CAPACITY EVALUATION
FOR THE BELFAST WATER DISTRICT
BELFAST, MAINE

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LIST OF ACRONYMS

AEH – A.E. Hodsdon Engineers
BWD – Belfast Water District
CEH – Caswell, Eichler & Hill
CFS – Cubic Feet per Second
FERC – Federal Energy Regulatory Commission
GPD – Gallons per Day
GPM – Gallons per Minute
GPY – Gallons per Year
MBNA – Maryland Bank National Association
MG – Million Gallons
MGY – Million Gallons per Year
NOAA – National Oceanic and Atmospheric Administration
NVC – Northport Village Corporation
OF – Overflow
PUC – Public Utilities Commission
TW – Test Well

Purpose

The purpose of this report is to evaluate the operational capabilities of the Belfast Water District (BWD) if they allow Nordic Aquafarms to purchase their Little River surface water supply and ground water from BWD in amounts up to 262,800,000 gallons per year (GPY). This equates to 720,000 gallons per day (GPD) and 500 gallons per minute (GPM). The agreement also stipulates that 500 GPM will be the maximum rate delivered to the facility, and that Nordic Aquafarms will purchase a minimum of 100,000,000 gallons per year (or make a payment in lieu of the minimum purchase).

This evaluation will show that BWD has sufficient capacity to operate the Belfast Water District, supply water to North Port Village Corporation by contractual obligation, provide Nordic Aquafarms with up to 720,000 GPD of water and maintain a reserve capacity for future needs.

Sources of Information

The Belfast Water District (BWD) has extensive documentation regarding their sources of supply and historic water usage. The reports we reviewed to produce this evaluation include;

- Pumping Records from 1969 to 2017
- Booster Pump Station Upgrades, Dirigo Engineering, 2005
- Hydrogeologic Analysis of the 8-inch Test Well (TW) at the TW-18 Site off Curtis Road in Swanville, Maine, W. Bradford Caswell, 2005
- Engineering Plan for Water System Improvements, Wright Pierce, 1979
- Hydrogeologic Evaluation of the Goose River Esker Aquifer, Caswell, Eichler and Hill, Inc. 1989
- Production and Test Well Logs, Well Redevelopment Records, various drillers, 1956 to 2013
- Ground water Modeling of the Smart Road Esker Aquifer, Jacques Whitford Company, 1999.
- Hydrogeologic Analysis of the 18-inch Production Well at the Curtis Road Site in Swanville, Maine, Caswell, 2005
- Update to the 1996 Water System Improvements Study for the Belfast Water District, Wright-Pierce, 2004.
- Belfast Water District Water System Capital Improvement Plan Preliminary Engineering Report, Dirigo Engineering, 2015

In addition, we evaluated precipitation records from the Belfast Station operated by the National Oceanic and Atmospheric Administration (NOAA) from 1960 to 2018, and reviewed the licensing criteria for Goose River Hydro, who operates a series of hydroelectric dams on the Goose River.

BACKGROUND

The Belfast Water Company was established in 1887 with the construction of the lower and upper dam and pump station on the Little River, a new storage reservoir and water mains. In 1913, a sand filtration system was installed at Little River and in 1919 the Belfast Water District was created and they assumed ownership of the assets of the Water Company.

The Little River was the sole source of water until the Smart Road Well was installed in1956. In 1966, the Jackson Pit well was constructed and began supplying water to the system. The Little River treatment plant was upgraded to include a diatomaceous earth filter in 1963 but the treatment system reportedly was not effective at all times due to the "flashy" nature (highly variable raw water quality) of the Little River source. Currently, the Smart Road Well and the Jackson Pit Well are the sources of supply for the Water District and have been since 1980.

SYSTEM DESCRIPTION

The Belfast Water System consists of approximately 4 miles of transmission main from the Jackson Pit Well to the Smart Road Well and then to Route 1. A pair of river crossings, one 12-inch and one 14-inch diameter, of the Passagassawakeag River provides water to the west side of Belfast where most of the water is used. A 10-inch diameter distribution main extends easterly along Route 1 to the Searsport town line where the Searsport and Belfast water systems are interconnected.

The distribution system is well looped with 12, 10, 8 and 6-inch mains with some 4-inch mains in limited areas. The distribution mains total approximately 39 miles of length. A water system map is included as Exhibit A (Dirigo Engineering, 2015).

The system also contains four welded steel, above ground water storage tanks as indicated in Table No. 1:

Table No. 1 – Belfast Water District Storage

Location	*Year Built*	*Capacity Million Gallons (MG)*	*Overflow (OF) Elev.*
Lincolnville Ave.	1956	0.5	275
Lincolnville Ave.	1988	1.3	275
Crocker Road	1997	0.75	401.5
Back Searsport Rd.	1956	0.5	275/287[1]

[1]Overflow is at 287. An altitude valve limits levels to 275.

The system is mostly one pressure zone with a hydraulic elevation of 275 feet. A small portion of the Back Searsport Road on the east side of Belfast is pressurized by a booster station. The Crocker Road Tank on the east side of Belfast is filled via a booster station located near the Lincolnville Avenue tanks. The Crocker Road high service area includes the former Maryland Bank National Association (MBNA) site and the area that is generally easterly of Route 1.

According to the 2016 PUC report, the Belfast Water District had 2,003 customers with 1,856 meters. In addition to Belfast customers, the BWD supplies water to a portion of Northport Village through a connection at the Northport/Belfast town line. A total of 7,384,000 gallons (14 GPM) was sold to Northport in 2016.

In 2016, a total of 198,951,100 gallons of water was produced with unaccounted for water at 20,751,917 gallons or 10% of the total production. The average daily demand was 543,582 gallons (378 GPM) and maximum day demand was 719,300 gallons (500 GPM).

Surface Water Supply (Little River)

The Little River surface water supply has not been used since 1980 when the Maplewood Poultry Company closed. This surface water supply has remained as an emergency back-up source however; activation would require a boil water order because of the lack of modern water treatment equipment. In 1979, Wright-Pierce concluded that "In general, everything at the Little River Station, including the buildings and equipment, is old, in poor condition and in need of replacement." The cost for water treatment upgrades was estimated at $3.1 million dollars (in 1979 dollars).

When Maplewood Poultry Company closed in 1980, a decrease of approximately 155 million gallons per year (MGY) is indicated in the water use records. This consists of an 85 MGY reduction of ground water and reduction of approximately 70 MGY of surface water from the Little River. The closure of Maplewood Poultry drove the decision of the Belfast Water District to not invest further in the Little River Source. Since 1980, the BWD has relied solely on its ground water source from the Goose River Aquifer.

Ground Water Use

Ground water use in Belfast has decreased dramatically since 1980 when the District switched completely to their ground water source. Figure No. 1 is a graph of ground water usage in Belfast from 1969 to the present. The graph only shows ground water use – Between 1969 and 1979 the District was also using the Little River surface water source at an average annual rate of about 70 MGY.

Figure 1. Belfast Water District
Historic Groundwater Production

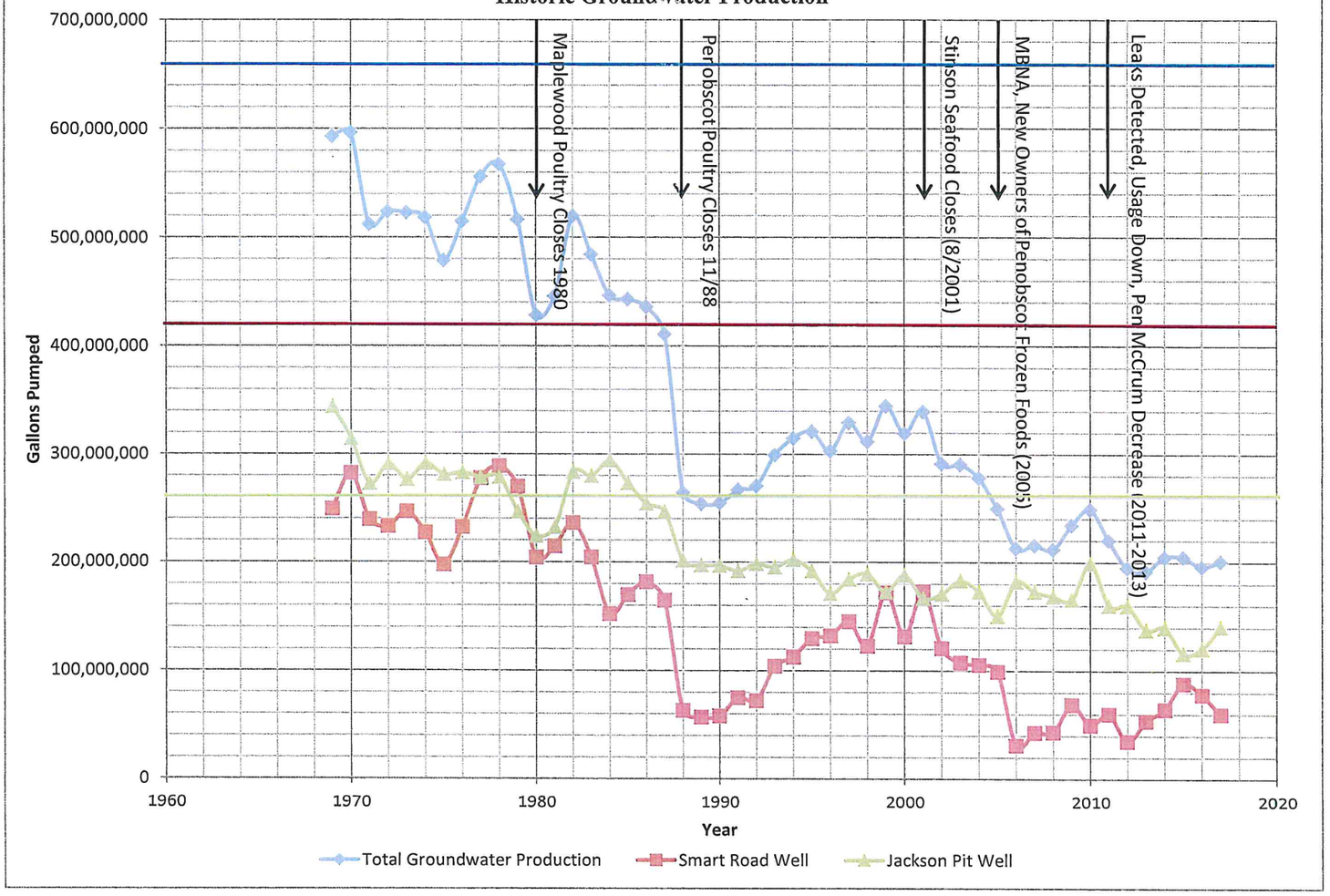

Figure No. 1 indicates that when Maplewood Poultry closed in 1980, ground water production decreased from 536 MGY (1969-1979 average) to 452 MGY (1980-1987 average). Another sharp drop in ground water use occurred in 1988, when Penobscot Poultry closed. Water usage declined from 452 MGY to 262 MGY (1988-1992 average). Subsequently, water use increased to a peak of approximately 345 MGY in 1999 but due to the closing of Stinson Seafood in 2001 and MBNA in 2005 and efforts by BWD staff to locate and repair leaks, the ground water withdrawal in Belfast has been reduced to an average of just under 200 MGY (2013-2017)

In addition to supplying the City of Belfast, the BWD has a contractual obligation to supply up to 22 MGY (42 GPM) to the Northport Village Corporation (NVC). The NVC is currently using approximately 7.4 MGY (14 GPM). The Belfast Water District has no other contractual obligations to supply water.

Population in Belfast has been on a slight increase from 2004 to 2014 but projections by the State of Maine Office of Policy and Management indicate that the population of Belfast is expected to decrease from 6,672 in 2014 to 5,907 by 2034. With negative population change projected, we expect the water usage in Belfast to be stable or slightly declining over the next 15 years (State of Maine Office of Policy and Management, on-line data, 2018).

WELLS

The Belfast Water District has been using ground water from the Goose River Esker Aquifer since 1955 when the Smart Road Well was completed (Figure No. 2). The area was further developed with the Jackson Pit Well in 1965. In 1980, faced with huge costs to upgrade the Little River Treatment Plant and a reduction of water use due to poultry processors leaving town, the District mothballed the treatment plant and has relied on the ground water source from these two wells ever since.

JACKSON PIT AND SMART ROAD WELLS

The Jackson Pit Well pumps through an 8-inch diameter cast iron water main cross country to the Smart Road Well Pumping Station. From there, a 14-inch diameter main delivers water from both wells along Smart Road and Swan Lake Avenue to the Back Searsport Road. A 12-inch main continues along Swan Lake Avenue to near Route 1. At that point, the main splits into two river crossings across the Passagassawakeag River. As mentioned previously, one river crossing is 12-inch and one is 14-inch diameter. The river crossings lead to the west side of Belfast and the extensive distribution system where most of the water is consumed.

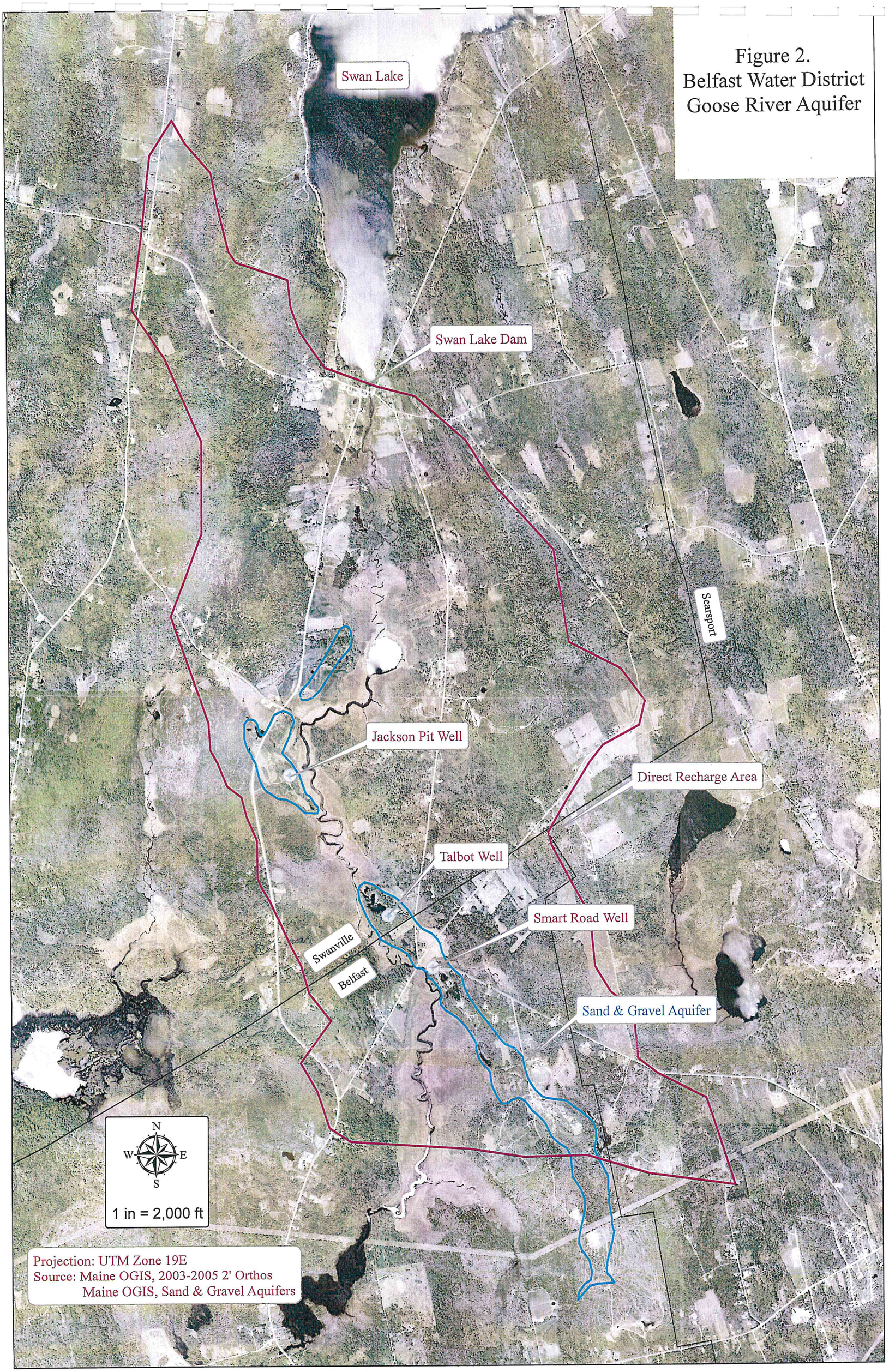
Figure 2.
Belfast Water District
Goose River Aquifer
Swan Lake
Swan Lake Dam
Searsport
Jackson Pit Well
Direct Recharge Area
Talbot Well
Smart Road Well
Swanville
Belfast
Sand & Gravel Aquifer
N
W
E
S
1 in = 2,000 ft
Projection: UTM Zone 19E
Source: Maine OGIS, 2003-2005 2' Orthos
Maine OGIS, Sand & Gravel Aquifers

The BWD currently operates the Jackson Pit Well on a timer at approximately 450 GPM in order to increase pressure along Swan Lake Avenue. The timer is set to run the pump between 5 am and 10 pm. The Smart Road Well is operated intermittently to keep the water storage tanks full. This operation is reflected in the amount of water withdrawn from each well. Even though the Jackson Pit Well has about ½ of the capacity of the Smart Road Well, in the past 10 years, it has supplied over 70% of the total water produced.

Basic information for the existing wells and pumps are in Table No. 2. Information for wells can be found in Exhibit C.

Table No. 2 – Basic Information of Existing Wells & Pumps

Well	Date Installed	Max. Yield (GPM)[1]	Estimated Safe Yield[2]	Pump Model	Size of Well	Depth (Feet)	Screen Interval	Static Water (Feet)
Smart Road	1955	1150	800/600	75 HP Goulds 12 RJHC	24" x 18"	44	29-44	6 +/-
Jackson Pit	1965	600	530	50 HP Goulds 10 MC-6	24" x 18"	51	41-51	12 +/-
Talbot	2005	1200	1200/1000	No Pump	18"	66	95 to 80	20 +/-

[1] Capacity of installed well pumps running alone. Assumes 1200 GPM pump will be installed in Talbot Well.
[2] Estimates for Smart Road and Talbot Well from Jacques Whitford, 1999. Estimate for Jackson pit well derived from 1969 to 1986 average pumping rates. Higher safe yield numbers for Smart Road and Talbot Wells indicate wells operating alone, lower numbers indicate both wells operating together.

As can be seen from the above table, the Smart Road Well by itself has the capacity to meet the current average demand of 543,582 gallons (378 GPM) and the maximum day demand of 719,300 gallons (500 GPM). The Jackson Pit Well, by itself, can also meet current demands but not with much reserve.

TALBOT WELL

The Talbot Well, installed in 2005, has been tested and modeled (Jacques Whitford, 1999) (Caswell, 2005) and has been determined to have a safe yield of 1,200 GPM when operated by itself. The Talbot Well has been shown to interfere with the capacity of the Smart Road Well. The capacity of both wells, operating continuously together, is estimated at 1,600 GPM. Both the Smart Road Well and the Talbot Well could be operated at higher rates for shorter periods of time to meet peak day demand.

With Nordic Aquafarms using water at their maximum contractual rate of 500 GPM, the average demand would increase to 878 GPM (1,264,000 gallons) and the peak day demand would increase to 1,000 GPM (1,440,000). The Jackson Pit Well could not keep up with these demands if there was a failure of the Smart Road Well. It is, therefore, recommended that the Belfast Water District connect the unused Talbot Well to the system. With the Talbot Well on-line, the Water District could continue to meet peak demand with any one of the three wells off-line.

SAFE YIELD

Safe yield can be defined as the amount of water that can be continuously pumped from the aquifer without causing negative effects on the aquifer or adjacent surface water sources. Safe yield is variable as it depends primarily on precipitation which is known to be variable on both a seasonal and year to year basis.

The best available estimate for the safe yield of the Smart Road Well is from the computer modeling of the aquifer (Jacques Whitford, 1999). This ground water model was developed, calibrated and used to run various operational scenarios for the Smart Road and Talbot wells pumping intermittently, continuously, alone and together (Jacques Whitford, 1999). The basis for the calibration of the model was a pumping test run on the Smart Road Well in 1989 (CEH, 1989). The modeling study concluded that the safe yield of the Smart Road Well running by itself is 800 GPM.

The safe yield of the Jackson Pit Well has not been estimated previously. We used an estimate of 530 GPM which is the average rate the well was pumped for the period of 1969 to 1986 when the well was operated nearly continuously.

Using the 800 GPM safe yield capacity as the maximum sustainable yield available from the Smart Road Well and 530 GPM from the Jackson Pit Well allows us to show how it will be possible for BWD to operate reliably and deliver up to 720,000 gallons of water per day to the proposed Nordic Aquafarms facility.

- Safe Yield – 1,915,000 GPD (699 MGY)
- Current Demand – 547,845 GPD (200 MGY)
- Additional NVC Obligation – 40,000 GPD (14.6 MGY)
- Current Reserve Capacity – 1,327,155 GPD (484.4 MGY)

With proposed sale of 262.9 MGY to Nordic Aquafarms, the Belfast Water District will be left with an operating reserve of approximately 221.5 MGY. This is equal to twice their current average daily demand.

With the Talbot Well placed online, the Safe Yield for the three wells combined could increase to an estimated 2,130 GPM or 1,119 MGY. In that case, using the same numbers as above, the Belfast Water District would have a reserve capacity of 641.5 MGY with the proposed sale of 262.8 MGY to Nordic Aquafarms. However, pumping at this rate would require a significant amount of ground water to be induced from the Goose River. This will be discussed more in the next section.

Interference Considerations

Well interference can be defined as the amount of drawdown one pumping well causes on another pumping well. In general, the closer the pumping wells are, the greater the interference there will be.

Under the current operational scenario, using the Smart Road Well and the Jackson Pit Well there is not much, if any interference between these wells because they are slightly over 1 mile apart and on opposite sides of the Goose River. Further the testing done in 1989 (CEH, 1989) indicated that the aquifer may be discontinuous between the two wells.

The Talbot Well, however, is located between the Smart Road Well and the Jackson Pit Well. It is on the same side of the river as the Smart Road Well and approximately 1,700 feet north of it. The aquifer has been proven by test drilling and pumping tests to be continuous between the Talbot and Smart Road Wells (CEH, 1989).

The ground water model and report (Jacques Whitford, 1999) conclude that the Talbot and Smart Road wells do interfere with each other and if they were to be pumped together, the well yields from the individual wells would be less than the sum of their capacities when pumping alone.

Subsequently to the ground water model being developed, an 8-inch diameter test well was installed at the Talbot Well site and a 3-day duration pumping test was run at 475 GPM. (Caswell, 2005). This pumping test indicates no interference with the Smart Road Well at that pumping rate and duration.

The 18 inch diameter Talbot Well was also installed in 2005 and a 24-hour pumping test at 1,242 GPM was run on that well (Caswell, 2005). Apparently, the Smart Road Well was operated during the pumping test and produced about 0.7 feet of drawdown in the Talbot Well, proving that the two wells will interfere with each other if pumped at a high enough rate for a sufficient period of time.

There is no information available regarding the potential for interference between the Talbot/Smart Road Wells and the Jackson Pit Well on the other side of Goose River. There may be no interference if the aquifer is discontinuous as suggested by previous investigations. When the Talbot Well is brought on-line, the District should monitor pumping rates and drawdowns to both confirm the magnitude of the modeled interference between the Talbot and Smart Wells and determine, in turn, if they interfere with the Jackson Road Well.

RECHARGE CONSIDERATIONS

The potential sources of recharge to the Goose River Aquifer include:

- Rainfall directly on the sand & gravel directly above the aquifer
- Rainfall on the uplands that drain to the aquifer
- Induced infiltration from Goose River into the aquifer

The conclusions reached by the previous investigators of this aquifer (CEH, 1989, Jacques Whitford, 1999, Caswell, 2005) indicate that a large portion of the water derived from the Goose River Aquifer is from induced infiltration. Induced infiltration can occur when a pumping well lowers the water beneath a stream bed enough to allow the stream water to flow into the aquifer. Most high yield gravel wells in Maine are located in areas that have the potential for induced infiltration, as it assures sustainable yields.

Keith Pooler (personal communication, 2018) indicated that the Water District measures stream flow in the Goose River at the outlet dam on Swan Lake and also at a location downstream of the wells. He reports that under most circumstances, that flow in the Goose River is greater downstream of the wells than it is at the dam. This indicates that most of the time, at current pumping rates, the wells are not deriving much water from induced recharge.

However, this might not be the case as pumping is increased from this aquifer in the future. In order to estimate the available ground water recharge, we delineated the direct recharge area to the aquifer as shown on Figure No. 2. The direct recharge area was truncated at the Swan Lake Dam as most of the ground water recharge in the upper part of the drainage basin will eventually enter Swan Lake and pass by the aquifer as surface water flow in the Goose River.

The direct recharge area to the aquifer comprises approximately 3,888 acres (6 square miles). Of that area, 203 acres is sand and gravel with the remainder being predominantly glacial till and fine grained glacio-marine sediments.

We obtained monthly precipitation records for Belfast Maine from 1960 to 2018 from the National Weather Service, Belfast Station (NOAA, 2018). The records indicate an average annual precipitation of 49.3 inches. On sand & gravel, approximately 50% of annual precipitation will recharge ground water. On glacial till and glacio-marine soils, approximately 15% of annual precipitation will recharge the ground water. This amounts to 24.65 inches of recharge on the sand and gravel and 7.4 inches of recharge on the remaining soils in the direct recharge area. Summing up the amount of available recharge provides an estimate of 876.3 MGY (1,667 GPM) which is actually in excess of the current estimated safe yield of the Smart Road and Jackson Pit wells.

This mass-balance analysis does indicate that if the Talbot Well were brought on-line and the aquifer were pumped by all three wells at the estimated safe yield of 1,119 MGY, a significant amount of water (462 GPM) would need to be induced from the Goose River to maintain that pumping rate.

Flow in the Goose River is controlled at the Swan Lake Dam by the operators, Goose River Hydro. The Federal Energy Regulatory Commission (FERC) license for this facility has a mandatory low flow of 5 cubic feet per second (2,244 GPM). This is the minimum amount of flow that must be released from Swan Lake at all times (FERC, 1980). This indicates that under conditions of maximum pumpage and low flow in the Goose River, 20% of the river flow could be induced into the aquifer.

Drought Considerations

The last condition which should be considered when evaluating the sustainability of a water source is drought conditions. For the purposes of this discussion, we are defining drought as 75% of average annual precipitation. Using that criteria, the precipitation records from 1960 to the present indicate the following drought periods:

- 1964 to 1965
- 1971
- 1978
- 2001

2001 marks the lowest year of precipitation with only 27.16 inches of precipitation (55% of normal) recorded. The drought year mass balance recharge analysis indicates that the available recharge in 2001 amounted to 482.5 MGY (918 GPM). Under those worse case circumstances, pumping at sustained high rates would cause more induced infiltration from the Goose River. Under the maximum estimated sustained yield of 1,110 MGY (2,130 GPM), the wells would need to induce 1,212 GPM from the Goose River or about 54% of required minimum base flow of 2,244 GPM (5 cubic feet per second (CFS).

Conclusion

The information presented in this report indicates that the Belfast Water District has the capacity to supply up to 262.9 MGY of water to Nordic Aquafarms, especially if the Talbot Well is brought on-line as recommended. In addition, the Belfast Water District will maintain an adequate reserve quantity of water for future growth, contractual obligations and emergency situations.

Disclaimer

This report relies primarily on the work of others. A.E. Hodsdon Engineers (AEH) did not independently verify this information. Unless there was actual knowledge of incorrect information or it was obvious that certain information was incorrect based on other information obtained or otherwise actually known to AEH, the information presented is presumed accurate.

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APPENDIX

Exhibit A – Water System Map

Exhibit B – Excerpt from PUC Reports and Belfast Water Use Records

Exhibit C – Production Well Information

- C1 – Smart Road Well
- C2 – Jackson Pit Well
- C3 – Talbot Well

Exhibit D – Pumping Test Data

- D1 – Smart Road Well Pumping Test Data (Caswell, Eichler & Hill, Inc. (CEH), 1989)
- D2 – Jackson Pit Well Pumping Test Data (R.E. Chapman, 1965)
- D3 – Talbot Well Pumping Test Data (Caswell, 2005)

Exhibit

A

Capacity Evaluation for the Belfast Water District, Belfast, Maine

A. Water System Map


Belfast
Belfast Bay
Northport
Legend
Town Lines
Water Mains
4" and Under
Dia.
6
8
10
12
14
Valve
Hydrant
Meter Pit
Note: Water system information provided by Belfast Water District.
0 0.05 0.1 0.2 0.3 0.4
Miles
N
CONFIDENTIAL
Belfast Water District
Belfast, Maine
Infrastructure Map 1 of 2
December 2010
DIRIGO ENGINEERING


Belfast
Swanville
Searsport
Belfast Bay
Legend
Town Lines
Water Mains
4" and Under
Dia.
6
8
10
12
14
Valve
Hydrant
Meter Pit
CONFIDENTIAL
Note: Water system information provided by Belfast Water District.
0 0.05 0.1 0.2 0.3 0.4 Miles
N
Belfast Water District
Belfast, Maine
Infrastructure Map 2 of 2
December 2010
DIRIGO ENGINEERING

Exhibit

B

Capacity Evaluation for the Belfast Water District, Belfast, Maine

B. Excerpts from PUC Reports and Belfast Water Use Records

TOTAL GALLONS PUMPED PER YEAR

YEAR	TOTAL PUMPED ALL SOURCES	SMART ROAD	JACKSON PIT	LITTLE RIVER STATION	
1969	682,221,860	248,972,160	343,926,400	89,323,300	
1970	680,053,732	282,253,100	314,172,344	83,628,288	
1971	587,394,100	239,218,700	272,525,100	75,650,300	
1972	597,158,600	232,771,700	290,754,000	73,632,900	
1973	588,747,800	246,476,100	276,053,600	66,218,100	
1974	586,561,100	227,078,200	291,145,200	68,337,700	
1975	550,891,900	197,282,000	280,930,400	72,679,500	
1976	585,369,800	232,007,400	282,619,500	70,742,900	
1977	621,786,300	277,595,800	278,292,200	65,898,300	
1978	611,698,800	288,795,500	278,397,200	44,506,100	
1979	580,008,300	269,969,400	246,330,500	63,708,400	
1980	435,766,600	204,130,900	223,851,300	7,784,400	(MAPLEWOOD CLOSED)
1981	446,662,200	214,466,400	232,195,800		
1982	519,439,300	236,056,700	283,382,600		
1983	483,880,900	204,288,900	279,592,000		
1984	446,122,805	152,063,705	294,059,100		
1985	442,616,820	169,528,100	273,088,720		
1986	435,627,300	181,576,200	254,051,100		
1987	410,723,378	164,455,670	246,267,708		
1988	264,444,450	63,095,060	201,349,390		(PENOBSCOT POULTRY CLOSED 11/88)
1989	253,935,490	56,900,700	197,034,790		
1990	254,528,200	57,951,900	196,576,300		
1991	266,907,500	75,149,200	191,758,300		
1992	270,610,500	72,363,400	198,247,100		
1993	299,340,300	104,131,700	195,208,600		
1994	314,847,300	112,695,200	202,152,100		
1995	321,246,700	129,613,800	191,632,900		
1996	303,158,366	132,276,500	170,881,866		
1997	329,425,900	145,262,800	184,163,100		
1998	311,863,900	122,823,700	189,040,200		
1999	344,555,700	171,973,400	172,582,300		
2000	319,447,900	131,475,700	187,972,200		
2001	339,661,323	172,988,320	166,673,003		(STINSON SEAFOOD CLOSED AUG 01)
2002	291,411,122	120,859,522	170,551,600		(LEAK DETECTION SURVEY AUG 02)
2003	290,452,500	107,681,500	182,771,000		
2004	278,214,400	105,729,600	172,484,800		
2005	249,811,800	99,579,400	150,232,400		(MBNA - IRRIG./PEN FROZ FD-NEW OWNERS)
2006	213,049,000	31,182,900	181,866,100		
2007	215,759,900	43,162,900	172,597,000		
2008	211,904,600	43,570,200	168,334,400		(RECESSION YR & USAGE DECREASED W/OTHER UTILITIES)
2009	234,517,400	68,990,300	165,527,100		
2010	249,055,800	50,148,000	198,907,800		
2011	220,394,100	60,294,400	160,099,700		(CUSTOMER USAGE DOWN & LEAKS DETECTED)
2012	194,865,600	35,213,900	159,651,700		(LEAKS DETECTED)
2013	191,728,200	53,943,900	137,784,300		PEN MCCRUM PRODUCTION DECREASED,IRRIGATION,CONSERVATION
2014	204,869,385	64,948,100	139,921,285		
2015	204,988,400	88,736,800	116,251,600		
2016	198,951,100	76,438,800	120,512,300		
2017	200,999,200	60,284,500	140,714,700		
	0				
TOTAL	18,137,677,631	6,930,452,737	10,425,114,706	782,110,188	
	TOTALS	SMART RD	JACKSON PIT	LITTLE RIVER	

SMART	2,493,447,900		
JACKSON	2,811,220,044		
			avg 10 yrs in 70's
	5,304,667,944		530,466,794

SMART	604,568,900		
JACKSON	1,507,704,885	avg 10 yrs in 2008-2017	
	2,112,273,785		211,227,379

MONTHLY/PUMPING/PUMPED YEAR

TOTAL GALLONS PUMPED PER YEAR

YEAR	TOTAL PUMPED ALL SOURCES	SMART ROAD	JACKSON PIT	LITTLE RIVER STATION		SMART RD & J.P.	YEAR
1969	682,221,860	248,972,160	343,926,400	89,323,300		592,898,560	1969
1970	680,053,732	282,253,100	314,172,344	83,628,288		596,425,444	1970
1971	587,394,100	239,218,700	272,525,100	75,650,300		511,743,800	1971
1972	597,158,600	232,771,700	290,754,000	73,632,900		523,525,700	1972
1973	588,747,800	246,476,100	276,053,600	66,218,100		522,529,700	1973
1974	586,561,100	227,078,200	291,145,200	68,337,700		518,223,400	1974
1975	550,891,900	197,282,000	280,930,400	72,679,500		478,212,400	1975
1976	585,369,800	232,007,400	282,619,500	70,742,900		514,626,900	1976
1977	621,786,300	277,595,800	278,292,200	65,898,300		555,888,000	1977
1978	611,698,800	288,795,500	278,397,200	44,506,100		567,192,700	1978
1979	580,008,300	269,969,400	246,330,500	63,708,400		516,299,900	1979
1980	435,766,600	204,130,900	223,851,300	7,784,400	(MAPLEWOOD CLOSED)	427,982,200	1980
1981	446,662,200	214,466,400	232,195,800			446,662,200	1981
1982	519,439,300	236,056,700	283,382,600			519,439,300	1982
1983	483,880,900	204,288,900	279,592,000			483,880,900	1983
1984	446,122,805	152,063,705	294,059,100			446,122,805	1984
1985	442,616,820	169,528,100	273,088,720			442,616,820	1985
1986	435,627,300	181,576,200	254,051,100			435,627,300	1986
1987	410,723,378	164,455,670	246,267,708			410,723,378	1987
1988	264,444,450	63,095,060	201,349,390	(PENOBSCOT POULTRY CLOSED 11/88)		264,444,450	1988
1989	253,935,490	56,900,700	197,034,790			253,935,490	1989
1990	254,528,200	57,951,900	196,576,300			254,528,200	1990
1991	266,907,500	75,149,200	191,758,300			266,907,500	1991
1992	270,610,500	72,363,400	198,247,100			270,610,500	1992
1993	299,340,300	104,131,700	195,208,600			299,340,300	1993
1994	314,847,300	112,695,200	202,152,100			314,847,300	1994
1995	321,246,700	129,613,800	191,632,900			321,246,700	1995
1996	303,158,366	132,276,500	170,881,866			303,158,366	1996
1997	329,425,900	145,262,800	184,163,100			329,425,900	1997
1998	311,863,900	122,823,700	189,040,200			311,863,900	1998
1999	344,555,700	171,973,400	172,582,300			344,555,700	1999
2000	319,447,900	131,475,700	187,972,200			319,447,900	2000
2001	339,661,323	172,988,320	166,673,003	(STINSON SEAFOOD CLOSED AUG 01)		339,661,323	2001
2002	291,411,122	120,859,522	170,551,600	(LEAK DETECTION SURVEY AUG 02)		291,411,122	2002
2003	290,452,500	107,681,500	182,771,000			290,452,500	2003
2004	278,214,400	105,729,600	172,484,800			278,214,400	2004
2005	249,811,800	99,579,400	150,232,400	(MBNA - IRRIG./PEN FROZ FD-NEW OWNERS)		249,811,800	2005
2006	213,049,000	31,182,900	181,866,100			213,049,000	2006
2007	215,759,900	43,162,900	172,597,000			215,759,900	2007
2008	211,904,600	43,570,200	168,334,400	(RECESSION YR & USAGE DECREASED W/OTHER UTILITIES)		211,904,600	2008
2009	234,517,400	68,990,300	165,527,100			234,517,400	2009
2010	249,055,800	50,148,000	198,907,800			249,055,800	2010
2011	220,394,100	60,294,400	160,099,700	(CUSTOMER USAGE DOWN & LEAKS DETECTED)		220,394,100	2011
2012	194,865,600	35,213,900	159,651,700	(LEAKS DETECTED)		194,865,600	2012
2013	191,728,200	53,943,900	137,784,300	PEN MCCRUM PRODUCTION DECREASED,IRRIGAT		191,728,200	2013
2014	204,869,385	64,948,100	139,921,285			204,869,385	2014
2015	204,988,400	88,736,800	116,251,600			204,988,400	2015
2016	198,951,100	78,438,800	120,512,300			198,951,100	2016
2017	200,999,200	60,284,500	140,714,700			200,999,200	2017
2018							2018
2019							2019
2020							2020
	0						
TOTAL	18,137,677,631	6,930,452,737	10,425,114,706	782,110,188		17,355,567,443	
	TOTALS	SMART RD	JACKSON PIT	LITTLE RIVER			

MONTHLY/PUMPING/PUMPED YEAR

TOTAL GALLONS PUMPED PER YEAR

YEAR	TOTAL PUMPED ALL SOURCES	SMART ROAD	JACKSON PIT	
1969	592,898,560	248,972,160	343,926,400	
1970	596,425,444	282,253,100	314,172,344	
1971	511,743,800	239,218,700	272,525,100	
1972	523,525,700	232,771,700	290,754,000	
1973	522,529,700	246,476,100	276,053,600	
1974	518,223,400	227,078,200	291,145,200	
1975	478,212,400	197,282,000	280,930,400	
1976	514,626,900	232,007,400	282,619,500	
1977	555,888,000	277,595,800	278,292,200	
1978	567,192,700	288,795,500	278,397,200	
1979	516,299,900	269,969,400	246,330,500	
1980	427,982,200	204,130,900	223,851,300	(MAPLEWOOD CLOSED)
1981	446,662,200	214,466,400	232,195,800	
1982	519,439,300	236,056,700	283,382,600	
1983	483,880,900	204,288,900	279,592,000	
1984	446,122,805	152,063,705	294,059,100	
1985	442,616,820	169,528,100	273,088,720	
1986	435,627,300	181,576,200	254,051,100	
1987	410,723,378	164,455,670	246,267,708	
1988	264,444,450	63,095,060	201,349,390	(PENOBSCOT POULTRY CLOSED 11/88)
1989	253,935,490	56,900,700	197,034,790	
1990	254,528,200	57,951,900	196,576,300	
1991	266,907,500	75,149,200	191,758,300	
1992	270.610,500	72.363,400	198,247,100	
1993	299,340,300	104,131,700	195,208,600	
1994	314,647,300	112,695,200	202,152,100	
1995	321,246,700	129,613,800	191,632,900	
1996	303,158,366	132,276,500	170,881,866	
1997	329,425,900	145,262,800	184,163,100	
1998	311,863,900	122,823,700	189,040,200	
1999	344,555,700	171,973,400	172,582,300	
2000	319,447,900	131,475,700	187,972,200	
2001	339,661,323	172,988,320	166,673,003	(STINSON SEAFOOD CLOSED AUG 01)
2002	291,411,122	120,859,522	170,551,600	(LEAK DETECTION SURVEY AUG 02)
2003	290,452,500	107,681,500	182,771,000	
2004	278,214,400	105,729,600	172,484,800	
2005	249,811,800	99,579,400	150,232,400	(MBNA - IRRIG./PEN FROZ FD-NEW OWNERS)
2006	213,049,000	31,182,900	181,866,100	
2007	215,759,900	43,162,900	172,597,000	
2008	211,904,600	43,570,200	168,334,400	(RECESSION YR & USAGE DECREASED W/OTHER UTILITIES)
2009	234,517,400	68,990,300	165,527,100	
2010	249,055,800	50,148,000	198,907,800	
2011	220,394,100	60,294,400	160,099,700	(CUSTOMER USAGE DOWN & LEAKS DETECTED)
2012	194,865,600	35,213,900	159,651,700	(LEAKS DETECTED)
2013	191,728,200	53,943,900	137,784,300	PEN MCCRUM PRODUCTION DECREASED,IRRIGATION,CONSERVATION
2014	204,869,385	64,948,100	139,921,285	
2015	204,988,400	88,736,800	116,251,600	
2016	198,951,100	78,438,800	120,512,300	
2017	200,999,200	60,284,500	140,714,700	
2018				
2019				
2020				
	0			
TOTAL	17,355,567,443	6,930,452,737	10,425,114,706	
	TOTALS	SMART RD	JACKSON PIT	

MONTHLY/PUMPING/PUMPED YEAR

Utility Name: Belfast Water District Year of Report: December 31, 2016

WATER PRODUCTION AND CONSUMPTION

1. Show quantities of water produced and purchased and the quantities delivered to consumers and lost or unaccounted for during the year. Where estimates are used, the basis thereof should be set forth in a footnote.

Line Number	Month	Thousand Gallons Delivered to Mains				
		Purchased	Groundwater		Surface Water	
			By Pumping	By Gravity	By Pumping	By Gravity
	(a)	(b)	(c)	(d)	(e)	(f)
1	January		13,176,900			
2	February		13,384,300			
3	March		13,621,800			
4	April		13,939,900			
5	May		17,074,100			
6	June		19,841,600			
7	July		21,422,900			
8	August		22,687,500			
9	September		17,698,800			
10	October		16,258,600			
11	November		14,313,800			
12	December		15,530,900			
13	Totals	0	198,951,100	0	0	0

14					THOUSAND GALLONS
15	Total PRODUCTION WATER				198,951,100
16					
17	Total REVENUE WATER (Page W-3, line 20, col. e) or	168,430			168,429,397
18					
19	Balance as NON-REVENUE WATER	**State Percentage:**	15.34%		30,521,703
20					
21	**Description and estimated consumption of Non-Revenue Water**				
22	Utility Usage-at source/treatment plants: ANALYZERS	Jackson Pit & Smart Rd.			1333050
23	Utility Usage-flushing hydrants	Number flushed:	252		209500
24	Utility Usage-bleeders	Number in use:	1		281850
25	Utility Usage-meter bench	Number meters tested:	0		
26	Utility Usage-other purposes (specify):				
27	FLUSHING MAINS: ANNUAL MAINTENANCE				227850
28	FLOW TESTS				4500
29	SEWER MAINS/SWEEPING - PUBLIC WORKS				275000
30	Fire Protection	Number of hydrant-using fires:	3		550000
31	Main Breaks	Number of breaks:	8		3895000
32	Service Line losses before meters	Number of cases:	9		2567036
33	Other Non-Revenue uses/losses (specify):				
34	FLUSH WELLS Jackson Pit Station 12,000 and Smart Rd Station 76,000				88000
35	FLUSH MAINS: Front Street Phase II Project: 309,000, Mayo Street: 13,000, Washington Street: 16,000				338000
36	Total Accounted for Non-Revenue Water (Lines 22 through Lines 35)				9769786
37	Unaccounted for Non-Revenue Water				20751917
38	Unaccounted for Non-Revenue Water **(State Percentage)**				10%
39					
40					

41	**System DEMAND Data**	Quantity (mgd)	Date
42	Average Daily Demand:	543582	
43	Maximum Day Demand:	719300	9/23/2016
44	Peak Hour Demand:	29971	

Remarks Note: Non-revenue water is water that was produced and used but did not produce water revenues; unaccounted for water is a subset of this.

Utility Name: Belfast Water District | Year of Report: December 31, 2016

CONSUMER'S METERS

1. Show the requested information concerning consumers' meters in service or in stock during the year.

Line Number	Size, in.	Number of Meters in Service				Number in Stock at End of Year	Number Purchased During Year	Number Condemned or Sold during Year
		Beginning Year	Installed During Year	Removed During Year	End of Year			
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	Owned by Respondent							
2	5/8	1556	284	269	1571	195	430	269
3	3/4	39	3	4	38	3	0	4
4	1	142	35	32	145	10	22	32
5	1 1/2	36	2	2	36	1	2	2
6	2	67	6	6	67	1	4	6
7	3	9	1	1	9	1	2	1
8	4	5	0	0	5	0	0	0
9	6	2	0	0	2	0	0	0
10								
11								
12								
13								
14								
15								
16								
17	Total	1856	331	314	1873	211	459	314
18	Owned by Consumers							
19	3/4	3			3			
20	2	7			7			
21	3	3			3			
22	4	1			1			
23								
24								
25								
26								
27	Total	14			14			

Exhibit

C

Capacity Evaluation for the Belfast Water District, Belfast, Maine

C. Production Well Information

C1 – Smart Road Well
C2 – Jackson Pit Well
C3 – Talbot Well

Exhibit

C1

Capacity Evaluation for the Belfast Water District, Belfast, Maine

C1. Smart Road Well

Belfast Water Department, Belfast, Maine

F. A. Sullivan - 9/12/55 - 9/16/55 — 24" x 18" gravel packed well

0-5 clay and sand; 5-20 medium sand; 20-42 coarse gravel; 42-45 dirty gravel; 45 ledge; 15' of 18" (5' of 150 slot and 10' of 180 slot) Everdur screen exposed. Left in 32' of 18" pipe, pulled out all 24" pipe.

Bottom of screen set @ 42' from ground level.
Static from top of pipe 2'2".
Pipe above ground 6".
Drawdown 8'2", pumping 1500 gpm from top of pipe.
Added 5' of pipe to top of well after pump test was over, making total depth of well 47'6".

2984/55

S.R. well

9/14/55

R. E. CHAPMAN CO.

OAKDALE, MASS.

S.R. well

Name of Driller F. A. SULLIVAN Names of Helpers O. M. PATTERSON F. G. SULLIVAN

Name & Location CITY OF BELFAST MAINE ON ACORN PROPERTY

Date Started 9/12/55 Date Finished 9/14/55

Hole No. 24"X18" #1

Depth From	Depth To	Classification of Material
0'	5'	CLAY & SAND
5'	20'	MEDIUM SAND
20'	42'	COURSE GRAVEL
42'	45'	DIRTY GRAVEL
45'		LEDGE

Feet of Screen Exposed: 15' OF 18" EUEDUR

Size of Screen & Slot: 5' OF 150 / 10' OF 180

Screen Left in: 15' EUEDUR WITH CONE FITTING & BOTTOM

Screen Pulled Out: NO

Pipe Left in: 32' OF 18"

Pipe Pulled Out: ALL 24" PIPE

Remarks

Date Started Date Finished

Hole No.

Depth From	Depth To	Classification of Material

Feet of Screen Exposed

Size of Screen & Slot

Screen Left in

Screen Pulled Out

Pipe Left in

Pipe Pulled Out

Remarks

Pump Test on Hole No.

Date	Time	Dr. Down	G. P. M.	Static and Other Info.
BOTTOM OF SCREEN SET AT 42' FROM GROUND LEVEL				
STATIC FROM TOP OF PIPE 2'-2"				
PIPE ABOVE GROUND 6"				
D.D. 8'-2"	PUMPING 1500 G.P.M. FROM TOP OF PIPE			
ADDED 5'-0" OF PIPE TO TOP OF WELL AFTER PUMP TEST WAS OVER. MAKING TOTAL DEPTH OF WELL 47'-6"				

Pump Test on Hole No.

Date	Time	Dr. Down	G. P. M.	Static and Other In

DENIS L. MAHER CO.
WELL DRILLING & PUMP SERVICES

January 22, 2013

RECEIVED
JAN 25 2013
BELFAST WATER DISTRICT

Belfast Water District
285 Northport Avenue
P.O. Box 506
Belfast, ME 04915-0506

Attn: Keith Pooler
Tel: 207-338-1200
Fax: 207-338-0444
keith@belfastwater.org

Smart Rd well

RE: 18" Gravel Well

Keith,

On December 10, 2012 we began the redevelopment of your 18" gravel well. It was tested at the beginning of the project at 674 GPM with a drawdown of 0.6' or a specific capacity of 1123 GPM/ft.

One hundred ten (110) gallons of 22° Baume 35% Muriatic Acid was injected along with 2.5 gallons of NW-220. The acid was neutralized with Soda Ash. A total of 40 machine hours resulted in a 21% increase in specific capacity.

This is an 18" well with an 18" telescope screen with an I.D. of 14.8". The mild steel bolts on the bowl assembly were replaced with stainless steel. The column was replaced along with one shaft coupling. The head shaft was replaced and the combination right angle gear shaft was cut and rethreaded to 37 ¼" for the motor shaft.

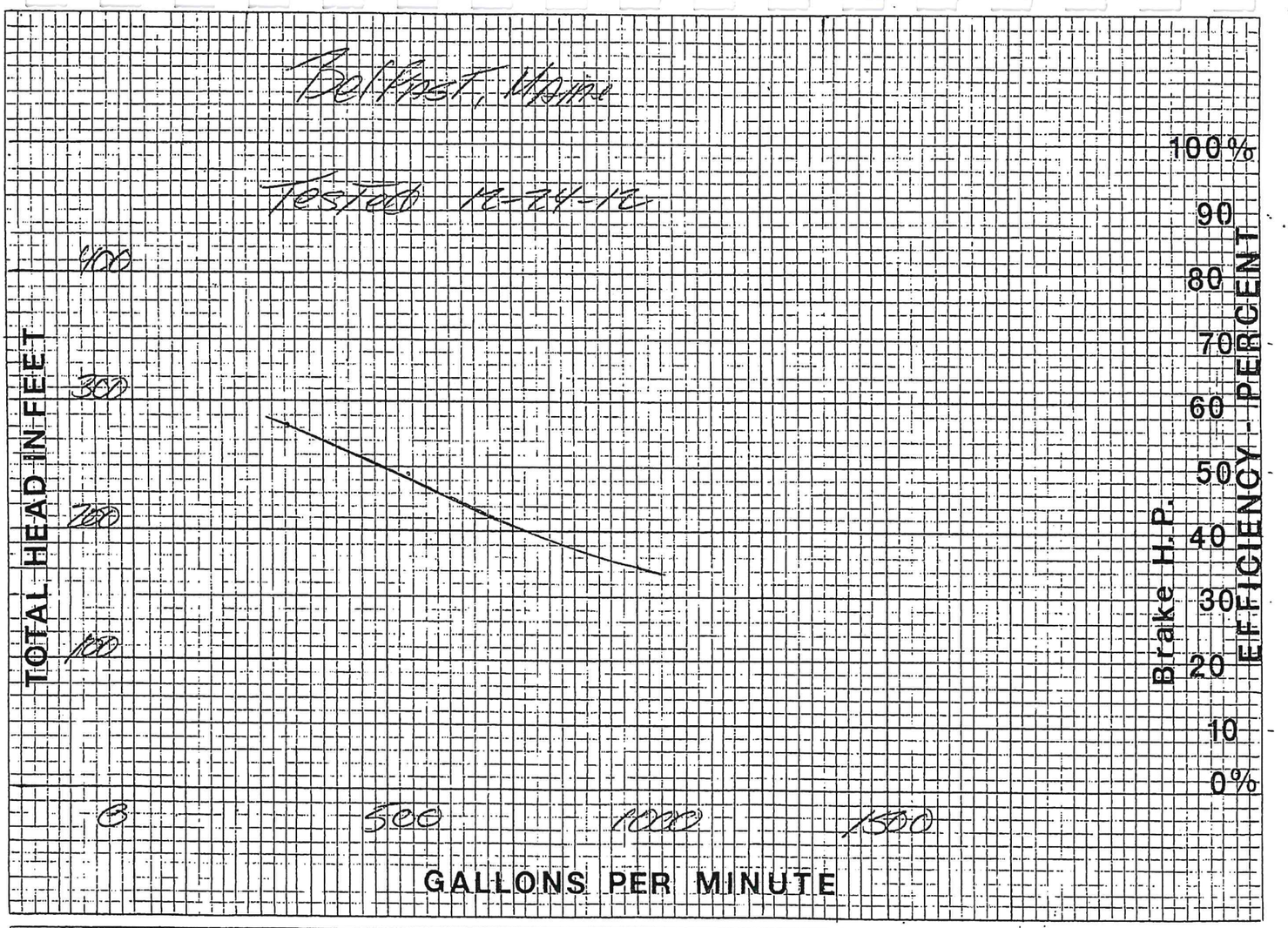
Attached is the performance curve and well development record.

If you need anything else please let us know.

Very truly yours,
Denis L. Maher Company

Denis L. Maher
President

Denis L. Maher Company, LLC
www. DenisLMaher.com
DLMaher@DenisLMaher.com
615-4606; Fax. 978-615-4607
19 Westford Rd., PO Box 130
Ayer, MA 01432-0130



Goulds 12AJMV	4519	Serial 881386				75HP US MOTOR Serial JJ133A-7A082185 A092M

DENIS L. MAHER CO.
WELL DRILLING & PUMP SERVICES

WELL REDEVELOPMENT RECORD

Job Name/Number: Belfast, Maine

Date Started: 12/10/17

Owner's Representative: Keith Pooler

Well Number: 18

Well Size: 18 Depth: 44' Screen Length: 15 Type: Tele

Static Water Level: 6 Static After Treatment: 6

Depth of Well Before: 44 After: 44

Original Specific Capacity: _____ @ _____ GPM

Rating Well Before @ 674 GPM with 0.6' Drawdown
= 1123 GPM/Foot of Drawdown

Chemicals Used: 100 gallon Muriatic Acid 2.5 gallons NW-220

Description of Surge Line: HV con 3 block 2, 7 + 12' 100' Sch 80 PVC

Rating Well After @ 680 GPM with 5 Drawdown
= 1360 GPM/Foot of Drawdown

Hours to Mob & Demob (with setup and down): 10

Hours Removing & Resetting Owner's Pump: _____

Type/Condition: _____

Hours Installing and Removing Surge Pump: 4

Hours Adding Chemicals: 1 Hours Surging: 40

Was Pump Reconditioned Before Reinstalling: _____

Remarks: _____

Name of Driller: S. Kelley/H Name of Helper _____

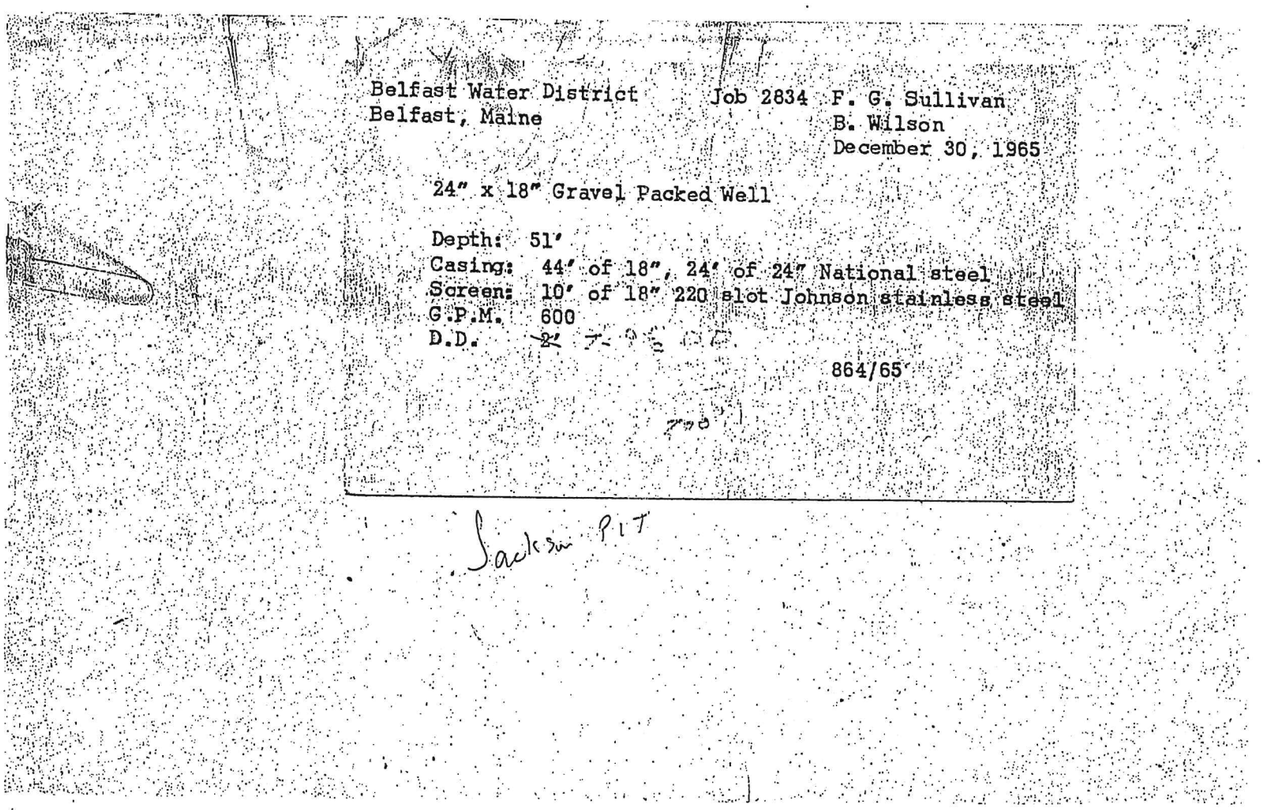
Denis L. Maher Company, LLC
www. DenisLMaher.com
DLMaher@DenisLMaher.com

Tel. 978-615-4606; Fax. 978-615-4607
7 Sculley Rd., PO Box 130
Ayer, MA 01432-0130

Exhibit
C2

Capacity Evaluation for the Belfast Water District, Belfast, Maine

C2. Jackson Pit Well



Belfast Water District
Belfast, Maine

Job 2834

F. G. Sullivan
B. Wilson
December 30, 1965

24" x 18" Gravel Packed Well

Depth: 51'
Casing: 44' of 18", 24' of 24" National steel
Screen: 10' of 18" 220 slot Johnson stainless steel
G.P.M. 600
D.D. ~~2"~~ 7-9-65

864/65

Jackson Pit

R. E. CHAPMAN CO.

OAKDALE, MASS.

DEC 31 1965

Name of Driller F. G. SULLIVAN Names of Helpers B. WILSON

Job: Name & Location TOWN OF BELFAST, ME. JACKSONS PIT SWANVILLE

Date Started 23 NOV 65 Date Finished 7 DEC. 65

Hole No. 2 - 24" X 18" GRAVEL PACK AT #24 OBS.

Depth From	Depth To	Classification of Material
0'		BROWN CLAY +
	10'	GRAVEL
10'	20	GRAY CLYED
20'	31'	GRAVEL
31'	40'	COURSE GRAY
40'	50½"	GRAVEL

Feet of Screen Exposed: 10' - 220 SLOT

Size of Screen & Slot: 18" - 10' - 220 SLOT

Screen Left in: 10' - 18" - 220

Screen Pulled Out: —

Pipe Left in: 18" — 44' - 24" — 24' FT.

Pipe Pulled Out: 28' OF 24"

Remarks: BOTTOM OF WELL 24" X 18" 51' BELOW PRESENT GROUND LEVEL

Date Started Date Finished

Hole No.

Depth From	Depth To	Classification of Material

Feet of Screen Exposed

Size of Screen & Slot

Screen Left in

Screen Pulled Out

Pipe Left in

Pipe Pulled Out

Remarks

Pump Test on Hole No.

Date	Time	Dr. Down	G. P. M.	Static and Other Info.
2 DEC. 65		PUMP + SURGE AT	425	GPM WITH 1'-2" D.D. IN WELL
				7" D.D. IN OBS. #24 - 3' N/A
3 DEC 65		PUMP + SURGE AFTER 20 HRS.		PUMP 425 GPM
		WITH 1' D.D. IN WELL		7" D.D. IN OBS
SET 40' OF 7" TURBIN ELECTRIC FOR TEMPERARY USE				
		AT 600 G.P.M.		

Pump Test on Hole No.

Date	Time	Dr. Down	G. P. M.	Static and Other Info.

R.E. Chapman Company
30 North Main Street
West Boylston, MA 01583

(508) 835-6231

Invoice:

Sold to

Belfast Water District
Route 1
PO Box 506
Belfast, ME 04915

Ship to

Jackson Pit Well Rehab
Route 141
Belfast, ME

Account	P.O. Num	Ship Via	Ship Date	Terms	Invoice Date	Page
BELFAST				Net 30	06/03/2005	1

Request for payment for providing labor, equipment and materials and supplies as noted below and for performing work operations on the Jackson Pit Well as noted:

Item	Quantity	Description	Unit Price	Extended Price
	1	Item #1: Mobilization/demobilization of equipment, materials and supplies to and from job site, lump sum	2500.00	2,500.00*
	1	Item #2: For 42 hours of on the job time for work operations involved with rehabilitation of the Jackson Pit Well at $1,600.00 per 8-hour day for labor, equipment, supplies and per diem	8400.00	8,400.00*

Only time I've Has been rehabbed Since 1965

VENDOR # 176
AMOUNT $ 10,900.00
ACCT. NO. 188-20
APPROVAL FOR PAYMENT [illegible]
DATE PAID 6/3/05
CHECK NO. 113711

* means item is non-taxable

Subtotal	10,900.00
Total	$10,900.00

LOG OF WELL REHABILITATION
R. E. CHAPMAN COMPANY

Date Started: May 19, 2005

Date Finished: May 27, 2005

Name & Address of Job: Town of Belfast, Maine

Customer's representative in charge of this work: Harry Smith

Well number & location: #1 - Jackson Pit

Well installed originally by: R. E. Chapman Company in 1965

Type of work to be done: Redevelopment

Name of Driller: Chris Johnson

Depth of well: 54' TOP

Length of Screen: 10'

Size of well: 18" x 24"

Original GPM: 425 with 1'2" feet of drawdown from top of pipe

Original static water level:

Static before treatment:	4.97'
Depth of well before treatment:	54'
Drawdown after treatment:	8'
Capacity of well before treatment:	315 gpm
Specific capacity of well before treatment:	39.37 gpm/ft-DD
Kind of treatment used:	Pump and surge, dead surge
Amount of treatment used:	
Capacity of well after treatment:	455 gpm
Drawdown after treatment:	.87'
Specific capacity of well after treatment:	522.98 gpm/ft-DD
Static water level after treatment:	4.85'

Type and condition of pump: Very good

Hours moving to and from job:

Hours removing and resetting pump: 4 hours

Hours surging and installing and removing surge pump: 24 hours

Condition of well on completion of work: Very good

Was pump reconditioned before reinstalling: Hung from calfline and reinstalled

Remarks: Good access - 15' roof hatch is 6' - 7' from edge of building, but had to take down fence around pump station

Signature of driller: Chris Johnson

Town of Belfast
Jackson Pit Well
Clean Rehabilitation
Work Activities
May, 2005

By R. E. Chapman Company

Date	Work Activities	Hours
Thursday May 19, 2005	Mobilize and arrive at Belfast job site at 1:30 PM Started to dismantle existing vertical turbine pump for removal, set up rig - stopped at 4:30 PM Note: Problem with chemical feed buildup in pipeline from pump station - could not fully close shutoff valve to isolate pump station - District personnel to correct problem for Monday AM	3
Monday May 23, 2005	Arrived on site at 10:30 AM, finish unbolting and removing pumping equipment from well, installed surge development apparatus in the well - stopped at 5:00 PM	6.5
Tuesday May 24, 2005	Arrived on site at 6:30 AM, initial rating on well SWL = 4.97' PWL = 12.97' DD = 8' Pumping Rate = 315 gpm Specific Capacity = 39.4 gpm/ft-DD Pump and surge development operations on well and rate well in PM SWL = 4.97' PWL = 6.98' DD = 2.01' Pumping Rate = 380 gpm Specific Capacity = 189.05 gpm/ft-DD (480% IMPROVEMENT!!) Stopped at 5:30 PM	11.0
Wednesday May 25, 2005	Arrived on site at 7:00 AM, decided no need to utilize chemicals - continue pumping and surging development operations on well - rate well SWL = 4.85' PWL = 5.72' DD = 0.87' Pumping Rate = 440 gpm Specific Capacity = 523 gpm/ft-DD (1300% IMPROVEMENT!!) Stopped at 5:30 PM	10.5

Town of Belfast
Jackson Pit Well
Clean Rehabilitation
Work Activities
May, 2005

By R. E. Chapman Company

Date	Work Activities	Hours
Thursday May 26, 2005	Arrived on site at 7:00 AM, remove surge development apparatus from well - reinstall vertical turbine pump into well, clean up project area until 3:00 PM	8.0
Tuesday May 30, 2005	Knock-down drill rig, load up and move off site	3.0
	Total	42 hours

Exhibit
C3

Capacity Evaluation for the Belfast Water District, Belfast, Maine

C3. Talbot Well

R. E. CHAPMAN CO.

OAKDALE, MASS.

Name of Driller Chris Johnson Names of Helpers Rich Fyrberg

Job: Name & Location 18" Well - Curtis Road - Belfast, ME

Date Started 9/29/05 Date Finished 10/03/05

Hole No. 18"

Depth From	Depth To	Classification of Material
0	3	Fill
3	21	Light-brown clay
21	34	Very fine & fine brown sand, trace of clay
34	36	Very fine & fine brown sand, trace of clay with some medium coarse sand
36	40	Medium-coarse brown sand with fine-medium blue-gray gravel
40	56	Fine-coarse gravel & cobbles
56	65	Coarse blue-gray gravel with some medium gravel
65	66	Coarse blue-gray

Feet of Screen Exposed

Size of Screen & Slot

Screen Left in

Screen Pulled Out

Pipe Left in 69.59' TOP

Pipe Pulled Out

Remarks

53'-56' Drilled
64'-66' Drilled

Stopped at 66' because couldn't advance 18". Tried to drill ahead, but couldn't

Pump Test on Hole No.

Date	Time	Dr. Down	G. P. M.	Static and Other Info.

Date Started Date Finished

Hole No.

Depth From	Depth To	Classification of Material
		gravel with some
		medium gravel, trace
		of clay & gray wash
		water

Feet of Screen Exposed

Size of Screen & Slot

Screen Left in

Screen Pulled Out

Pipe Left in

Pipe Pulled Out

Remarks

Pump Test on Hole No.

Date	Time	Dr. Down	G. P. M.	Static and Other Info.

SAND ANALYSIS

R. E. CHAPMAN CO.
30 North Main St.
West Boylston, MA 01583-1126

Customer's Name BELFAST WATER DISTRICT

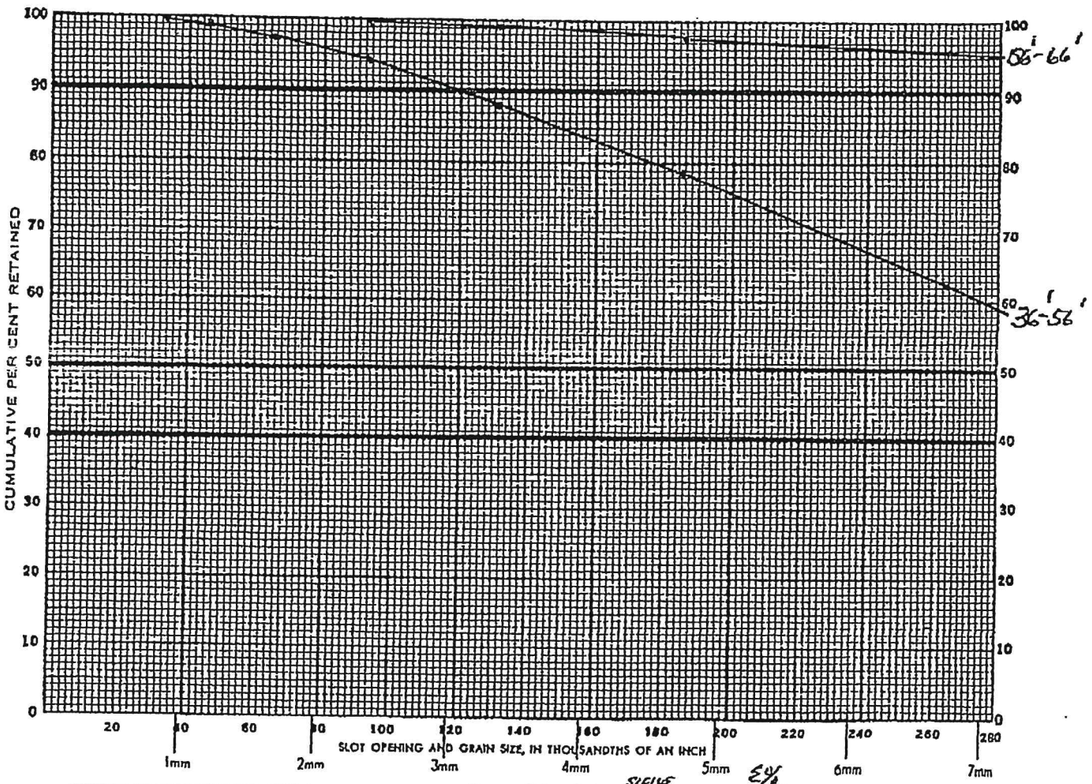
Town BELFAST State ME Date OCT. 5, 2005

Well Location OFF CURTIS ROAD

Type of Well 18" NAT. DEVELOPED WELL

Depth of Sample 36'-56', 56'-66'

Sample taken by CHRIS JOHNSON, DRILLER RE CHAPMAN CO.



Sieve Openings	Cumulative Per Cent Retained	
	36-56	56-66
.263	62.3	96.5
.185	78.8	97.5
.131	88.0	98.8
.093	94.0	99.0
.065	97.5	
.046	99.0	
.033	99.5	
.023		
.016		
.012		
.008		
.006		
.004		
Dust		

Gravel Pack Recommended

SIEVE	RET.
56-66' - #25	81.3%
#35	91.5%

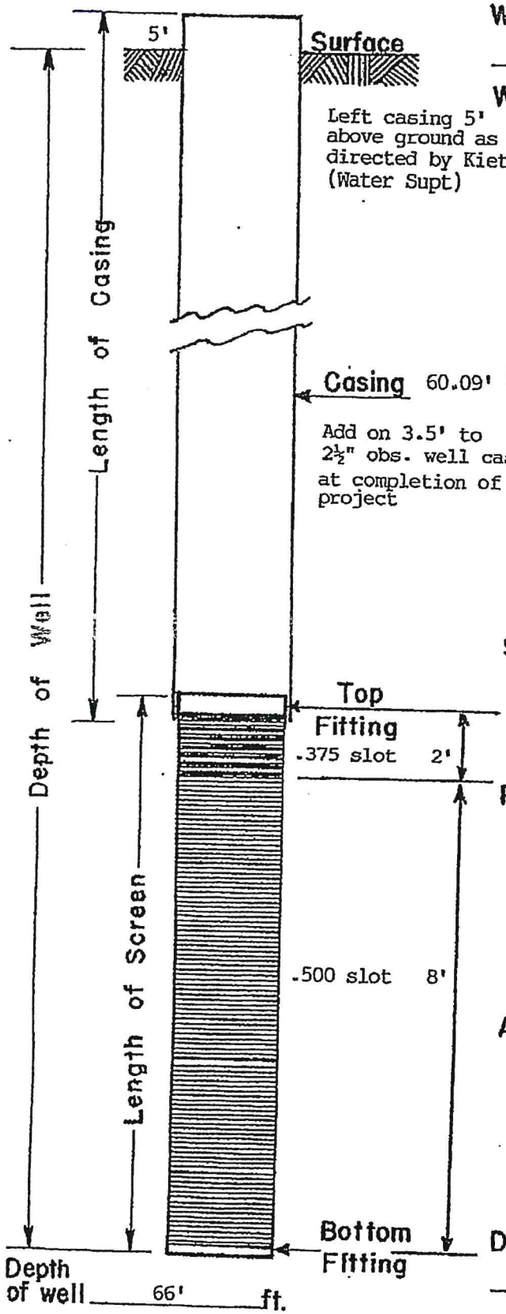
Slot Opening Recommended

Recommended Screen Dia. ___ in. Length ___ ft.

Type Screen _____ Metal _____

By W.A.

CONSTRUCTION RECORD



WELL OWNER Belfast Water District

Belfast, Maine

WELL NO. 18" off Curtis Road

Left casing 5' above ground as directed by Kieth (Water Supt)

Date October 26, 2005

CASING DETAILS

Length 60.09' (including 5' AGL) ft.

Diameter 18 in.

Kind Sch. 40 Steel

Casing 60.09'

SCREEN DETAILS

Add on 3.5' to 2½" obs. well casing at completion of project

Make Johnson

Length 10.25' (13.80' with riser) ft.

Diameter 18" telescope in.

Slot size .375/.500 slot

Metal Stainless Steel

SCREEN FITTINGS

Top Rubber packer welded

Bottom Plate Bottom

PUMP TEST (Reference Point approx. 2' AGL)

Static level 20.39' (before adding 3' of casing) ft.

Rate 1242 g.p.m.

Draw down 22.15 ft.

Hours pumped 24 hrs.

ARTIFICIALLY GRAVEL TREATED

Yes _____ **No** X

Thickness _____ in.

Size of gravel _____

DRILLER Chris Johnson - R. E. Chapman Company

Courtesy of EDWARD E. JOHNSON, INC.—*Manufacturers of Johnson Well Screens*

Exhibit

D

Capacity Evaluation for the Belfast Water District, Belfast, Maine

D. Pumping Test Data

D1 – Smart Road Well Pumping Test Data (CEH, 1989)
D2 – Jackson Pit Well Pumping Test Data (R.E. Chapman, 1965)
D3 – Talbot Well Pumping Test Data (Caswell, 2005)

Exhibit

D1

Capacity Evaluation for the Belfast Water District, Belfast, Maine

D1. Smart Road Well Pumping Test (CEH, 1989)

Pump Test Results

Title: BELFAST WATER DISTRICT SMART ROAD PUMPING TEST PUMPING WELL

Start time: 11.00 (hr.mm) Static water level: 8.35 feet

Day	Time	TSPB (min)	Feet Inches	Feet	Drawdown
		0		8.45	0.10
1	11.01	1		8.75	0.40
1	11.02	2		8.77	0.42
1	11.03	3		8.82	0.47
1	11.04	4		8.86	0.51
1	11.05	5		8.89	0.54
1	11.06	6		8.91	0.56
1	11.07	7		8.97	0.62
1	11.08	8		8.98	0.63
1	11.09	9		9.00	0.65
1	11.10	10		9.02	0.67
1	11.12	12		9.05	0.70
1	11.14	14		9.06	0.71
1	11.16	16		9.09	0.74
1	11.18	18		9.10	0.75
1	11.20	20		9.12	0.77
1	11.25	25		9.18	0.83
1	11.30	30		9.23	0.88
1	11.35	35		9.25	0.90
1	11.40	40		9.30	0.95
1	11.45	45		9.31	0.96
1	11.50	50		9.35	1.00
1	12.00	60		9.39	1.04
1	12.15	75		9.45	1.10
1	12.30	90		9.52	1.17
1	13.00	120		9.62	1.27
1	14.00	180		9.78	1.43
1	16.00	300		9.98	1.63
1	18.00	420		10.12	1.77
1	20.00	540		10.27	1.92
1	22.00	660		10.40	2.05
1	24.00	780		10.49	2.14
2	2.00	900		10.60	2.25
2	4.00	1020		10.71	2.36
2	6.00	1140		10.80	2.45
2	8.00	1260		10.98	2.63
2	10.00	1380		11.17	2.82
2	12.00	1500		11.23	2.88
2	14.00	1620		11.32	2.97
2	16.00	1740		11.38	3.03
2	18.00	1860		11.44	3.09
2	20.00	1980		11.49	3.14
2	22.00	2100		11.56	3.21
2	24.00	2220		11.61	3.26
3	2.00	2340		11.67	3.32

Pump Test Results

Title: BELFAST WATER DISTRICT SMART ROAD PUMPING TEST PUMPING WELL

Start time: 11.00 (hr.mm) Static water level: 8.35 feet

Day	Time	TSPB (min)	Feet Inches	Feet	Drawdown
3	4.00	2460		11.74	3.39
3	6.00	2580		11.81	3.46
3	8.00	2700		11.85	3.50
3	10.00	2820		12.05	3.70
3	12.00	2940		12.13	3.78
3	14.00	3060		12.20	3.85
3	16.00	3180		12.24	3.89
3	18.00	3300		12.28	3.93
3	20.00	3420		12.37	4.02
3	22.00	3540		12.39	4.04
3	24.00	3660		12.43	4.08
4	2.00	3780		12.47	4.12
4	4.00	3900		12.53	4.18
4	6.00	4020		12.58	4.23
4	8.00	4140		12.62	4.27
4	11.00	4320		12.75	4.40
4	11.01	4321		11.73	3.38
4	11.02	4322		11.67	3.32
4	11.03	4323		11.64	3.29
4	11.04	4324		11.60	3.25
4	11.05	4325		11.58	3.23
4	11.06	4326		11.56	3.21
4	11.07	4327		11.53	3.18
4	11.08	4328		11.50	3.15
4	11.09	4329		11.48	3.13
4	11.10	4330		11.47	3.12
4	11.12	4332		11.44	3.09
4	11.14	4334		11.38	3.03
4	11.16	4336		11.35	3.00
4	11.18	4338		11.29	2.94
4	11.20	4340		11.26	2.91
4	11.25	4345		11.21	2.86
4	11.30	4350		11.15	2.80
4	11.35	4355		11.13	2.78
4	11.40	4360		11.08	2.73
4	11.45	4365		11.04	2.69
4	11.50	4370		11.01	2.66
4	12.00	4380		10.96	2.61
4	12.15	4395		10.88	2.53
4	12.30	4410		10.83	2.48
4	13.00	4440		10.74	2.39
4	14.00	4500		10.57	2.22
4	16.00	4620		10.44	2.09
4	18.00	4740		10.18	1.83
4	20.00	4860		9.80	1.45

Title: BELFAST WATER DISTRICT SMART ROAD PUMPING TEST PUMPING WELL

Start time: 11.00 (hr.mm) Static water level: 8.35 feet

Day	Time	TSPB (min)	Feet Inches	Feet	Drawdown
5	8.00	5580		9.60	1.25
5	12.00	5820		9.49	1.14
5	16.00	6060		9.38	1.03
5	20.00	6300		9.27	0.92
6	8.00	7020		9.10	0.75
6	12.00	7260		9.05	0.70
6	16.00	7500		9.03	0.68

Caswell, Eichler and Hill, Inc.
Pump Test Results
Recovery Data

Title: BELFAST WATER DISTRICT SMART ROAD PUMPING TEST PUMPING WELL

Start time: 11.00 (hr.mm) Stop time: 4320 minutes (TSPB)
Static water level: 8.35 feet

Day	Time	TSPB (min)	TSPS (min)	t/t'	Feet Inches	Feet	Residual Drawdown
4	11.01	4321	1	4321.00		11.73	3.38
4	11.02	4322	2	2161.00		11.67	3.32
4	11.03	4323	3	1441.00		11.64	3.29
4	11.04	4324	4	1081.00		11.60	3.25
4	11.05	4325	5	865.00		11.58	3.23
4	11.06	4326	6	721.00		11.56	3.21
4	11.07	4327	7	618.14		11.53	3.18
4	11.08	4328	8	541.00		11.50	3.15
4	11.09	4329	9	481.00		11.48	3.13
4	11.10	4330	10	433.00		11.47	3.12
4	11.12	4332	12	361.00		11.44	3.09
4	11.14	4334	14	309.57		11.38	3.03
4	11.16	4336	16	271.00		11.35	3.00
4	11.18	4338	18	241.00		11.29	2.94
4	11.20	4340	20	217.00		11.26	2.91
4	11.25	4345	25	173.80		11.21	2.86
4	11.30	4350	30	145.00		11.15	2.80
4	11.35	4355	35	124.43		11.13	2.78
4	11.40	4360	40	109.00		11.08	2.73
4	11.45	4365	45	97.00		11.04	2.69
4	11.50	4370	50	87.40		11.01	2.66
4	12.00	4380	60	73.00		10.96	2.61
4	12.15	4395	75	58.60		10.88	2.53
4	12.30	4410	90	49.00		10.83	2.48
4	13.00	4440	120	37.00		10.74	2.39
4	14.00	4500	180	25.00		10.57	2.22
4	16.00	4620	300	15.40		10.44	2.09
4	18.00	4740	420	11.29		10.18	1.83
4	20.00	4860	540	9.00		9.80	1.45
5	8.00	5580	1260	4.43		9.60	1.25
5	12.00	5820	1500	3.88		9.49	1.14
5	16.00	6060	1740	3.48		9.38	1.03
5	20.00	6300	1980	3.18		9.27	0.92
6	8.00	7020	2700	2.60		9.10	0.75
6	12.00	7260	2940	2.47		9.05	0.70

Exhibit

D2

Capacity Evaluation for the Belfast Water District, Belfast, Maine

D2. Jackson Pit Well Pumping Test Data (R.E. Chapman, 1965)

R. E. CHAPMAN CO., OAKDALE, MASS.

LOG OF PUMP TEST

TEL. WEST BOYLSTON TEmple 5-3727

CUSTOMER

TOWN BELFAST

STREET RT 141 SWANVILLE STATE MAINE

OWNER OF PROPERTY JACKSONS PIT

OPERATORS F-G SULLIVAN & B. WILSON

SIZE & TYPE OF PUMP 6" SUCTION + 8" ADAPTER

DISCHARGE LINE Size 6 in. Length 200 feet

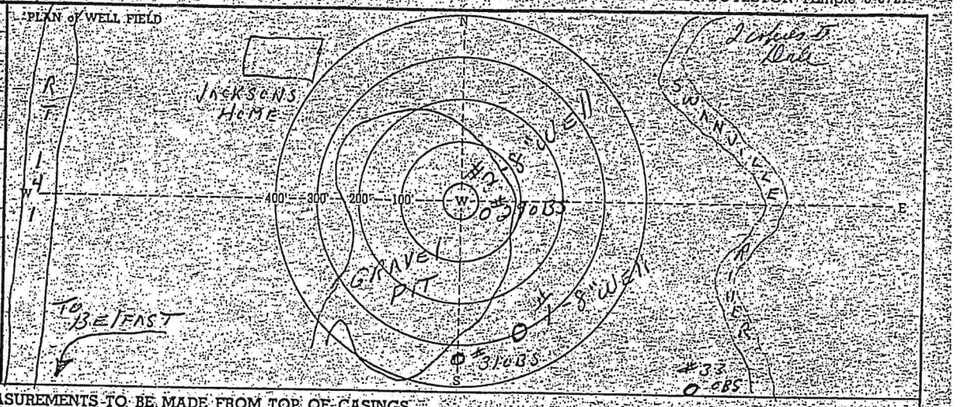
ORIFICE PIPE 8 in. SIZE ORIFICE PLATE 6 in.

DESCRIPTION OF WELL BEING PUMPED 8" TEST WELL #2

LENGTH OF DUNKER ON TAPE ... in. ADD TO READINGS (When you make read.)

LENGTH OF ALTITUDE LINE FROM CENTER OF GAUGE ... ft. ... in.

PLAN of WELL FIELD



ALL MEASUREMENTS TO BE MADE FROM TOP OF CASINGS

Top of Pipe

Top of Pipe Above Ground

Ground

CASING

Measurement Diagram

FINISHED WELL NO	#2 TEST WELL
DEPTH OF WELL	46'
TOP OF PIPE ABOVE GROUND	3'-3"
STATIC READING	11'-8½"

Observation Wells Information

	No. 29	No. 31	No. 1-WELL	No. 33	No.	No.
Depth	45'	Depth	Depth 80'	Depth	Depth	Depth
Pipe AG	13"	Pipe AG 1'	Pipe AG 2'	Pipe AG 3"	Pipe AG	Pipe AG
Static	9'-6"	Static 23'-8"	Static 18'	Static 22'-11½"	Static	Static

START TEST 8:00 AM

START PUMP TEST READINGS BELOW THIS LINE

AIR-LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Tape Meas'nt in Well	Orifice Head in Inches	GPM	Water Level	Water Level	Water Level	Water Level	Water Level	Water Level
18 Nov 65	8:30 AM			14'-11½"	35¼"	950	9'-10½"	23'-8"	18'	22'-11"		
	9:00			15'-2¼"	35'6"		10'-4"	23'-8"	18'	22'-11"		
	10:00			15'-4¾"	35¼"		10'-8"	23'-7¾"	18'	22'-11"		
	11:00			15'-4¾"	35¼"		10'-9"	23'-7¾"	18'	22'-11"		
	12:00			15'-7"	35¼"		11'-	23'-7¾"	18'	22'-11"		
	1:00 PM			15'-9"	35¼"		11'-2¼"	23'-7¾"	18'	22'-11"		
	2:00			16'-1¼"	35¼"		11'-4½"	23'-8"	18'	22'-11"		
	3:00			16'-3½"	35¼"		11'-6"	23'-8¼"	18'	22'-11¼"		
	4:00			16'-4"	35¼"		11'-8"	23'-8¼"	18'	22'-11¼"		

R. E. CHAPMAN CO., OAKDALE, MASS. — LOG OF PUMP TEST

CUSTOMER Town of Ballast Water — NO. 2 — TEL. WEST BOYLSTON TEmple 5-3727

START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Tape Measmt in Well	Orifice Head in Inches	GPM	#29 Water Level	#31 Water Level	#4 Water Level	#33 Water Level	Water Level	Water Level
	5:00 Pm			16'-5"	35 1/4	950	11'-9"	23'-8 3/4"	18	22'-11 3/4"		
	6:00 Pm			16'-6 1/2"	"	"	11'-10 3/4"	23'-8 3/4"	18	23'-11 1/2"		
	7:00 Pm			16'-7 1/2"	"	"	12'-11 1/2"	23'-8 3/4"	18	23'-11 1/2"		
	8:00 Pm			16'-8 3/4"	"	"	13'-1/2	23'-8 3/4"	18	23'-11 1/2"		
	9:00 Pm			16'-10"	"	"	12'-2"	23'-9	18	22'-11 3/4"		
	10:00 Pm			16'-11"	"	"	12'-2 1/2"	23'-9 1/4	18	22'-11 3/4"		
	11:00 Pm			16'-11 1/2"	"	"	12'-3 1/4"	23'-9 1/4	18	23'-		
	12:00 Pm			17'-1"	"	"	12'-4 1/2"	23'-9 1/2"	18	23'-		
Nov 12-65	1:00 AM			17'-3"	"	"	12'-5 1/2"	23'-9 1/2"	18	23'-1/4		
	2:00 Am			17'-5"	"	"	12'-7"	23'-9 1/2"	18	23'-1/2		
	3:00 Am			17'-7"	"	"	12'-8 1/2"	23'-9 1/2"	18	23'-3/4		
	4:00 Am			17'-7	"	"	12'-9"	23'-10	18	23'-3/4		
	5:00 Am			17'-7	"	"	12'-9 1/4	23'-10 1/2	18	23'-3/4		
	6:00 Am			17'-7	"	"	12'-9 1/2"	23'-11"	18	23'-1"		
	7:00 Am			17'-7	"	"	12'-9 1/2"	23'-11 1/4	18	23'-1 1/4"		
	8:00 Am			17'-7	"	"	12'-9 1/2"	23'-11 1/2"	18	23'-1 1/2"		
	9:00 Am			17'-7	"	"	12'-10"	23'-11 1/2"	18	23'-1 1/2"		
	10:00 Am			17'-7	"	"	12'-11"	23'-11 1/2"	18	23'-1 3/4"		
	11:00 Am			17'-7	"	"	12'-11"	23'-11 1/2"	18	23'-2"		
	12:00 Noon			17'-7	"	"	12'-11	23'-11 1/2"	18	23'-2"		
	1:00 Pm			17'-7 1/2"	35 1/4	950	12'-11	23'-11 1/2"	18	23'-2"		
12 Nov 65	2: PM			17'-8"	35 1/4	950	12'-11 1/4	23'-11 1/2"	18	23'-2"		
	3: PM			17'-8 1/2"	35 1/4	950	12'-11 1/2	23'-11 1/2"	18	23'-2		
	4: PM			17'-9"	35 1/4	950	12'-11 3/4	23'-11 1/2"	18	23'-2 1/4"		
cloudy	5: PM			17'-10"	35 1/4	950	13'-	23'-11 1/2"	18	23'-2 1/4"		
	6: PM			17'-10 1/2"	35 1/4	950	13'-1/4"	23'-11 1/2"	18	23'-2 1/4"		
	7: PM			17'-11"	35 1/4	950	13'-1/2	23'-11 1/2"	18	23'-2 1/4"		
	8: PM			17'-11 1/2"	35 1/4	950	13'-1"	23'-11 1/2	18'-	23'-2 1/4"		
	9: PM			17'-11 3/4"	35 1/4	950	13'-1 1/2"	24'-	18'-	23'-2 1/4		
	10: PM			18'-3/4"	35 1/4"	950	13'-2"	24'-3/4"	18'-3"	23'-2 1/2"		
	11: PM			18'-1 1/4"	35 1/4"	950	13'-2 1/2"	24'-1 1/2	18'-3"	23'-2 3/4"		

CUSTOMER TOWN OF BELFAST, ME

R. E. CHAPMAN CO., OAKDALE, MASS.

NO. 3

LOG OF PUMP TEST 1965

TEL. WEST BOYLSTON TEmple 5-3727

#2 WELL START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Tape Meas'mt in Well	Orifice Head in Inches	GPM	#29 Water Level	#31 Water Level	#1 WELL Water Level	#33 Water Level	Water Level	Water Level
		STATIC		11'-8½"		STATIC	9'-6"	23'-8"	18'-2"	22'-11½"		
13 NOV 65	12 PM			18'-1½"	35¼"	950	13'-3"	24'-2"	18'-3"	23'-2¾"		
	1 AM			18'-1½"	35¼"	950	13'-3½"	24'-2¾"	18'-3"	23'-3"		
	2 AM			18'-1¾"	35¼"	950	13'-4"	24'-2½"	18'-3"	23'-3"		
	3 AM			18'-2"	35¼"	950	13'-5"	24'-2¾"	18'-3"	23'-3¼"		
	4 AM			18'-2½"	35¼"	950	13'-6"	24'-3"	18'-3"	23'-3¼"		
	5 AM			18'-2½"	35¼"	950	13'-6½"	24'-3¼"	18'-3"	23'-3½"		
(LIGHT RAIN)	6 AM			18'-2¾"	35¼"	950	13'-7"	24'-3½"	18'-3"	23'-3½"		
	7 AM			18'-2¾"	35¼"	950	13'-8"	24'-3¾"	18'-3"	23'-3¾"		
	8 AM			18'-3"	35¼"	950	13'-9"	24'-4"	18'-3"	23'-4"		
	9 AM			18'-3¼"	35¼"	950	13'-10"	24'-4½"	18'-6"	23'-4¼"		
	10 AM			18'-3½"	35¼"	950	13'-11"	24'-5"	18'-6"	23'-4½"		
	11 AM			18'-4"	35¼"	950	14'-0"	24'-5½"	18'-6"	23'-5"		
	12 Noon			18'-4½"	35¼"	950	14'-½"	24'-6"	18'-6"	23'-5½"		
	1 PM			18'-5"	35¼"	950	14'-1"	24'-6½"	18'-6"	23'-6"		
	2:			18'-5½"	35¼"	950	14'-1½"	24'-7"	18'-6"	23'-6½"		
	3:			18'-6"	35¼	950	14'-2"	24'-7½"	18'-6"	23'-6¾"		
	4:			18'-7"	35¼	950	14'-2½"	24'-8"	18'-6"	23'-7¼"		
	5:			18'-8"	35¼	950	14'-4"	24'-8½"	18'-6"	23'-7¾"		
— Rain —	6:			18'-9"	35¼	950	14'-4½"	24'-9"	18'-6"	23'-8¼"		
	7:			18'-10"	35¼	950	14'-4¾"	24'-9½"	18'-6"	23'-8¾"		
	8:			18'-11"	35¼	950	14'-5"	24'-10"	18'-6"	23'-9¼"		
	9:			19'-0"	35¼	950	14'-5½"	24'-9¾"	18'-9"	23'-9¼"		
	10:			19'-¼"	35¼	950	14'-6"	24'-9½"	18'-9"	23'-9¼"		
	11:			19'-¼"	35¼	950	14'-6½"	24'-9¼"	18'-9"	23'-9¼"		
Nov 14-65	12: Mid			19'-½"	35¼	950	14'-7"	24'-9"	19'	23'-9¼"		
	1: Am			19'-½"	35¼	950	14'-7½"	24'-8¾"	19'	23'-9½"		
Hard Rain	2: Am			19'-¾"	35¼	950	14'-8"	24'-8½"	19'	23'-9½"		
	3: Am			19'-¾"	35¼	950	14'-8¼"	24'-8¼"	19'	23'-9¾"		
	4: Am			19'-1"	35¼	950	14'-8½"	24'-8¼"	19'	23'-9¾"		
	5: Am			19'-1"	35¼	950	14'-9"	24'-8"	19'	23'-9¾"		

R. E. CHAPMAN CO., OAKDALE, MASS. — LOG OF PUMP TEST

TEL. WEST BOYLSTON TEmple 5-3727

CUSTOMER Town of Belfast Me — NO # 4

START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Tape Meas'nt. in Well	Orifice Head in Inches	GPM	#29 Water Level	#31 Water Level	#1 Water Level	#33 Water Level	Water Level	Water Level
		Static		11 8½		Static	9'6"	23'8"	18'	22'11½"		
FAIR	6 Am			19'2"	35¼	950	14'9"	24'8"	19'	23'9½"		
	7 Am			19'3"	35¼	950	14'9¼"	24'8¼"	19'	23'9¾"		
	8 Am			19'4"	35¼	950	14'9¾"	24'9"	19	23'10½"		
	9 Am			19'5"	35¼	950	14'10	24'9½"	19'	23'11		
	10 Am			19'6"	35¼	950	14'10¼"	24'9½"	19'	23'11¼"		
	11 Am			19'7"	35¼	950	14'10½"	24'9¾"	19'	23'11½"		
COLD	12 Noon			19'8"	35¼	950	14'11"	24'10"	19'	23'11¾"		
	1 Pm			19'9"	35¼	950	14'11¼"	24'10¼"	19'	24'		
	2 Pm			19'10"	35¼	950	14'11½"	24'10½"	19'	24'¼"		
	3 Pm			19'11"	35¼	950	15'	24'11"	19	24'½"		
	4 Pm			20'	35¼	950	15'2"	24'11¼"	19	24'¾"		
	5 Pm			20'1"	35¼	950	15'2½"	25'	19	24'1"		
	6 Pm			20'1¼"	35¼	950	15'3¾"	24'11¾"	19	24'1¼"		
	7 Pm			20'1½"	35¼	950	15'3½"	24'11½"	19	24'1½"		
	8 Pm			20'2"	35¼	950	15'3½"	24'11¾"	19	24'1½"		
	9 Pm			20'2¼"	35¼	950	15'3½"	24'11½"	19	24'1½"		
	10 Pm			20'2¾"	35¼	950	15'3½"	24'11¾"	19	24'1¼"		
	11 Pm			20'3"	35¼	950	15'3½"	25'	19	24'1½"		
	12 Pm			20'3"	35¼	950	15'4"	25'¼"	19	24'1¾"		
Nov 15 1965	1 Am			20'3"	35¼	950	15'4½"	25'½"	19	24'2"		
	2 Am			20'3"	35¼	950	15'5"	25'¾"	19	24'2¼"		
	3 Am			20'3"	35¼	950	15'5½"	25'1"	19	24'2½"		
	4 Am			20'3"	35¼	950	15'5½"	25'1¼"	19	24'2¾"		
	5 Am			20'3"	35¼	950	15'5½"	25'1½"	19	24'3¼"		
	6 Am			20'3"	35¼	950	15'5½"	25'1½"	19	24'3¼"		
	7 Am			20'3"	35¼	950	15'5½"	25'1½"	19	24'3"		
	8 Am			20'3"	36¼	950	15'5½"	25'1½"	19	24'3¼"		
Cloudy & Cold	9 Am			20'3"	35¼	950	15'5½"	25'1¾"	19	24'3½"		
	6 AM			20'3"	35¼	950	15'5½"	25'2"	19	24'3½"		
	11 AM			20'3"	35¼	950	15'6	25'2¼	19	24'3¾"		

CUSTOMER TOWN OF BELFAST, ME

R. E. CHAPMAN CO., OAKDALE, MASS. NO. 5

DEC 31 195

LOG OF PUMP TEST

TEL. WEST BOYLSTON TEmple 5-3727

START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Tape, Meas'nt. to Well	Orifice Head in Inches	GPM	#2 Water Level	#3 Water Level	#1 WELL Water Level	#4 Water Level	#1 WELL Water Level	Water Level
15 NOV. 65	12 NOON	46°	STATIC	19' 8½"								#1 WELL
	1 PM			20' 3½"	35¼"	950	15' 6¾"	25' 3¾"	19'	34' 4"		6 PM
	2 PM			20' 4"	35¼"	950	15' 7"	25' 3"	19'	34' 4¼		
CLEAR & COLD	3 PM		START PUMPING #1 8" WELL INTO TOWN SYSTEM AT APPROX 900 GPM	20' 4"	35¼"	950	15' 7⅛"	25' 3¼"	19'	34' 4¾		
	4 PM	46°		20' 5"	35¼"	950	15' 7½"	25' 9"	50'	34' 5"	1700	
	5 PM			20' 5"	35¼"	950	15' 8"	25' 10"	50'	34' 5⅛"	1700	
	6 PM			20' 5¼"	35¼"	950	15' 8⅛"	25' 11"	50' 6"	34' 8"		
	7 PM			20' 5¼"	35¼"	950	15' 9"	26' ¼"	50' 6"	34' 9¼"	"	"
	8 PM	46°		20' 5⅛"	35¼"	950	15' 9⅛"	26' 1½"	50' 6"	34' 9¾"	"	"
	9 PM			20' 5⅜"	35¼"	950	15' 9½"	26' 2½"	50' 6"	34' 10"	"	"
	10 PM			20' 5¾"	35¼"	950	15' 10"	26' 3"	51' -	34' 10½"	1700	350 GPM
	11 PM			20' 6"	35¼"	950	15' 10⅛"	26' 3⅛"	51' 6"	34' 11½"	"	"
	12 PM			20' 6"	35¼"	950	15' 11"	26' 4"	50' -	35' -	1500	350 GPM
16 NOV 65	1 AM			20' 7"	35¼"	950	15' 11⅛"	26' 4½"	46' -	35' ⅛"	1500 RPM	
	2 AM			20' 8"	35¼"	950	16' -	26' 5"	42' -	35' 1½"	"	"
	3 AM			20' 9"	35¼"	950	16' ⅛"	26' 5½"	46' -	35' 2½"	"	"
	4 AM			20' 9"	35¼"	950	16' ¼"	26' 6"	46' -	35' 2½"	"	"
RAIN and	5 AM			20' 10"	35¼"	950	16' ½"	26' 6½"	46' -	35' 4¼"	"	"
SNOW 5:30 A.M.	6 AM			20' 11"	35¼"	950	16' ⅝"	26' 7"	46' -	35' 5"	"	"
ALL SNOW AT 6:00	7 AM			21'	35¼"	950	16' ¾"	26' 7½"	46' -	35' 5½"	1500	350 GPM
SNOW MELTING	8 AM			21' ⅛"	35¼"	950	16' ⅞"	26' 8"	46' -	35' 5¾"	"	"
RAIN AT 9:00 AM	9 AM			21' ⅛"	35¼"	950	16' ⅞"	26' 8½"	46' -	35' 6"	"	"
	10 AM			21' ¼"	35¼"	950	16' ¾"	26' 9"	46' -	35' 6½"	"	"
CUT BACK TO	11 AM			21' ½"	35¼"	950	16' 1"	26' 9½"	46' -	35' 7"	"	"
600 GAL PER MIN	12 AM			19' 5⅛"	14¼"	600	16' 1⅛"	26' 10"	46' -	35' 7½"	"	"
	1 PM			19' 3"	14¼"	600	16' -	26' 10¾"	46' -	35' 7¾"	1500	350 GPM
RAIN	2 PM	46°		19' ⅛"	14¼"	600	15' 10"	26' 11"	46' -	35' 8¼"	"	"
MODERATE RAIN	3 PM			18' 11⅞"	14¼"	600	15' 9"	26' 11⅛"	46' -	35' 9¼"	"	"
" "	4 PM			18' 11⅛"	14¼"	600	15' 8"	27' -	47' -	35' 10"	1500	350 GPM

R. E. CHAPMAN CO., OAKDALE, MASS. — LOG OF PUMP TEST

DEC 31 1965

CUSTOMER TOWN OF BELFAST, ME. — NO. 6 — TEL. WEST BOYLSTON TEmple 5-3727

#2 well — START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Air Gauge Reading	Tape Meas'nt. in Well	Orifice Head in Inches	GPM	#2 Well Water Level	#3 Well Water Level	#1 Well Water Level	#4 Well Water Level	RPM	GPM Water Level
			STATIC	11'-8½"	5"	STATICS	9'-6"	23'-8"	18'	22'-11½"		
16 NOV. 65	5 PM			18'-11¾"	14¼"	600	15'-7¾"	27'-½"	47'-	25'-10¾"	1500	APROX
RAIN	6 PM	46		18'-11½"	14¼"	600	15'-7½"	27'-1"	47'-	25'-10½"	1500	350 GPM
	7 PM			18'-11¼"	14¼"	600	15'-7¼"	27'-1½"	47'-6"	25'-10¾"	1500	350
	8 PM			18'-11"	14¼"	600	15'-7¼"	27'-2"	47'-6"	25'-11"	"	"
	9 PM			18'-10½"	14¼"	600	15'-7"	27'-2¼"	47'-6"	25'-11¼"	"	"
	10 PM	46°		18'-10"	14¼"	600	15'-7"	27'-2½"	47'-6"	25'-11¼"	"	"
CLOUDY - MISTY	11 PM			18'-9¾"	14¼"	600	15'-7"	27'-2¾"	47'-6"	26'-	"	"
17 NOV. 65	12 PM			18'-8½"	14¼"	600	15'-7"	27'-3"	47'-6"	26'-½"	1500 RPM	350 GPM
	1 AM			18'-8½"	14¼"	600	15'-7"	27'-3¼"	47'-6"	26'-¾"	"	"
FOG - WARM	2 AM			18'-8½"	14¼"	600	15'-7"	27'-3½"	47'-6"	26'-1"	"	"
	3 AM			18'-8½"	14¼"	600	15'-7"	27'-3¾"	47'-6"	26'-1¼"	"	"
	4 AM			18'-8½"	14¼"	600	15'-7"	27'-4"	47'-6"	26'-1½"	"	"
	5 AM			18'-8½"	14¼"	600	15'-7"	27'-4¼"	47'-6"	26'-1¾"	"	"
	6 AM			18'-8½"	14¼"	600	15'-7"	27'-4½"	47'-6"	26'-2"	1500 RPM	350 GPM
	7 AM			18'-8½"	14¼"	600	15'-7"	27'-4¾"	47'-6"	26'-2¼"	"	"
	8 AM			18'-8½"	14¼"	600	15'-7"	27'-5"	47'-6"	26'-2½"	"	"
MODERATE TO	9 AM			18'-8½"	14¼"	600	15'-7"	27'-5¼"	48'	26'-2¾"	"	"
HEAVY RAIN	10 AM			18'-8½"	14¼"	600	15'-7"	27'-5¾"	48'	26'-3¼"	"	"
	11 AM			18'-8½"	14¼"	600	15'-7"	27'-6¼"	48'	26'-3¾"	"	"
	12 AM			18'-8½"	14¼"	600	15'-7"	27'-6¾"	48'-6"	26'-4"	1500 RPM	350 GPM
17 NOV. 65	1 PM			18'-8½"	14¼"	600	15'-7¼"	27'-7"	48'	26'-4¼"	"	"
	2 PM	46°		18'-8½"	14¼"	600	15'-7¼"	27'-7¼"	48'	26'-4½"	"	"
	3 PM			18'-8¾"	14¼"	600	15'-7¼"	27'-8½"	48'	26'-4¾"	"	"
RAIN MODERATE	4 PM			18'-8¾"	14¼"	600	15'-7¼"	27'-7¾"	48'	26'-5"	"	"
	5 PM			18'-8¾"	14¼"	600	15'-7¼"	27'-8"	48'	26'-5¼"	"	"
	6 PM			18'-9"	14¼"	600	15'-7¼"	27'-8¼"	48'	26'-5½"	1500	350 GPM
CLOUDY - COLD	7 PM			18'-9"	14¼"	600	15'-7½"	27'-8¼"	48'	26'-5¾"	"	"
	8 PM	46°		18'-9¼"	14¼"	600	15'-7¾"	27'-8½"	48'	26'-6"	"	"
	9 PM			18'-9¼"	14¼"	600	15'-7¾"	27'-8½"	48'	26'-6¼"	"	"
	10 PM			18'-9¼"	14¼"	600	15'-8"	27'-8¾"	48'	26'-6¼"	"	"

DEC 31 1965

R. E. CHAPMAN CO., OAKDALE, MASS. LOG OF PUMP TEST

CUSTOMER TOWN OF BELFAST, ME. NO. 7 TEL. WEST BOYLSTON TEmple 5-3727

START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Depth to Water in Well #11	Orifice Head in Inches	GPM	#2 Water Level	#3 Water Level	#4 & #11 Water Level	#33 Water Level	GPM Water Level	Water Level
			STATIC	11'-8 1/2"		STATICS.	9'-6"	23'-8"	18'-	22'-11 1/2"	00	
17 NOV 65	11 PM			18'-9 1/2"	14 1/4"	600	15'-8"	27'-8 3/4"	48'-	26'-6 1/2"	350 GPM	
	12 PM	46°		18'-9 1/2"	14 1/4"	600	15'-8"	27'-9"	48'-	26'-7"	"	"
18 NOV 65	1 AM			18'-9 1/2"	14 1/4"	600	15'-8"	27'-9"	48'-	26'-7"	"	"
	2 AM			18'-9 1/2"	14 1/4"	600	15'-8"	27'-9"	48'-	26'-7"	"	"
CLOUDY & COLD	3 AM			18'-9 1/2"	14 1/4"	600	15'-8"	27'-9 1/4"	48'-	26'-7"	"	"
	4 AM			18'-9 1/2"	14 1/4"	600	15'-8"	27'-9 1/2"	48'-	26'-7"	"	"
	5 AM			18'-9 1/2"	14 1/4"	600	15'-8 1/4"	27'-9 3/4"	48'-	26'-7 1/4"	"	"
CLOUDY & COLD	6 AM			18'-9 1/2"	14 1/4"	600	15'-8 1/4"	27'-10"	48'-	26'-7 1/4"	"	"
	7 AM			18'-9 3/4"	14 1/4"	600	15'-8 1/4"	27'-10 1/4"	48'-	26'-7 1/2"	"	"
	8 AM			18'-10"	14 1/4"	600	15'-8 1/4"	27'-10 1/2"	48'-	26'-7 3/4"	350 GPM	
SNOW, LIGHT	9 AM			18'-10 1/4"	14 1/4"	600	15'-9 1/4"	27'-10 3/4"	48'-	26'-8"	"	"
	10 AM			18'-10 1/2"	14 1/4"	600	15'-9 1/2"	27'-11"	48'-	26'-8 1/2"	"	"
	11 AM			18'-10 3/4"	14 1/4"	600	15'-9 1/2"	27'-11"	48'-	26'-8 3/4"	"	"
	12 NOON	46°		18'-11"	14 1/2"	600	15'-9 3/4"	27'-11 1/4"	48'-	26'-9"	"	"
	1 PM			18'-11 1/4"	14 1/2"	600	15'-9 3/4"	27'-11 1/2"	48'-	26'-9"	"	"
CLEAR & COLD	2 PM			18'-11 1/2"	14 1/2"	600	15'-9 3/4"	27'-11 1/2"	48'-	26'-9 1/4"	"	"
	3 PM			18'-11 1/2"	14 1/2"	600	15'-10"	27'-11 3/4"	48'-	26'-9 1/4"	"	"
	4 PM			18'-11 3/4"	14 1/2"	600	15'-10"	27'-11 3/4"	48'-	26'-9 1/2"	330 GPM	
	5 PM			18'-11 3/4"	14 1/2"	600	15'-10"	27'-11 3/4"	48'-	26'-9 1/2"	"	"
18 NOV 65	6 PM	46°		18'-11 3/4"	14 1/2"	600	15'-10"	28'-	48'-	26'-9 3/4"	"	"
	7 PM			19'-	14 1/2"	600	15'-10 1/4"	28'-	48'-	26'-9 3/4"	"	"
	8 PM			19'-	14 1/2"	600	15'-10 1/4"	28'-	48'-	26'-10"	"	"
	9 PM			19'-	14 1/2"	600	15'-10 1/4"	28'-	48'-	26'-10"	"	"
	10 PM			19'-	14 1/2"	600	15'-10 1/4"	28'-	48'-	26'-10 1/4"	350 GPM	
SNOW & COLD	11 PM			19'-	14 1/2"	600	15'-10 1/4"	28'-	48'-	26'-10 1/4"	"	"
	12 NIGHT			19'-	14 1/2"	600	15'-10 1/4"	28'-	48'-	26'-10 1/4"	"	"
19 NOV 65	1 AM			19'-	14 1/2"	600	15'-10 1/4"	28'-	48'-	26'-10 1/4"	"	"
	2 AM			19'-	14 1/2"	600	15'-10 1/2"	28'-1/4	48'-	26'-10 1/2"	"	"
CLEAR & COLD	3 AM			19'-	14 1/2"	600	15'-10 1/2"	28'-1/4	48'-	26'-10 1/2"	"	"
	4 AM			19'-	14 1/2"	600	15'-10 1/2"	28'-1/4	48'-	26'-10 1/2"	"	"

DEC 31 1965

R. E. CHAPMAN CO., OAKDALE, MASS.

LOG OF PUMP TEST

CUSTOMER Town of Belfast, Me. NO. 8

TEL. WEST BOYLSTON TEmple 5-3727

START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	#2 Dug Well Water Level	Orifice Head in Inches	GPM	#29 Water Level	#31 Water Level	#1 WELL Water Level	#33 Water Level	#1 WELL GPM Water Level	Water Level
			STATIC	11-8½"		STATICS	9'-6"	23'-8"	18'-	23'-11½"	0-0	
19 NOV 65	5 AM			19'-¼"	14¼"	600	15'-10¾"	28'-½"	48'-	26'-10¾"	350 GPM	
	6 AM			19'-¼"	14¼"	600	15'-10¾"	28'-½"	48'-	26'-10¾"		
	7 AM			19'-¼"	14¼"	600	15'-10¾"	28'-½"	48'-	26'-10¾"		
	8 AM	46°		19'-¼"	14¼"	600	15'-10¾"	28'-¾"	48'-	26'-11"		
	9 AM			19'-¼"	14¼"	600	15'-11"	28'-¾"	48'-	26'-11"		
CLEAR & COLD	10 AM			19'-¼"	14¼"	600	15'-11"	28'-¾"	48'-	26'-11¼"		
	11 AM			19'-¼"	14¼"	600	15'-11"	28'-1"	48'-	26'-11¼"		
	12 NOON			19'-¼"	14¼"	600	15'-11¼"	28'-1"	47'-6"	26'-11½"		
28 NOV 65	1 PM			19'-¼"	14¼"	600	15'-11¼"	28'-1"	47'-6"	26'-11½"		
	2 PM	46°		19'-¼"	14¼"	600	15'-11¼"	28'-1¼"	47'-6"	26'-11¾"		
	3 PM		STOP PUMP CHECK OIL + SERVISE						47'-6"	27'-		
	4 PM			19'-2"	14¼"	600	16'-	28'-2½"	47'-6"	27'-		
	5 PM			19'-2"	14¼"	600	16'-¼"	28'-2¾"	47'-6"	27'-¼"		
	6 PM			19'-2¼"	14¼"	600	16'-½"	28'-2¾"	47'	27'-½"		
	7 PM			19'-2¼"	14¼"	600	16'-½"	28'-2¾"	47'	27'-¾"	350 GPM	
	8 PM			19'-2¼"	14¼"	600	16'-½"	28'-3"	47'	27'-1"		
	9 PM			19'-2¼"	14¼"	600	16'-½"	28'-3"	47'-	27'-1¼"		
CLEAR & COLD	10 PM	46°		19'-2¼"	14¼"	600	16'-¾"	28'-3"	47'-	27'-1½"		
	11 PM			19'-2¼"	14¼"	600	16'-¾"	28'-3¼"	47'-	27'-1¾"		
	12 PM			19'-2¼"	14¼"	600	16'-1"	28'-3¼"	47'-	27'-2"		
20 NOV 65	1 AM			19'-2¼"	14¼"	600	16'-1"	28'-3½"	47'-	27'-2¼"	350 GPM	
	2 AM			19'-2¼"	14¼"	600	16'-1"	28'-3¾"	47'	27'-2¼"		
	3 AM			19'-2¼"	14¼"	600	16'-1"	28'-4"	47'	27'-2¼"		
	4 AM			19'-2¼"	14¼"	600	16'-1"	28'-4¼"	47'	27'-2¾"		
	5 AM			19'-2¼"	14¼"	600	16'-1¼"	28'-4¼"	47'	27'-2¾"		
CLEAR & COLD	6 AM			19'-2¼"	14¼"	600	16'-1¼"	28'-4¼"	47'	27'-3"		
	7 AM			19'-2¼"	14¼"	600	16'-1¾"	28'-5"	47'	27'-3¼"	350 GPM	
	8 AM			19'-2¼"	14¼"	600	16'-2"	28'-5¼"	47'	27'-3¼"		
	9 AM			19'-2¼"	14¼"	600	16'-2¼"	28'-5¼"	47'	27'-3¼"		
	10 AM			19'-2¼"	14¼"	600	16'-2¼"	28'-5¼"	47'	27'-3¼"		

DEC 31 '65

R. E. CHAPMAN CO., OAKDALE, MASS. LOG OF PUMP TEST

CUSTOMER Town of Belfast, Me. NO. 9 TEL. WEST BOYLSTON TEmple 5-3727

START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Tape Meas'nt 2 in. Well	Orifice Head in Inches	GPM	# 29 Water Level	# 31 Water Level	# 1 WELL Water Level	# 2 Water Level	# 1 WELL & PM Water Level	PM Water Level
			STATIC	11'-8 3/4"		STATIC	9'-6"	23'-8"	78'-	22'-11 3/4	60	
2nd Nov. 65	11 AM	41°		19'-2 3/4"	14 3/4"	600	16'-2 3/4	28'-5 3/4	47'	27'-3 3/4	350 11 AM	
CLEAR - COLD	12 NOON			19'-2 3/4"	14 3/4"	600	16'-2 3/4	28'-5 3/4	47'	27'-3 3/4"	11	
	1 PM			19'-2 3/4"	14 3/4"	600	16'-2 3/4	28'-5 3/4"	47'	27'-4"	11	
	2 PM			19'-2 3/4"	14 3/4"	600	16'-3"	28'-6"	47'	27'-4 1/4"	11	
	3 PM	46°		19'-2 3/4"	14 3/4"	600	16'-3"	28'-6"	47'	27'-4 1/4"	11	
	3 PM			STOPPED PUMP & CHECKED OIL & WATER						27'-4 1/2"	11	
	4 PM			19'-2 3/4"	14 3/4"	600	16'-3 1/4	28'-6 1/2"	47'	27'-4 1/2"	350 4 PM	
	5 PM			19'-2 1/2"	14'-1/4"	600	16'-3 1/2	28'-6 1/2"	47'	27'-4 3/4		
	6 PM			19'-2 1/2"	14'-1/4"	600	16'-3 3/4	28'-6 1/2"	47'	27'-5 1/4		
	7 PM			19'-2 1/2"	14'-1/4"	600	16'-3 3/4	28'-6 1/2	47'	27'-5 1/4		
	8 PM			19'-2 1/2"	14'-1/4"	600	16'-4"	28'-6 1/2	47'	27'-5 1/2		
	9 PM			19'-2 3/4"	14'-1/4"	600	16'-4 1/4	28'-6 3/4	47'	27'-5 3/4		
	10 PM			19'-2 3/4"	14'-1/4"	600	16'-4 1/4	28'-6 3/4	47'	27'-5 3/4		
	11 PM			19'-2 3/4"	14'-1/4"	600	16'-4 1/2	28'-6 3/4	47'	27'-6		
	12 PM			19'-2 3/4"	14'-1/4"	600	16'-4 1/2	28'-6 3/4	47'	27'-6		
31 Dec 65	1 AM			19'-2 3/4"	14'-1/4"	600	16'-4 1/2	28'-6 3/4	47'	27'-6		
	2 AM			19'-3"	14'-1/4"	600	16'-4 3/4	28'-6 3/4	47'	27'-6 1/4		
	3 AM			19'-3"	14 1/4"	600	16'-4 3/4	28'-7"	47'	27'-6 1/4		
	4 AM			19'-3"	14 1/4"	600	16'-4 3/4	28'-7"	47'	27'-6 1/4		
Rain Sublearoo	5 AM			19'-3 1/4"	14 1/4"	600	16'-5"	28'-7 1/4"	47'	27'-6 1/2		
	6 AM			19'-3 1/4"	14 1/4"	600	16'-5"	28'-7 1/4"	47'	27'-6 1/2		
	7 AM			19'-3 1/4"	14 1/4"	600	16'-5 1/4"	28'-7 1/4"	47'	27'-6 3/4		
	8 AM			19'-3 1/2"	14 1/4"	600	16'-5 1/4"	28'-7 1/4"	47'	27'-6 3/4"		
	9 AM			19'-3 1/2"	14 1/4"	600	16'-5 1/4"	28'-7 1/2"	47'	27'-6 3/4		
	10 AM			19'-3 1/2"	14 1/4"	600	16'-5 1/4"	28'-7 1/2"	47'	27'-6 3/4		
	11 AM			19'-3 1/2"	14 1/4"	600	16'-5 1/4"	28'-7 1/2"	47'	27'-6 3/4		
	12 PM			19'-3 3/4"	14 1/4"	600	16'-5 1/4"	28'-7 1/2"	47'	27'-6 3/4		
	1 PM			19'-3 3/4"	14 1/4"	600	16'-5 3/4"	28'-7 1/2"	47'	27'-6 3/4		
	2 PM			19'-3 3/4	14 1/4	600	16'-6	28'-8"	47'	27'-7"		

R. E. CHAPMAN CO., OAKDALE, MASS. — LOG OF PUMP TEST — DEC 31 1965

CUSTOMER — NO. 10 — TEL. WEST BOYLSTON TEmple 5-3727

START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Tape Meas'nt. in Well	Orifice Head in Inches	GPM	29 Water Level	31 Water Level	Water Level	33 Water Level	Water Level	Water Level
			STATIC	11-8 1/2"			9'-1"	23'-8"	14' Well	27'-11 1/2"	3.50 6PM	
	3 PM			19'-7 1/2"	14-1/2"	600	16'-6"	28'-8"	47'	37'-7"	"	"
	4 PM			19'-4"	14 1/2"	600	16'-6"	28'-8"	47'	37'-7 1/4"	"	"
Nov 21-65	5 PM			19'-4"	14 1/4"	600	16'-6 1/4"	28'-8 1/4"	47'	37'-7 1/4"	"	"
Rain light	6 PM	46°		19'-4 1/2"	14 1/2"	600	16'-6 1/2"	28'-8 1/4"	47'	37'-7 1/4"	"	"
	7 PM			19'-4 1/4"	14-1/2"	600	16'-6 1/2"	28'-8 1/4"	47'	37'-7 1/2"	"	"
Cloudy	8 PM			19'-4 1/2"	14 1/2"	600	16'-6 1/2"	28'-8 1/2"	47'	37'-7 1/2"	"	"
	9 PM			19'-4 3/4"	14 1/2"	600	16'-6 3/4"	28'-8 1/2"	47'	37'-7 1/2"	"	"
	10 PM			19'-5"	14 1/4"	600	16'-6 3/4"	28'-8 1/2"	47'	37'-7 3/4"	"	"
	11 PM			19'-5 1/4"	14 1/4"	600	16'-6 3/4"	28'-8 3/4"	47'	37'-7 3/4"	"	"
	12 PM	46°		19'-5 1/4"	14 1/4"	600	16'-7"	28'-9"	47'	37'-7 3/4"	3.50 6PM	
CLOUDY &	1 AM			19'-5 3/4"	14 1/4"	600	16'-7"	28'-9 1/4"	47'	37'-8"	"	"
MIST	2 AM			19'-6"	14 1/4"	600	16'-7 1/4"	28'-9 1/2"	47'	37'-8"	"	"
Nov 22, 1965	3 AM			19'-6 1/4"	14 1/4"	600	16'-7 1/2"	28'-9 1/2"	47'	37'-8 1/4"	"	"
	4 AM			19'-6 1/2"	14 1/4"	600	16'-7 1/2"	28'-10"	47'	37'-8 1/2"	"	"
LIGHT RAIN	5 AM			19'-6 3/4"	14 1/2"	600	16'-7 3/4"	28'-10 1/2"	47'	37'-8 3/4"	"	"
	6 AM	46°		19'-7"	14 1/2"	600	16'-8"	28'-11"	47'	37'-8 3/4"	"	"
	7 AM			19'-7"	14 1/4"	600	16'-8"	28'-11"	47'	37'-8 3/4"	"	"
LIGHT RAIN	8 AM			19'-7"	14 1/4"	600	16'-8"	28'-11"	47'	37'-8 3/4"	"	"
	9 AM			19'-7"	14 1/2"	600	16'-8"	28'-11"	47'	37'-9"	"	"
CLOUDY & COLD	10 AM			19'-7"	14 1/4"	600	16'-8"	28'-11"	47'	37'-9 1/4"	"	"
	11 AM			19'-7"	14 1/4"	600	16'-8"	28'-11"	47'	37'-9 1/4"	"	"
LIGHT NOON	12 AM	46°		19'-7"	14 1/4"	600	16'-8"	28'-11"	47'	37'-9 1/4"	3.50 6PM	
RAIN	1 PM			19'-7"	14 1/4"	600	16'-8 1/4"	28'-11 1/4"	47'	37'-9 1/4"	"	"
	2 PM			19'-7"	14 1/4"	600	16'-8 1/2"	28'-11 1/4"	47'	37'-9 1/4"	"	"
	3 PM			19'-7"	14 1/4"	600	16'-8 3/4"	28'-11 1/2"	47'	37'-9 3/4"	"	"
	4 PM			19'-7"	14 1/4"	600	16'-8 3/4"	28'-11 1/2"	47'	37'-9 3/4"	"	"
	5 PM			19'-7"	14 1/4"	600	16'-9"	28'-11 3/4"	47'	37'-10"	"	"
	6 PM	46°		19'-7"	14 1/4"	600	16'-9"	28'-11 3/4"	47'	37'-10"	"	"
MODERATE RAIN	7 PM			19'-7"	14 1/4"	600	16'-9"	28'-11 3/4"	47'	37'-10"	"	"
	8 PM			19'-7"	14 1/4"	600	16'-9"	29'	47'	37'-10 1/4"	"	"

CUSTOMER TOWN OF BELFAST, ME.

R. E. CHAPMAN CO., OAKDALE, MASS. NO. 11

LOG OF PUMP TEST

TEL. WEST BOYLSTON TEmple 5-3727

DEC 31 1965

START PUMP TEST READINGS BELOW THIS LINE

Date, Weather and Sample Taken	Time	Water Temperature	Alt. Gauge Reading	Topo. Meas'nt in Well	Orifice Head in Inches	GPM	#29 Water Level	#31 Water Level	#1 WELL Water Level	#33 Water Level	#1 WELL 6 PM Water Level	
			STATIC	11-8½"		STATIC	9'-6"	23'-8"	18'	32'-11½"		
22 NOV. 65	9 PM	46°	49	19'-7"	14½"	600	16'-9"	29'	47'	37'-10¼"	350 GPM	
LIGHT RAIN	11 PM			19'-7"	14½"	600	16'-9"	29'	47'	37'-10½"	"	
	12 PM			19'-7"	14½"	600	16'-9¼"	29'	47'	37'-10⅜"	"	
23 NOV. 65	1 AM			19'-7"	14½"	600	16'-9¼"	29'-¼"	47'	37'-10¾"	"	
	2 AM			19'-7"	14½"	600	16'-9¼"	29'-¼"	47'	37'-10¾"	"	
SNOW	3 AM	46°		19'-7"	14½"	600	16'-9¼"	29'-⅛"	47'	37'-10¾"	"	
	4 AM			19'-7"	14½"	600	16'-9½"	29'-⅛"	47'	37'-11"	350 GPM	
	5 AM			19'-7"	14½"	600	16'-9⅛"	29'-⅛"	47'	37'-11¼"	"	
LIGHT	6 AM			19'-7"	14½"	600	16'-9⅛"	29'-¾"	47'	37'-11¼"	"	
SNOW	7 AM	46°		19'-7"	14½"	600	16'-9⅛"	29'-1"	47'	37'-11¾"	"	
			STOP	PUMP	TEST	START	RECOVERY	READINGS.				
	7:01 AM			18'-8½"	00	000	16'-9¼"					
	7:03 AM			18'-7½"			16'-8¼"	29'-⅛"	47'	37'-11"	350 GPM	
	7:05 AM			18'-5½"			16'-7¼"	29'-¼"	47'	37'-10¾"	"	
	7:15 AM			18'-4½"			16'-5¾"	29'-¼"	47'	37'-10¾"	"	
	7:30 AM			18'-2½"			16'-3½"	29'-¼"	47'	37'-10¾"	"	
	8 AM			18'-2"			16'-2¾"	29'-¼"	47'	37'-10¾"	"	
SNOW-RAIN	8:30 AM			18'-1¼"			16'-2"	29'-¼"	47'	37'-10¾"	350 GPM	
	9 AM			18'-½"			16'-1¼"	29'-¼"	47'	37'-10¾"	"	
	10 AM	8°	TEST	PULLED	OUT		16'	29'-¼"	47'	37'-10¾"	"	
	11:30 AM						15'-8"	29'-¼"	47'	37'-10¾"	"	
	2 PM						15'-5"	29'-¼"	47'	37'-10¾"	"	
24 NOV 65	7 AM						13'-11¼"	29'-"	47'-"	37'-10¾"	"	

Exhibit

D3

Capacity Evaluation for the Belfast Water District, Belfast, Maine

D3. Talbot Well Pumping Test Data (Caswell, 2005)

TABLE 2: SUMMARY OF DRAWDOWN DATA FOR THE 18-INCH WELL						
BELFAST WATER DISTRICT						
BELFAST, MAINE						
Oct-05						
Date and Time	Elapsed Time			Feet to Water		
		18-inch	TW-18	TW-5	TW-7	TW-16
	minutes					
Oct 25, 2005: 8:00 AM						
8:30	0	0	0	0	0	0
8:30:30	0.5	0.18	0.04			
8:31	1	0.18	0.1			
8:32	2	0.22	0.17			
8:33	3	0.23	0.11			
8:34	4	0.24	0.12			
8:35	5	0.25	0.14			
8:36	6	0.28	0.14			
8:37	7	0.28	0.14			
8:38	8	0.3	0.15			
8:39	9	0.3	0.16			
8:40	10	0.33	0.18			
8:50	20	0.4	0.26			
9:00	30	0.47	0.32			
9:10	40	0.5	0.44			
9:20	50	0.57	0.39			
9:30	60	0.59	0.5			
9:40	70	0.63	0.5			
9:50	80	0.65	0.55			
10:00	90	0.69	0.53			
10:10	100	0.73	0.6			
10:20	110	0.75	0.6			
10:30	120	0.76	0.66	0.4	0	0
2:30	360	1.13	0.93	0.68	-0.07	0.04
6:30	600	1.79	1.12	0.87	-0.1	0.1
10:30	840	1.42	1.31	0.97	-0.14	0.31
Oct 26, 2005: 2:30	1080	1.54	1.43	0.98	-0.21	0.43
6:30	1320	1.64	1.49	1.08	-0.2	0.67
8:30	1440	1.76	1.53	1.36	-0.35	0.88
8:50	1460	1.76	1.53	1.36	-0.35	0.88
8:50:30	1460.5	1.58	1.56			
8:51	1461	1.58	1.57			
8:52	1462	1.58	1.57			
8:53	1463	1.58	1.56			
8:54	1464	1.58	1.56			
8:55	1465	1.58	1.55			
8:56	1466	1.57	1.53			
8:57	1467	1.56	1.49			
8:58	1468	1.51	1.46			
8:59	1469	1.51	1.45			
9:00	1470	1.48	1.43			
9:10	1480	1.4	1.39			
9:20	1490	1.28	1.32			
9:30	1500	1.28	1.24			
9:40	1510	1.2	1.2			
9:50	1520	1.17	1.2			
10:00	1530	1.15	1.2			
11:00	1590	0.9	0.88	0.98		0.75

TABLE 1: SUMMARY OF ONE-DAY, CONSTANT-RATE PUMPING TEST DATA FOR THE 18-INCH WELL

BELFAST WATER DISTRICT
BELFAST, MAINE
Oct-05

Date and Time	Elapsed Time			Feet to Water			Pumping	Rainfall
		18-inch	TW-18	TW-5	TW-7	TW-16	Rate	
	minutes						gpm	inches
Oct 25, 2005: 8:00 AM							0	rain
8:30	0	20.39	16.89	22.51	0.83	1.17	0	rain
8:30:30	0.5	20.57	16.93				1242	rain
8:31	1	20.57	16.99				1242	rain
8:32	2	20.61	17.06				1242	rain
8:33	3	20.62	17				1242	rain
8:34	4	20.63	17.01				1242	rain
8:35	5	20.64	17.03				1242	rain
8:36	6	20.67	17.03				1242	rain
8:37	7	20.67	17.03				1242	rain
8:38	8	20.69	17.04				1242	rain
8:39	9	20.69	17.05				1242	rain
8:40	10	20.72	17.07				1242	rain
8:50	20	20.79	17.15				1242	rain
9:00	30	20.86	17.21				1242	rain
9:10	40	20.89	17.33				1242	rain
9:20	50	20.96	17.28				1242	rain
9:30	60	20.98	17.39				1242	rain
9:40	70	21.02	17.39				1242	rain
9:50	80	21.04	17.44				1242	rain
10:00	90	21.08	17.42				1242	rain
10:10	100	21.12	17.49				1242	rain
10:20	110	21.14	17.49				1242	rain
10:30	120	21.15	17.55	22.91	0.83	1.17	1242	rain
2:30	360	21.52	17.82	23.19	0.76	1.21	1242	rain
6:30	600	22.18	18.01	23.38	0.73	1.27	1242	rain
10:30	840	21.81	18.2	23.48	0.69	1.48	1242	rain
Oct 26, 2005: 2:30	1080	21.93	18.32	23.49	0.62	1.6	1242	rain
6:30	1320	22.03	18.38	23.59	0.63	1.84	1242	rain
8:30	1440	22.15	18.42	23.87	0.48	2.05	1242	rain
8:50	1460	22.15	18.42	23.87	0.48	2.05	1242	rain
8:50:30	1460.5	21.97	18.45				0	rain
8:51	1461	21.97	18.46				0	rain
8:52	1462	21.97	18.46				0	rain
8:53	1463	21.97	18.45				0	rain
8:54	1464	21.97	18.45				0	rain
8:55	1465	21.97	18.44				0	rain
8:56	1466	21.96	18.42				0	rain
8:57	1467	21.95	18.38				0	rain
8:58	1468	21.9	18.35				0	rain
8:59	1469	21.9	18.34				0	rain
9:00	1470	21.87	18.32				0	rain
9:10	1480	21.79	18.28				0	rain
9:20	1490	21.67	18.21				0	rain
9:30	1500	21.67	18.13				0	rain
9:40	1510	21.59	18.09				0	rain
9:50	1520	21.56	18.09				0	rain
10:00	1530	21.54	18.09				0	rain
11:00	1590	21.29	17.77	23.49		1.92	0	2.13

TABLE 1: SUMMARY OF THREE-DAY, CONSTANT-RATE PUMPING TEST DATA AT CURTIS ROAD WELL SIT

BELFAST WATER DISTRICT
BELFAST, MAINE
Jun-05

Date and Time	Elapsed Time			Feet to Water				Pumping	Rainfall
		8-inch	TW-18	TW-7	TW-5	TW-16	TW-1	Rate	
	minutes							gpm	Inches
June 14, 2005: 9:30	0	20.81	17.44	1.72	23.43	2.24	4.86	0	
9:30:30	0.5	23.8						475	
9:31	1	23.7	17.9					475	
9:32	2	23.7	17.89					475	
9:33	3	23.71	17.87					475	
9:34	4	23.71	17.87					475	
9:35	5	23.7	17.88					475	
9:36	6	23.71	17.88					475	
9:37	7	23.71	17.89					475	
9:38	8	23.71	17.89					475	
9:39	9	23.71	17.89					475	
9:40	10	23.72	17.9					475	
9:50	20	23.75	17.93					475	
10:00	30	23.77	17.96					475	
10:10	40	23.75	17.97					475	
10:20	50	23.8	18					475	
10:30	60	23.82	18.01					475	
10:40	70	23.84	18.02					475	
10:50	80	23.86	18.04					475	
11:00	90	23.86	18.05					475	
11:10	100	23.88	18.07					475	
11:20	110	23.88	18.06					475	
11:30	120	23.88	18.07	1.75	23.43	2.27	4.74	475	
12:30	180	23.92	18.07	1.75	23.44	2.26	4.72	475	
14:00	270	23.95	18.12	1.75	23.49	2.33	4.89	475	
16:00	390	24.02	18.18	1.75	23.75	2.36	4.65	475	
20:00	630	24.07	18.22		23.82	2.39	4.59	475	0.06
24:00:00	870	24.19	18.34		23.88	2.41	4.65	475	
June 15, 2005: 4:00	1110	24.28	18.39		23.97	2.49	4.51	475	
8:00	1350	24.29	18.46	1.79	24.01	2.53	4.5	475	0.05
12:00	1590	24.25	18.51		24.06	2.56	4.47	475	
16:00	1830	24.38	18.55	1.81	24.17	2.57	4.45	475	
20:00	2070	24.43	18.6		24.15	2.6	4.45	475	

Date and Time	Elapsed Time			Feet to Water				Pumping	Rainfall
		8-inch	TW-18	TW-7	TW-5	TW-16	TW-1	Rate	
	minutes							gpm	Inches
24:00:00	2310	24.48	18.64		24.18	2.63	4.43	475	
June 16, 2005: 4:00	2550	24.51	18.68		24.23	2.66	4.39	475	0.04
8:00	2790	24.53	18.71	1.85	24.26	2.71	4.38	475	
12:00	3030	24.54	18.76		24.29	2.72	4.38	475	
16:00	3270	24.58	18.79	1.89	24.33	2.75	4.36	475	
20:00	3510	24.63	18.82	1.9	24.34	2.69	5.16	475	
24:00:00	3750	24.68	18.85		24.36	2.85	5.31	475	
June 17, 2005: 4:00	3990	24.71	18.88		24.39	3	5.12	475	
8:00	4230	24.79	18.92	1.95	24.52	2.99	4.77	475	0.05
9:15	4305	24.78	19.01		24.54	3	4.73	475	
9:30	4320	24.78	19.01					475	
9:30:30	4320.5	22	18.63					0	
9:31	4321	21.97	18.59						
9:32	4322	21.95	18.57						
9:33	4323	21.94	18.56						
9:34	4324	21.93	18.55						
9:35	4325	21.91	18.55						
9:36	4326	21.92	18.55						
9:37	4327	21.89	18.54						
9:38	4328	21.89	18.54						
9:39	4329	21.9	18.53						
9:40	4330	21.89	18.53						
9:50	4340	21.84	18.49						
10:00	4350	21.85	18.46						
10:10	4360	21.82	18.44						
10:20	4370	21.8	18.42						
10:30	4380	21.77	18.4						
10:40	4390	21.75	18.39						
10:50	4400	21.74	18.38						
11:00	4410	21.71	18.36						
11:10	4420	21.7	18.35						
11:20	4430	21.71	18.34						
11:30	4440	21.7	18.33	1.95	24.33	2.88	4.67		
17:00	4830	21.5	18.1	1.92	24.08	2.67	4.5		
June 18, 2005: 8:30	5760	21.25	17.85	1.88	23.88	2.5	4.38		
15:30	6180	21.21	17.81	1.88	23.83	2.42	4.33		
June 19, 2005: 7:30	7140	21.04	17.64	1.88	23.71	2.29	4.33		
18:00	7770	21.04	17.64	1.88	23.71	2.24	5.21		

TABLE 2: SUMMARY OF DRAWDOWN DATA AT CURTIS ROAD WELL SITE							
BELFAST WATER DISTRICT							
BELFAST, MAINE							
Jun-05							
Date and Time	Elapsed Time			Feet of Drawdown			
		8-inch	TW-18	TW-7	TW-5	TW-16	TW-1
	minutes						
June 14, 2005: 9:30	0	0	0	0	0	0	0
9:30:30	0.5	2.99					
9:31	1	2.89	0.46				
9:32	2	2.89	0.45				
9:33	3	2.9	0.43				
9:34	4	2.9	0.43				
9:35	5	2.89	0.44				
9:36	6	2.9	0.44				
9:37	7	2.9	0.45				
9:38	8	2.9	0.45				
9:39	9	2.9	0.45				
9:40	10	2.91	0.46				
9:50	20	2.94	0.49				
10:00	30	2.96	0.52				
10:10	40	2.94	0.53				
10:20	50	2.99	0.56				
10:30	60	3.01	0.57				
10:40	70	3.03	0.58				
10:50	80	3.05	0.6				
11:00	90	3.05	0.61				
11:10	100	3.07	0.63				
11:20	110	3.07	0.62				
11:30	120	3.07	0.63	0.03	0	0.03	-0.12
12:30	180	3.11	0.63	0.03	0.01	0.02	-0.14
14:00	270	3.14	0.68	0.03	0.06	0.09	0.03
16:00	390	3.21	0.74	0.03	0.32	0.12	-0.21
20:00	630	3.26	0.78		0.39	0.15	-0.27
24:00:00	870	3.38	0.9		0.45	0.17	-0.21
June 15, 2005: 4:00	1110	3.47	0.95		0.54	0.25	-0.35
8:00	1350	3.48	1.02	0.07	0.58	0.29	-0.36
12:00	1590	3.44	1.07		0.63	0.32	-0.39
16:00	1830	3.57	1.11	0.09	0.74	0.33	-0.41
20:00	2070	3.62	1.16		0.72	0.36	-0.41

Date and Time	Elapsed Time			Feet of Drawdown			
		8-inch	TW-18	TW-7	TW-5	TW-16	TW-1
	minutes						
24:00:00	2310	3.67	1.2		0.75	0.39	-0.43
June 16, 2005: 4:00	2550	3.7	1.24		0.8	0.42	-0.47
8:00	2790	3.72	1.27	0.13	0.83	0.47	-0.48
12:00	3030	3.73	1.32		0.86	0.48	-0.48
16:00	3270	3.77	1.35	0.17	0.9	0.51	-0.5
20:00	3510	3.82	1.38	0.18	0.91	0.45	0.3
24:00:00	3750	3.87	1.41		0.93	0.61	0.45
June 17, 2005: 4:00	3990	3.9	1.44		0.96	0.76	0.26
8:00	4230	3.98	1.48	0.23	1.09	0.75	-0.09
9:15	4305	3.97	1.57		1.11	0.76	-0.13
9:30	4320	3.97	1.57				
9:30:30	4320.5	1.19	1.19				
9:31	4321	1.16	1.15				
9:32	4322	1.14	1.13				
9:33	4323	1.13	1.12				
9:34	4324	1.12	1.11				
9:35	4325	1.1	1.11				
9:36	4326	1.11	1.11				
9:37	4327	1.08	1.1				
9:38	4328	1.08	1.1				
9:39	4329	1.09	1.09				
9:40	4330	1.08	1.09				
9:50	4340	1.03	1.05				
10:00	4350	1.04	1.02				
10:10	4360	1.01	1				
10:20	4370	0.99	0.98				
10:30	4380	0.96	0.96				
10:40	4390	0.94	0.95				
10:50	4400	0.93	0.94				
11:00	4410	0.9	0.92				
11:10	4420	0.89	0.91				
11:20	4430	0.9	0.9				
11:30	4440	0.89	0.89	0.23	0.9	0.64	-0.19
17:00	4830	0.69	0.66	0.2	0.65	0.43	-0.36
June 18, 2005: 8:30	5760	0.44	0.41	0.16	0.45	0.26	-0.48
15:30	6180	0.4	0.37	0.16	0.4	0.18	-0.53
June 19, 2005: 7:30	7140	0.23	0.2	0.16	0.28	0.05	-0.53
18:00	7770	0.23	0.2	0.16	0.28	0	0.35

TABLE 3: SUMMARY OF RECOVER DATA AT CURTIS ROAD WELL SITE								
BELFAST WATER DISTRICT								
BELFAST, MAINE								
Jun-05								
T1 = Time Since	T2 = Time Since	T1 / T2			Feet of Drawdown			
Pumping Began	Pumping Ended		8-inch	TW-18	TW-7	TW-5	TW-16	TW-1
minutes	minutes							
4320.5	0.5	8641	1.19	1.19				
4321	1	4321	1.16	1.15				
4322	2	2161	1.14	1.13				
4323	3	1441	1.13	1.12				
4324	4	1081	1.12	1.11				
4325	5	865	1.1	1.11				
4326	6	721	1.11	1.11				
4327	7	618	1.08	1.1				
4328	8	541	1.08	1.1				
4329	9	481	1.09	1.09				
4330	10	433	1.08	1.09				
4340	20	217	1.03	1.05				
4350	30	145	1.04	1.02				
4360	40	109	1.01	1				
4370	50	87	0.99	0.98				
4380	60	73	0.96	0.96				
4390	90	49	0.94	0.95				
4400	100	44	0.93	0.94				
4410	110	40	0.9	0.92				
4420	120	37	0.89	0.91				
4430	130	34	0.9	0.9				
4440	140	32	0.89	0.89	0.23	0.9	0.64	-0.19
4830	530	9	0.69	0.66	0.2	0.65	0.43	-0.36
5760	1460	4	0.44	0.41	0.16	0.45	0.26	-0.48
6180	1880	3	0.4	0.37	0.16	0.4	0.18	-0.53
7140	2840	3	0.23	0.2	0.16	0.28	0.05	-0.53
7770	3470	2	0.23	0.2	0.16	0.28	0	0.35

Date and Time	Elapsed Time			Feet to Water				Pumping	Rainfall
		8-inch	TW-18	TW-7	TW-5	TW-16	TW-1	Rate	
	minutes							gpm	inches
24:00:00	2310	24.48	18.64		24.18	2.63	4.43	475	
June 16, 2005: 4:00	2550	24.51	18.68		24.23	2.66	4.39	475	0.04
8:00	2790	24.53	18.71	1.85	24.26	2.71	4.38	475	
12:00	3030	24.54	18.76		24.29	2.72	4.38	475	
16:00	3270	24.58	18.79	1.89	24.33	2.75	4.36	475	
20:00	3510	24.63	18.82	1.9	24.34	2.69	5.16	475	
24:00:00	3750	24.68	18.85		24.36	2.85	5.31	475	
June 17, 2005: 4:00	3990	24.71	18.88		24.39	3	5.12	475	
8:00	4230	24.79	18.92	1.95	24.52	2.99	4.77	475	0.05
9:15	4305	24.78	19.01		24.54	3	4.73	475	
9:30	4320	24.78	19.01					475	
9:30:30	4320.5	22	18.63					0	
9:31	4321	21.97	18.59						
9:32	4322	21.95	18.57						
9:33	4323	21.94	18.56						
9:34	4324	21.93	18.55						
9:35	4325	21.91	18.55						
9:36	4326	21.92	18.55						
9:37	4327	21.89	18.54						
9:38	4328	21.89	18.54						
9:39	4329	21.9	18.53						
9:40	4330	21.89	18.53						
9:50	4340	21.84	18.49						
10:00	4350	21.85	18.46						
10:10	4360	21.82	18.44						
10:20	4370	21.8	18.42						
10:30	4380	21.77	18.4						
10:40	4390	21.75	18.39						
10:50	4400	21.74	18.38						
11:00	4410	21.71	18.36						
11:10	4420	21.7	18.35						
11:20	4430	21.71	18.34						
11:30	4440	21.7	18.33	1.95	24.33	2.88	4.67		
17:00	4830	21.5	18.1	1.92	24.08	2.67	4.5		
June 18, 2005: 8:30	5760	21.25	17.85	1.88	23.88	2.5	4.38		
15:30	6180	21.21	17.81	1.88	23.83	2.42	4.33		
June 19, 2005: 7:30	7140	21.04	17.64	1.88	23.71	2.29	4.33		
18:00	7770	21.04	17.64	1.88	23.71	2.24	5.21		

TABLE 4: DISTANCE-DRAWDOWN DATA FOR THE CURTIS ROAD SITE		
BELFAST WATER DISTRICT		
BELFAST, MAINE		
Jun-05		
WELL	RADIAL DISTANCE IN FEET	DRAWDOWN IN FEET
8-inch	0.33	3.97
TW-18	2	1.57
TW-7	667	0.23
TW-5	381	1.11
TW-16	1,143	0.76