

**Fifty-Second  
Annual Report  
of the  
Trustees and Officers  
of the  
BANGOR WATER DISTRICT  
Bangor, Maine  
for the year ending  
December 31, 2009**

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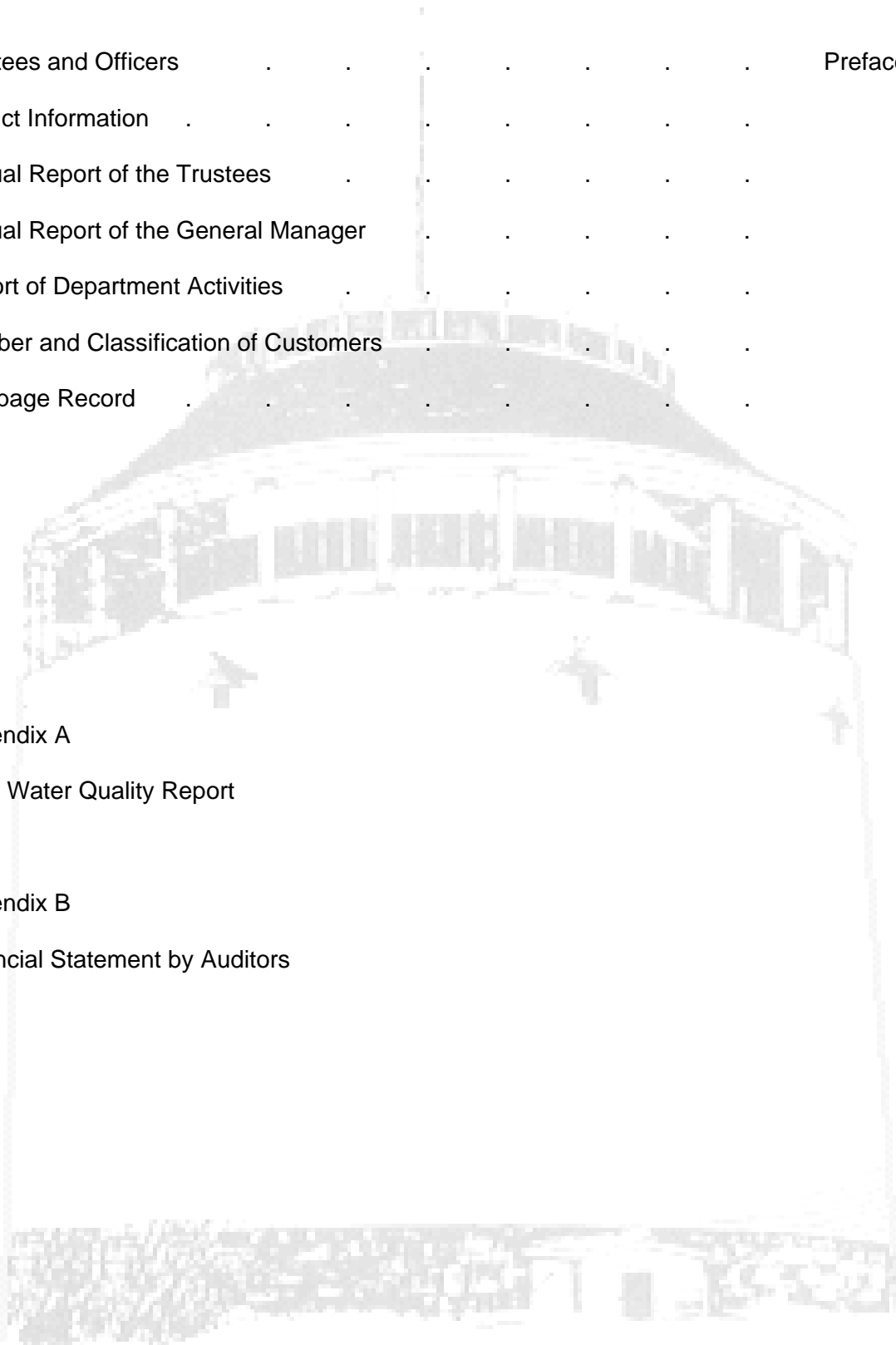
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**TRUSTEES OF  
BANGOR WATER DISTRICT  
2009**

G. Richard Doll, vice-chair	.	.	.	.	.	.	Term expires 2011
Ralph Foss, clerk	.	.	.	.	.	.	Term expires 2011
Richard Fournier II	,	.	.	.	.	.	Term expires 2010
Laurel Grosjean	.	.	.	.	.	.	Term expires 2011
Stanley J. Miller	.	.	.	.	.	.	Term expires 2012
James Rines	.	.	.	.	.	.	Term expires 2012
Bradford Wellman, chair	.	.	.	.	.	.	Term expires 2010

**OFFICERS OF  
BANGOR WATER DISTRICT  
2009**

Kathy Moriarty	.	.	.	.	.	.	General Manager
Weston Haskell	.	.	.	.	.	.	Assistant General Manager
Dana Smith	.	.	.	.	.	.	Treasurer/ Accounting and Finance Manager

## **BANGOR WATER DISTRICT General Information**

Did you know that

- \* The District pumps and treats approximately 5,000,000 gallons of water each day.
- \* The water is delivered through 180 miles of pipeline ranging up to 30 inches in diameter.
- \* The District supplies more than 55,000 people in the greater Bangor area.
- \* The water comes from Floods Pond in Otis, and is piped under the Penobscot River to reach Bangor. The Penobscot River was abandoned as a water source nearly 50 years ago.
- \* The District is a quasi-municipal corporation, chartered by the State of Maine, and is a separate entity from the City of Bangor. The formation of the District was approved by voters in 1957. The only source of revenue is money raised through water bills, public and private fire protection, and other utility services.

### **History**

In 1875, Bangor officials contracted with the Holly Co. for the installation of 76,951 feet of water mains to be used for domestic, industrial and fire protection utilizing water from the Penobscot River. Many of these lines are still in service today.

Bangor had experienced typhoid epidemics nearly every year in the late part of the 1800's and early 1900's. The City government appointed a citizen committee to ascertain the cause of the problem, and during the investigation it was noted that among the local schools, only those using "City" water had an incident of the disease. Other signs also indicated that the water supply was the principal carrier. To correct this situation, a filter plant was completed in 1908. This plant utilized coagulation, sedimentation, and filtration, and was capable of handling 8,000,000 gallons of water per day. Later, chlorination facilities were installed to provide disinfection.

Orderly growth of the system continued until 1957 when it was agreed--after long debate--that Bangor must switch its water supply from the river (heavily polluted by upstream dumping of sewage and mill waste) to some other source if the quality of water provided to the citizens was to be improved.

An act of the Maine Legislature in 1957 created the Bangor Water District, which was approved in a City referendum. After formation of a Board of Trustees, the title to the City water system was handed to the new water district. In essence, the act authorized the District to control a number of ponds to supply water to Bangor and surrounding towns. Floods Pond in Otis was chosen following careful testing over a number of years by the District. A total of \$4,000,000 in Series "A" bonds financed construction of a new pump station at Floods Pond and a transmission line from the pond to Bangor.

With the new system in operation in 1959, the water-powered Deane Pump located in the old water works building on the Penobscot River gave way to electric turbine pumps at Johnston Pump Station at Floods Pond. Subsequently the old filter plant building on State Street was converted to work shops and storage space, and a new office building was constructed. The "new" water from Floods Pond was of such high quality that it did not require extensive treatment to place it in a ready state for consumption.

In the ensuing decades, increasingly sophisticated equipment was added to the District's facilities, the Thomas Hill Standpipe became a National Historic landmark, and customers were changed from "flat rate" to "metered" service to provide more equitable distribution of charges and to encourage conservation.

In 1995, a new treatment plant was constructed on the access road to Floods Pond in response to changing federal regulations. The plant utilizes ozone--instead of chlorine--as the primary disinfectant, and chloramines (a combination of chlorine and ammonia) as a secondary disinfectant.

At the invitation of the Town of Hermon in 1999, the District expanded its service area with a 14,000-foot extension of 12-inch main on Odlin Road from Dowd Road in Bangor into Hermon and along Coldbrook Road. The expansion, funded by the Town of Hermon, also included more than a dozen new hydrants, and a new standpipe and control valve facility to control standpipe levels.

In 2002, at the invitation of the Town of Orrington, BWD expanded its existing service area. The Town completed a 3500-foot extension of BWD's line serving customers along Rt. 15, funded by the municipality. The new 12-inch pipe will provide water service to 70 or more potential customers, and interconnects with City of Brewer's water distribution system for emergency use.

### **Source of Supply**

The source of supply for the Bangor Water District is Floods Pond in Otis. The pond lies 15 miles east of Bangor in a rocky, rugged area which was scoured by the retreating glaciers. The pond supplies an excellent source of water that is clear, soft and palatable year-round. The watershed has an area of approximately 8.7 square miles. The estimated dependable yield of Floods Pond is about 8.2 million gallons per day. In order to protect the source of water, the District originally acquired a strip of land 200 feet wide around the periphery of Floods Pond and Burnt Pond, and in recent years has purchased several thousand additional acres of land in the watershed area to control activities which could impact on water quality.

### **Johnston Pump Station**

Johnston Pump Station, located on the shore of Floods Pond, is named after Donald Johnston, a former District superintendent. The station has two 36-inch diameter intake pipes; one is in approximately 13.5 feet of water, and the second is in about 23 feet of water. Four vertical well-type electrically driven 150 hp pumps are on site, each capable of pumping five million gallons per day. From 1957 to 1995, raw water was treated at this pump station.

## **Butler Ozone Treatment Facility**

Beginning in 1995, chemical dosing was moved to the new Butler Ozone Treatment Facility located about a mile from the original station. The water is treated with ozone and chloramines for disinfection, soda ash for pH adjustment, and fluoride for dental health. It is interesting to note that the pond has a natural fluoride content of about 0.20 ppm.

The Butler facility was named for Paul G. Butler of Bangor, who worked a total of 33 years for the City Water Department that then became the Bangor Water District. In addition to serving as chemist and assistant superintendent, Butler was responsible for much of the testing that resulted in Floods Pond being chosen as the source of supply.

Both plants have auxiliary generators to ensure lights, heat and pumping facilities during a power failure. The ozone facility is manned by operators 24 hours a day, seven days a week who control water pumpage and treatment and monitor other District storage and pump facilities through a computer network.

## **Pump Stations and Standpipes**

Three pump stations in Bangor are used to control water flow. These are:

- Griffin Road, built in 1987
- Perry Road, built in 1988
- Bangor International Airport, built in 1943, which underwent extensive renovations in 1994. The station named in honor of Harold Crane of Bangor, a retired 43-year employee and former service truck supervisor.

Water--totaling 11,850,000 gallons—is stored in six standpipes for daily drawdown and for emergency purposes. These are:

- Thomas Hill--which holds 1,750,000 gallons and is a riveted wrought iron tank with a wood jacket. It is located on Thomas Hill, rises 50 feet, and is 75 feet in diameter. The tank, built in 1897, is the District's oldest standpipe. It is a national historic landmark as designated by the Register of Historic Places and the Maine Historic Preservation

Commission. It is also designated an American Water Landmark by the American Water Works Association, and a state historic civil engineering landmark by the Maine Chapter of the American Society of Civil Engineers. The lights which illuminate the top at night resemble a queen's crown, in keeping with Bangor being known as the "Queen City."

- Bomarc--a welded steel tank located at the former Bomarc base which holds 1,500,000 gallons. This standpipe was constructed in 1986.
- Essex Street—a steel tank built in 1933 and holding 2,000,000 gallons, the tank is 47 feet high and 85 feet in diameter. A second tank – built in 1958 – was taken down in 2009 and will be replaced with a new concrete tank.
- Hammond Street--a steel welded tank holding 5,000,000 gallons. It stands 74 feet high and is 110 feet in diameter. It was built in 1963.
- Bangor International Airport--a 1,000,000 gallon standpipe which stands 100 feet high. It was built in 1944, and is painted in an orange-and-white checkerboard fashion due to its proximity to runways.
- Hermon – the District's newest standpipe, built in 1999. Holding 600,000 gallons, the standpipe is located on the Coldbrook Road in Hermon and was constructed as part of the Hermon service area expansion.

### **SCADA System**

Operation of the pump station and standpipes, chemical dosing, and monitoring equipment are supported by a System Control and Data Acquisition system (SCADA) computer. The computer is monitored from the engineering department on State Street in Bangor and at the ozone plant. This SCADA system helps operate all BWD transmission and distribution facilities, and is designed to continue operating in case of power loss. The SCADA system utilizes telephone telemetry to communicate with the 14 remote sites which it monitors and operates on a continuous basis. In the event that all communications are lost, there is a small computer at each pump station designed to allow continued operation. Many other functions

such as intrusion alarms, temperature control, etc. are monitored by the SCADA system. The system is capable of monitoring up to 99 sites, thus giving the District expansion capabilities in the future.

### **Transmission Lines**

Transmission facilities include a 30-inch reinforced pre-stressed concrete pipeline from Floods Pond to the Penobscot River (76,821 feet in length). The main runs along the side of Burnt, Little Burnt, and Snowshoe ponds, and then west to Eddington. A 5.5-mile private road runs over the transmission line to the intersection with Rt. 9, at which point the line then runs along Route 9. On the east bank of the Penobscot River, the transmission line splits into two 24-inch pre-stressed reinforced concrete mains which pass under the river.

On the west bank of the river in Veazie, the two lines rejoin and form a single 30-inch main which runs to a control valve facility, and on to Mount Hope Avenue and into the City.

### **Customer Service**

There are approximately 11,000 services (direct water connections) which provide service to approximately 10,500 domestic accounts and 500 fire protection services. Domestic water customers are charged based on the amount of water use measured by a meter. Fire protection is provided through 1110 public hydrants and 220 private hydrants.

The District also provides water directly to customers in sections of Clifton, Eddington, Hermon, Orrington, Hampden, and Veazie, as well as to the Hampden Water District.

The water provided meets all of the maximum contaminant level requirements of the Safe Drinking Water Act. The District monitors the water quality for bacteriological contamination each working day in its own certified laboratory to ensure it meets all regulations.

**ANNUAL REPORT  
OF THE BOARD OF TRUSTEES  
BANGOR WATER DISTRICT  
2009**

On behalf of the Board of Trustees, I am pleased to present the 52nd annual report of the Bangor Water District.

At the Board's **annual meeting**, the following officers were chosen: Bradford Wellman, chair; G. Richard Doll, vice-chair; and Ralph Foss, clerk. Kathy Moriarty was appointed as General Manager, and Dana J. Smith was appointed as Treasurer.

During the year, Trustees Miller and Rines joined the Board. Departing Trustees Hwalek and Wellington were presented with a plaque acknowledging their service.

Several major projects headed the Board's agenda in 2009, all related to long-term planning and supported by ARRA funding, bond funding, and a rate adjustment. These included:

- Planning for federally mandated installation of **additional treatment methods** (such as ultra-violet disinfection) which must be in place at Floods Pond by 2013. (The alternative to UV disinfection could be construction of a filter plant at a cost of \$40 million.)
- Planning for an **overhaul of Johnston Pump Station**, virtually untouched since it was constructed in 1958.
- Consideration of **extending and lowering the intake lines** at Floods Pond to deeper, cooler waters. The lower intake level would provide additional water flow under drought conditions, and would also bring cooler water into the treatment plant which would reduce disinfection costs associated with warmer summer water temperatures.
- **Replacement of the Essex Street four-million-gallon** standpipe which has pitting in its metal surface and significant rusting on the dome supports. The exterior of the tank was last painted in 1997, and the interior in 1974.

These were among the projects submitted and approved for \$2.1 million in **ARRA funding**, in the form of a 30 percent grant and a no-interest loan. The money supported planning and engineering associated with the first three items, and construction of a new 3.4-million-gallon concrete tank at Essex Street.

The Board opted for a concrete tank based on operating and maintenance costs compared to a steel tank. Once the new tank is on line, the two-million-gallon standpipe will be removed as well. Construction began in August, and completion is expected in the spring of 2010.

The District was able to secure a \$49,500 grant from Efficiency Maine to help fund a “passive” water mixing system inside the standpipe, a change that should save approximately \$9,000 per year in electrical costs.

Meetings were held on-site with the **District’s consulting engineers** regarding the interconnected projects of designing the additional treatment facilities for LT-2 (Long-Term 2) compliance, renovating Johnston Pump Station, and extending the intake lines. Many items will need to be addressed including location of the treatment in the disinfection process, types of UV reactors and associated costs, and evaluation of JPS pumpage.

The District had initially explored seeking an **exemption from LT-2 compliance** – based on the exceptional quality of Floods Pond water – but increasing requirements and criteria from federal regulatory agencies made the likelihood unlikely and expensive. The Board continues to monitor developments on this front while proceeding with conceptual design work.

A **rate adjustment** to support current operations and long-term planning was approved by the Maine Public Utilities Commission for implementation on July 1. As a result of the change, the average residential water bill increased eight cents per day.

For the second year in a row, metered water consumption declined by two percent, but expenses to maintain the water system infrastructure continue to increase. The District continues to search for ways to **reduce costs**, such as:

- Participating in several programs through our electrical supplier to reduce costs (saving \$44,000 in 2009). These include careful planning of our pumping/treatment needs to allow going “off-grid” by using generators when New England’s energy demands are highest. Last year, treatment plant electrical costs totaled \$262,476
- Maintaining our permanent work force at 31 employees in spite of increased work-load demands (this level has remained constant since 1995), and opting for no cost of living increases for 2010.
- Switching from tablet to liquid chlorine, a lower cost product, as part of the disinfection process. This is a follow-up to a change several years ago from gas to liquid ammonia—a safer and less expensive chemical.
- Opting for quarterly/monthly bids on disinfection chemicals when annual quotes were considerably higher than usual due to unstable market conditions.
- Rebidding insurance coverage (other than health and worker’s comp policies) resulting in a reduction in cost
- Installing energy-efficient lighting at the State Street facility, and maintaining temperature set-backs for heating and cooling buildings.

Work continued on a **second interconnect project** – funded by the Brewer Water Department - at a site on the Rooks Road. The interconnect and associated pumps/valves allows the two utilities to feed water to each other in an emergency situation or during maintenance shut-downs. After testing, Bangor supplied water to Brewer for several weeks in late 2009 while Brewer performed work on its intake lines.

An initial interconnect was installed by Bangor on the Penobscot River bridge in the 1990’s.

The long-anticipated **energy-recovery turbine project** at the Veazie control valve site moved closer to completion with the resolution of several items with the Federal Energy Regulatory Commission and Bangor Hydro-Electric Co. Following design and installation of a surge anticipation valve to protect the transmission line, actual power generation is anticipated in early 2010.

The District continues to support work done by the University of Maine on the **arctic charr population** in Floods Pond. UMaine monitors the population activity, including tagging of fish and observation of the spawning beds. Due to cutbacks in recent years, the District has assisted in funding the University's Floods Pond Student Fellowship. The recipient conducts research, reports on the research to the District and the Maine Department of Inland Fisheries and Wildlife, and participates in the District's annual Open House. This year's \$3,100 includes a \$1000 stipend for the grad student (an amount which has remained consistent) and the remainder for equipment, travel, and other expenses.

The Trustees approved the District's participation in Maine **WARN**, a formalization of mutual aid for utilities throughout the state. Participation enhances BWD's access to resources for information during emergencies.

The Board continues to meet quarterly with the **Bangor City Council**. The members have a standing invitation to visit our facilities and learn about our operations.

In closing, I wish to thank the Board members and the utility staff for their efforts on behalf of the District and its customers.

Respectfully submitted,  
**BANGOR WATER DISTRICT**

Bradford Wellman, chair

**ANNUAL REPORT  
OF THE GENERAL MANAGER**

**BANGOR WATER DISTRICT  
2009**

I am pleased to present my annual report as General Manager of the Bangor Water District. Work in 2009 at the District continued on several fronts:

- Efforts by the engineering department resulted in significant progress on its **GIS system**, essentially a transition from paper to electronic maps. The change included investigating and selecting software, training, and field work to gather and enter coordinates - marking District facilities as small as valves. To free time for staffers, Dig-Safe work was contracted out to On-Target, with half of the expense covered by a state System Capacity Grant.
- Approximately **100 service boxes were** repaired or replaced by the Construction Department as part of the year's emphasis on maintenance items. The work will provide easier operation of the valves for a variety of purposes.
- A new and long-anticipated customer information and **billing system** – shared with the City of Bangor's Wastewater Department - was installed in the fall of this year. The Windows-based software provides flexibility not offered by a decade-old DOS system.

Replacement of the District's **unleaded fuel tank** was necessary due to a leak between the tank's inner and outer walls. Staff reviewed various scenarios including continuing the interim approach of purchasing fuel elsewhere, replacing tank in the same location, or installing an above-ground tank. After analyzing the costs and the various requirements for each option, the most economical approach – based on a 20-year tank life – was to install a new in ground tank. This approach allows the District better control over its fuel supply, and as the old tank is still under warranty, some money may be forthcoming from the vendor.

Planning began for **replacement of the District's SCADA system** – purchased in 1987 – that operators use to monitor and control the water treatment and distribution systems. Outdated software, limited functionality, and dwindling support make it necessary to upgrade to the next generation of software. The District will include funding in its 2010 budget request, and will also seek state grant/loan funding.

Service Department personnel continued the transition to **radio-read meters**, installing some 800 new units as part of a multi-year project. The meters reduce reading time and thereby avoid the cost of additional personnel as our service base grows.

Over 1200 cords of wood were harvested for a 70 acre area in the District's watershed during the **2009 harvest**, producing revenue – after expenses – of \$18,600. The utility's forestry consultant has mapped out an area in the southern part of the watershed for the 2010 project, which will include a biomass harvest in accordance with the Biomass Crop Assistance Program.

The District hosted 350 students (the largest number in several years) for its annual Open House at Floods Pond to mark **National Drinking Water Week** in May. Representatives from the University of Maine (charr management) and American Forest Management (BWD's woodland manager) also participated.

The **quarterly tours of Thomas Hill Standpipe** continue to draw interested visitors, including 252 for the winter tour, 783 for the spring tour, 761 for the summer tour, and 817 for the fall tour.

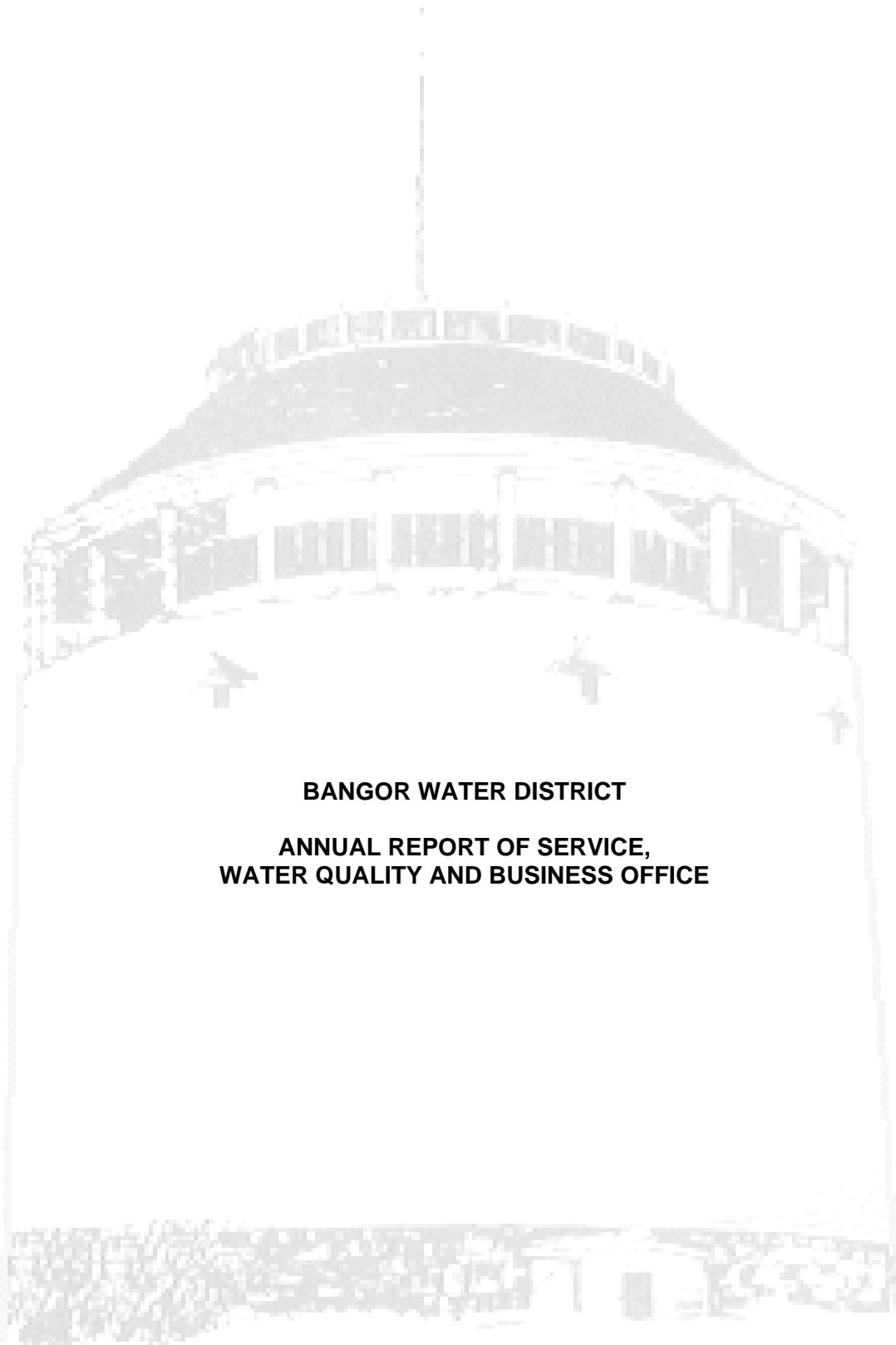
Other items of note:

- Maintenance Supervisor Charlie Baker retired after almost 40 years of service. A restructuring of the engineering and maintenance departments will result the hiring of an assistant engineer.
- Employee Larry Howes, a water treatment plant operator, completed 35 years of service at BWD.
- Water treatment plant operator Richard Gustafson passed away after an extended illness, and operator Bob Stetson retired. Both were replaced with new employees.
- Office Manager Kim Marchegiani received the Sid Anthony Award from Maine Water Utilities Association
- District employees were recognized by the Bangor City Council with a proclamation recognizing their “around the clock” delivery of services, often under less than ideal conditions.
- The annual newsletter and water quality report were mailed to all customers
- Staff attended the American Water Works Association, the Maine Rural Water Association, and the Maine Water Utilities Association conferences.

In closing, I wish to extend my thanks to the Board, our customers, and all of the employees for their continued support during the past 12 months.

Respectfully submitted,  
**BANGOR WATER DISTRICT**

Kathy Moriarty, General Manager



**BANGOR WATER DISTRICT**  
**ANNUAL REPORT OF SERVICE,  
WATER QUALITY AND BUSINESS OFFICE**

<b><u>Service Dept:</u></b>	<b><u>2005</u></b>	<b><u>2006</u></b>	<b><u>2007</u></b>	<b><u>2008</u></b>	<b><u>2009</u></b>
Number of meter readings collected:	44,530	44,720	46,881	47,346	45,516
Number of meters tested:	985	708	420	113	92
Number of meters set/removed:	1,690	1,916	888	2,146	1,642
Number of service assignments completed:	6,183	5,400	5,094	5,741	5,267

**Water Quality:**

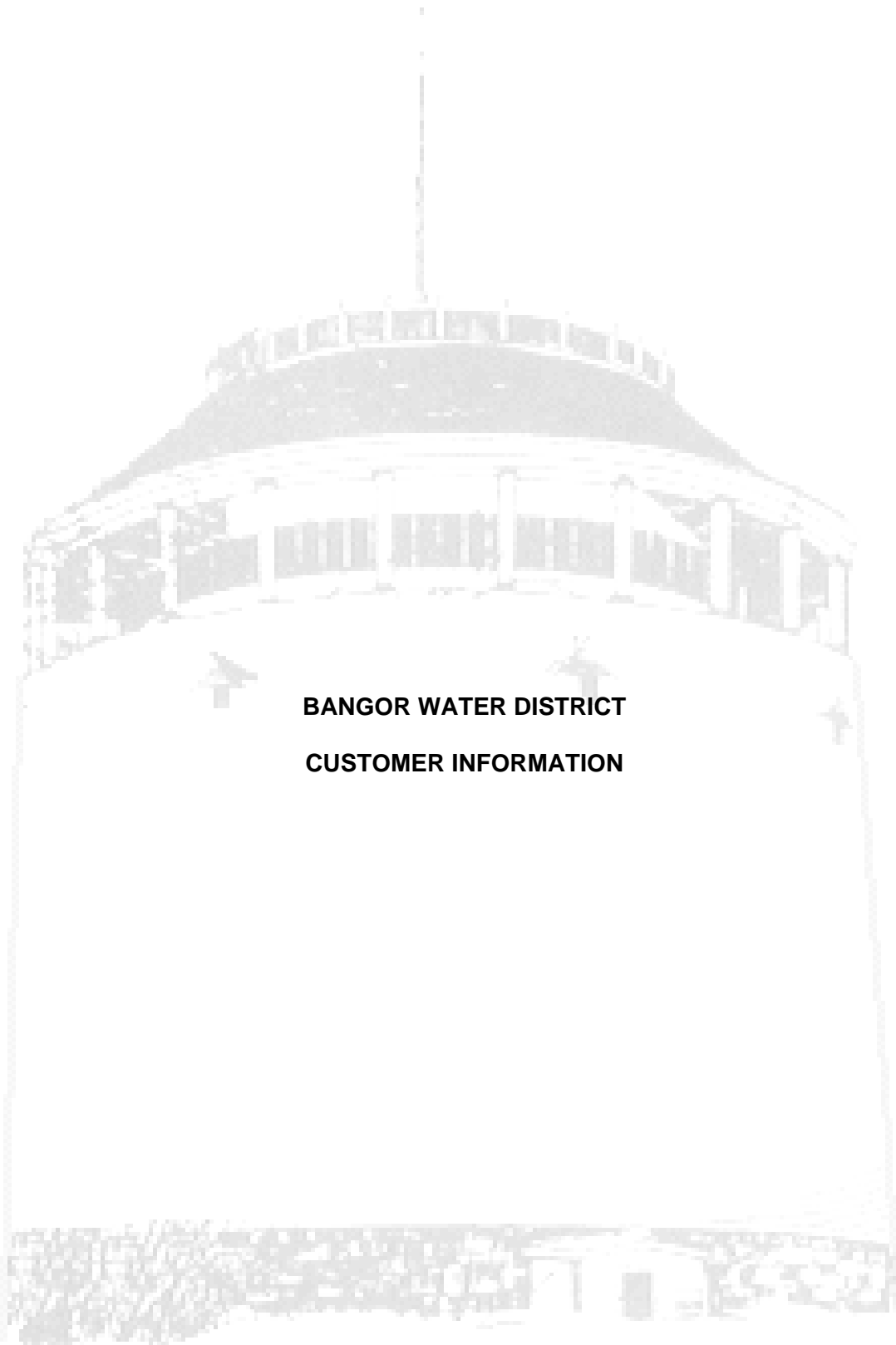
Total number of BWD samples:	2,850	2,939	2,539	3,158	3,156
Number of tests performed:	14,496	13,873	12,164	12,910	13,182
Total number of other utility samples:	766	665	894	723	726
Number of tests performed:	1,608	1,549	1,818	1,469	1,448
Water quality complaints investigated:	37	40	27	29	28

**Business Office:**

Number of service slips processed:	6,074	5,274	4,908	5,471	5,380
Number of bills issued:	39,683	40,597	40,390	44,737	42,781
Amount of BWD water payments processed:	\$4,025,184	\$3,933,334	\$4,202,788	\$4,338,581	\$4,538,590
Amount of water payments collected by City of Bangor sewer department	\$201,598	\$199,573	\$192,669	\$197,487	\$182,602
Amount of sewer payments collected by BWD	\$4,129,625	\$3,856,613	\$4,197,024	\$4,346,633	\$4,366,487

**Collections**

Number of bills issued:	39,683	40,597	40,390	44,737	42,781
Number of residential late notices mailed	3073	3336	3812	3720	3585
Average amount of overdue residential bill	\$45.59	\$45.25	\$44.86	\$49.00	\$50.00
Number of non-residential late notices mailed	363	382	415	383	370
Average amount of overdue non-residential bill	\$153.56	\$132.98	\$125.91	\$116.00	\$114.00
Number of accounts shut off for non-payment	53	62	73	75	88



**BANGOR WATER DISTRICT  
CUSTOMER INFORMATION**

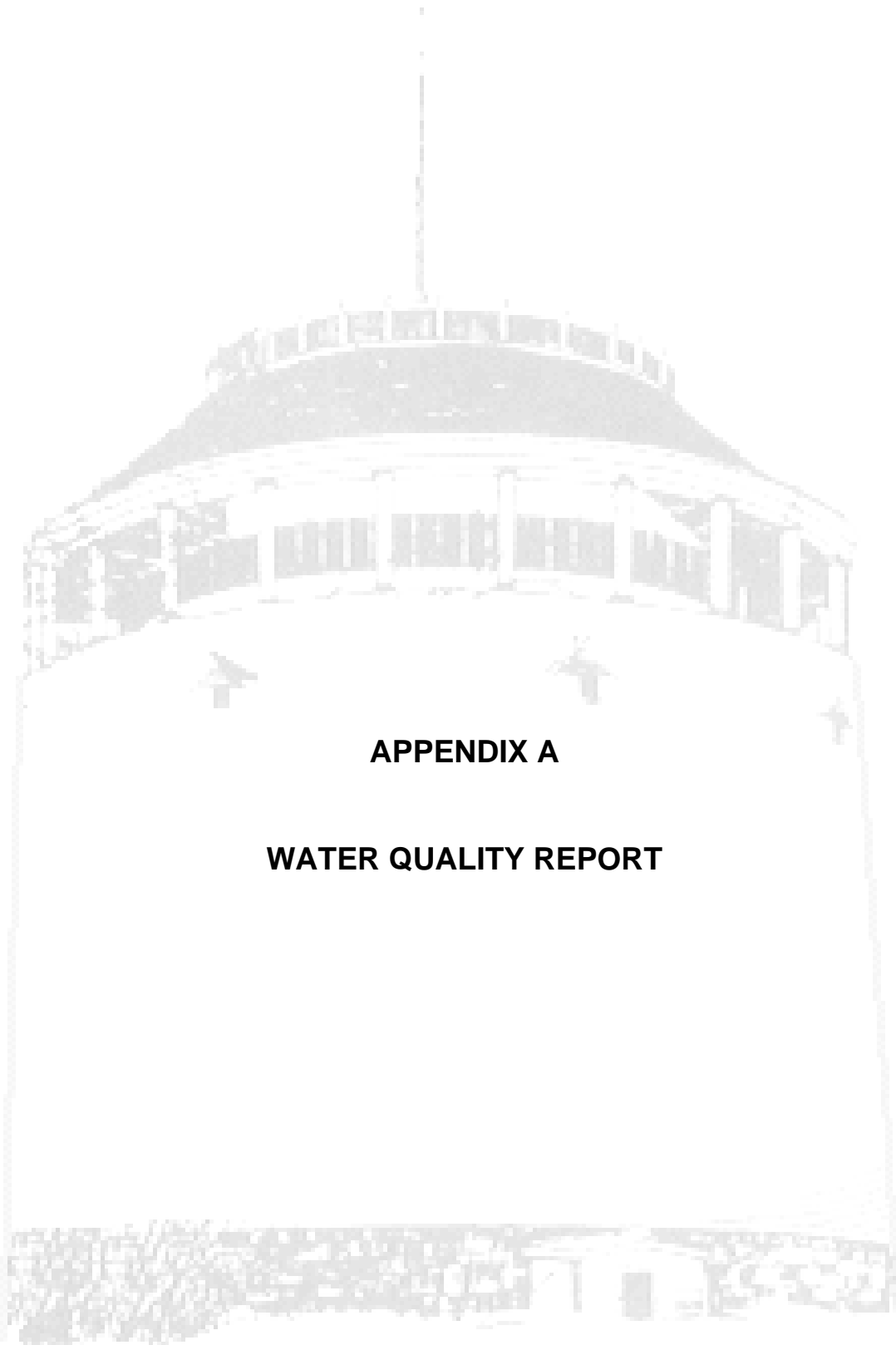
## BANGOR WATER DISTRICT

### CUSTOMER INFORMATION

<b>Number and Classification of Billed Accounts</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Residential	8,509	8,545	8,622	8,641	8,665
Commercial	1,429	1,454	1,457	1,473	1,536
Industrial	23	20	18	18	25
Governmental	456	451	456	456	486
Fire Protection	448	464	487	497	508
Hampden Water District	5	5	4	4	4
	10,870	10,939	11,044	11,089	11,224

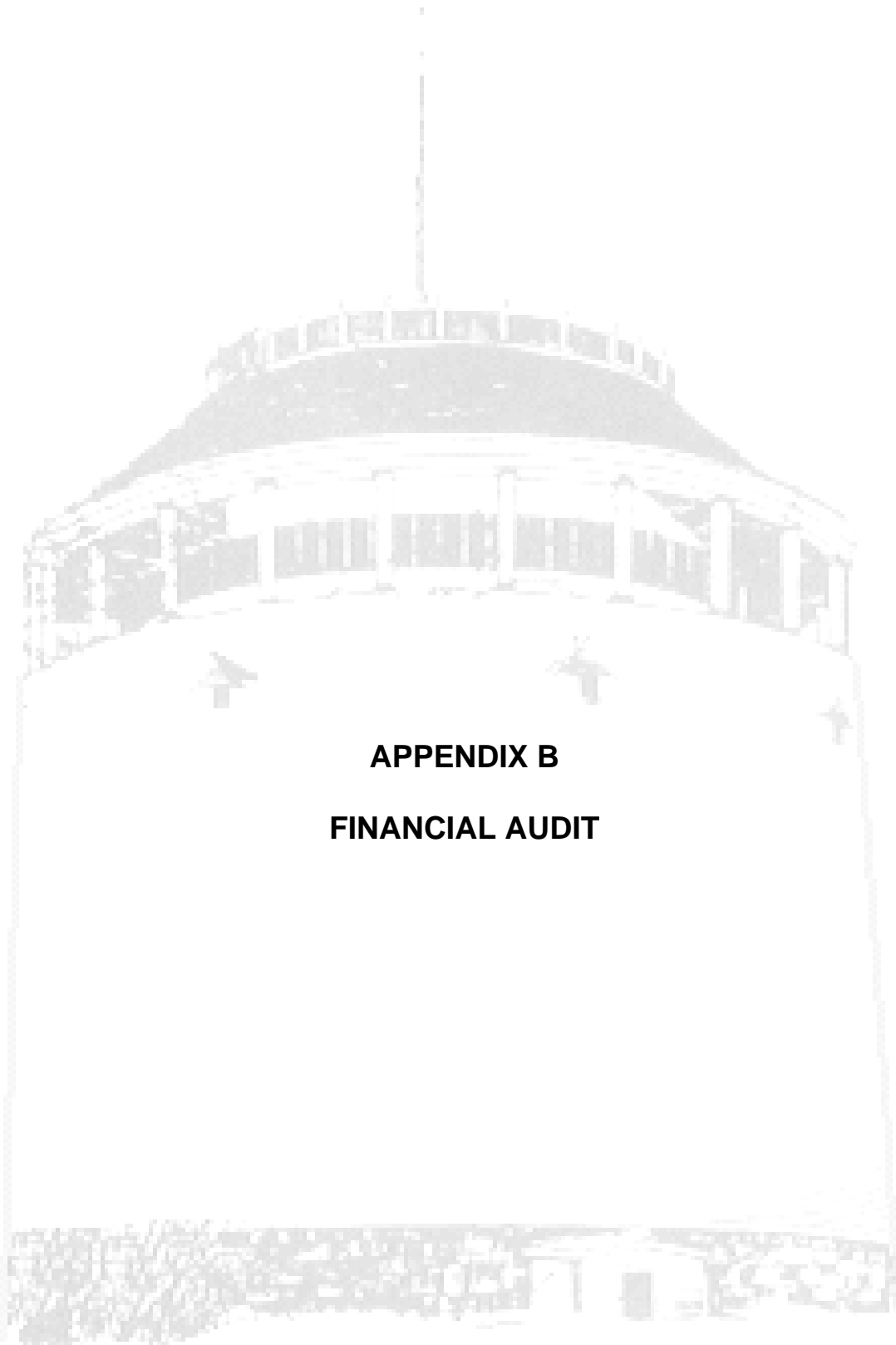
### Pumpage (gallons)

January	151,114,000	148,714,000	139,487,000	156,692,000	139,166,000
February	138,614,000	134,882,000	133,060,000	152,584,000	148,334,000
March	153,220,000	146,104,000	153,130,000	157,156,000	138,719,000
April	144,182,000	151,606,000	149,775,000	153,094,000	132,101,000
May	148,257,000	158,760,000	161,904,000	162,390,000	141,755,000
June	161,031,000	152,474,000	177,874,000	161,952,000	147,681,000
July	172,767,000	170,396,000	171,859,000	175,981,000	146,044,000
August	177,236,000	169,646,000	176,061,000	160,078,000	164,653,000
September	164,334,000	163,798,000	160,708,000	154,032,000	162,858,000
October	154,655,000	169,045,000	157,610,000	159,451,000	149,897,000
November	147,427,000	146,631,000	154,068,000	152,355,000	157,232,000
December	149,157,000	137,837,000	150,544,000	136,768,000	136,139,000
	1,861,994,000	1,849,893,000	1,886,080,000	1,882,533,000	1,764,579,000



**APPENDIX A**

**WATER QUALITY REPORT**



**APPENDIX B**

**FINANCIAL AUDIT**