

**ANNUAL REPORT OF WATER USE IN
THE APPROVED SERVICE AREA
AND RETURN FLOW
FOR THE
CITY OF
NEW BERLIN, WISCONSIN**

WAUKESHA COUNTY, WISCONSIN
MARCH 2011

RECEIVED-DNR

MAR 14 2011

DRINKING WATER & GW



Prepared By: City of New Berlin Water Utility
16450 W National Avenue
New Berlin, WI 53151

TABLE OF CONTENTS

INTRODUCTION.....	1
SECTION 1 - THE TOTAL AMOUNT OF WATER PURCHASED FROM THE CITY OF MILWAUKEE.....	1
SECTION 2 - THE AMOUNT OF WATER SOLD TO EACH CATEGORY AND SUBCATEGORY OF CUSTOMER ON A QUARTERLY BASIS WITHIN THE CITY LIMITS	2
SECTION 3 - THE AMOUNT OF WATER SOLD TO EACH CATEGORY AND SUBCATEGORY OF CUSTOMER ON A QUARTERLY BASIS WITHIN THE APPROVED DIVERSION AREA	2
SECTION 4 – AVERAGE RESIDENTIAL PER CAPITA USE.....	2
SECTION 5 – A DESCRIPTION OF THE EFFORTS MADE BY THE CITY TO IMPROVE WATER CONSERVATION AND EFFICIENCY AND MINIMIZE INFILTRATION AND INFLOW TO THE SANITARY SEWER SYSTEM	2
Water Conservation	2
Infiltration and Inflow (I/I)	3
SECTION 6 – ESTIMATES OF THE MONTHLY SEWERAGE RETURN FLOW FROM WITHIN THE APPROVED WATER SUPPLY SERVICE AREA	5

ANNUAL REPORT OF WATER USE, WATER DIVERSION AND RETURN FLOW FOR THE CITY OF NEW BERLIN, WISCONSIN

INTRODUCTION

The information contained in this document provides the needed data and related explanations of the data required to satisfy the conditions of the WATER SUPPLY SERVICE AREA PLAN AND DIVERSION APPROVAL issued by the Wisconsin Department of Natural Resources (DNR) dated May 21, 2009. In particular, the data and explanations report the following information for calendar year 2010 for the City of New Berlin (CITY):

1. The total amount of water purchased from Milwaukee.
2. The amount of water sold to each category and the subcategory of customer on a quarterly basis within the City limits.
3. The amount of water sold to each category and the subcategory of customer on a quarterly basis within the approved diversion area.
4. Average residential per capita use.
5. A description of the efforts made by the City to improve water conservation and efficiency and minimize the infiltration and inflow into the sanitary system.
6. Estimates of the total monthly sewerage flow within the City.
7. Estimates of the monthly sewerage return flow from within the approved water supply service area.

The information is presented in 6 sections with titles identical to those above. Data is presented in a tabular format preceded by explanation of each table, how the data was obtained and how the data was interpreted using estimating techniques, engineering judgment and data analysis. Table titles first contain the section number they refer to then the number of the table.

SECTION 1 - THE TOTAL AMOUNT OF WATER PURCHASED FROM THE CITY OF MILWAUKEE

The City of Milwaukee provides all of the water currently used by the CITY. In 2009, the CITY still used groundwater until July for some of their water needs. In July, the improvements needed to allow the entire CITY to be served with Lake Michigan water via the City of Milwaukee were completed, thus allowing for discontinuance of the use of groundwater supplies. These projects were completed following the Diversion Approval mentioned above.

Table 1-1 provides the "Total Amount of Water Purchased from the City of Milwaukee" as measured by Milwaukee and billed to the CITY. Table 1-1 contains two columns, the first listing the month and the second representing the total combined water pumpage from the two Milwaukee water pumping stations serving the CITY. The volumes' reported are in gallons per month and totaled for the year.

SECTION 2 - THE AMOUNT OF WATER SOLD TO EACH CATEGORY AND SUBCATEGORY OF CUSTOMER ON A QUARTERLY BASIS WITHIN THE CITY LIMITS

The CITY records and reports all water sold in a report to the Wisconsin Public Service Commission (PSC) by customer class each year. The four customer classes are Residential, Commercial, Industrial and Public. The CITY can further break these water sales records down by geographic location east and west of the subcontinental divide and by residential units comprised of condominiums and apartments that are tracked as commercial establishments. Table 2-1 provides a breakdown of these water sales on a quarterly basis for the entire City and by the standard PSC customer classes and the subcategories tracked by the CITY.

SECTION 3 - THE AMOUNT OF WATER SOLD TO EACH CATEGORY AND SUBCATEGORY OF CUSTOMER ON A QUARTERLY BASIS WITHIN THE APPROVED DIVERSION AREA

Table 3-1 reports only water used in the Approved Diversion Area on a quarterly basis by Major Category and also provides a breakdown of residential use by condominiums and apartments in the Approved Diversion Area.

SECTION 4 – AVERAGE RESIDENTIAL PER CAPITA USE

Table 4-1 provides a calculation of average residential per capita use. That calculation shows residential per capita use to be 60.38 gallons per capita per day City wide. The calculation takes into account single family residential, condominium residential, and apartment residential and also breaks the information down by basin.

SECTION 5 – A DESCRIPTION OF THE EFFORTS MADE BY THE CITY TO IMPROVE WATER CONSERVATION AND EFFICIENCY AND MINIMIZE INFILTRATION AND INFLOW TO THE SANITARY SEWER SYSTEM

Water Conservation

The CITY adopted a Water Conservation Plan on December 8, 2009. A copy of the plan is attached to this document in appendix A. That Plan has six distinct goals to promote water conservation.

- Reduce per capita residential water consumption from January 1, 2008 by not less than ten (10) percent by the year 2020 for utility customers as per an agreement between the City of New Berlin and the Wisconsin Department of Natural resources (WDNR).
- Enable the City to meet future needs of our growing population.
- Protect Ground and surface water supplies from unsustainable depletion.
- Eliminate unnecessary waste in water use practices.
- Reduce wastewater treatment volume and associated municipal expenditures.

- Promote the increased use of harvested and recycled water for irrigation needs through the use of cisterns where appropriate for commercial and industrial development.

Specific accomplishments include the preparation of the plan near the end of the reporting year of 2009. That plan includes a savings projected of 9.4 million gallons of water per year by not using water softeners in the diversion area and a savings of 8.7 million gallons by reducing hydrant flushing from twice per year to once per year for a total estimated annual savings of 18.1 million gallons. The CITY also adopted sprinkling restrictions for residents to follow year round. Per capita residential water use decreased city wide from 68.03 in 2007 to 64.89 in 2008 to 64.39 in 2009 and to 60.38 in 2010. These represent 4.62 percent and 0.77 percent decreases in 2008 and 2009, respectively and 6.23% in 2010.

Beginning in April of 2010, the CITY launched a toilet rebate program designed to provide incentives for utility customers to abandon 5 gallon per use toilets and install 1.3 gallon per flush toilets. The amount of the rebate is \$100. There were 78 toilets replaced in 2010. The program will continue in 2011.

With the completion of the conservation plan and use of the CITY web site and newsletters to provide public education on the need for water conservation, New Berlin is committed to continuing to educate the public. Many previous studies have shown the value of public education is an important component of water conservation efforts. The conservation plan clearly details these efforts.

Infiltration and Inflow (I/I)

The City has an annual I/I program that has been in place since 1997. The City spent \$352,785.25 in 2010 on I/I reduction. Table 5-1 provides a listing of I/I reduction projects from 2010

Infiltration and Inflow (I/I) occurs in all sanitary sewerage systems. Infiltration refers to rainwater and groundwater that seeps into the system through defective pipes and joints. Inflow refers to storm water and surface water that enters the sewer directly. Both cause "clear water" to enter the system and increase treatment costs, cause sewer backups, bypassing and overflows.

Wastewater systems all have differing designs, construction, ages and are located in varying climates. With this in mind, there are not national standards for allowable I/I. Rather, EPA has required through the NPDES permit program that all wastewater overflows be eliminated. This requirement has prompted many sewerage systems to take active measures to reduce I/I. The MMSD is one of these.

MMSD addresses I/I reduction by placing limits on peak hourly flow rates. If a metered area exceeds the limits, I/I reduction is required. The requirements for these metered areas, also called "meter sheds" as listed in the MMSD 2035 Facility Plan are:

Sanitary Meter Shed Area (acres)	Maximum Allowable Peak Hourly Flow Rate (gallons per acre per day)
Less than 250	18,400
250 to 499	17,700
500 to 999	16,400
1,000 to 2,499	13,700
2,500 to 4,999	9,400
Greater than 5,000	4,000

Based upon the MMSD Facility Plan sewer flows for New Berlin, all areas of the City are currently in compliance with the above limits.

The City of New Berlin annually contracts with a consultant to monitor sewer flows during wet periods and prepare a report quantifying I/I. Preliminary results of the 2009 flow monitoring plan and analysis of flows by the city's consultant are provided in Appendix C.

Precise quantification of I/I is impossible with today's technology. Area and velocity flow meters are used annually by the City to derive estimates of I/I by basin and sub-basin. These meters replace older style "level only" meters and are considered to be more accurate. Still, the environment in which they are placed has flooding, toxic gases, high levels of solids and other impairments which readily affect the meters performance. Data that is collected must be collated and suspect data discarded. The remaining reliable data is then professionally analyzed and reasonable professional estimates of I/I can then be made. This is the program used by New Berlin.

The most current estimates of I/I by the City's consultant indicate that total average daily sewer flows are 6.025 MGD. The attached email correspondence from the City and R.A. Smith indicates how they arrived at this figure. Using basin monitors this flow can be divided into flow east and west of the sub continental divide. We estimate 2.877 MGD of flow for the eastern portion and 3.148 for the western portion of the sewer service area. This was determined by using all of the flow from basins 5 and 6 (Meter 5A) and 50 percent of the flow from basin 7 (Meter 7B). Based upon 2009 metered water use and estimates of sewerage flow the following average daily flows and I/I estimates can be derived:

	<u>Water Pumpage</u>	<u>Sewer Flows</u>	<u>I/I</u>
East of Divide	1.205 MGD	2.877 MGD	1.672 MGD
West of Divide	1.617 MGD	3.148 MGD	1.531 MGD
Total	2.822 MGD	6.025 MGD	3.203 MGD

These are the most current and accurate estimates of I/I available for the City of New Berlin. These volumes change regularly and there will be differing estimates each year depending on a number of factors including groundwater levels and precipitation amounts and severity of precipitation events.

The City has spent approximately \$20 million since 1997 on I/I reduction efforts. This includes all capital projects for manhole rehabilitation, studies and sanitary sewer replacement or relining. They received only 1 of 2 awards given by MMSD for their I/I reduction efforts in 2003. There are current budgeted amounts of 352,000 for 2010 and \$450,000 for 2011 respectively. Future projects will focus on higher I/I areas as identified by annual studies.

New Berlin ranks 5th out of 29 communities in expenditures for I/I reduction. This places them well ahead of many larger and older communities with more I/I.

It is important to realize that the I/I will occur and transmit some quantity of water across the basin divide. It is more important to realize that approval of the diversion has eliminated about 2.0 MGD of pumped water from outside the basin flowing into the basin on a daily basis. This, coupled with the strong commitment to reducing I/I by New Berlin, as evidenced above, absolutely minimizes the amount of water entering the basin from outside the basin.

Going forward, New Berlin proposes to monitor the amount of water used inside and outside the basin by customer water meter. Further, they propose to continue with the annual I/I quantification studies and will use the results of those studies to estimate I/I on both sides of the divide. This information will be available on an annual basis for the previous year.

SECTION 6 – ESTIMATES OF THE MONTHLY SEWERAGE RETURN FLOW FROM WITHIN THE APPROVED WATER SUPPLY SERVICE AREA

Table 6-1 provides estimated flows both in the great Lakes basin and Mississippi basin in the approved water supply service area.

In addition, there are 1,879 private wells on the sewer system with an estimated volume of 17,995 gallons per quarter.

Table 1-1

Total Amount of Water Purchased From the City of Milwaukee
 Annual Report of Water Use in the approved service area and Return Flow - 2010
 City of New Berlin, Wisconsin

Month	Monthly Total Amount of Water Purchased From The City of Milwaukee
January	74,231,520
February	34,945,812
March	99,955,988
April	68,135,320
May	66,242,880
June	85,803,080
July	79,071,080
August	89,677,720
September	74,351,200
October	72,870,160
November	71,546,200
December	65,816,520
Total Annual Pumpage	882,647,480

Source:

City of Milwaukee, Wisconsin Public Service Commission

Table 2-1

Amount of Water Sold to Each Category and Subcategory of Customer on a Quarterly Basis Within the City Limits - 2010
 Annual Report of Water Use in the approved service area and Return Flow - 2010
 City of New Berlin, Wisconsin

	Major Category (all numbers are total gallons sold)				Total
	Residential	Commercial	Industrial	Public	
1st Quarter 2010	124,516,000	82,509,000	13,006,000	3,292,000	223,323,000
2nd Quarter 2010	107,094,000	72,255,000	12,774,000	2,969,000	195,092,000
3rd Quarter 2010	142,059,000	84,293,000	15,133,000	2,759,000	244,244,000
4th Quarter 2010	99,869,000	72,753,000	14,316,000	3,188,000	190,126,000
Total	473,538,000	311,810,000	55,229,000	12,208,000	852,785,000

	Residential Subcategory (all numbers are total gallons sold)		Totals
	Great Lakes Basin	Mississippi Basin	
1st Quarter 2010	81,952	42,564	
2nd Quarter 2010	72,210	34,884	
3rd Quarter 2010	96,321	45,738	
4th Quarter 2010	67,224	32,645	
Total	317,707	155,831	473,538

	Condominium and Apartment Subcategory of Commercial Category		Totals
	Great Lakes Basin	Mississippi Basin	
1st Quarter 2010	17,077	21,360	
2nd Quarter 2010	14,328	18,219	
3rd Quarter 2010	16,528	21,220	
4th Quarter 2010	13,809	18,772	
Total	61,742	79,571	141,313

Source: City of New Berlin Utility Department

Table 3-1

Amount of Water Sold to Each Category and Subcategory of Customer on a Quarterly Basis Within the Approved Water Service Area - 2010
 Annual Report of Water Use and Return Flow - 2010
 City of New Berlin, Wisconsin

	Major Category				Total
	Residential	Commercial	Industrial	Public	
1st Quarter 2010	42,564,000	55,616,000	13,006,000	2,725,000	113,911,000
2nd Quarter 2010	34,884,000	49,076,000	12,774,000	2,444,000	99,178,000
3rd Quarter 2010	45,738,000	57,473,000	15,284,000	2,537,000	121,032,000
4th Quarter 2010	32,645,000	49,706,000	14,448,000	2,702,000	99,501,000
Total	155,831,000	211,871,000	55,512,000	10,408,000	433,622,000

Condominium and Apartment Subcategory of Commercial Category	
1st Quarter 2010	21,360,000
2nd Quarter 2010	18,219,000
3rd Quarter 2010	21,220,000
4th Quarter 2010	18,772,000
Total	79,571,000

Source: City of New Berlin Utility Department

Table 4-1

Average Residential Per Capita Use
 Annual Report of Water Use in the approved service area and Return Flow - 2010
 City of New Berlin, Wisconsin

Basin	Cust Class	2010 Quarter (Use in Gallons)								Total	Population	Average Residential Per capita Use in Gallons per Day
		1st		2nd		3rd		4th				
		Cons	Cons	Cons	Cons	Cons	Cons	Cons	Cons			
Great Lakes	C-CONDO/APT	17,077,000	14,328,000	16,528,000	13,809,000					61,742,000	3,324	
Great Lakes	R Residential	81,952,000	72,210,000	96,321,000	67,224,000					317,707,000	13,565	
	TOTALS									379,449,000	16,889	61.55
Mississippi	C-CONDO/APT	21,360,000	18,219,000	21,220,000	18,772,000					79,571,000	3,656	
Mississippi	R Residential	42,564,000	34,884,000	45,738,000	32,645,000					155,831,000	7,354	
	TOTALS									235,402,000	11,010	58.58
Combined City Wide Residential Per Capita Water Use in Service Area										614,851,000	27,899	60.38

Source: City of New Berlin Utility Department, Milwaukee Metropolitan Sewerage District

Table 5-1

Water Conservation Efforts and I/I Reduction Efforts
 Annual Report of Water Use in the approved service area and Return Flow - 2010
 City of New Berlin, Wisconsin

Project Title	Work Involved	Project Expenditures
Various Areas	Sewer Rehabilitation, Relining and Manhole Repairs to Reduce I/I	\$352,785
	Total 2010 Expenditures	\$352,785

Source: City of New Berlin Utility Department

Year	Amount
2000	\$1,234,824
2001	\$1,118,524
2002	\$1,212,340
2003	\$1,089,713
2004	\$148,310
2005	\$1,418,395
2006	\$544,788
2007	\$192,847
2008	\$1,570,444
2009	\$958,745
2010	\$352,785
	\$894,701

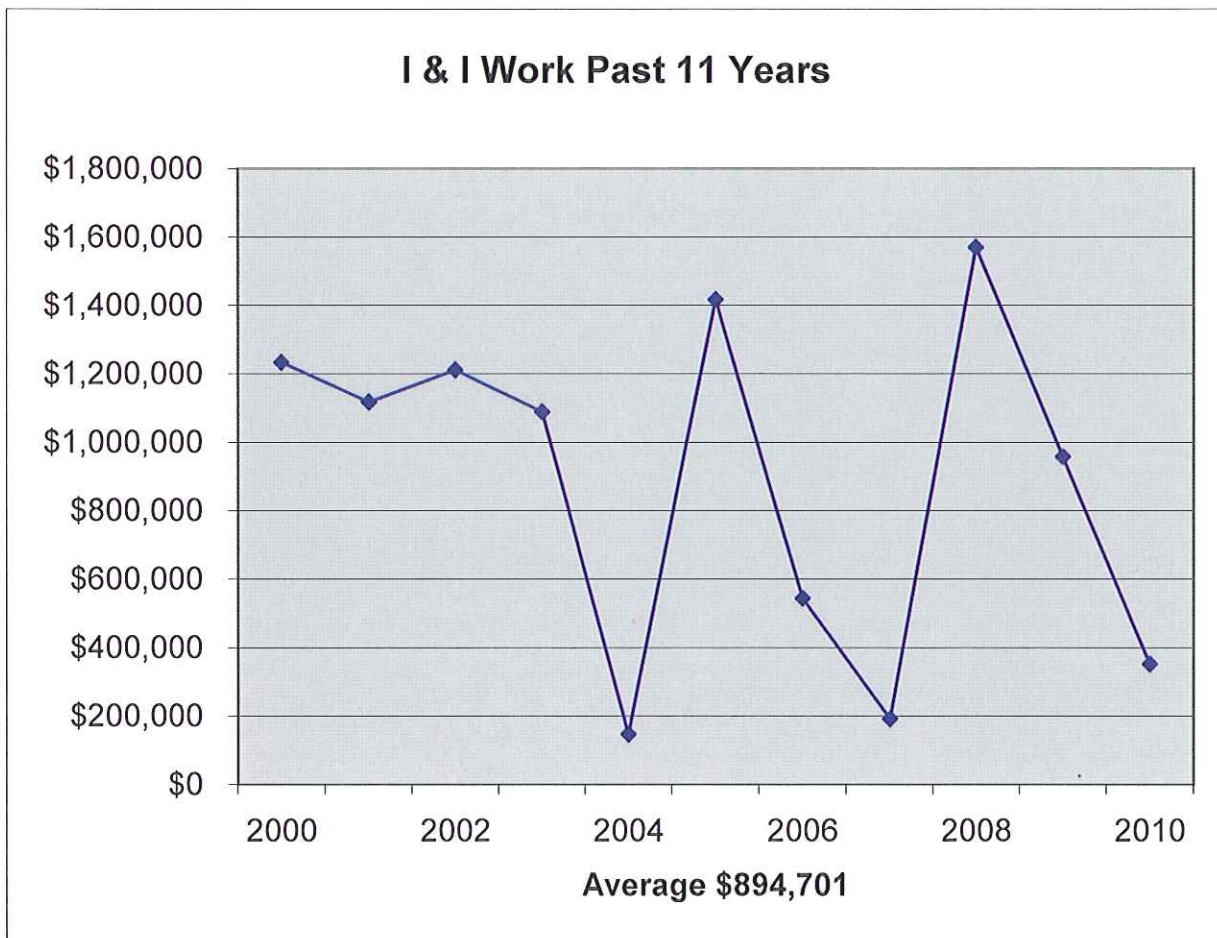


Table 6-1

Estimates of the Monthly sewerage return Flow From Withing the Approved Water Supply Service Area and approved Diversion Area
 Annual Report of Water Use in the approved service area and Return Flow - 2010
 City of New Berlin, Wisconsin

Basin	Average Daily Flow (MGD)	Monthly (30-Day Flow Gallons)	Annual Flow (Gallons)
Great Lakes Basin	0.0852	2,550,689	31,033,384
Mississippi River Basin	0.4691	14,073,012	171,221,645
Total	0.5543	16,623,701	202,255,029

Source: City of New Berlin Utility Department