



## CHAPTER 14

### RECOMMENDED CAPITAL IMPROVEMENTS PLAN

This chapter summarizes the recommended infrastructure system improvements and presents a proposed capital improvements program. The recommended Capital Improvements Plan prioritizes system improvements and provides a schedule for the timing of construction. Budget cost estimates for each improvement are also summarized.

#### 14.1 RECOMMENDED WATER SYSTEM CAPITAL IMPROVEMENTS

##### 14.1.1 Water Storage

It is recommended that the Water Utility construct a new 0.15 MG water tower. The recommended tower overflow elevation should match the overflow elevation of the Jungwirth Tower. The recommended location for the new water tower is on the Village-owned wastewater treatment plant site.

##### 14.1.2 Combining Pressure Zones

It is recommended that the Utility consolidate the operation of the existing dual pressure zone system under one combined pressure zone. The existing PRV Stations should be decommissioned, and any isolation valves between the existing pressure zones be opened. The Hwy 57 Standpipe will then function as a ground reservoir, with standpipe storage being pumped into the system by the Sister Bay Booster Station. The Well 1 pump equipment will need to be modified to pump against the higher head conditions of the combined pressure zone.

Because of the higher pressures that will be generated in the lowest lying portions of the water distribution system immediately adjacent to Green Bay, the Utility should consider the installation of individual PRVs on water services in these affected areas. It is also recommended that the consolidation of the two pressure zones into a single zone be planned to coincide with the implementation of the new water tower recommended above.

##### 14.1.3 Water Service to Outlying Planning Areas

The recommended combined pressure zone system will adequately serve the majority of the future water service area with pressures and fire flows. The only significant area that cannot be adequately served is the area of higher topographic elevation south and west of Country Lane in the southwestern corner of the planning area. The Water Utility will need to implement a new high level pressure zone to adequately serve future customers in this area.

##### 14.1.4 Distribution System

Figure 7-7 illustrated the recommended Sister Bay Water Utility Year 2025 Master Plan. The figure illustrates recommended improvements to the existing distribution system and the recommended transmission mains required to serve the future service area. The improvements have been recommended to strengthen and expand the existing transmission main network, and support system expansion into future service areas.



## **14.2 RECOMMENDED SANITARY SEWER CAPITAL IMPROVEMENTS**

### **14.2.1 Improvements to Address Existing Needs**

The improvements to address existing sanitary sewer deficiencies were shown in Figure 10-1 and summarized in Table 10-1. These improvements address three different types of existing sewer system deficiencies: potential future capacity restrictions, pipe settlements and sump manholes.

To address the potential future capacity restrictions deficiency, it is recommended that a sanitary sewer flow diversion upstream of the problem area be created by redirecting some of the wastewater flow around the affected low flow capacity area. It is recommended that this sewer flow diversion be constructed south of Maple Drive and west of Claflin Street.

The sewer pipe segment deficiency identified in Chapter 10 will be difficult to repair without removing and replacing the settled sections of pipe. Due to the potential for further settlement, it is recommended that the entire segment from manhole to manhole be removed and replaced. This will allow inspection of the trench bottom prior to new pipe installation, to determine if the trench bottom needs additional treatment prior to installation of a new sewer pipe.

Several sanitary sewer system manholes were constructed without poured inverts, and currently act as sump manholes. During periods of low flow, wastewater solids drop out of suspension into these sumps, and the sumps need to be regularly cleaned. This is an unnecessary recurring system maintenance activity that can be eliminated with proper manhole construction. It is recommended that the identified sump manholes be modified with poured concrete inverts. The recommended improvement will require a contractor to temporarily bypass pump around the affected manholes, properly clean the sumps, pour new concrete inverts, and allow the concrete inverts to properly cure prior to removing the temporary bypass.

### **14.2.2 Improvements to Serve Future Growth**

The recommended approach for serving future growth is a combination of constructing new facilities in the future development areas as well as building a new trunk sewer down Bay Shore Drive to serve future development to the south. As the existing trunk sewer system is close to capacity in critical downtown Village areas, the new trunk sewer in Bay Shore Drive will provide additional capacity in the downtown area, while at the same time providing a means to serve future areas to the south.

Sanitary sewer service to the future expansion area was broken down into drainage basins or sanitary sewer “regions” for planning the implementation and sequencing of improvements. There are six individual sewer service regions identified in the northern portion of the future sewer service expansion area (Regions A – F), and four regions identified in the southern portion of the expansion area (Regions G – J). Recommended trunk sewer facility improvements to serve expansion areas were illustrated in Figures 10-2 and 10-3.

## **14.3 RECOMMENDED STORM WATER CAPITAL IMPROVEMENTS**

It is recommended that the necessary easements and/or property described in Chapter 12 are secured to accomplish the work to minimize potential for development encroachment on areas that require structural BMPs beyond the Improved NCD. As it is believed that the area of the NCD improvement lies within the Storm Water Storage Zones, this work can be done by easement vs. purchase if the authority to zone in



this manner exists. The highest priority recommended Improved Natural Closed Depressions improvement projects are discussed further below.

#### **14.3.1 Watersheds #2700 and #2900**

The highest priority project should be all associated work that affects the recommended storm water lift station pump replacement in NCD #2700. Recommended improvements include proposed piping, culverts, replacement of pump and storm sewer along Scandia Road from Watershed #2900.

#### **14.3.2 Watershed #3100**

The second priority is the recommended improvements associated with the proposed detention basin within Watershed #3100 to address flooding concerns adjacent to Woodcrest Road. It has been reported that the flooding currently experienced is minor.

#### **14.3.3 Watershed #6300**

A new storm sewer is recommended for North Bay Shore Drive between and Sunset and E. Mill Roads, and the project should be incorporated with the proposed WDOT improvements planned for the STH 42 corridor unless flooding becomes chronic and causes extensive property damage.

#### **14.3.4 Watershed #2800**

A new storm sewer along Waters End Road and channel lining is recommended and can be incorporated into other work when this project can be accommodated into the Town of Liberty Grove's budget.

#### **14.3.5 Watershed #2600**

Improvements recommended for Watershed #2600 will replace undersized storm sewer but was not listed as a flood prone area. Continued monitoring should determine this project's priority.

#### **14.3.6 Watershed #3600**

While recommended improvements in this area are important for reducing flooding in the golf course/condominium area, much of the recommended corrective work can be accomplished within the grounds by the responsible party. The recommended detention pond improvement upslope may not prove to be necessary if flood proofing is determined to be feasible.

#### **14.3.7 Watershed #3900**

It is recommended that preliminary engineering work should proceed on the potential detention pond near East Larson to confirm that the pond would be effective in this location and to allow property purchase to proceed before additional development takes place. If flooding near Larson is of minor concern, the remaining upslope improvements can be delayed. The property at Gateway Drive is already under the control of the Village, and construction can be coordinated with the STH 42 work by WDOT to save cost, but final construction of improvements can wait for funding.



### **14.3.8 Water Quality Capital Improvements**

The proposed capital improvements to address storm water quality issues are primarily recommended to provide protection for the Village's underground drinking water supply. The current level of storm water runoff treatment, primarily due to the numerous NCDs, is at the approximate level required by NR 216 permit requirements. The discussion in Chapter 13 prioritizes the work by location with respect to the Wellhead Protection Zones. As the water service is extended out to areas beyond the wellhead protection zones as they now exist, the need to protect private wells replaced by a municipal water system decreases. However, continued growth may exceed projections, or current wells may need to be abandoned. New well sites will need protection zones. The protection of the area's groundwater aquifer should continue to be pursued to the extent feasible.

The locations recommended for Improved NCDs are noted in the figures for each watershed in Chapter 12.

## **14.4 COMPREHENSIVE UTILITIES MASTER PLAN**

The proposed Sister Bay Comprehensive Utilities Master Plan is illustrated in Figure 14-1. The proposed Master Improvements Plan has been formulated based on all the information presented in this study. All the improvements have been developed and prioritized based on deficiencies identified in the existing infrastructure systems, and the needs of the Village's future service planning area. Table 14-1 summarizes the recommended capital improvements plan for the Comprehensive Utilities Planning area over the 20-year planning period.

The actual construction cost for the recommended improvements may vary from the costs outlined in this report, depending on the year facilities are constructed, the rate of increase in future construction costs, and unforeseen conditions which could be encountered during design of the improvements.

In establishing priorities for these improvements, it will be necessary to take into consideration the availability of Utility financial resources and local Village needs to assure that the recommended improvements are implemented in an orderly, coordinated, and economical fashion.

**TABLE 14-1**

**RECOMMENDED CAPITAL IMPROVEMENTS PLAN  
COMPREHENSIVE UTILITIES MASTER PLAN  
SISTER BAY, WISCONSIN**

<b>SHORT-TERM IMPROVEMENTS (2006-2010)</b>		
<b>Water System</b>		<b>Budget Estimate</b>
Construct New Water Tower		\$840,000
Eliminate Dead End Water Mains in Low Fire Flow Areas		\$760,000
Modify Well 1 Pump to operate in Combine Zone System		\$55,000
<b>Water System Subtotal</b>		<b>\$1,655,000</b>
<b>Sanitary Sewer System</b>		<b>Budget Estimate</b>
Construct Diversion From MH 39 to MH 193		\$50,000
Remove and replace 10 inch pipe from MH 47 to MH 45		\$60,000
Pour concrete inverts in manholes to eliminate sumps		\$40,000
Construct Trunk Sewer in Bay Shore Drive		\$445,000
Upgrade Lift Station No. 1 Capacity		\$229,000
Stage 1 of Region H Improvements; Interim Lift Station and Force Main		\$549,000
Stage 2 of Region H Improvements; First Phase of Lift Station H and Force Main		\$2,000,000
Region E Improvements		\$947,000
Region F Improvements		\$1,504,000
Region G Improvements		\$1,096,000
<b>Sanitary Sewer System Subtotal</b>		<b>\$6,920,000</b>
<b>Storm Water System - Infrastructure Improvements (by Watershed Priority)</b>		<b>Budget Estimate</b>
2700	North Spring Road Culverts; New Lift Station Pump; Subwatershed #2702 Retention Basin; Lift Station Storm Sewer Outlet	\$1,196,000
2900	New Storm Sewer and Retention Pond	\$530,000
3100	Channel Improvements; Subwatershed #3102 Retention Pond; Subwatershed #3105 Outlet Storm Sewer	\$2,094,000
6300	New Storm Sewer Improvements	\$143,000
2800	Replace Storm Sewer System with Larger Pipe	\$100,000
2600	New Storm Sewer along Waters End Road	\$125,000
3600	Private Improvements: Floodproofing Structures; Golf Hazard Retention Pond Improvements; Channel and Culvert Replacement and/or Reconstruction	\$487,000
3600	Public Improvements: Culvert Replacements; Subwatershed #3601 and #3603 NCD Capacity Expansion	\$3,920,000
3900	Gateway Drive Retention Pond; Larson Road Retention Pond; Storm Sewer Capacity Improvements	\$232,000
<b>Storm System Infrastructure Subtotal</b>		<b>\$8,827,000</b>
<b>Storm Water System - Water Quality Improvements (by Watershed Priority)</b>		<b>Budget Estimate</b>
3000	NCD Improvements	\$488,400
3102	NCD Improvements	\$703,200
3105	NCD Improvements	\$2,942,400
4401	NCD Improvements	\$346,000
4402	NCD Improvements	\$688,500
<b>Storm System Water Quality Subtotal</b>		<b>\$5,168,500</b>
<b>Overall Short-Term Improvement Total</b>		<b>\$22,570,500</b>

**TABLE 14-1**

**RECOMMENDED CAPITAL IMPROVEMENTS PLAN  
COMPREHENSIVE UTILITIES MASTER PLAN  
SISTER BAY, WISCONSIN**

<b>LONG-TERM IMPROVEMENTS (2011-2025)</b>	
<b>Water System</b>	
	<b>Budget Estimate</b>
Distribution System Expansion	\$12,033,000
Water Supply or Storage	\$800,000
Implement New Southwest High Level Pressure Zone	\$450,000
<b>Water System Subtotal</b>	<b>\$13,283,000</b>
<b>Sanitary Sewer System</b>	
	<b>Budget Estimate</b>
Stage 3 of Region H Improvements	\$4,829,000
Region J Improvements	\$2,591,000
Region I Improvements	\$817,000
Upgrade MH106 to MH104 from an 8 inch to 10 inch pipe	\$50,000
Region D Improvements	\$731,000
Region C Improvements	\$3,193,000
Region B Improvements	\$429,000
Region A Improvements	\$789,000
<b>Sanitary Sewer System Subtotal</b>	<b>\$13,429,000</b>
<b>Storm Water System - Infrastructure Improvements</b>	
	<b>Budget Estimate</b>
3000 New Storm Sewer with Underdrain	\$100,000
<b>Storm System Infrastructure Subtotal</b>	<b>\$100,000</b>
<b>Storm Water System - Water Quality Improvements (no priority)</b>	
	<b>Budget Estimate</b>
300 NCD Improvements	\$58,800
500 NCD Improvements	\$94,200
800 NCD Improvements	\$235,400
900 NCD Improvements	\$1,129,900
1002 NCD Improvements	\$1,194,600
1300 NCD Improvements	\$219,500
1600 NCD Improvements	\$411,900
1900 NCD Improvements	\$382,500
2002 NCD Improvements	\$307,800
2302 NCD Improvements	\$123,600
2500 NCD Improvements	\$66,500
3101 NCD Improvements	\$918,000
3200 NCD Improvements	\$170,700
3603 NCD Improvements	\$775,600
5200 NCD Improvements	\$67,100
6301 NCD Improvements	\$81,800
<b>Storm System Water Quality Subtotal</b>	<b>\$6,237,900</b>
<b>Overall Long-Term Improvement Total</b>	<b>\$33,049,900</b>

<b>Note</b>	Estimates include engineering and contingency costs.
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