage  Stock

\*El Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which water rises in the well.

Dia of Packed Case	Dia and Weight of Casing	From Pit	To Pit	PERFORATIONS		
				Dist From	From Pit	To Pit
52"	Steel	5 1/2'	18'			
24"	Steel	"	30 1/2'			
24"	Stainless	30 1/2'	40 1/2'	#5	30 1/2'	40 1/2'

Static Water Level for non-flowing Well 19' 11" feet

Shut-in Pressure for Flowing Well Not known

Pumping Water Level 30' feet at 250 gal per minute

Discharge in gal per min. of flowing well Not known

Turbine pump & flow tested Orifice Length of Test 8 hrs

Remarks: (Gravel packing, cementing, packers, type of shutoff, location of place of use of groundwater if not at well, and any other similar pertinent information, including number of acres irrigated, if used for irrigation)

Double gravel wall - 52" dia. to 24" screen, outer casing cemented in 60" dia. hole. 1 1/2" PVC treatment coil around screen

206

Driller's License Number

Layne-Minnesota Company

Driller's Signature

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

M: 87580

