CHAPTER 8: WASTEWATER AND WATER DISTRIBUTION UTILITIES

Revisions approved by Council on 6/14/2016 via Ordinance #2568

New Berlin is divided by the subcontinental divide. This drainage divide between the Mississippi River drainage basin and the Great Lakes – St. Lawrence River drainage basin cuts through the eastern portion of the city. Roughly 27.0 square miles, or about 73 percent of the total area of the city, are located in the Fox River watershed. This is the portion on the western side of the subcontinental divide and is part of the Mississippi River watershed. The remaining area is tributary to the Great Lakes – St. Lawrence River drainage basin. The subcontinental divide runs north and south from the City of Brookfield generally between Sunny Slope Road and Moorland Road to Howard Avenue, where it dips to the east then quickly back to the southwest. The Divide then continues into the City of Muskego near Calhoun Road (extended), as shown on Figure 8.1. The subcontinental divide has a bearing on the areas of the city that receive municipal services.

REGIONAL SANITARY SEWER SYSTEM

New Berlin's sanitary sewer system is entirely tributary to the Milwaukee Metropolitan Sewerage District (MMSD) and subsequently to Lake Michigan after treatment at one of MMSD's two treatment facilities. MMSD is a regional governmental agency providing wastewater treatment and flood management services to 28 municipalities in Southeastern Wisconsin serving over 1.1 million people in a 411 square mile planning area.

MMSD adopted a 2020 Facilities Plan which identifies the facilities, programs, operational improvements and policies required by the year 2020 to meet the existing regulatory framework and permitting requirements. The MMSD 2020 Facilities Plan sets forth ongoing investments and facilities improvements to be made in order to provide a target level of protection for sanitary sewer overflows and conditions. Additionally, the Plan calls for measures to be undertaken by municipalities served by MMSD to prevent increases in Infiltration/Inflow (I/I) through the year 2020. The primary focus of the 2020

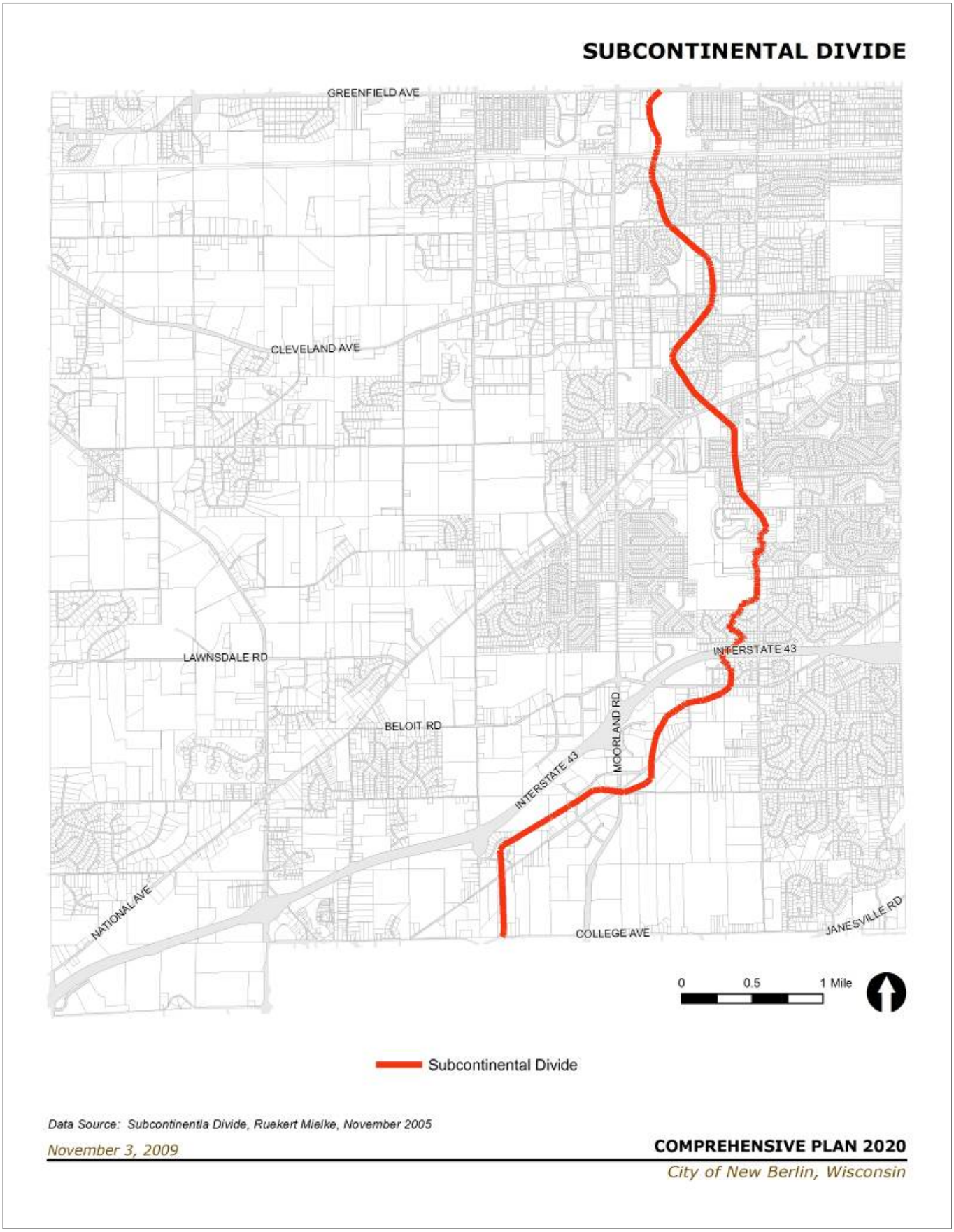

Figure 8.1. The Subcontinental Divide in New Berlin.

Facilities Plan is to achieve the highest level of water quality improvement in the most cost-effective manner while meeting MMSD's regulatory requirements. New Berlin is actively involved in the MMSD 2020 Facilities Plan in order to assure adequate sanitary services are planned for.

LOCAL SANITARY SEWER SYSTEM

New Berlin maintains a large network of sanitary facilities, as shown on Figure 8.2, consisting of approximately 183 miles of gravity sewer mains and 9 lift stations with force mains, which are constantly maintained and improved as new development and redevelopment occurs. New Berlin utilizes an annual Capital Improvement Program to ensure that proper maintenance and upgrades to the sanitary system take place. New Berlin works with developers to make certain that when new development is proposed that new infrastructure is properly sized and constructed to fit within the current sanitary sewer system.

On September 24, 1974, the City of New Berlin entered into an agreement with the City of Muskego to create the Linnie Lac Sanitary Sewer District. An amendment to this agreement was executed on November 28, 2000. The Linnie Lac Sanitary Sewer District was created to provide sewer to parcels within the City of New Berlin through the City of Muskego. The agreement establishes a service area boundary for the Linnie Lac Sanitary Sewer District and establishes the parcels that the City of Muskego has agreed to provide service to. The City of New Berlin has no intention of expanding this service area beyond what was agreed to in the November 28, 2000 amendment. Figure 8.1-1 identifies the Linnie Lac Sanitary Sewer District Boundaries and also identifies the parcels that are currently being serviced through the City of Muskego.

Figure 8.3 shows the lands in New Berlin which are located within the current MMSD service area (areas that are currently able to receive public utilities) and the Ultimate MMSD Planning Area (long term planning). Approximately 6,200 acres or 41 percent of the ultimate MMSD Planning Area is contained in the Great Lakes basin and approximately 8,800 acres or 59 percent is contained in the Fox River basin.

Approximately 10,100 acres are located within the current MMSD Service Area and approximately 3,300 additional acres are located in

the MMSD Ultimate Planning Area. An additional 8,200 acres are located in areas that are tributary to the Fox River Pollution Control Center or to the Town of Vernon. The City does not have wastewater treatment capacity reserved at either the Fox River Pollution Control Center or the Town of Vernon.

Infiltration/Inflow Control

New Berlin is very active and works in conjunction with MMSD to control the amount of infiltration/inflow (I/I) entering the sanitary sewer system. To date, the New Berlin Wastewater Utility has spent $8.5 Million in I/I reduction efforts since 1997. The Utility's efforts have resulted in an average of 1.3 Million gallons per year less of wastewater being conveyed to MMSD.

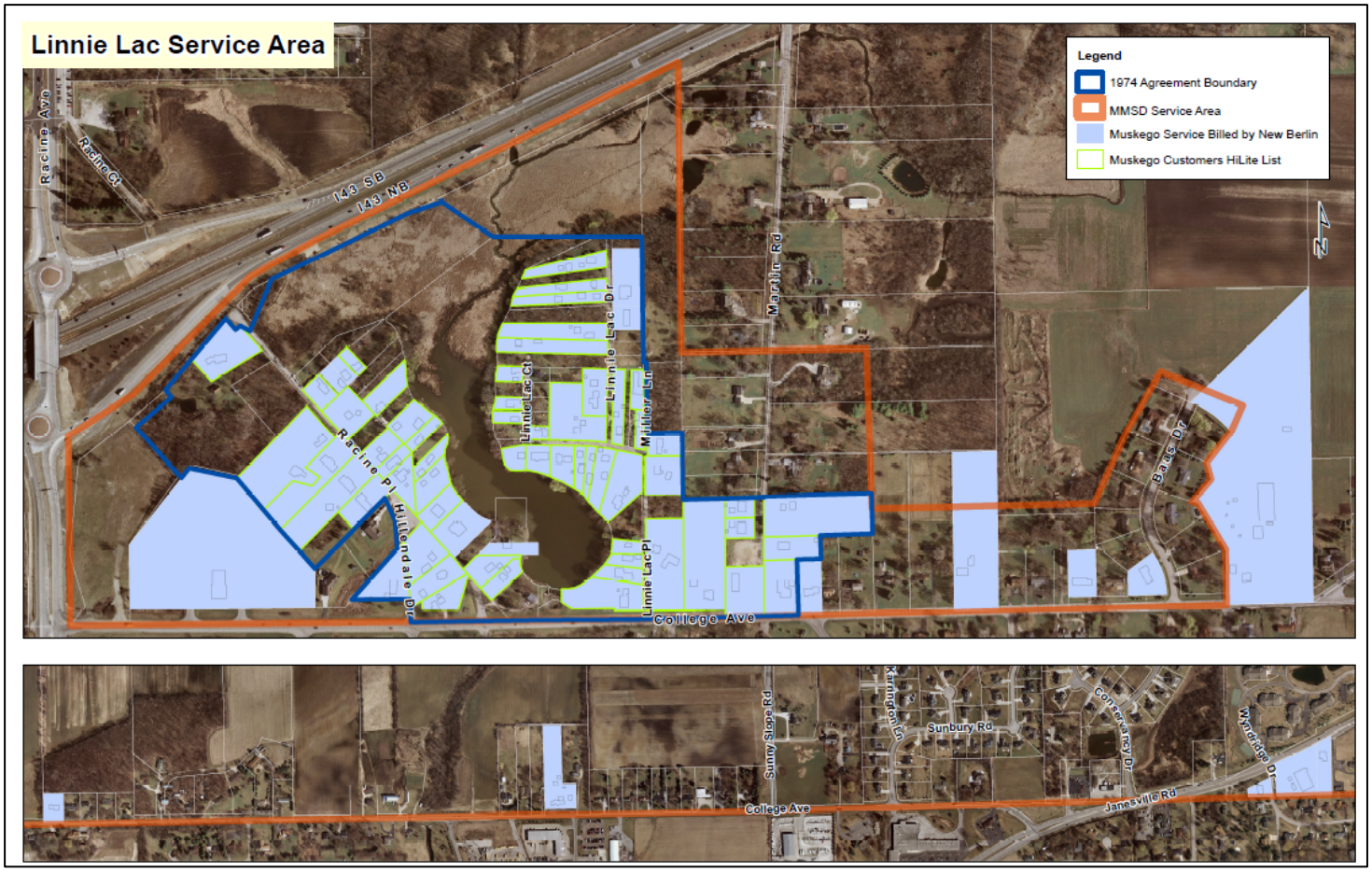

Figure 8.1-1. Linnie Lac Sanitary Sewer District & other parcels served through the City of Muskego.

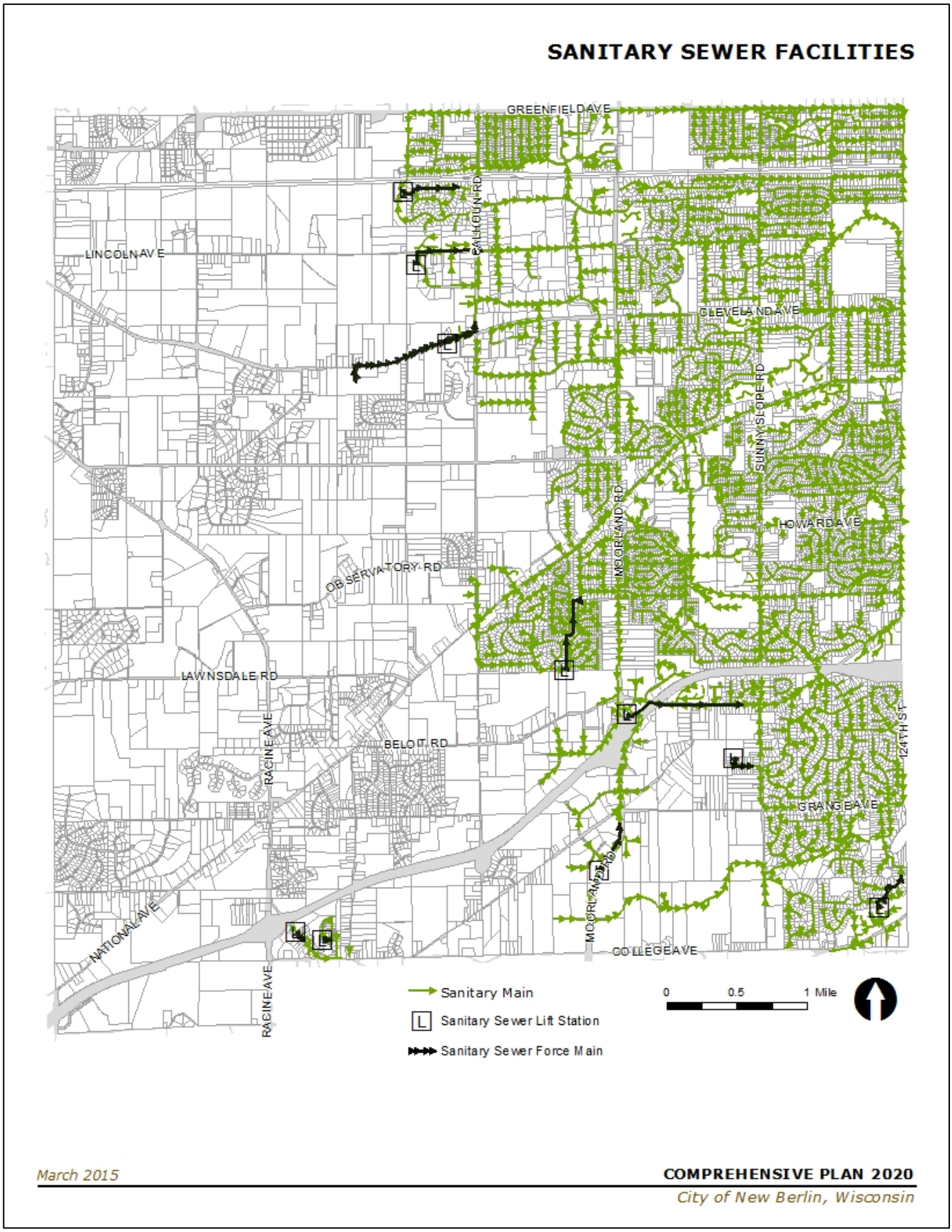

Figure 8.2. Sanitary Sewer Facilities in New Berlin

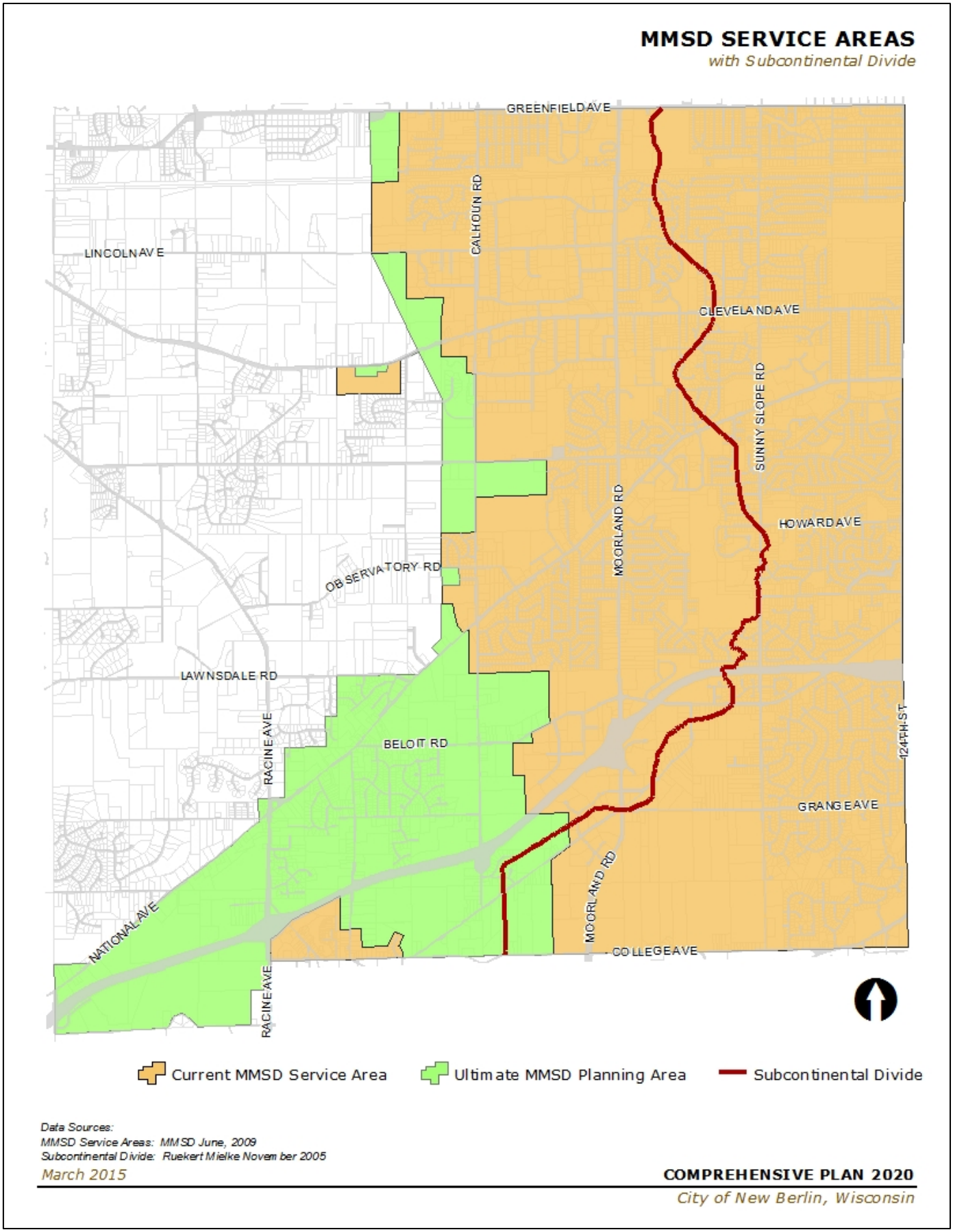

Figure 8.3. MMSD Service Areas in New Berlin

In 1998 and in earlier years, New Berlin experienced hundreds of sewer backups due to many storm events. The backups were likely the result of excessive I/I into the City's sanitary sewer system. The I/I was attributed to high groundwater leaking through deteriorated pipes, joints, manholes, leaking laterals, illegal storm drain connections and sump pump connections.

The MMSD 2010 Facilities Plan identified the Buena Park sewer basin as having a significant I/I problem. In 2001, the New Berlin Wastewater Utility conducted a pilot study to identify and control I/I from public sources in the Buena Park sewer basin. The study elements included:

- Flow monitoring
- Rainfall measurement
- Smoke testing of 3,000 lineal feet of sanitary sewer
- Building inventory and consultation
- Dye water flooding of the sanitary laterals
- CCTV review and report
- Data integration and analysis

The City's ultimate goal was to eliminate basement back-ups and sanitary sewer overflows on a City-wide basis. The pilot project served as a model for future I/I programs that were applied to other sanitary systems within the City. The project's primary objective was to identify the sources of the I/I into the City's sanitary sewer system and recommend a program for cost-effective repair and removal of the I/I sources. As a result of the pilot study, data collected confirmed that during times of rainfall, the sewer system experienced a significant increase in wastewater flow, thus, leading to the conclusion that significant amounts of storm water was finding its way into the sewers. Testing of private properties in the Buena Park study area found evidence of connections (downspouts, cleanouts, basement foundation drains, leaking or defective laterals) that were directing clear water into the sewer system. Following the study, the New Berlin Common Council adopted the City of New Berlin Infiltration and Inflow Mitigation Ordinance No. 2227 in April 2004. This Ordinance created Section 267-14 of the New Berlin Municipal Code entitled "Clear Water Infiltration and Inflow Mitigation".

By 2006, following significant I/I reduction efforts, that number of sewer backups dwindled to three due to large storm events. In 2008, New

Berlin experienced some sewer backups associated with the June storm.

Utility Projects

Utility rehabilitation projects are generated by Closed Circuit Televising (CCTV) of the sewer lines. This allows the Utility Staff to review pipe conditions, note defects including scaling, cracks, mineral deposits, spalling materials, etc. Based on the findings, rehabilitation projects are scheduled and completed on an annual basis.

The New Berlin Wastewater Utility constantly works to upgrade and renew its facilities to provide the required level of service to utility customers. The Utility accomplishes this goal by replacing or rehabilitating aging and undersized pipes, and upgrading inefficient lift stations as necessary. One of the primary factors to consider in replacing or rehabilitating aging or inadequate facilities is funding. The Wastewater Utility develops budgets to allow the rehabilitation of segments of the wastewater system each year without the need for unreasonable rate increases to its customers. The Wastewater Utility must continue to evaluate those portions of the sanitary sewer system which are in need of replacement and/or rehabilitation. Public input during the planning process can aid in identifying areas of concern.

SERVICE AREA BOUNDARIES AND EXPANSION

As New Berlin grows and develops, the Wastewater Utility and the City will provide guidance to developers in extending the sanitary sewer utilities.

The adopted MMSD 2020 Facilities Plan took into account New Berlin's GDMP Future Land Use Map along with MMSD's infrastructure to determine the capacity needed to meet the needs of potential future development in the City. There may be locations where Interceptor Sewers have to be extended for the connection of local sanitary sewers as part of private development. This may result in a sharing of the cost between the City and developers in the construction of the Interceptor Sewer. An example of this is in Section 35 (see Chapter 17, Figure 17.17) and the eastern portion of Section 34. A 36" diameter Interceptor has been extended to Moorland Road to allow development to occur in Neighborhoods G and H. Once that Interceptor Sewer was installed, the Moorland Road Lift Station was abandoned and replaced

with a local gravity sewer along Moorland Road connecting to the Interceptor Sewer.

In 2009, the Common Council adopted an Urban Service Area Boundary (USAB) (Figure 8.4) which is defined by the American Planning Association as: “A defined area, not always coincidental with a municipality’s corporate boundaries, that defines the geographical limits of government supplied public facilities and services”.

Upon any future modifications to the adopted USAB, an evaluation by the Department of Community Development will need to occur to ensure compatible land uses and development intensities are appropriate for properties that have accessibility to public utilities and conduct an assessment to determine that facility infrastructure is sufficient to meet the needs of the development, as well as, existing users. This analysis will be completed as part of a submitted application to the Department of Community Development.

An Urban Service Area Boundary is not a growth boundary and will not limit new development to certain areas of the City. Rather, the goal is to synchronize urban growth with provision of infrastructure needed to accommodate growth. As developing communities grow and plan for growth they often establish Urban Service Areas so that regional infrastructure is available to support anticipated development in alignment with local and regional long range plans.

The development of an USAB (in addition to the MMSD Current Service Area & MMSD Ultimate Planning Area Limits) does three things:

- Safeguards and preserves local decision-making, while achieving regional objectives of efficiency and cost-effective growth
- Provides capacity for growth, without building too much or not enough infrastructure
- Accommodates growth while also preserving and protecting the natural environment.

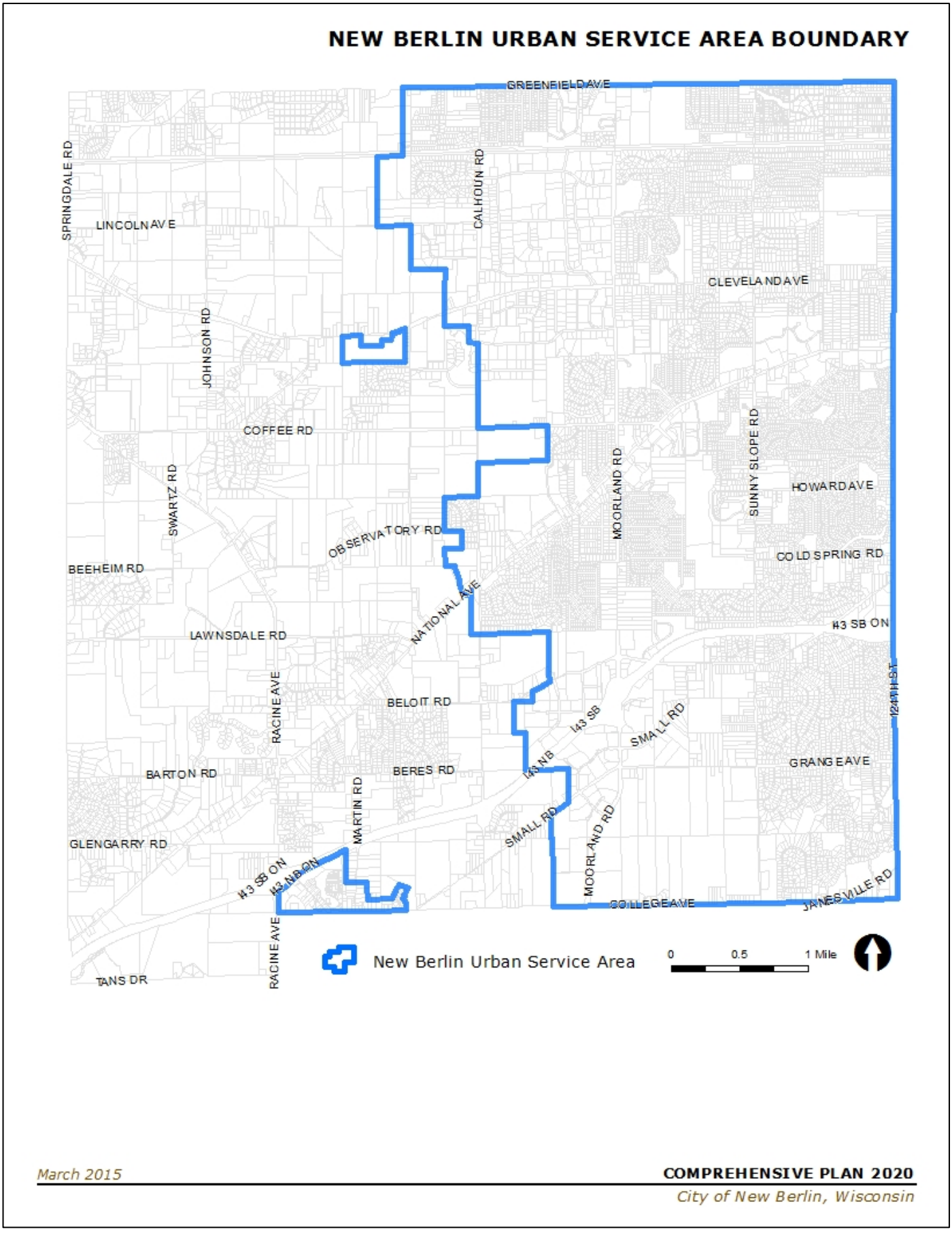

Figure 8.4. New Berlin Urban Service Area Boundary

For changes to occur to the USAB, any property owners (within the MMSD Ultimate Planning Area) who wish to include their properties within the USAB will also need to follow through with the formal MMSD Service Area amendment process requiring City, SEWRPC, MMSD and WDNR review & approval prior to the start of construction. The City wishes to reaffirm that decisions on the extension of utilities to undeveloped lands will require an assessment that facility infrastructure is sufficient to meet the needs of the development, as well as, existing users as required by the New Berlin Urban Service Area Boundary Ordinance # 2405.

Local sanitary sewer main extensions would be initially financed and constructed by developers through private contracts based on the overall requirements of the City and Wastewater Utility. When individual developments are completed and the sanitary sewer systems are made functional, the utilities would then be dedicated to the New Berlin Wastewater Utility.

Relative to sanitary sewer availability in areas where existing lots of record are served by Private On-Site Wastewater Treatment Systems (POWTS), the City will need to modify the requirements of Municipal Code Chapter 267-7 A which requires connection to sanitary sewer within one year following the sewer becoming available. If residents do not desire to connect to the municipal sanitary sewer, the City will not force the connection unless there are health and safety issues. Those residents that do not connect to sanitary sewer within the first year of the sewer being available will be required to petition the City for future connections.

Historically, the 1986 Sanitary Sewer System Map pertaining to the interceptor sewer indicates that the interceptor sewer was sized to have capacity for an additional 5,000 acres (7.8 square miles) of development west of Sunny Slope Road. The Future Land Use Map included in this Plan contains additional business park/industrial lands and fewer residential units than the previously approved GDMP Future Land Use Map. The analysis from 1986 for sizing the interceptor sewer indicates that the interceptor sewer has adequate capacity to handle new development in Sections 35 & 34 as proposed in this Plan.

LOCAL WATER SUPPLY SYSTEM

The New Berlin Water Utility manages the public water supply for the City. It works closely with the United States Environmental Protection Agency (USEPA) and the WDNR to ensure that the public water supply system meets all current regulations and is positioned to comply with future regulations that become law. Frequent routine sampling of the supply points and the distribution system provide the information needed to monitor water quality. The Utility staff takes more than 400 water quality samples each year. The samples are tested in accordance with WDNR protocol for microorganisms, inorganic contaminants, organic contaminants and radioactive materials. An annual water quality report is prepared and sent to each customer to inform them of system characteristics and report any water quality violations that may occur. The New Berlin Water Utility will continue to prioritize studies and engineering projects in an effort to meet or exceed any and all Federal and State drinking water regulations.

A Water System Study was completed in 2014/2015. The study provided a list of recommended projects for the next 20-25 years. That study is on file with the Utility Division.

New Berlin is uniquely positioned within southeast Wisconsin as it straddles the "Sub-Continental Divide", which runs north-south through the eastern part of the City. Nearly 27 square miles in the western part of the City, or about 73 percent of the City's total land area, is located in the Fox River Watershed. This portion is west of the Sub-Continental Divide and part of the Mississippi River Watershed. The remaining City land area is tributary to the Great Lakes / St. Lawrence River drainage basin.

The Utility Service Area is supplied with water from Lake Michigan which is purchased from the Milwaukee Water Works. In this portion of the City wastewater is returned to Lake Michigan via the Milwaukee Metropolitan Sewerage District sewer system. The western portions of the City, outside of the Utility Service Area, uses groundwater/private wells as their water supply source

The current water distribution system, as shown on Figure 8.5, consists of approximately 166 miles of water mains, two Lake Michigan water pumping/metering stations, 4below grade reservoirs, and three elevated storage towers. The New Berlin Water Utility currently supplies

approximately 1.2 Billion gallons of water annually to 7,600 customers. In 2008, the breakdown of New Berlin water customers comprised of:

- Residential 47 percent
- Commercial 34 percent
- Industrial 6 percent
- Public 1 percent
- Other 12 percent

The average residential water use per residential customer in New Berlin is approximately 65 gallons per customer per day (gpcd) based on 2015 Utility records. The Water Utility has worked hard to reduce water usage to help conserve a very valuable resource. We have in place an odd-even sprinkling schedule citywide to reduce water usage to lawns and gardens. In addition, we have a program in place whereby we change out water meters on a 10-year cycle instead of the 20-year program that the PSC requires. Changing the meters on a 10-year cycle ensures more accurate water consumption usage totals. Now that water utility customers are supplied with Milwaukee Water throughout the entire service area, the Utility will see reductions in water usage as follows:

1. 90% of all customers will NOT USE water softeners
    - 180 gallons of water passes through every time the softener runs
    - 9.4 million gallons of water will be saved by not using softeners

2. 8.7 million gallons will be saved annually due to the reduction of hydrant flushing from twice per year to once per year.

A total of 18.1 million gallons of water will be saved annually with just these two changes. All water supply system customers are MMSD sanitary sewer customers. This means all water not consumed returns to Lake Michigan via the sanitary sewer system and is treated by MMSD.

The New Berlin Water Utility constantly works to upgrade and renew its facilities to provide the required level of service to utility customers. The Utility accomplishes this goal by replacing or rehabilitating aging and undersized pipes, inefficient wells, and old reservoirs as necessary. One of the primary factors to consider in replacing or rehabilitating aging or inadequate facilities is funding. The Water Utility develops

budgets to allow the rehabilitation of a reasonable portion of all facilities each year without the need for unreasonable rate increases to its customers. The Water Utility must continue to evaluate those portions of the water supply system which are in need of replacement and/or rehabilitation. Public input during the planning process can aid in identifying areas of concern.

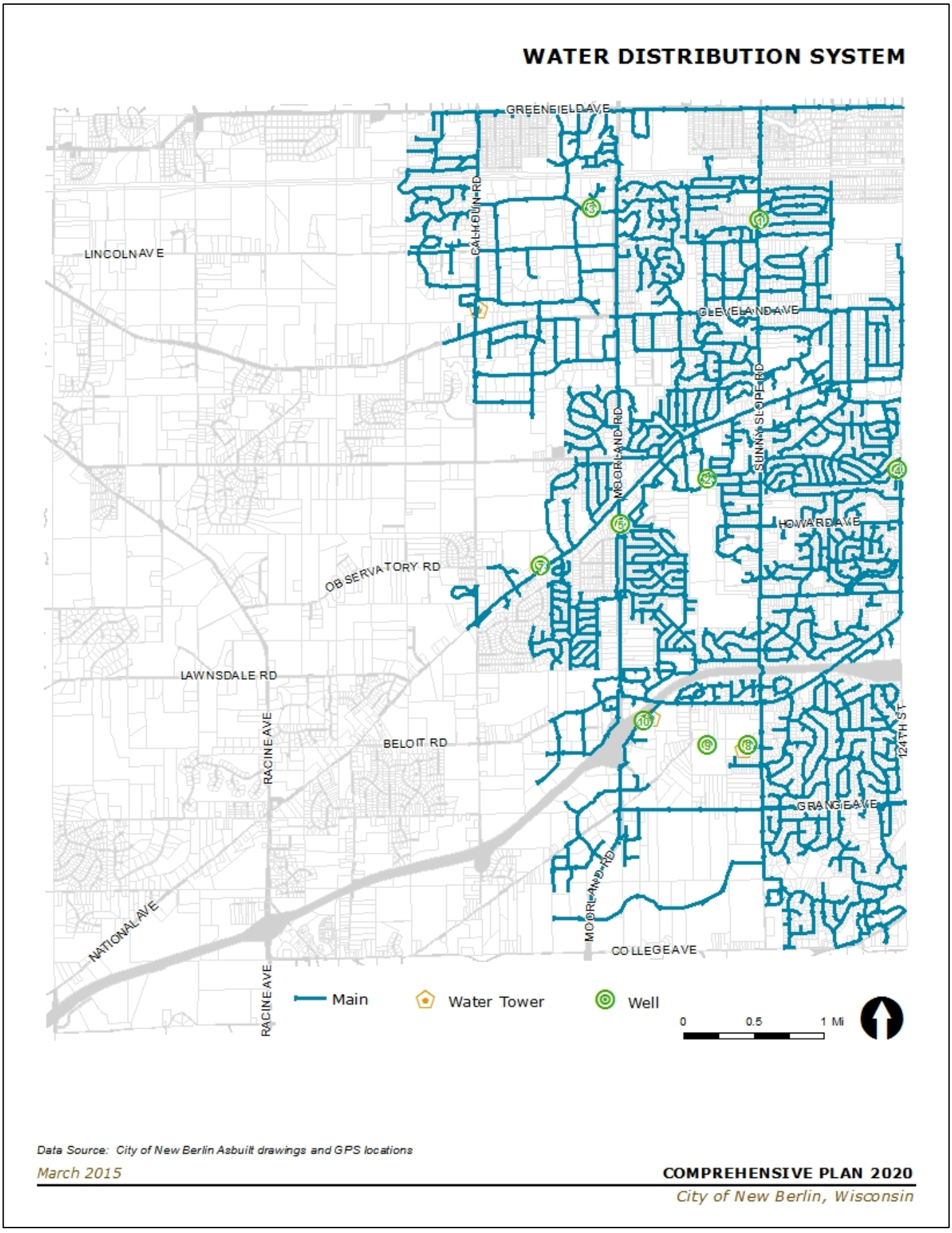

Figure 8.5. Water Distribution System in New Berlin

As New Berlin grows and develops, the Water Utility and the City will provide guidance to developers in extending water utilities. All water main extensions require the approval of the WDNR prior to the start of construction. Water main extensions would be initially financed and constructed by developers through private contracts based on the overall requirements of the City and Water Utility. Once individual developments are completed and the water distribution systems are made functional, the utilities would then be dedicated to the New Berlin Water Utility.

THE GREAT LAKES COMPACT

Approximately the eastern third of Wisconsin (and, coincidentally, the eastern third of New Berlin) is located within the Lake Michigan portion of the Great Lakes-St. Lawrence River basin. Concern over the possibility of diversions which would remove water from the basin have prompted action by the States and Canadian Provinces bordering the basin. The U.S. Water Resources Development Act of 1986 required unanimous approval of all eight Great Lakes states governors for any proposed out-of-basin diversion. In 2001, the eight Great Lakes states governors and the premiers of Ontario and Quebec agreed to prepare basin-wide binding agreements, such as an interstate compact, to protect and improve the quantity and quality of the water in the Great Lakes. In December 2005, the governors signed the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement and called for legislative enactment of the draft compact. The Compact was ratified by the Wisconsin legislature in May 2008 as Wisconsin 2007 Act 227. The Compact was ratified by all the Great Lakes states and was signed into law by President George W. Bush on October 3, 2008.

Key provisions of the Act 227 include 1) regulation and review of proposals to withdraw or divert water from the basin, 2) water conservation and 3) water supply plans.

Diversions

Act 227 prohibits diversions outside the basin but contains the provision to grant exceptions to communities and counties that straddle the Great Lakes basin dividing line if treated wastewater is returned to the lakes. According to the Compact, New Berlin falls under the definition of a "Straddling Community." The definition is ". . . any incorporated City,

Town or the equivalent thereof, that is either wholly within any County that lies partly or completely within the Basin or partly in two Great Lakes watersheds but entirely within the Basin, whose corporate boundary existing as of the date set forth in [reference to subsection of agreement or compact] is partly within the Basin or partly within two Great Lakes watersheds." Under that definition, New Berlin is eligible to use Great Lakes water and must meet the qualifications specified in the Compact including the requirement to return all water to the Great Lakes basin.

New Berlin's proposal will result initially in 1.89 million gallons per day being transferred out of the basin and 2.97 million gallons per day returned to the basin – a net gain of 1,080,000 gallons a day. That means that for every gallon of Great Lakes water New Berlin uses, it will return 1.6 gallons back to Lake Michigan.

WATER CONSERVATION

Act 227 establishes a statewide water conservation and efficiency program, to be administered by the WDNR, the PSC and the Department of Commerce. The Plan has been submitted for review and approval.

The City currently has a water conservation program and has documented a 6 percent decrease in residential water use over the past ten years -- even as the population has grown. New Berlin is exploring additional measures to decrease water use. New Berlin already uses many leading conservation strategies: it meters all water users and charges them according to volume used, limits the days on which residents may water their lawn, inspects meters and building plumbing, conducts programs to help users detect leaky faucets, toilets and pipes. The City also is reviewing the adoption of conservation water rates. Traditionally, the unit cost for water decreases with increasing consumption. With conservation rates, the unit cost may remain the same or even increase with increasing consumption. The City has incorporated the Water Conservation Plan into the Comprehensive Plan which has the following stated goals:

- Reduce overall water consumption.
- Enact water protection / conservation ordinances and codes.
- Protect wellhead recharge areas.

- Provide incentives for water conservation.
- Promote 3-Dimensional (groundwater, storm water and surface-water) water management.
- Implement good storm water Best Management Practices ("BMPs") that enhance recharge areas.

By implementing the Water Conservation Plan the City is striving to:

- Reduce per capita residential water consumption by as much as ten (10) percent by the Year 2020 for Utility customers.
- 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.

The City has also created a rebate program to further encourage water conservation.

Water Supply Plan

Act 227 establishes requirements for water supply plans. The Act requires that a public water supply system prepare a water supply plan as a condition of receiving approval of a proposal for a diversion from the basin. The Water Supply Service Area Plan prepared by Ruekert-Mielke in January 2009 is intended to fulfill this requirement. Contained within the Water Supply Service Area Plan is a delineation of the service area, performed by SEWRPC.