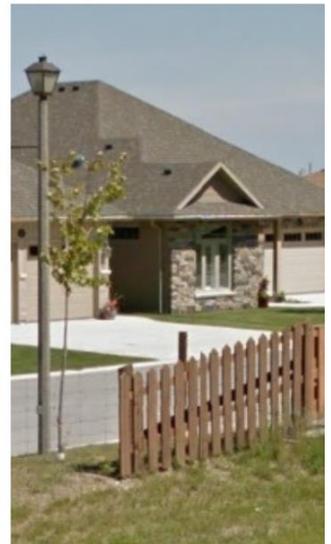
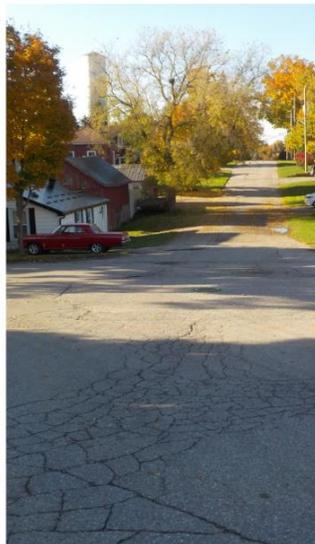
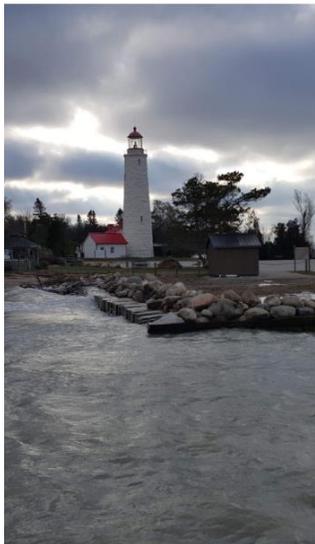


TOWNSHIP OF HURON-KINLOSS

# GROWTH, WATER AND WASTEWATER SERVICING MASTER PLAN



**BLUEPRINT**  
FOR THE FUTURE  
*Water & Wastewater Servicing Master Plan*



**BMROSS**  
engineering better communities

Issued: June 2, 2023

**TOWNSHIP OF HURON-KINLOSS  
GROWTH, WATER AND WASTEWATER SERVICING MASTER  
PLAN**

June 2, 2023

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File No. 18265

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## **TOWNSHIP OF HURON-KINLOSS**

### **GROWTH, WATER AND WASTEWATER SERVICING MASTER PLAN**

#### **EXECUTIVE SUMMARY**

##### **A. PURPOSE OF THE MASTER PLAN**

The Township of Huron-Kinloss initiated a Master Plan in May 2022, following the Municipal Class Environmental Assessment (MCEA) study process to assess future growth within the primary settlement areas of Ripley and Lucknow and secondary settlement area of the Lakeshore, as well as to identify water and wastewater infrastructure needs.

The Master Plan will become the basis for, and used in support of, future projects required to accommodate projected growth.

##### **B. KEY FINDINGS**

###### **B.1. Growth and Development**

The most recent population count for the Township of Huron-Kinloss is from the 2021 Census. In 2021, the Township Census population was 7,723. The populations of the primary settlement areas were 1,154 and 800, for Lucknow and Ripley respectively. The Lakeshore area, a secondary settlement area, has a population of 3,183 persons.

Overall, there has been a 9.25% change in the population of the Township over the last 5 years. The majority of the population growth has occurred in the Lakeshore area, with moderate growth occurring in Lucknow and Ripley.

Several population forecasts from a number of sources suggest growth will occur in the primary and secondary settlement areas over the next 25 years, with a significant proportion of the growth occurring in the Lakeshore area.

There are a number of approved and proposed developments in the Township. The known development proposals (as of July 2022) and vacant infill lots result in a development commitment of 803 units for the Township as a whole. Ripley holds the most development commitments with 331 units, followed by Lakeshore South, Lakeshore North and Lucknow with 182, 157 and 133 units respectively.

Residential dwelling growth was forecasted in Equivalent Residential Units (ERUs) where one ERU is considered equivalent to a single detached residence. Table B.1 shows the forecasted increase in ERUs to 2047 for Lucknow, Ripley and Lakeshore.

**Table B.1 Forecasted Increase in ERU to 2047 – Lucknow, Ripley, and Lakeshore**

<b>Forecast</b>	<b>Lucknow (additional ERUs 2022-2047)</b>	<b>Ripley (additional ERUs 2022-2047)</b>	<b>Lakeshore (additional ERUs 2022-2047)</b>
Forecasted Range (Low to High)	50-235	75-252	600-611

These values have been used in the investigation and evaluation of capacity requirements for water and wastewater servicing for forecasted growth.

## **B.2. Settlement Area Land Needs**

The need for additional land for settlement areas was assessed through a comparison of forecasted residential growth and the total potential number of units. Total potential units were determined through current development proposals, infill lots and the amount of land zoned for residential development or future development. The number of potential lots in each settlement area is summarized in Table B.2. Additionally, density requirements set out in the Township’s Official Plan and servicing limitations were considered, such as the absence of municipal sewage services in the Lakeshore settlement area.

**Table B.2 - Potential Future Units in Lucknow, Ripley and Lakeshore (based on current lot inventory)**

<b>Settlement Area</b>	<b>Total Potential No. of Units</b>
Lucknow	891
Ripley	493
Lakeshore	549

Over the next 25 years, additional land within the Lakeshore settlement area will be required to accommodate the projected low, medium and high growth scenarios. Under the high growth scenario, space for 62 ERUs will be required. At 5 units per hectare in this area, this equates to 12.4 hectares (30 acres) of additional land required to accommodate the projected growth.

## **C. LUCKNOW SERVICING**

### **C.1. Lucknow Water System**

The Lucknow Water System is a groundwater-based supply and distribution system that services the village of Lucknow and approximately 10 customers south of Lucknow in the Township of Ashfield-Colborne-Wawanosh. The system is supplied by two groundwater wells, located within Lucknow. Storage for the system is currently provided by a standpipe located at 656 Wheeler Street which has a total volume of 996 m<sup>3</sup>. The effective volume of the storage is approximately 35 m<sup>3</sup>. A pumphouse at 482 Ross Street controls the operations of the well pumps based on the water level in the standpipe. The standpipe is currently in the process of being replaced by an elevated storage facility with a total and effective storage of 1,600 m<sup>3</sup>. There are two trunk watermains, a 250 mm diameter trunk along Campbell Street from Montgomery Lane to Walter Street and a 300 mm trunk watermain from approximately the location of the soccer fields on Havelock Street south to the intersection with Campbell Street. There are also larger diameter watermains (200 mm) from the standpipe south along Ross Street and along Bob Street to the second well pumphouse.

The capacity of the system is specified by the Municipal Drinking Water License (MDWL) and Permit To Take Water (PTTW). For the Lucknow Water System, the PTTW limits the rated capacity to 2,000 m<sup>3</sup>/day. The firm capacity of the system, which is taken as the capacity with the largest well or pump out of service, is 935 m<sup>3</sup>/day.

Current demands are estimated based on the maximum day flows over the last three years. The maximum day flow is 1,210 m<sup>3</sup>/day. There are approximately 682 customers serviced by the Lucknow Water System, as determined from billing and metered customer lists provided by the Township.

For the Lucknow Water System, the existing system capacity is adequate for the projected needs of the community. The projection takes into account the current demand, committed capacity, and projected 25 years demands.

#### **C.1.1. Known Issues**

As previously noted, the existing standpipe has been due for a replacement, but this process is currently underway. Well No. 5 is approaching the point of needing replacement. It is currently located on a confined site with poor access which means it would be likely that an alternative site is desired for a replacement well.

### **C.2. Wastewater Services**

There is municipal sewage collection in Lucknow and treatment is provided through an aerated lagoon system, located in the northeast corner of the village. The system includes a pumping station, three treatment lagoons, a storage lagoon and six rapid infiltration basins. The current rated capacity of the system is 750 m<sup>3</sup>/day. The sewage pumping station (SPS) has three sewage pumps and pumps sewage via a forcemain

along Willoughby Street to Washington Street to the lagoons. Most of the sewage collection system is made up of 200 mm sewers; however, there are larger diameter sewers in the system. The three year annual average flow of the system is 559 m<sup>3</sup>/day. The current number of customers serviced by the system is 675. The treatment system operates under ECA No. 3567-999KAF which stipulates average effluent concentration objectives for the aerated lagoon and monthly average effluent concentration limits for groundwater monitoring.

For the Lucknow Wastewater System, the existing capacity is adequate for the projected needs of the community; under the highest growth forecast the treatment plant would be at capacity in 2047.

### **C.2.1. Issues**

In recent years at the WWTP, aerators have been replaced, as has sand media in the rapid infiltration basins. This work was considered typical given equipment age and anticipated life expectancy.

## **D. RIPLEY SERVICING**

### **D.1. Ripley Water System**

The village of Ripley is supplied water from the Ripley Drinking Water System. The system consists of four groundwater wells, an elevated storage tank and the distribution network. An elevated water storage facility was recently constructed, with a storage capacity of 1,465 m<sup>3</sup>, and is adjacent to the Ripley Huron Community Sports Complex. The distribution system is mostly made up of 150 mm distribution water mains, with two small sections of trunk watermain recently constructed from the new elevated storage tank to Malcolm Street and to supply the Queen Street watermain. Recently, a 150 mm watermain was extended along Queen Street, from William Street to provide water service to the Ripley Industrial Park. There are approximately 366 customers connected to the Ripley Water System.

For the capacity of the Ripley Water System, the PTTW limits it to 2,880 m<sup>3</sup>/day, with a firm capacity of the system of 2,250 m<sup>3</sup>/day. Current demands are estimated based on the maximum day flow over the last three years. The maximum day flow in Ripley between 2019 and 2021 is 1,147 m<sup>3</sup>/day.

For the Ripley Water System, the existing system capacity is adequate for the projected needs of the community.

#### **D.1.1. Known Issues**

There are no significant issues or concerns related to the Ripley Water System. It is known that available fire flows at the eastern limit of the system, within industrial lands, is limited to values that are less than typical industrial area targets.

## **D.2. Wastewater Servicing**

The village of Ripley has wastewater treatment for residents provided through a lagoon-based system. The treatment components include three waste stabilization ponds, a single post aeration cells and a sub-surface diffused air aeration system, located at the eastern edge of the village. Treated effluent from the system is discharged into the South Pine River, between October 15<sup>th</sup> and May 1<sup>st</sup>. The capacity of the system is an average flow of 600 m<sup>3</sup>/day, and the discharge of effluent cannot exceed 4,200 m<sup>3</sup>/day.

There are two sewage pumping stations for the system, known as the Community Centre SPS and the Ripley SPS. Sewage from the entire village is conveyed to the Ripley SPS and then pumped to the lagoons. The sewage collection system provides services to all developed properties in Ripley, which includes 366 customers. The three year annual average flow for Ripley is 368 m<sup>3</sup>/day. The treatment system operates under ECA No. 3-0724-88-006 which stipulates effluent concentration objectives and effluent concentration limits for the system. In 2019 and 2020 there were no effluent sample exceedances of the concentration objectives or limits. In 2021, one sample did exceed the limit value.

For the Ripley Wastewater System, the existing system is theoretically over-committed and on that basis there is a deficit in reserve capacity. However, current plant usage is approximately 61% of plant capacity, and based on the highest growth forecast, sewage flows are not anticipated to reach plant capacity until approximately 2038.

### **D.2.1. Issues**

Though rated for a capacity of 600 m<sup>3</sup>/day, the ECA for the plant requires that once annual average flows reach 500 m<sup>3</sup>/day, the lagoon performance and receiving stream shall be further analyzed to confirm that the rated capacity of 600 m<sup>3</sup>/day will have no negative impact on the receiver. At this time, average flows are not near 500 m<sup>3</sup>/day.

It is recommended that reserve capacity calculations be regularly updated, especially as development occurs. When a plant expansion is required, it is recommended that the MCEA to support that project be commences at least 5 years prior to the forecasted need for additional capacity.

## **E. LAKESHORE SERVICING**

### **E.1. Lakeshore Water System**

Along the Lakeshore, residents are supplied water via the Lakeshore Drinking Water System. The system supplies properties from south of the Huronville area, south of Kincardine to Point Clark. It also extends south to provide water to residents in the Courtney/Amberley Beach area and east to service the hamlet of Amberley. The maximum water supply capacity of the system is 11,634 m<sup>3</sup>/day. The system is split into two pressure zones: Lakeshore North, which includes the Huronville South and Murdock Glen wells, and Lakeshore South, which is supplied by the Point Clark and Blairs Grove wells. In total, there are five wells that supply the system. The water supplied by the wells

is disinfected utilizing sodium hypochlorite. Storage for the system is provided in a standpipe located on Concession 2, east of Point Clark. The total volume of storage of this facility is 1,500 m<sup>3</sup>, with an effective storage of 138 m<sup>3</sup>. Water for the Inverlyn Lake/Huronville area of the Township is provided by the Municipality of Kincardine. The Lakeshore Water Distribution System is connected to the Municipality of Kincardine Water System to allow for either system to provide supply in case of an emergency or maintenance operations.

This water system includes an extensive distribution system that supplies the different lakeshore communities, as well as the hamlet of Amberley and the Amberley Beach area. The system includes watermains generally ranging from 150 to 250 mm diameter, with some smaller diameter watermains in some areas, a standpipe and pumphouses.

There are 853 customers in the north pressure zone and 1,590 in the south pressure zone.

The current demands for the North Lakeshore and South Lakeshore system are based on the maximum day demands between 2019 and 2022. In the northern portion of the system, the maximum day demand is 2,656 m<sup>3</sup>/day, and 3,375 m<sup>3</sup>/day in the south.

For the Lakeshore North System, the PTTW limits the rated capacity to 5,741 m<sup>3</sup>/day. The firm capacity of the system is 1,814 m<sup>3</sup>/day. For the Lakeshore South system, the MDWL limits the rated capacity to 5,893 m<sup>3</sup>/day, and the firm capacity is 2,618 m<sup>3</sup>/day.

The existing supply capacity of the Lakeshore Water System is adequate for the projected needs of the Lakeshore area.

### **E.1.1. Issues**

Based on formulae contained in the MECP Design Guidelines for Drinking Water Systems – 2008, the existing standpipe does not provide the recommended stored water volume for the existing service population. In summary, slightly more than 4,000 m<sup>3</sup> storage volume is recommended for the existing service population. In consideration of forecasted growth, slightly more than 4,300 m<sup>3</sup> storage volume is recommended to accommodate development.

A limited number of locations are expected to have pressures below minimum recommended MECP Guideline values under peak system demand conditions, and a limited number of hydrants on dead-end watermain, remote from sources of supply, would be considered Class C/red. These low pressure and low fire flow areas are generally a result of high elevation and/or location at the end of dead-end watermains.

## **E.2. Wastewater Servicing**

In the Inverlyn/Huronville area, sanitary sewage collection and treatment services are provided by the Municipality of Kincardine. For the remainder of the properties within the Lakeshore, collection and treatment is provided by private, on-site sewage treatment systems.

### **E.2.1. Issues**

The 2020 Provincial Planning Statement (PPS) does not permit partial services within settlement areas unless needed to address failed on-site sewage services and for infilling and minor rounding out. Given this, it is unlikely that additional individual private sewage services will be permitted within an expanded Lakeshore settlement area. A wastewater servicing strategy is required for the Lakeshore area.

## **F. RESERVE CAPACITY ANALYSIS**

The reserve capacity analysis for the Lucknow water supply suggests there is sufficient uncommitted capacity at this time. The Lucknow wastewater treatment facility currently has sufficient capacity, but at the highest rate of growth projected would require expansion by 2047.

In Ripley, the water supply and storage has sufficient capacity for existing users and future development. The wastewater treatment system is theoretically over-committed, on the basis of what is considered a development commitment.

Lakeshore North and South have larger water supply reserves available than that of Lucknow and Ripley. From the examination of the water storage capacity, additional storage capacity is recommended.

## **G. SERVICING AND GROWTH OUTSIDE OF THE SETTLEMENT AREAS**

The current Bruce County Official Plan includes Inland Lake and Estate Residential designations. These designations could be applied to a development outside of the existing settlement areas. Presently, the Inland Lake designation applies to some areas around Silver Lake and Paradise Lake in Huron-Kinloss. Developments under this designation will require plans and studies to determine the suitability of the development. The Estate designation recognizes the potential for residential development on large lots in non-agricultural areas. Presently, there are lands within the Township that could be redesignated for Estate Residential. Such a development would require either full municipal servicing or communal servicing which will add to the Township's overall budget demands or require an agreement between the developer and the Township. In addition, prior to promoting development outside of the existing settlement areas, Council should consider the resources required to support additional service areas and associated demands (e.g. winter road maintenance, garbage collection, etc.).

## H. SUMMARY OF PREFERRED SOLUTIONS

The following table provides a summary of the preferred solutions to existing and future servicing issues. In most cases the solutions are subject to additional more detailed investigations.

**Table H.1 – Summary of Preferred Servicing Strategies and Recommendations**

Facility/Service	Identified Issue	Required by Year	Preferred Solution/Recommendations	Probable Cost (2023\$)	Class EA Schedule
Lucknow Water System	Need to replace Well 5.	5-10 years	Replace Well 5 with a new municipal well at a new site	\$150,000 for MCEA. \$1,250,000 for new well and pumphouse.	B
Lucknow Water System	Watermain sizing for future development areas	Dependent on development	Ensure appropriate watermain sizing and looping within development areas	Cost borne by development	N/A
Lucknow Wastewater System	Long-term need for additional treatment capacity	Long-term (10-25 years)	Over short-term recommend updating reserve capacity calculations regularly. Over long-term, MCEA will be required for treatment expansion.	\$3,000 for regular reserve capacity update. \$200,000 for MCEA.	C
Lucknow Wastewater System	Limited sewer capacity in sections between Wheeler St. and Inglis St. and Ross St. and Inglis St.	Dependent on development	Ensure flows are routed appropriately.	Cost borne by development	N/A
Ripley Water System	Limited fire flow to the Industrial Park	Dependent on development	Promote dry industries or use of on-site storage or fire pumps	Cost borne by development	N/A

<b>Facility/Service</b>	<b>Identified Issue</b>	<b>Required by Year</b>	<b>Preferred Solution/Recommendations</b>	<b>Probable Cost (2023\$)</b>	<b>Class EA Schedule</b>
Ripley Water System	Watermain sizing for future development areas in southern part of community	Dependent on development	Ensure appropriate watermain sizing and looping within developments.	Cost borne by development	N/A
Ripley Wastewater System	Theoretical over commitment of treatment capacity	Immediately	Enact an allocation policy and regularly update reserve capacity calculations.	\$3,000 for regular reserve capacity update.	N/A
Ripley Wastewater System	Long-term treatment capacity	Long-term (10-25 years)	MCEA for treatment expansion will be required.	\$200,000 for MCEA.	C
Lakeshore Water System	Deficiency in water storage	5-10 years	An additional water storage facility	\$125,000 for MCEA. \$5,000,000 for new storage facility.	B
Lakeshore Wastewater System	Servicing expanded settlement area	Long-term (10-25 years)	Continued private, on-site servicing in the existing settlement area, decentralized or communal servicing in the expanded settlement area	\$200,000 for MCEA.	C for a communal wastewater treatment plant.



## **TOWNSHIP OF HURON-KINLOSS**

### **GROWTH, WATER AND WASTEWATER SERVICING MASTER PLAN**

#### **1.0 INTRODUCTION**

##### **1.1 Project Introduction**

The Township of Huron-Kinloss initiated a Master Plan, following the Municipal Class Environmental Assessment (MCEA) study process in May 2022 to identify water and wastewater infrastructure needs and assess future growth within the primary settlement areas of Ripley and Lucknow and secondary settlement area of the Lakeshore. In this regard, the Master Plan will become the basis for, and used in support of future projects required to accommodate projected development.

The study process followed the procedures set out in the MCEA document, dated June 2000, as amended in 2007, 2011, 2015, and 2023 (Municipal Engineers Association, 2000). B. M. Ross and Associates Limited (BMROSS) was engaged to conduct the MCEA investigation on behalf of the Township.

##### **1.2 General Description of Master Plans**

Master Plans are long-range plans which integrate infrastructure requirements for existing and future land uses with environmental assessment planning principles (Municipal Engineers Association, 2000). These plans examine existing infrastructure systems within defined areas in order to provide a framework for planning subsequent works. Master Plans typically exhibit several common characteristics. They:

- Address the key principles of successful environmental planning;
- Provide a strategic level assessment of various options to better address overall system needs, potential impacts, and mitigation;
- Address at least the first two phases of the MCEA process;
- Are generally long-term in nature;
- Apply a system-wide approach to planning which relates infrastructure either geographically or by a particular function;

- Recommend an infrastructure servicing plan which can be implemented through the completion of separate projects; and
- Include descriptions of the specific projects needed to implement the Master Plan.

### **1.3 Integration with the Class EA Process**

#### **1.3.1 Class EA Phases**

The Master Plan has been completed in accordance with the planning and design process of the MCEA. The MCEA is an approved planning document which describes the environmental assessment process that proponents must follow in order to meet the requirements of the Environmental Assessment Act (EA Act) (Municipal Engineers Association, 2000).

The MCEA approach allows for the evaluation of alternative methods of carrying out a project and identifies potential environmental impacts.

The MCEA planning process is divided into five phases which are described below and illustrated in Figure 1.1.

- Phase 1 - Problem or opportunity identification.
- Phase 2 - Evaluation of alternative solutions to the defined problems and selection of a preferred solution.
- Phase 3 - Identification and evaluation of alternative design concepts and selection of a preferred design concept.
- Phase 4 - Preparation and submission of an Environmental Study Report (ESR) for Stakeholder review.
- Phase 5 - Implementation of the preferred alternative and monitoring of any impacts.

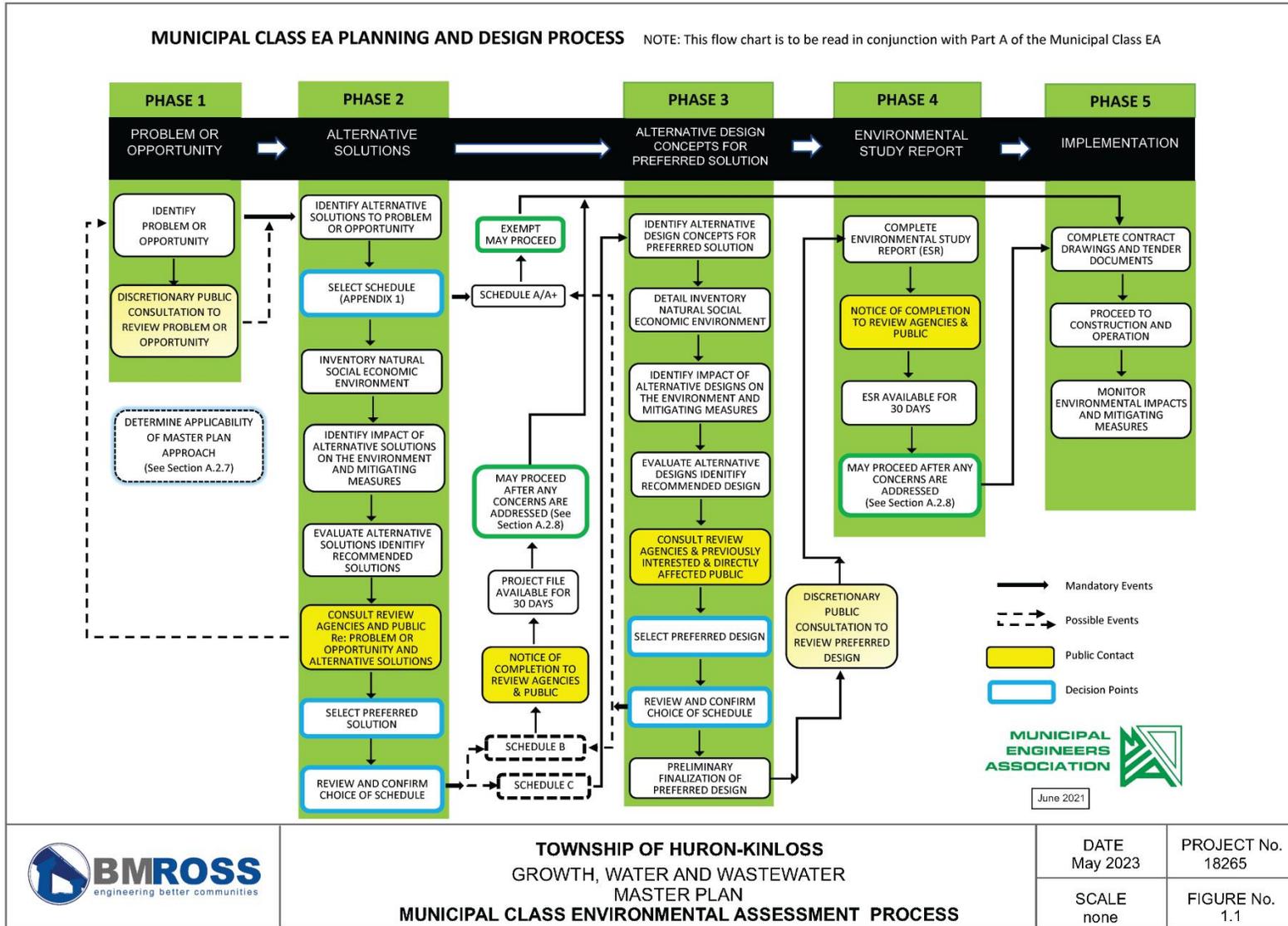
#### **1.3.2 Classification of Project Schedules**

Projects are classified into different project schedules according to the potential complexity and the degree of environmental impacts that could be associated with the project. Four schedules are included in the MCEA process:

- Exempt,
- Exempt following completion of the archaeological potential screening and/or collector road screening,

# Figure 1.1 MCEA Planning and Design Process

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- Schedule B – Projects that are approved following the completion of a screening process that incorporates Phase 1 and 2 of the MCEA process as a minimum, and
- Schedule C – Projects that are approved subject to following the full MCEA process.

The MCEA process is self-regulating, and municipalities are expected to identify the appropriate level of environmental assessment based upon the project and alternatives they are considering.

#### 1.4 Master Plan Approaches

Given the broad nature and scope of Master Plans, the MCEA document provides proponents with four approaches to conducting Master Plan investigations. Proponents are encouraged to adapt and tailor the master planning process to suit the needs of the study being undertaken providing that, at a minimum, the assessment involves an evaluation of servicing deficiencies followed by a review of possible solutions (i.e., Phases 1 and 2 of the MCEA process).

Table 1.1 summarizes the primary components associated with each of the four Master Plan approaches outlined within the MCEA document.

**Table 1.1 – Summary of MCEA Master Plan Approaches**

<b>Approach</b>	<b>Key Characteristics</b>	<b>Project Implementation</b>
1	<ul style="list-style-type: none"> <li>- Master Plan prepared at the conclusion of Phases 1 and 2 of the MCEA process.</li> <li>- Completed at a broad level of assessment.</li> <li>- Serves as basis for future investigations associated with specific Schedule B and C projects.</li> </ul>	<ul style="list-style-type: none"> <li>- Schedule B and C projects require further Class EA investigations.</li> </ul>
2	<ul style="list-style-type: none"> <li>- Master Plan prepared at the conclusion of Phases 1 and 2 of MCEA process.</li> <li>- Includes a more detailed level of investigation and consultation completed, such that it satisfies requirements for Schedule B screenings.</li> <li>- Final public notice for Master Plan serves as Notice of Completion for individual Schedule B projects.</li> </ul>	<ul style="list-style-type: none"> <li>- Schedule B projects are approved.</li> <li>- Schedule C projects must complete Phase 3 and 4 of Class EA process.</li> </ul>

Approach	Key Characteristics	Project Implementation
3	<ul style="list-style-type: none"> <li>- Master Plan prepared at the conclusion of Phase 4 of MCEA process.</li> <li>- Level of review and consultation encompasses Phases 1 to 4 of the MCEA process.</li> <li>- Final public notice for Master Plan serves as Notice of Completion for Schedule B and C projects reviewed through the Master Plan.</li> </ul>	<ul style="list-style-type: none"> <li>- Further Class EA investigations are not required for projects reviewed through the Master Plan.</li> </ul>
4	<ul style="list-style-type: none"> <li>- Integration of Master Plan with associated Planning Act approvals.</li> <li>- Establishes need and justification in a very broad context.</li> <li>- Best suited when planning for a significant geographical area for an extended time period.</li> </ul>	<ul style="list-style-type: none"> <li>- Depending on level of investigation associated with the Master Plan, Class EA investigations may be required for specific projects.</li> </ul>

**1.4.1 Applied Approach**

At the outset of the Master Plan process, it was identified that Approach 1 would be utilized for this assessment. Under this framework, the Master Plan defines broad infrastructure requirements within the study area, serves as the basis of future detailed investigations, and identifies preliminary alternatives for consideration for Schedule B or C projects that are required to accommodate growth. Under this framework, Schedule B and C projects that are identified will require additional MCEA investigations in the future.

The Master Plan is subject to approval from the Township of Huron-Kinloss but does not require formal approval under the EA Act. A Master Plan Report Notice will be issued at the conclusion of the Master Plan. Any projects identified within this Master Plan that are considered Schedule B and C activities will be required to complete additional investigations to satisfy the requirements of MCEA process prior to approval, design, and construction.

## **2.0 STUDY AREA AND EXISTING CONDITIONS**

### **2.1 Township of Huron-Kinloss**

The Township of Huron-Kinloss is located in southern Bruce County, along the shoreline of Lake Huron. The Township was formed through the amalgamation of the Township of Huron and Township of Kinloss in 1999. It is bounded by Lake Huron to the west, Municipality of Kincardine to the north, on the east by the Municipality of South Bruce and Municipality of Brockton, and by the Township of Ashfield-Colborne-Wawanosh (ACW) in Huron County to the south.

The Township has a land base of approximately 475 km<sup>2</sup>, with Lucknow and Ripley being the primary settlement areas, or urban areas, within the Township. There is also an area of extensive development along the shoreline, east of Lake Range Drive from the southern boundary of the Township to the northern boundary with Kincardine. The lakeshore area is considered a secondary settlement area, and includes a number of communities including Point Clark, Blairs Grove, Bruce Beach, Heritage Heights, Huronville, and Inverlyn Lake. Many of these communities include permanent and seasonal residents. There are also several smaller hamlets through the Township, including: Amberley, Pine River, Kinloss, Holyrood, Whitechurch, and Kinlough. The general location of the Township, including the settlement areas and hamlets are shown in Figure 2.1.

Agriculture and tourism are the dominant economic sectors within the Township. In the larger region, the energy sector is the major economic driver. This is the result of the presence of Bruce Power, a nuclear power generating facility north of Kincardine. The economic influence of Bruce Power extends to Huron-Kinloss, with many residents employed at the site or in related fields. Other residents employed outside of the Township commute to Kincardine, Wingham, Walkerton, and Goderich.

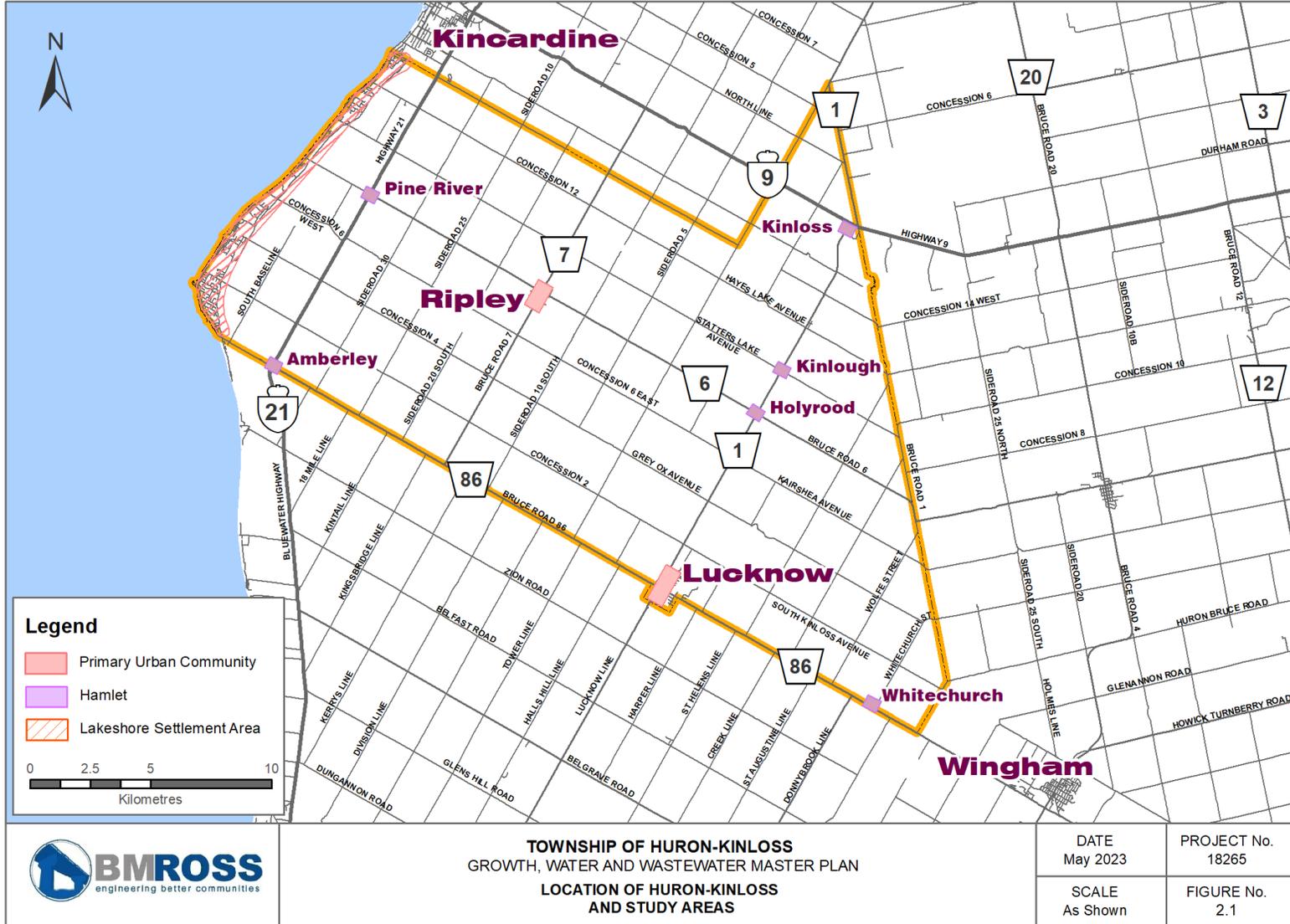
### **2.2 Study Area**

For the purposes of assessing growth and servicing needs, this Master Plan will focus on three specific areas within the Township – Lucknow, Ripley, and the Lakeshore. These areas are the largest population centres within the Township and historically where most of the growth and development has occurred. Ripley and Lucknow are primary settlement areas, with municipal water and wastewater services available. Given the availability of full services, provincial and local planning policies direct the majority of future growth to these communities. The Lakeshore area is partially serviced (municipal water services are available) and minor rounding out and infilling development is permitted. The Official Plan specifies that development of permanent and seasonal residents uses is a desired outcome, provided it is balanced against protection of the sensitive coastal environment (Township of Huron-Kinloss, 2016).

The hamlet areas, such as Whitechurch and Kinlough, have not been included in the analyses for this study. These areas were excluded as development pressures have

Figure 2.1 Location of Huron-Kinloss and Study Areas

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been low and future development is limited to minor infilling. It is expected that new development in the hamlets will be minimal and there are enough lands currently available to accommodate the low levels of growth.

### **2.2.1 Lucknow**

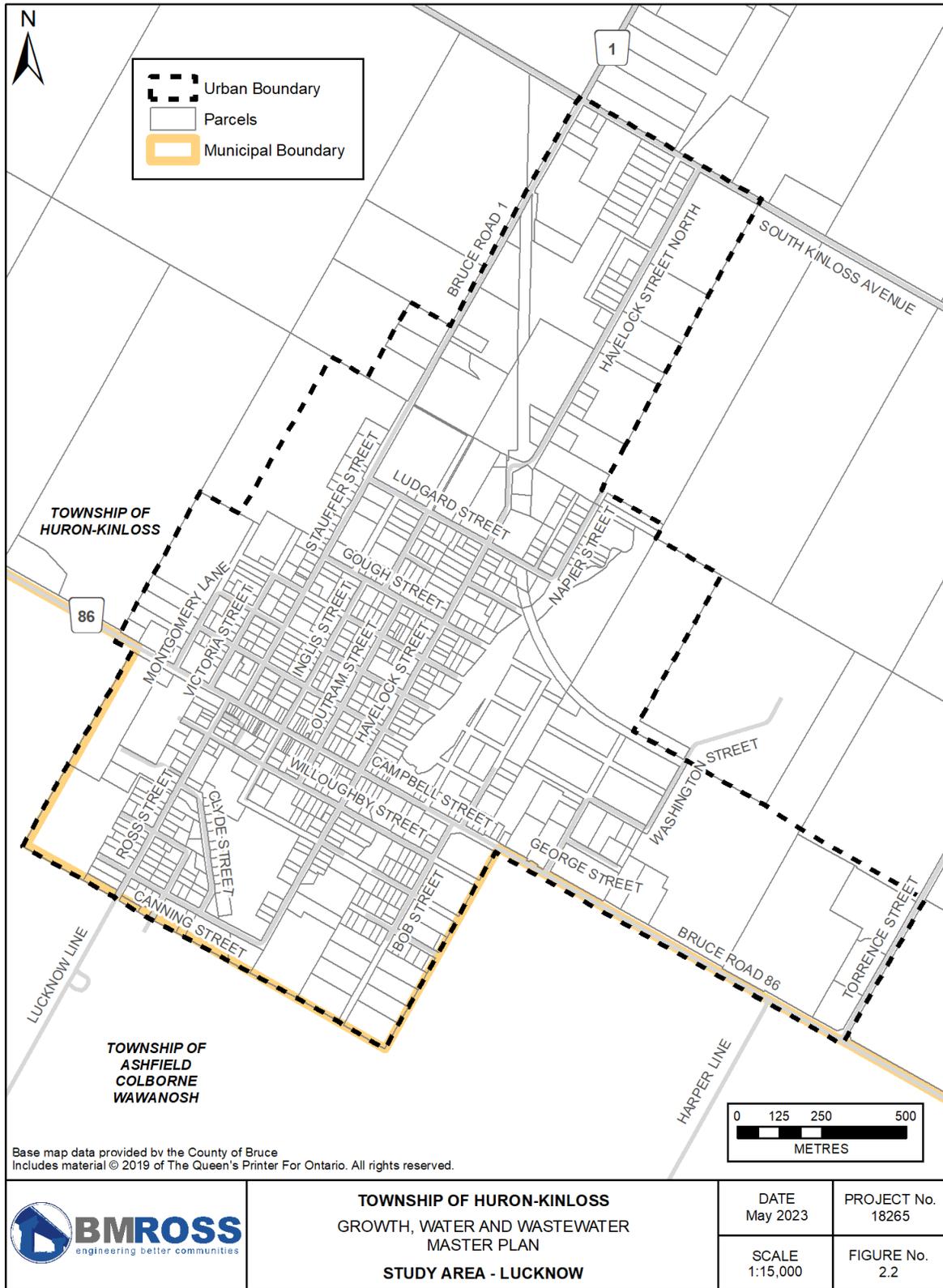
Lucknow is the largest primary settlement area within Huron-Kinloss. It is situated along County Road 86, approximately 20 km west of Wingham, along the southern boundary of the Township (Figure 2.2). The population of Lucknow is 1,154, as reported in the 2021 Census (Statistics Canada, 2023). There are over 500 private dwellings in the community. Lucknow serves as a commercial and industrial centre for the surrounding rural areas. Dickies Creek, Kinloss Creek, and Anderson Creek all flow through Lucknow and converge south of the village. Lands around these creeks are zoned to reflect potential flooding hazards.

Lucknow has a well-defined commercial core along County Road 86 (Campbell Street), featuring restaurants, a bank, funeral home, bakery, hardware store, clothing store, florist, and pharmacy, in addition to several offices. The community also features a nursing home, retirement homes, public elementary school, arena, library, churches, medical offices, precast concrete manufacturer, and an industrial grain elevator. There are also a number of industries located along County Road 1 in Ashfield-Colborne-Wawanosh within close proximity to Lucknow, including, Lucknow Co-op and Helm Welding.

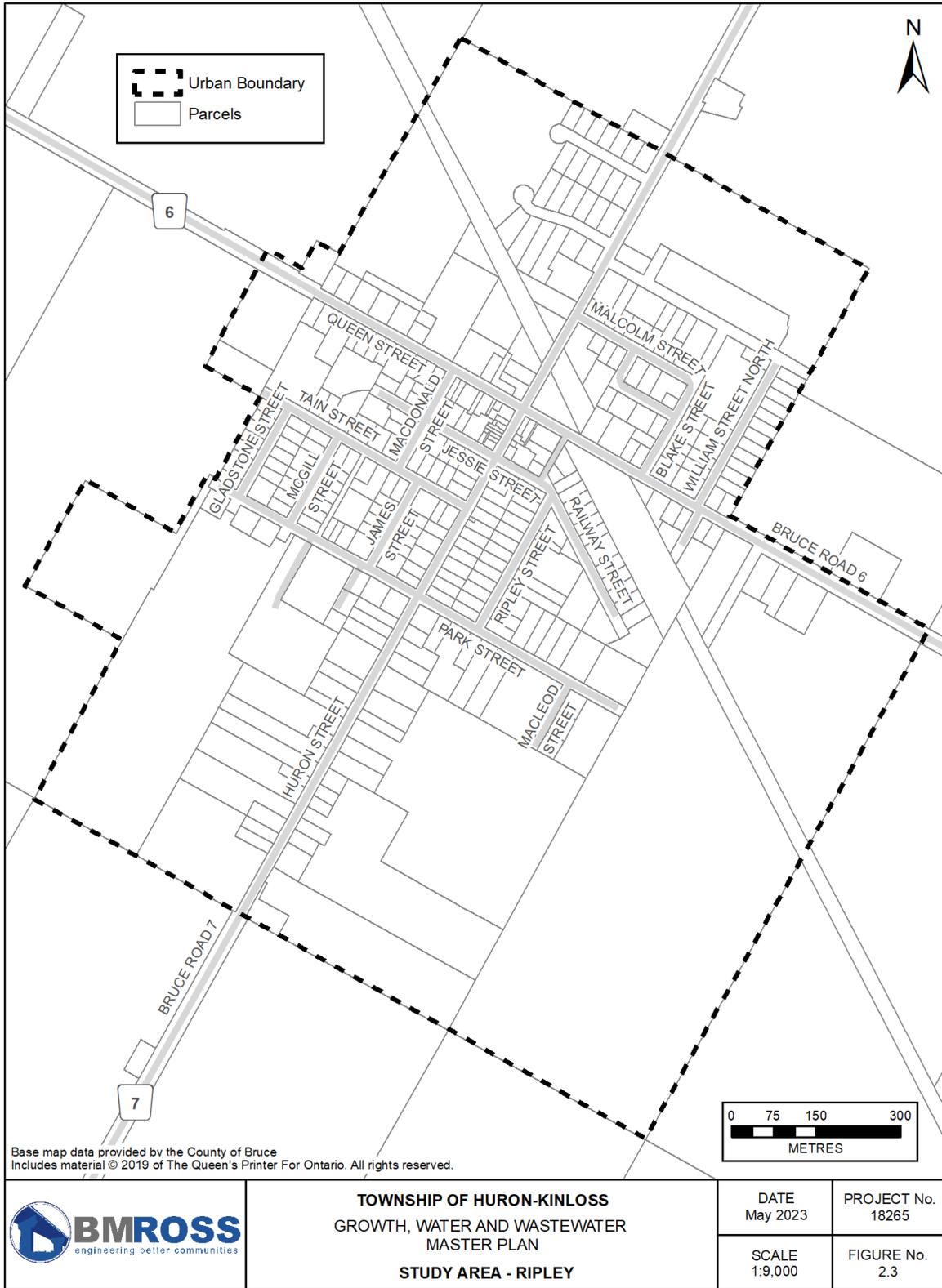
### **2.2.2 Ripley**

The community of Ripley is centered around the intersection of Bruce Road 6 (Concession 8) and Bruce Road 7 (Sideroad 15), in the former Huron Township. It serves as the administrative centre for the Township, being home to the municipal office. Ripley is a small, rural community with a population of approximately 800 residents in 2021 (Statistics Canada, 2023). There are approximately 340 private dwellings in the village. There are a small number of businesses in Ripley that service the surrounding rural area. The community includes an arena, fire hall, public elementary school, a church, retirement home, daycare centre, curling rink, post office, and library. The commercial core of the village is centred around the intersection of Queen Street and Huron Street. It features a restaurant, variety store, pharmacy, home décor store, convenience store, and LCBO outlet and offices. A number of the storefronts are currently unoccupied. There is a large block of former commercial buildings on Queen Street, east of Huron Street that are unoccupied. There is also a vacant commercial space on the southwest corner of the intersection of Huron and Queen Street. Major employers within Ripley include Hurontel, Current Electric, Pollock Electric, and the Township. A map of Ripley is included in Figure 2.3.

Figure 2.2 Lucknow Settlement Area



**Figure 2.3 Ripley Settlement Area**



### **2.2.3 Lakeshore Area**

The Lakeshore secondary settlement area stretches from Amberley Beach at the south end of Huron-Kinloss to the northern boundary with the Municipality of Kincardine. It includes the lands between Lake Huron and Lake Range Drive and is made up of a number of communities or areas, including:

- Point Clark,
- Lurgan Beach,
- Blairs Grove,
- Bruce Beach,
- Heritage Heights,
- Kin-Bruce,
- Boiler Beach, and
- Inverlyn Lake/Huronville.

Figure 2.4 shows the locations of these different lakeshore communities. Generally, these communities are residential in nature, with limited commercial or other land uses. In many of the Lakeshore communities there is a mix of seasonal and permanently occupied homes as a result of their proximity to Lake Huron. The oldest of these communities, Point Clark, Lurgan Beach, and Bruce Beach, were originally cottage communities and still have many seasonal residences. Other communities, such as Heritage Heights and Inverlyn Lake/Huronville, have more permanently occupied homes. The different communities vary significantly in terms of size, density, and occupation (in terms of seasonal or permanent residency).

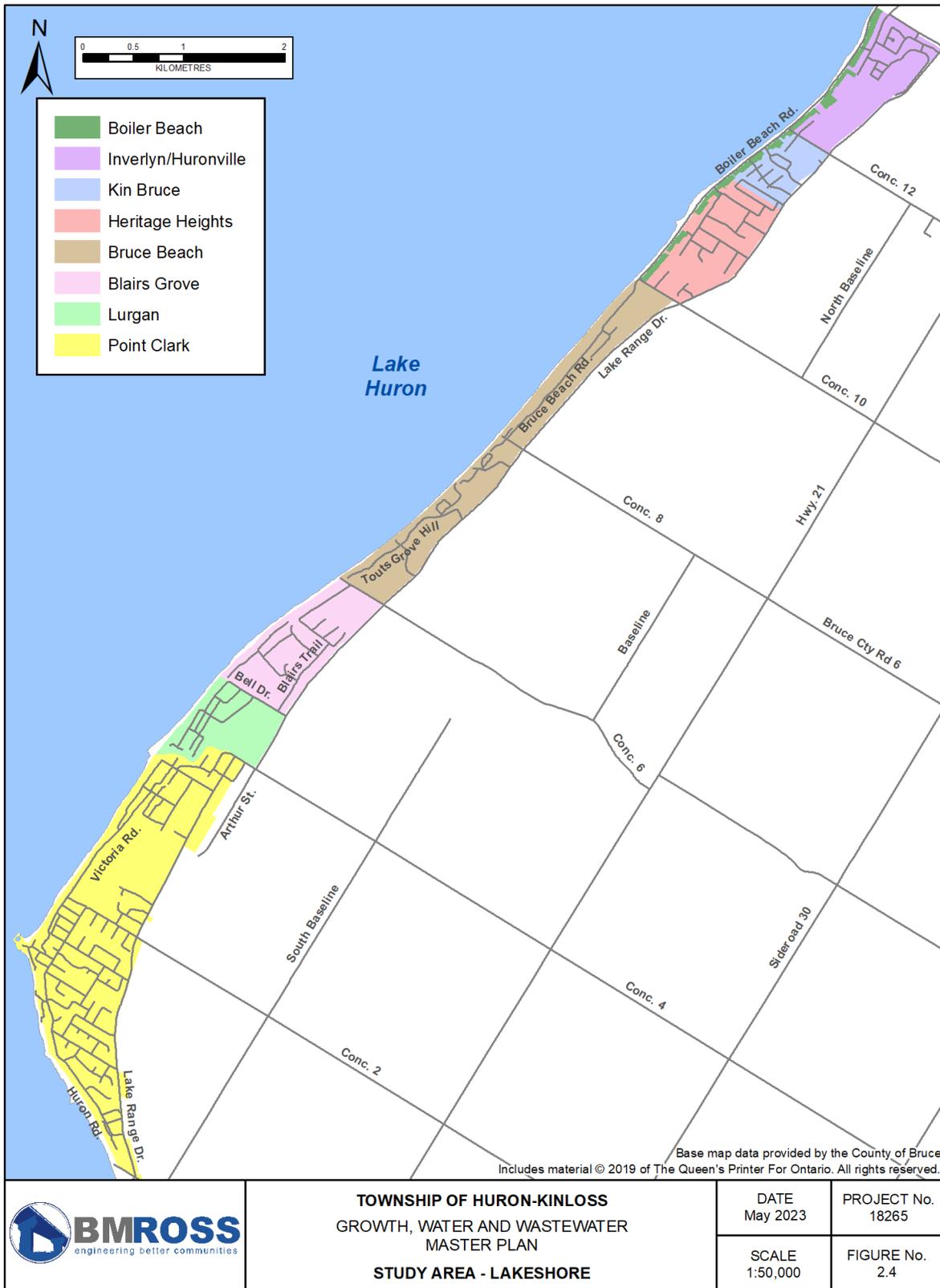
For the purposes of organization of this report and mapping, the Lakeshore has been split into Lakeshore South and Lakeshore North. Lakeshore South includes the areas south of Concession 6, while Lakeshore North are the lands north of that road.

## **2.3 Environmental Setting**

### **2.3.1 General**

The MCEA Master Plan process requires an inventory of the environment. The environmental review represents a general overview of local conditions. This environmental inventory is used to identify factors that could influence the identification and selection of alternative solutions to the problem or opportunity being investigated. The background review for the Master Plan process incorporated the assembly of information about the local environment.

Figure 2.4 Lakeshore Settlement Area



Information was collected as part of a desktop analysis, based on the following key sources:

- Saugeen Valley Conservation Authority, website, and mapping;
- Government of Canada Species at Risk website;
- Ministry of Natural Resources and Forestry Natural Heritage Information Centre (NHIC) website; and
- Existing files and reports from the Township and BMROSS.

### **2.3.2 General Physiography**

The study area encompasses three physiographic regions, from west to east: the Huron Fringe, Huron Slope, and Horseshoe Moraines (Chapman & Putnam, 1984). The Huron Fringe is the narrow area of land adjacent to the Lake Huron shoreline and the shoreline bluff to the west. It was formed by the wave-cut terraces of the glacial lakes, and consists of boulders, gravel bars, and sand of the former glacial lakes. It stretches from Sarnia north to Tobermory. The Lakeshore area of Huron-Kinloss is found within this physiographic region.

The Huron Slope is a clay plain, modified by a narrow strip of sand and glacial beaches, located east of the shoreline bluff and west of the Horseshoe Moraines. Between Point Clark and Ripley, there are deeper, silty-natured clay soils. The till overlying the stratified clay is generally up to 3 m thick.

West of the Huron Slope is the Horseshoe Moraine region. This area has two primary landforms that characterize it, the irregular moraines and ridges composed of till and kame deposits and the sand and gravel terraces with swampy valley floors (Chapman & Putnam, 1984). The hills surrounding Lucknow are examples of the moraines locally.

Soils in the study area vary from sand soils to silt and clay loams. Generally, the soils along the lakeshore area below the bluff are sandy, belonging to the Sullivan Sand group (Hoffman & Richards, 1954). These soils have good drainage, but low fertility for agricultural purposes and are susceptible to erosion. Above the shoreline bluff, the soils are sandy or clay loams. In the Ripley area, the dominant soil is Brookston Clay Loam, which is characterized by smooth, gently sloping topography. It is less well drained but is suitable for growing cash crops if drained. The soils surrounding Lucknow are loamy in texture, and include the Harrison Loam, Burford Loam, Huron Silt Loam, and Donnybrook Sandy Loam. These soils are well suited for agriculture and generally drain well (Hoffman & Richards, 1954).

### **2.3.3 Significant Natural Features**

#### **2.3.3 (a) General**

The community of Lucknow is surrounded by a rural landscape with multiple land uses including agriculture, natural environment, and resource extraction. The existing village boundary is surrounded by multiple river corridors, wetland complexes, wooded areas, and licenced aggregate operations (see Figure 2.5). Woodlands surrounding Lucknow appear relatively fragmented and disconnected based on historic and present agricultural land uses. Dickies Creek, Kinloss Creek, and Anderson Creek are located within the urban settlement boundary of Lucknow as well as woodlands designated as significant by the Township of Huron-Kinloss Official Plan.

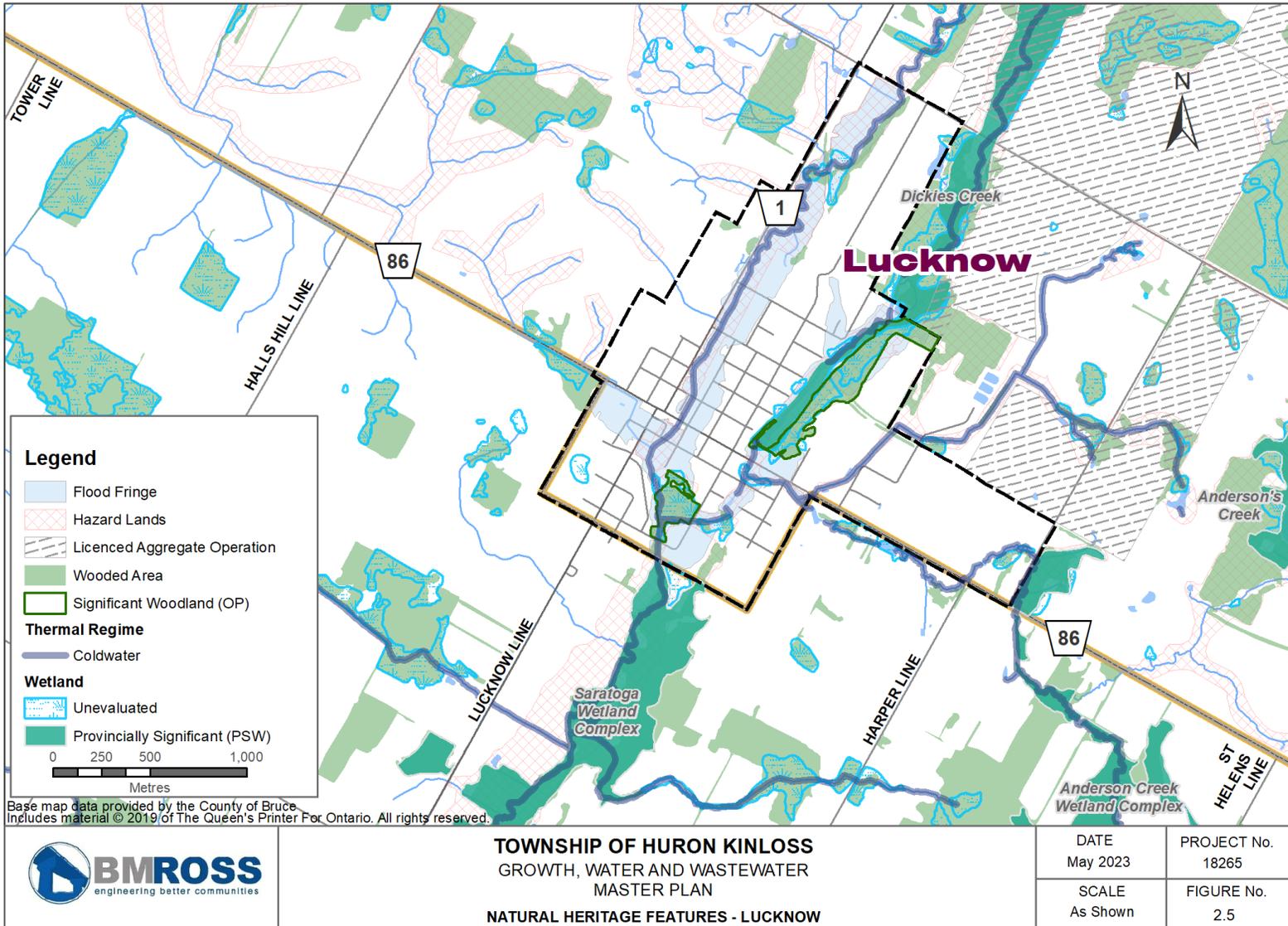
The community of Ripley is surrounded predominately by a rural landscape with a focus on agriculture as a primary use. The existing boundary is surrounded by multiple river corridors including the Pine River and South Pine River (see Figure 2.6). Woodlands surrounding Ripley appear scarce, relatively fragmented, and disconnected based on historic and present agricultural land uses. Within the urban settlement boundary of Ripley, natural areas are limited to a few small unevaluated wetlands and wooded areas located at the south end of the community.

Lakeshore North is surrounded by Lake Huron to the west and a rural landscape with a focus on agriculture to the east. The existing boundary is surrounded by several aquatic habitats including the Stewart Swamp and Royal Oak Creek. The surrounding landscape is primarily composed of agricultural lands (see Figure 2.7). Woodlands surrounding Lakeshore North appear relatively fragmented and disconnected based on historic and present agricultural land uses. Within the urban settlement boundary of Lakeshore North, there is a network of woodlands designated as significant by the Township of Huron-Kinloss Official Plan.

Lakeshore South is surrounded by Lake Huron to the west and a rural landscape with a focus on agriculture to the east. The surrounding landscape is primarily composed of agricultural lands (see Figure 2.7). Woodlands surrounding Lakeshore South appear relatively fragmented and disconnected based on historic and present agricultural land uses. Within the urban settlement boundary of Lakeshore South, there is a network of woodlands designated significant by the Township of Huron-Kinloss Official Plan and multiple unevaluated wetlands. Clark Creek and Pine River flow west through the urban settlement boundary of Lakeshore South and drain into Lake Huron.

### Figure 2.5 Natural Heritage Features – Lucknow

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**Figure 2.6 Natural Heritage Features – Ripley**

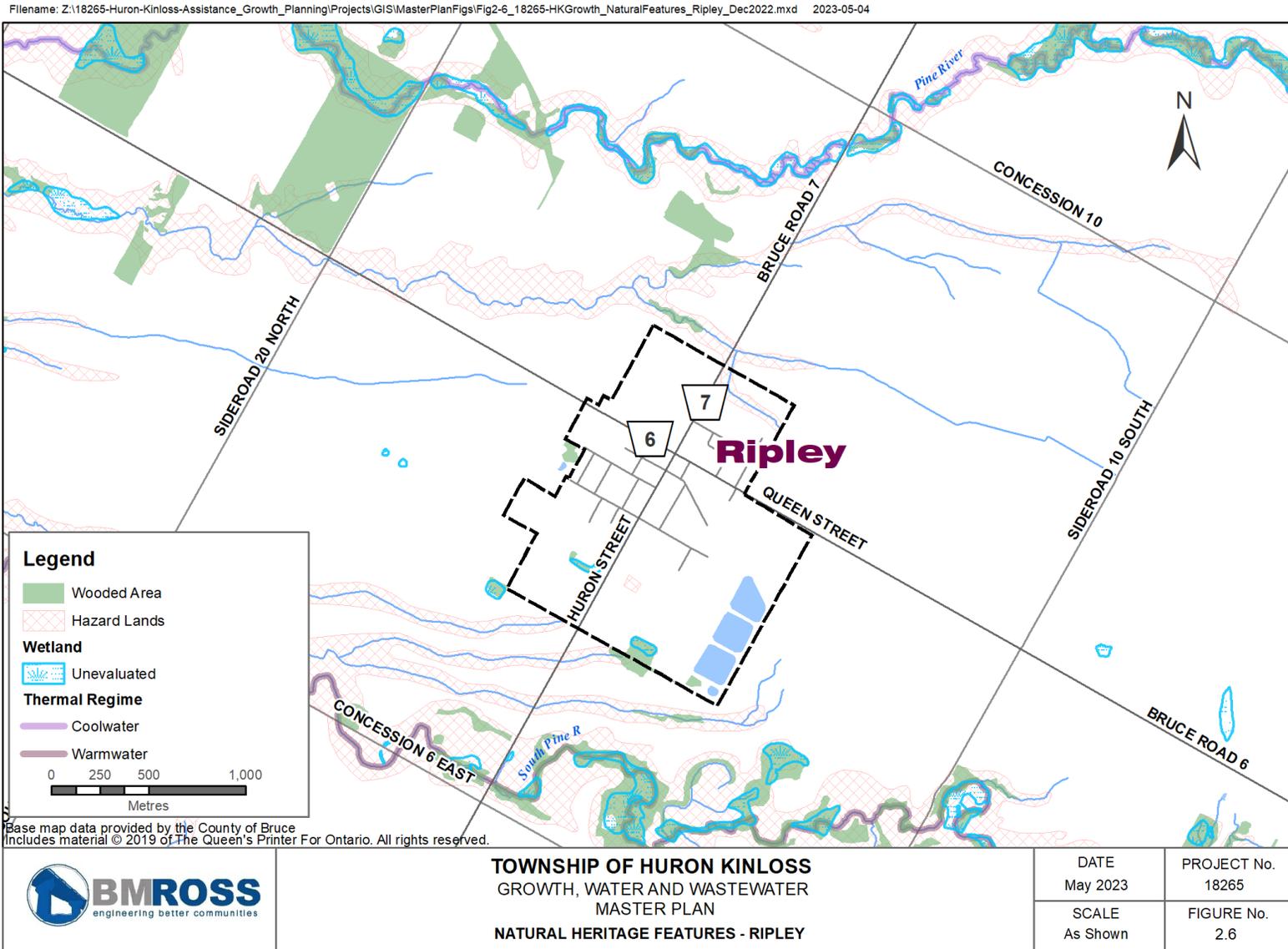
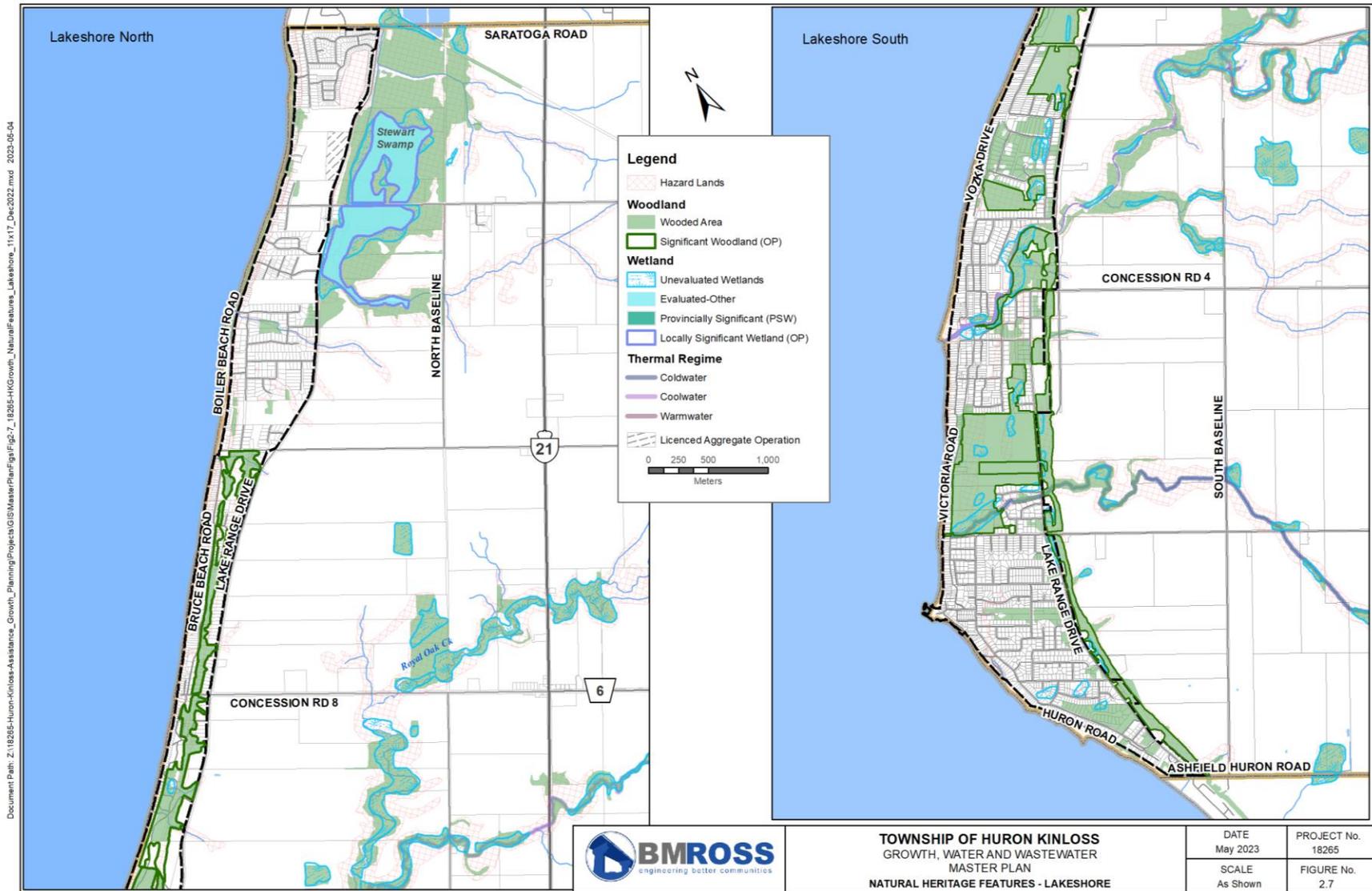


Figure 2.7 Natural Heritage Features – Lakeshore Area



### 2.3.3 (b) Watercourses

Dickies Creek, Kinloss Creek (also known as Ackert Drain), and Anderson Creek flow through Lucknow and converge at the south end, draining into the Nine Mile River. The Nine Mile River continues to flow south until it reaches Dungannon Road, where it makes a significant meander to flow west, eventually draining into Lake Huron at Port Albert. The watercourse supports a diverse fish community including sensitive coldwater species such as Brook Trout (*Salvelinus fontinalis*), Brown Trout (*Salmo trutta*), and Rainbow Trout (*Oncorhynchus mykiss*) as well as top predators, such as the Northern Pike (*Esox lucius*). There are records of a Special Concern fish species within the Nile Mile River, the Northern Brook Lamprey (*Ichthyomyzon fossor*), downstream of the location where the St. Helen's Creek drains into the Nile Mile River.

The Royal Oak Creek and South Pine River drain into the Pine River approximately 5.3 kilometres and 4.5 kilometres upstream from where the river outlets into Lake Huron at Lurgan Beach. Before draining into the lake, the Pine River meanders in a southwest direction. The watercourse supports a diverse fish community including Brown Trout (*Salmo trutta*), Lake Chub (*Couesius plumbeus*), and Smallmouth Bass (*Micropterus dolomieu*). There are records of a Special Concern fish species within the Pine River, the Silver Lamprey (*Ichthyomyzon unicuspis*), downstream of the location where the South Pine River drains into the Pine River.

The Stewart Drain is located approximately 20 metres east of the existing village boundary of Lakeshore West. The drain flows north through the Stewart Swamp and eventually drains into the Penetangore River. The watercourse supports a diverse fish community including sensitive coldwater species such as Brook Trout (*Salvelinus fontinalis*), Chinook Salmon (*Oncorhynchus tshawytscha*), and Rainbow Trout (*Oncorhynchus mykiss*) as well as top predators, such as the Northern Pike (*Esox lucius*) and Smallmouth Bass (*Micropterus dolomieu*).

Clark Creek flows west through the existing village boundaries of Lakeshore South and outlets into Lake Huron directly north of Concession 2. The watercourse supports a diverse fish community including Rainbow Trout (*Oncorhynchus mykiss*), Rainbow Darter (*Etheostoma caeruleum*), White Sucker (*Catostomus commersonii*), and multiple baitfish. Based on background information compiled, aquatic species at risk are not known to inhabit Clark Creek.

Within the existing boundaries of Lucknow, Ripley, Lakeshore North, and South, there are multiple open and closed municipal drains including Taylor Drain, McLeod Municipal Drain, Culbert Municipal Drain, Harris Municipal Drain, and Lake Range Drain. The drains collect runoff from the area and eventually discharge into large watercourses or waterbodies. Based on background information compiled, there are no known aquatic species at risk and/or associated habitat known to exist within the drains.

Lake Huron has a coldwater thermal regime and supports a wide variety of fish species at different life stages including Pacific Salmon (*Oncorhynchus spp.*), Freshwater Drum

(*Aplodinotus grunniens*), Lake Trout (*Salvelinus namaycush*), Lake Whitefish (*Coregonus clupeaformis*), Rainbow Smelt (*Osmerus mordax*), and Walleye (*Sander vitreus*). Lake Huron is home to the Shortnose Cisco (*Coregonus reighardi*), which is an Endangered fish species.

Buffers have been established around watercourses and along shorelines to restrict and protect natural features from development and to protect residents from threats, such as flooding. The Nine Mile River and its tributaries are regulated by the Maitland Valley Conservation Authority under O. Reg 147/06 (Regulation of development, interference, with wetlands and alterations to shorelines and watercourses). The Pine River, Penetangore River, Clark Creek, and their tributaries, as well as the Lake Huron shoreline are regulated by the Saugeen Valley Conservation Authority under O. Reg 147/06 (Regulation of development, interference, with wetlands and alterations to shorelines and watercourses).

### 2.3.3 (c) Areas of Natural and Scientific Interest

The Ministry of Natural Resources and Forestry (MNRF) maintains an inventory of Areas of Natural and Scientific Interest (ANSIs) in Ontario. These life science or earth science features are recognized for their importance related to natural heritage, scientific study, or education. To identify ANSIs within the vicinity of Lucknow, Ripley, and the Lakeshore regions, the MNRF Make a Map: Natural Heritage Areas application was consulted (Ministry of Natural Resources and Forestry, 2021). There are no ANSIs located near Lucknow, Ripley, or the Lakeshore regions.

### 2.3.3 (d) Natural Areas

The following natural areas were identified through a search of the NHIC database:

**Table 2.1 – Natural Areas within Proximity to Lucknow, Ripley, Lakeshore North, and South**

Type	Name	Location	Description
Natural Area	Dickies Creek Wetland Complex	Lucknow, adjacent to Dickies Creek	Provincially significant wetland that has been evaluated. The wetland type is swamp.
Natural Area	Dickies Creek	Lucknow	Coldwater stream that supports sensitive coldwater fish species.
Wildlife Concentration Area	Mixed Wader Nesting Colony	Lucknow	Suitable nesting habitat for mixed waterbirds.
Natural Area	Saratoga Wetland Complex	South of Lucknow	Provincially significant wetland that has been evaluated. The wetland type is swamp.
Natural Area	Anderson Creek Wetland Complex	East of Lucknow	Provincially significant wetland that has been evaluated. The wetland type is swamp.

Type	Name	Location	Description
Natural Area	Anderson's Creek	Lucknow	Coldwater stream that supports sensitive coldwater fish species.
Natural Area	Lucknow Waterworks Conservation Area	Lucknow	Local park with a pavilion and picnic tables, mowed lawn, and pedestrian bridge over Dickies Creek.
Natural Area	Stewart Swamp	Directly east of Lakeshore North	Wetland that has been evaluated. The wetland type is swamp.
Plant Community	Little Bluestem – Long-leaved Reed Grass – Great Lakes Wheat Grass Dune Grassland Type	Lakeshore North and Lakeshore South	Very rare in Ontario (SRANK: S2). Found along the Great Lakes shoreline on stabilized foredunes.
Plant Community	Sea Rocket Sand Beach Type	Lakeshore North and Lakeshore South	Rare in Ontario (SRANK: S2S3). Found along the Great Lakes shoreline.
Natural Area	Point Clark	Lakeshore South	Natural environments within the Point Clark area.

Dickies Creek and its associated wetland complex is located within the existing boundaries of Lucknow. The Dickies Creek wetland complex is provincially significant and has been classified as a swamp. The woodlands surrounding Dickies Creek have been designated as significant by the Township of Huron-Kinloss Official Plan. A mixed wader nesting colony is present within the Dickies Creek wetland complex. The Lucknow Waterworks Conservation Area is located adjacent to Dickies Creek, within the existing boundaries of Lucknow. Anderson's Creek and its associated wetland complex is located east of Lucknow, outside of the existing boundaries. The Anderson's Creek wetland complex is provincially significant. The Saratoga Wetland Complex is located directly south of Lucknow. There are multiple unevaluated wetlands found throughout Lucknow adjacent to Dickies Creek, Kinloss Creek (also known as Ackert Drain), and Anderson Creek.

There are two unevaluated wetlands with associated wooded areas located within the existing boundaries of Ripley, at the south end. There are no significant wetlands or woodlands located within or surrounding the existing boundaries of Ripley.

The Stewart Swamp, located east of Lakeshore North, has been evaluated and is classified as a swamp. Little Bluestem, Long-leaved Reed Grass, Great Lakes Wheat Grass dune grassland habitat is very rare in Ontario and Sea Rocket sand beach habitat is rare in Ontario. Both habitats are present along the shorelines within Lakeshore North

and Lakeshore South and Great Lakes Sandreed (*Sporobolus rigidus var. magnus*) and Sand-dune Wildrye (*Elymus lanceolatus spp. psammophilus*) have been reported within the habitats. The Point Clark natural area is located within the existing boundaries of Lakeshore South. Woodlands located within Lakeshore North and Lakeshore West have been designated as significant by the Township of Huron-Kinloss Official Plan. There is one unevaluated wetland located within the existing boundaries of Lakeshore North and multiple unevaluated wetlands throughout the existing boundaries of Lakeshore South.

Woodlands surrounding Lucknow, Ripley, Lakeshore North, and Lakeshore South appear relatively fragmented and disconnected based on historic and present agricultural land uses.

### **2.3.4 Species at Risk**

An evaluation for the presence of significant species and their associated habitats within the study area has been incorporated into the project planning process. A review of available information on species and habitat occurrences determined that the study area may contain species and/or associated habitats that are legally protected under Provincial and Federal legislation.

The protection of species at risk and their associated habitats comes from the following federal and provincial legislation:

- The Federal Species at Risk Act, 2002 (SARA) provides for the recovery and legal protection of listed wildlife species and associated critical habitats that are extirpated, endangered, threatened or of special concern and secures the necessary actions for their recovery. On lands that are not federally owned, only aquatic species and bird species included in the Migratory Bird Convention Act (1994) are legally protected under SARA. (Environment Canada, 2017).
- The Provincial Endangered Species Act, 2007 (ESA) provides legal protection of endangered and threatened species and their associated habitat in Ontario. Under the legislation, measures to support their recovery are also defined.

To identify what species at risk may be located in the vicinity of Lucknow, Ripley, Lakeshore North, and Lakeshore South, the following sources were consulted:

- Natural Heritage Information Centre, Make a Heritage Map;
- Environment Canada, Species at Risk Public Registry. SARA Schedule 1 Species List;
- Ontario Reptile & Amphibian Atlas;
- Ontario Species at Risk Website;
- Fisheries and Oceans Canada Aquatic Species at Risk Online Mapping;
- Ontario Breeding Bird Atlas, Region 4;

- Atlas of the Mammals of Ontario; and
- TEA Ontario Butterfly Atlas.

A list of potential species at risk found within the Township of Huron-Kinloss, provided by the MNR, is included in Appendix A. The Township incorporates a large area and wide variety of environs that include terrestrial and aquatic habitats. To identify species more likely to be found within the study area, the NHIC database was consulted. The NHIC database provides species occurrences based on 1 km<sup>2</sup> square system. The squares that overlapped with the settlement areas of Lucknow, Ripley, Lakeshore North, and Lakeshore South were searched for species occurrences. Species recorded within the study area are identified in the list provided in Appendix A.

It should be noted that the majority of the study areas for this Master Plan are within an existing urban settlement area, with extensive previously disturbed areas and limited habitat potential. Future projects identified through the Master Plan will require site-specific investigations to determine the potential for species at risk at the site.

### **2.3.5 Breeding Birds**

The Atlas of Breeding Birds of Ontario (2001-2005) was used to identify the bird species with confirmed, probable, and possible breeding habitat in proximity to the study area. The study areas are within the 100 km<sup>2</sup> areas identified by the Atlas as Squares 17MJ37, 17MJ38, 17MJ47, 17MJ48, 17MJ56, and 17MJ57 in Region 6: Huron-Perth and Region 8: Bruce (Bird Studies Canada, 2009).

Lucknow is located within atlas square 17MJ56. A total of 103 species were observed within the square. A total of 64 species of breeding birds were confirmed to have habitat within the area. In addition to the confirmed species, 27 species are considered to have probable, and 12 species have possible breeding habitats in the area.

Ripley is located within atlas square 17MJ57. A total of 77 species were observed within the square. A total of 40 species of breeding birds were confirmed to have habitat within the area. In addition to the confirmed species, 17 species are considered to have probable, and 20 species have possible breeding habitats in the area.

Lakeshore North and Lakeshore South are located within atlas squares 17MJ37, 17MJ38, 17MJ47, and 17MJ48. A total of 128 species were observed within the square. A total of 50 species of breeding birds were confirmed to have habitat within the area. In addition to the confirmed species, 44 species are considered to have probable, and 34 species have possible breeding habitats in the area.

The survey area includes key habitat for identified species, such as forest (in all stages of growth), riverine areas, agricultural areas, wetlands, and shoreline areas.

### **2.3.6 Cultural Heritage Environment**

For the purposes of this Master Plan, a broad examination of cultural heritage and areas of archaeological potential was undertaken. The Master Plan will identify future infrastructure projects that may require site specific reviews of cultural heritage and archaeological resources. It is anticipated that these reviews will be done in conjunction with Schedule B or C EAs, as required.

#### **2.3.6 (a) Archaeological Resources**

The County of Bruce and Township of Huron-Kinloss do not have Archaeological Management or Master Plans. In the absence of these plans, the County does provide mapping of areas of archaeological potential based on proximity to waterbodies. In Lucknow and Ripley, much of the urban settlement area has archaeological potential based on the proximity to waterbodies, early historic transportation routes, and an early historic settlement area. However, there are areas, such as many of the existing roads, where deep extensive disturbance has occurred as a result of water, wastewater, and road infrastructure projects and the potential for archaeological resources is likely low.

In the Lakeshore area, the proximity to Lake Huron and water bodies draining towards the lake result in much of the current settlement area having archaeological potential. Any projects identified in this area should evaluate the potential for archaeological resources in conjunction with future MCEA requirements.

#### **2.3.6 (b) Cultural Heritage Landscapes and Built Heritage Resources**

There is currently no municipal register of heritage properties or listing of properties with heritage value in Huron-Kinloss. There are also no sites within the Township listed on the Ontario Heritage Register. Within the urban areas of Ripley and Lucknow, there are buildings that may have heritage value given their age, architectural style, or historic purpose/use. This includes a number of former churches, buildings in the downtown cores, cemeteries, former schools, and residences. In the Lakeshore area, there is one Federal Historic Site: the Point Clark Lighthouse. There is also a cemetery and church, south of the Pine River in Point Clark.

Given the broad scope of this Master Plan and the existing water and wastewater infrastructure in place within the study area, any future projects identified should consider impacts to cultural heritage landscapes and built heritage resources on a project-by-project basis.

### **2.3.7 Climate Change**

As part of the MCEA process, potential impacts associated with climate change need to be evaluated. Some of the phenomena associated with climate change that may be considered during impact evaluations include:

- Changes in the frequency, intensity, and duration of precipitation, wind, and heat events;

- Changes in soil moisture;
- Changes in sea/lake levels;
- Shifts in plant growth and growing seasons; and
- Changes in the geographic extent of species ranges and habitat.

There are two approaches that can be utilized to address climate change in project planning. These are as follows:

- Reducing a project's impact on climate change (climate change mitigation). Mitigation of climate change impacts may include:
  - Reducing greenhouse gas emissions related to the project.
  - Alternative methods of completing the project that would reduce any adverse contributions to climate change.
- Increasing the project's and local ecosystem's resilience to climate change (climate change adaptation). Considerations related to climate adaptation include:
  - How vulnerable is the project to climate-related severe events?
  - Are there alternative methods of carrying out the project that would reduce the negative impacts of climate change on the project?

Through the evaluation of alternatives as part of the second phase of the MCEA, consideration of each of these approaches should be completed and included in the final determination of the preferred approach to completing a project.

### **2.3.8 Dust, Noise and Air Quality**

There are multiple sensitive receptors located within the study area including schools, day-care facilities, senior care facilities, and sensitive natural environments. The Ripley and Lucknow wastewater treatment plants (WWTP) are considered existing sources of odour and air pollution and emissions are expected to increase in the future with increased effluent from residential and commercial development. The Lucknow WWTP is located outside of the urban boundary of Lucknow, to the northeast. The Ripley WWTP is located within the urban boundary of Ripley, at the southeast end. Currently, there are no sensitive receptors located adjacent to the existing WWTPs.

There may be temporary impacts related to construction, which will be evaluated as part of the evaluation of alternative and potential mitigation measures during individual project planning. Additional upgrades to the WWTPs may be required to deal with increases in wastewater odour and air pollution emissions.

## **2.4 Clean Water Act (Source Water Protection)**

The intent of the Clean Water Act (CWA), 2006 is to “protect existing and future drinking water” sources in Ontario. Under the Act, source protection areas and regions were established, giving conservation authorities the duties and power of a drinking water source protection authority. These duties focus on the development, implementation, monitoring and enforcement of information and policies related to source water protection.

Lucknow is located within the Maitland Valley Source Protection Area, in the Ausable Bayfield Maitland Valley Source Protection Region. The Source Protection Plan for this source protection region came into effect in January 2019, under the direction of the Clean Water Act (2006). Ripley and the Lakeshore Areas are located within the Saugeen Valley Source Protection Area, in the Saugeen, Grey, and Northern Bruce Peninsula Source Protection Region. The Source Protection Plan for this source protection region came into effect in July 2016, under the direction of the Clean Water Act (2006). The Source Protection Plans outline policies developed to protect municipal drinking water sources from threats and the Approved Assessment Reports summarize the watershed characteristics and drinking water threats.

Water quantities throughout the Maitland Valley and Saugeen Valley Protection Areas were assessed as part of the work completed for the Approved Assessment Report. The investigation examined water quantities and the potential future stress to aquifers as a result of water takings. For the Tier I stress assessment, the degree of stress for the identified subwatersheds was calculated. The Nine Mile subwatershed, which includes Lucknow, was determined to have low potential stress to groundwater taking from average demand and the monthly maximum demands (Ausable Bayfield Maitland Valley Source Protection Region, 2019). Similarly, the Pine River/Lurgan Beach subwatershed, which includes Ripley and the Lakeshore Areas, was determined to have low potential stress to groundwater takings from the average demand and the monthly maximum demands (Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region, 2015).

The Assessment Report also identifies and describes areas within the Protection Area in terms of the intrinsic susceptibility of the underlying aquifers to contamination. In the Township of Huron-Kinloss, Ripley and Lucknow have low to moderate intrinsic susceptibility due to a thick layer of low permeable overburden located above the aquifers. Along the Lakeshore Area, the intrinsic susceptibility varies from low to high with areas where there is little to no natural protection due to little overburden material and/or highly permeable overburden material.

The Highly Vulnerable Areas (HVA) and Significant Groundwater Recharge Areas (SGRA) within the Township were also delineated for the Assessment Report. HVAs are located in the eastern section of the Township, with vulnerability scores of six. SGRAs

are located throughout the Township in areas where coarse-textured substrates are present. Vulnerability scores for the SGRAs range from 2 to 6.

The WHPA for the Lucknow Drinking Water System extends south-eastward 7.7 km from the wells into the Township of Ashfield-Colborne-Wawanosh (Ausable Bayfield Maitland Valley Source Protection Region, 2019). The WHPA includes residential, commercial, municipal, and agricultural land uses. Within the WHPA for the two municipal wells, 13 significant drinking water threats were identified. These threats pertain to:

- waste disposal sites, sewage systems, agricultural source material application, and storage;
- non-agricultural source material application, handling, and storage;
- commercial fertilizer application, handling, and storage;
- pesticide application, handling, and storage;
- fuel handling and storage;
- dense non-aqueous phase liquid handling and storage; and
- grazing and pasturing livestock.

With respect to water quality, it was noted the source aquifer for the Lucknow wells has naturally high fluoride, but this is dealt with during treatment. There were no drinking water quality issues resulting from ongoing or past activities identified for the Lucknow wells.

The Well Head Protection Areas (WHPA) for the Village of Ripley Well Supply extends south-eastward 18.5 km from the wells and has a total land area of 30 km<sup>2</sup> (Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region, 2015). The WHPA includes residential, commercial, and agricultural land uses. Within the WHPA, 69 significant drinking water threats were identified. These threats pertain to:

- road salt application, handling, and storage;
- dense non-aqueous phase liquid handling and storage; and
- livestock grazing.

With respect to water quality, it was noted the source aquifer for the Ripley wells has naturally high fluoride but is dealt with during treatment. There were no drinking water quality issues resulting from ongoing or past activities identified for the Ripley wells.

The Lakeshore Drinking Water System consists of 5 bedrock wells, with two located in Point Clark and 1 located in Blair Grove, Murdock Glen and Huronville. Multiple wells have been decommissioned in the system due to casing failures and have since then been replaced. The Point Clark WHPA extends south-eastward 6 km from the well and

has a total land area of 3.38 km<sup>2</sup>. The Blairs Grove WHPA extends eastward 5 km from the well and has a total land area of 1.87 km<sup>2</sup>. The Murdock Glen WHPA extends south-eastward 5 km from the well and has a total land area of 2.28 km<sup>2</sup>. The Huronville WHPA extends eastwards 7 km from the well and has a total land area of 0.91 km<sup>2</sup>. The WHPAs include residential, municipal, rural, and agricultural land uses. A total of 8, 12, 33 and 60 significant drinking water threats were identified for the Huronville, Murdock Glen, Point Clark and Blairs Groves WHPAs, respectively. These threats pertain to sewage systems, and fuel handling and storage. With respect to water quality, it was noted that the source aquifers for the Lakeshore wells have naturally high fluoride, hardness, iron, and sodium. Additionally, total dissolved solids standards were exceeded at the Point Clark and Blair Grove wells and sulphate levels were high at the Blair Grove well. These components are removed during treatment. There were no drinking water quality issues resulting from ongoing or past activities identified for the Lakeshore wells.

The WHPA delineated for the Lucknow, Ripley and Lakeshore drinking water systems are shown in Figure 2.8.

The Source Protection Plan defines the policies in place within vulnerable areas to protect sources from significant drinking water threats. Vulnerable areas within the Water and Wastewater Servicing Master Plan study area include WHPAs A to D for the Lucknow, Ripley, and Lakeshore wells. With respect to the Master Plan, the following threats or activity categories relate to activities associated with water and wastewater servicing (Ausable Bayfield Maitland Valley Source Protection Region, 2019) (Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region, 2015):

- Sewage Systems – Collection, storage, transmittance, treatment, and disposal; and
- Fuel Handling and Storage.

The policies that apply to these threats are briefly summarized in Table 2.2.

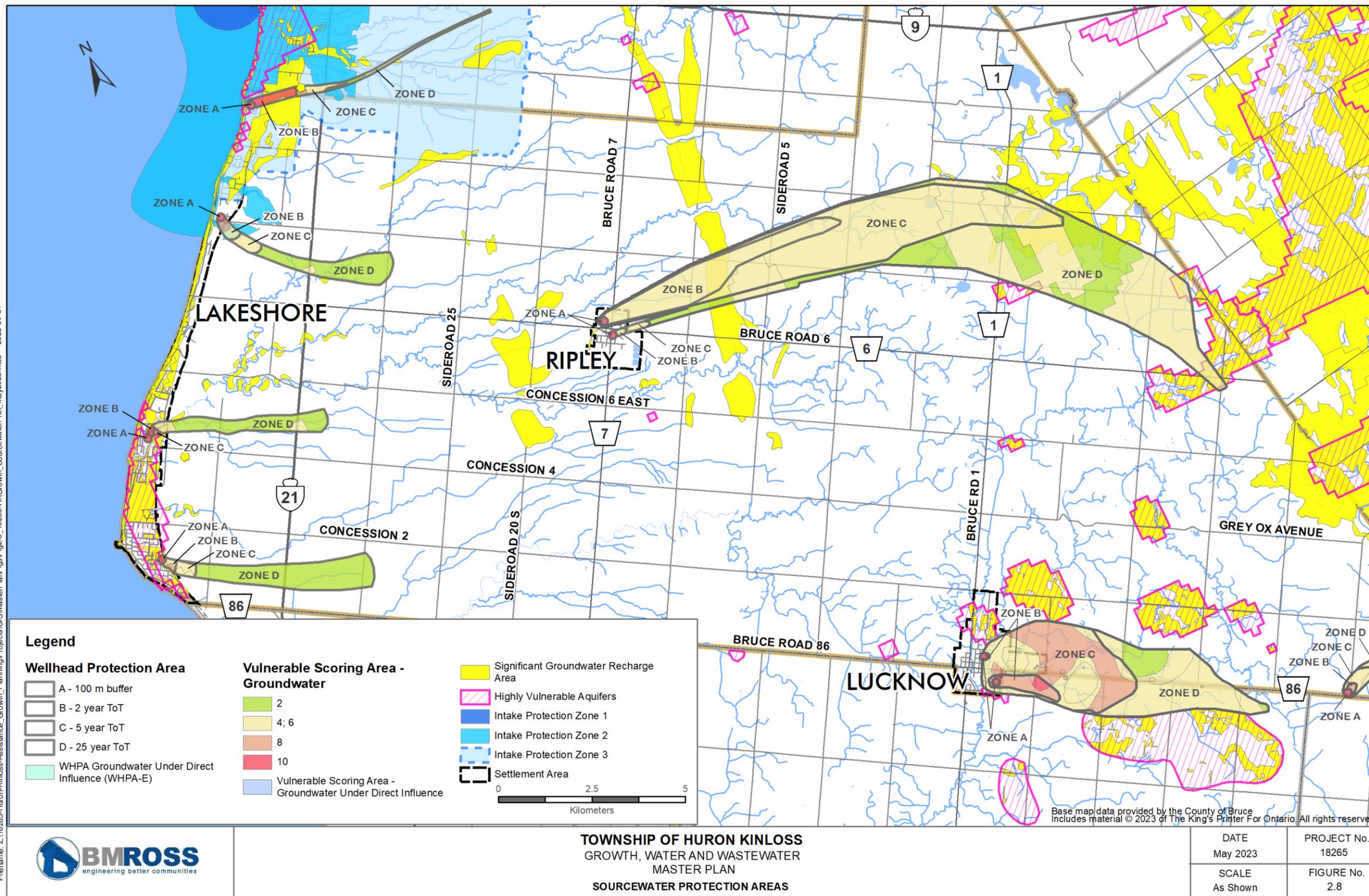
**Table 2.2 Source Water Policies relating to the Water and Wastewater Servicing**

<b>Policy</b>	<b>Policy Description</b>
02-01 Sewer Connection Bylaw	Municipalities with a sewer line in a vulnerable area or within 100 m of a vulnerable area will enact a sewer connection by-law.
02-02 Approval of Environmental Compliance Approvals for On-site Sewage Systems	On-site sewage system design standards shall include measures to reduce levels of nitrogen and phosphorus in effluent. An emergency plan shall be developed in case the system fails. On-site monitoring shall be completed to ensure the system is functioning as designed. The system shall be inspected regularly as per the most up to date inspection requirements stated in the On-site Sewage Maintenance Inspection document developed by the Ministry of Municipal Affairs and Housing. Compliance monitoring shall be prioritized in areas where septic failures have occurred or where older systems that have not been inspected recently exist. Improvement or replacement of non-complaint systems is required.

<b>Policy</b>	<b>Policy Description</b>
02-03 Constraint on Environmental Compliance Approvals for On-site Sewage System	Installation of an on-site sewage system is not permitted in locations where there is a sewer connection bylaw; installation of a treatment unit may be permitted provided the approval contains appropriate terms and conditions to ensure the sewage system never becomes a significant drinking water threat.
02-04 Maintenance Inspection Program	A mandatory on-site sewage maintenance inspection program shall be implemented. It is recommended that all greywater or blackwater that drains from buildings be connect to on-site sewage system. Systems that are located closest to the municipal drinking water wellheads, lack documentation of licence, permit or approval, or are more than 10 years old should be prioritized. When an on-site sewage system is failing or in violation, the system should be repaired or replaced.
02-05 Sewer Requirement for New Lots	Where a future septic system would be a significant drinking water threat, new lots created through severance or Plan of Subdivision will only be permitted where lots will be serviced by a municipal sewage system or where a septic system can be located outside of a vulnerable area.
02-06 Building Code Changes Related to On-site Sewage Systems	This policy outlines changes that shall be made to the Building Code regarding on-site septic systems. Advanced septic systems shall be installed in vulnerable areas where on-site sewage systems are considered a significant drinking water threat. Standards to define advanced septic systems shall include nitrate and phosphorous effluent levels.
02-07 Review of Environmental Compliance Approvals for Sewage Works	For industrial effluent discharge, sewage treatment plant bypass discharge to surface water, storage of sewage (e.g., treatment plant tanks) and sewage treatment plant effluent discharge (including lagoons) in vulnerable areas, the MOECC shall: review existing approvals and determine whether the approvals contain appropriate terms and conditions.
02-08 Constraints on Environmental Compliance Approvals for Sewage Works	No future sewage works (industrial effluent discharge, sewage treatment plant bypass discharge to surface water, storage of sewage (e.g., treatment plant tanks) and sewage treatment plant effluent discharge (including lagoons) in vulnerable areas shall be established. Approvals for an expansion of an existing sewage works or renewal/updating of a previous approval may be approved upon certain conditions.
02-09 Sewer Maintenance	In all vulnerable areas, where establishment, operation or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage (future and existing), municipalities shall inspect and maintain municipal sanitary sewers and related pipes to uphold high standards of performance and minimize the risk of leaks.
02-10 Sewer Locating Program	In all areas where establishment, operation or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage (existing and future), Municipalities will consider establishing or continuing a program that will: collect information and document the location of sewage lines, and document how properties are serviced.
02-11 Stormwater Management Review	Storm water discharge designs shall be updated or retrofitted to meet modern standards.
02-12 Separation of Combined Sewers	In all vulnerable areas, where there is combined sewer discharge to surface water; or sewage treatment plant bypass discharge to surface water, Municipalities will give due consideration to establishing or continuing a program to separate combined sewers.
02-13 Infiltration Prevention	In all vulnerable areas, with existing sanitary sewers and related pipes, and/or discharge of Stormwater from a stormwater management facility, Municipalities shall give due consideration to establishing or continuing programs that reduce infiltration of wastewater into groundwater aquifers that are used as drinking water sources.

<b>Policy</b>	<b>Policy Description</b>
02-14 Design Principles for New Development	Infiltration from stormwater management systems is to be minimized and structures that directly infiltrate stormwater to the subsurface are prohibited.
15-01 Prohibition of Certain Fuel Facilities	The expansion or establishment of facilities within vulnerable areas is not permitted. Existing operations can continue if following a Risk Management Plan.
15-02 Risk Management for Small Fuel Facilities	Above and below grade handling and storage of 250L of fuel is considered a significant drinking water threat due to potential leaks and spills from aging infrastructure or improper storage.
15-03 Risk Management for Certain Fuel Facilities	IPZ-3, an event-based delineation, has been developed to prevent intake contamination during extreme weather events from certain activities inside and outside IPZ-1 and IPZ-2. These certain activities are considered significant drinking water threats.
TP-02 Municipal By-law for Water Connection	Municipalities shall give due consideration to enacting a water connection by-law in WHPA A or WHPA B vulnerable areas (for existing or future activities).
TP-03 Circulation of Proposals with New Transport Pathways	Municipalities are obligated to provide information on any proposals involving future transport pathways to the source protection authority and source protection committee.
TP-04 Water Services for New Lots	Municipalities will consider including in their official plan a provision regarding the servicing of new lots (future activity) in WHPA A or WHPA B vulnerable area that stipulates new lots are only permitted where the property will be connected to a municipal water system.

Figure 2.8 Source Water Protection Areas in the Township of Huron-Kinloss



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**TOWNSHIP OF HURON KINLOSS**  
GROWTH, WATER AND WASTEWATER  
MASTER PLAN  
SOURCEWATER PROTECTION AREAS

DATE	PROJECT No.
May 2023	18265
SCALE	FIGURE No.
As Shown	2.8

### 3.0 BACKGROUND PLANNING AND ISSUES REPORT

Prior to the initiation of the Master Plan, a Background Planning and Issues Report was completed by BMROSS in July 2022. This report summarizes a significant amount of planning, development, and infrastructure related information related to Ripley, Lucknow, and the Lakeshore areas of Huron-Kinloss. The information summarized in the Background Report is the basis for the analysis carried out through the Master Plan.

The Background Report summarizes the available information related to four major topics: current land uses and historic settlement patterns, water and wastewater services and capacity, community form and function, and a community planning analysis.

#### 3.1 Inventory of Land Uses

For Ripley, Lucknow, and the Lakeshore areas, an inventory of current land uses was undertaken to determine the current amount of development and land available for future development in terms of infill lots and undeveloped lots. The assessment distinguished between vacant lots currently available for development and lots that may be constrained from immediate development. For the purposes of the vacant lot assessment, a constraint to development included environmental features such as hazard lands, significant woodlands, flood fringe areas, and other factors such as a lack of road access. Some vacant constrained lots may be developed in the future; however, it is expected that additional studies or rezoning would be required prior to development. Table 3.1 summarizes the amount of residential, non-residential, vacant, and vacant constrained lots in the settlement areas, from the Background Report.

**Table 3.1 – Number of lots in Settlement Areas from 2019 Background Planning Issues Report**

Land Use	Ripley	Lucknow	Lakeshore
Residential	255	474	2,380
Non-Residential	29	55	7
Vacant	23	58	259
Vacant Constrained	28	50	52

The primary land use in the settlement areas is residential, with limited non-residential land uses. The inventory shows there is a greater number of residential properties along the Lakeshore than in the primary settlement areas of Ripley and Lucknow combined. The greatest number of vacant lots is in the Point Clark (137) area of the Lakeshore, followed by Lucknow (58), and Blairs Grove (37). The total number of vacant lots, available for development at the time of writing the Background Report, equates to a 12.5-year supply of new housing based on the 20-year average number of building permits per year across the Township.

### **3.2 Occupancy**

Historically, there has been a significant number of seasonally occupied cottages or homes in the Lakeshore area of the Township. The Background Report examined the number of seasonal homes as well as the change in the number of seasonal homes over the last 40 years.

Over the entire Lakeshore area, the current percentage of seasonally occupied homes is 44.2%. Bruce Beach and Lurgan Beach are the areas of the Lakeshore where there are the highest proportion of seasonally occupied homes, at 69.1% and 68.2% respectively. The Heritage Heights and Inverlyn Lake/Huronville areas of the Lakeshore have the smallest proportion of seasonal homes.

Estimates of the number of seasonal homes in the Lakeshore area are available dating back to 1977. The examination of the trend in seasonally occupied homes from 1977 to 2019 revealed a decline in the number of seasonally occupied homes. In 1977, an estimated 80% of homes in the Lakeshore area (excluding Inverlyn Lake/Huronville) were occupied seasonally, compared to 46% in 2019. The proportion of homes occupied on a permanent basis in the Lakeshore area has now exceeded the number of cottages. It is expected that the trend towards increasing permanent occupancy will continue in the future. This is due to the availability of residential lots in areas such as Point Clark and Heritage Heights, continued growth in the local economy resulting in increased demand for permanent housing and shifts in demographics, such as, seniors living longer at home, retirement of baby boomers, and an increased portion of single-occupied homes. Despite the trend away from seasonally occupied homes, it is expected that there will continue to be a set proportion of homes that are seasonally occupied along the lakeshore.

### **3.3 Historic Development Patterns**

The Background Report reviewed residential building permit data, provided by the Township, to examine trends and patterns in development over the last 20 years. Across the Township, 88% of the residential building permits are issued for the settlement areas of Ripley, Lucknow, or the Lakeshore. In total, there have been 479 building permits issued for new residential development in these areas over the last 20 years, which equates to an average of 24 new homes per year.

The majority of building permits were issued for properties within Inverlyn Lake/Huronville, Point Clark, and Heritage Heights. These areas account for 63% of the total number of building permits issued. The growth in these areas is attributable to the availability of lots for development through Plan of Subdivision in Inverlyn Lake/Huronville and Heritage Heights, and infill lots in Point Clark. In Ripley and Lucknow, the number of new residential building permits issued in the last 20 years are 25 and 29 respectively. In Ripley, the residential construction has included multi-unit developments along Park, Queen, and Huron Streets. In Lucknow, all the new residential development has been scattered through the community on infill lots. There are Plans of Subdivision for Ripley

and Lucknow, however prior to 2019 these Plans had not proceeded to construction which limited the availability of new lots for residential development.

The greater number of infill lots and lots created through the Plan of Subdivision process are likely the factors driving the greater amount of development within the Lakeshore area. In addition to the availability of lots, the larger size of lots, newer neighbouring housing stock and proximity to Kincardine and Lake Huron may be other factors driving growth along the Lakeshore area compared to the inland communities.

### **3.4 Proposed Developments**

The Background Issues Report also reviewed the proposed developments in Ripley, Lucknow, and the Lakeshore. The proposed developments included proposals in various phases, from proposed through to approved Plans of Subdivision. In 2019, there were 91 residential units proposed in Lucknow, 193 in Ripley and 185 in the Lakeshore area. With a 20-year average of 24 new residential units per year across the settlement areas, the proposed residential units equate to a 19-year supply of lots.

### **3.5 Community Form and Function**

An inventory of community resources, linkages with adjacent communities and community concerns for Lucknow, Ripley, and the Lakeshore area was also completed as part of the Background Report.

Lucknow is the largest commercial urban centre in Huron-Kinloss and serves as a commercial and industrial hub for the southeastern portion of Huron-Kinloss as well as ACW. It features a downtown core along Campbell Street with mixed use commercial and residential buildings. There is a strong sense of local community and support for local service groups. Residents in Lucknow travel to Wingham and Goderich for services not available in the community. Lucknow has the most diverse range of housing options in the Township, with a greater number of multi-type units and apartments. Historically, Lucknow has had a relatively steady population. This is attributed to low migration in and out of the community, availability of local employment, long term residency, and a low number of new homes built over the last 20 years. Community concerns in Lucknow include absence of certain services (such as a grocery store), vacant storefronts, maintaining community groups, condition of the housing stock, and a lack of new growth.

Ripley is the smaller primary settlement area in Huron-Kinloss. The community has a small downtown core, with relatively few commercial and industrial businesses to support local employment. It serves as the institutional and recreational hub for the former Huron Township area. Generally, there are strong family ties within and to the community which foster a strong sense of the community. Residents are generally employed outside of Ripley and travel to Kincardine, Goderich, and Lucknow for employment. Kincardine is the next closest urban centre and where most residents travel to for services. Historically, Ripley has attracted first time home buyers and young families with the availability of single-detached homes and lower home prices compared to Kincardine. The population

of Ripley has only modestly increased over the last 10 years, with an average of 2.4 new residential units per year. There are local concerns regarding the depressed downtown with most residents working out of the community, maintaining local service groups and a lack of residential and non-residential growth.

The Lakeshore Area encompasses several distinct communities that vary in size and occupancy. Point Clark is the largest community within the Lakeshore area in both population and area. North of Concession 10, the Lakeshore area has a higher proportion of permanent occupied homes, generally geared to families in areas such as Huron Heights and Huronville and seniors in Inverlyn Lake. Areas such as Lurgan Beach and Bruce Beach have a higher proportion of seasonally occupied residences. In general, there is no commercial core associated with the Lakeshore area, with relatively few non-residential uses in the area. Given this, most permanent residents travel outside of the area to the Municipality of Kincardine or Town of Goderich for employment. Similarly, residents also generally travel to Kincardine or Goderich for shopping and other services, as there are none available within the Lakeshore area. In recent years, most development within the Township has occurred within the Lakeshore area as the result of the availability of lots (either existing lots of record or developed through Plans of Subdivision). The local concerns and issues for the Lakeshore area include: increased residency dependent on septic systems, limited opportunities for development beyond infill within the current settlement area boundary, conflicts with adjacent agricultural land uses, redevelopment on small lots, impacts of development on natural features, and traffic levels.

### **3.6 Planning Analysis**

The Background Report summarizes the planning context and policies relevant to servicing and settlement in Huron-Kinloss. The policies reviewed include the 2020 Provincial Planning Statement, Bruce County Official Plan, Huron-Kinloss Official Plan, and Minimum Distance Separation. These policies provide the framework for planning for future development and services within the settlement areas.

In addition to the review of planning policy, the Background Report also included a preliminary analysis of potential future growth areas for the settlement areas. This analysis was undertaken to identify areas for further investigation for future expansion of settlement area boundaries based on potential constraints and opportunities. The criteria for the constraint and opportunity analysis included environmental, planning and infrastructure considerations. Examples of the criteria include: species at risk habitat, hazard lands, environmental protected lands (e.g., wetlands), flood hazards, buffers around features such as farms, wind turbines, and wastewater treatment plants, and constraints or opportunities for future water and wastewater infrastructure.

For Lucknow, the constraint and opportunity analysis identified the greatest number of potential constraints in the southern portion of the village. The constraints in this area are generally associated with environmental factors, including a provincially significant

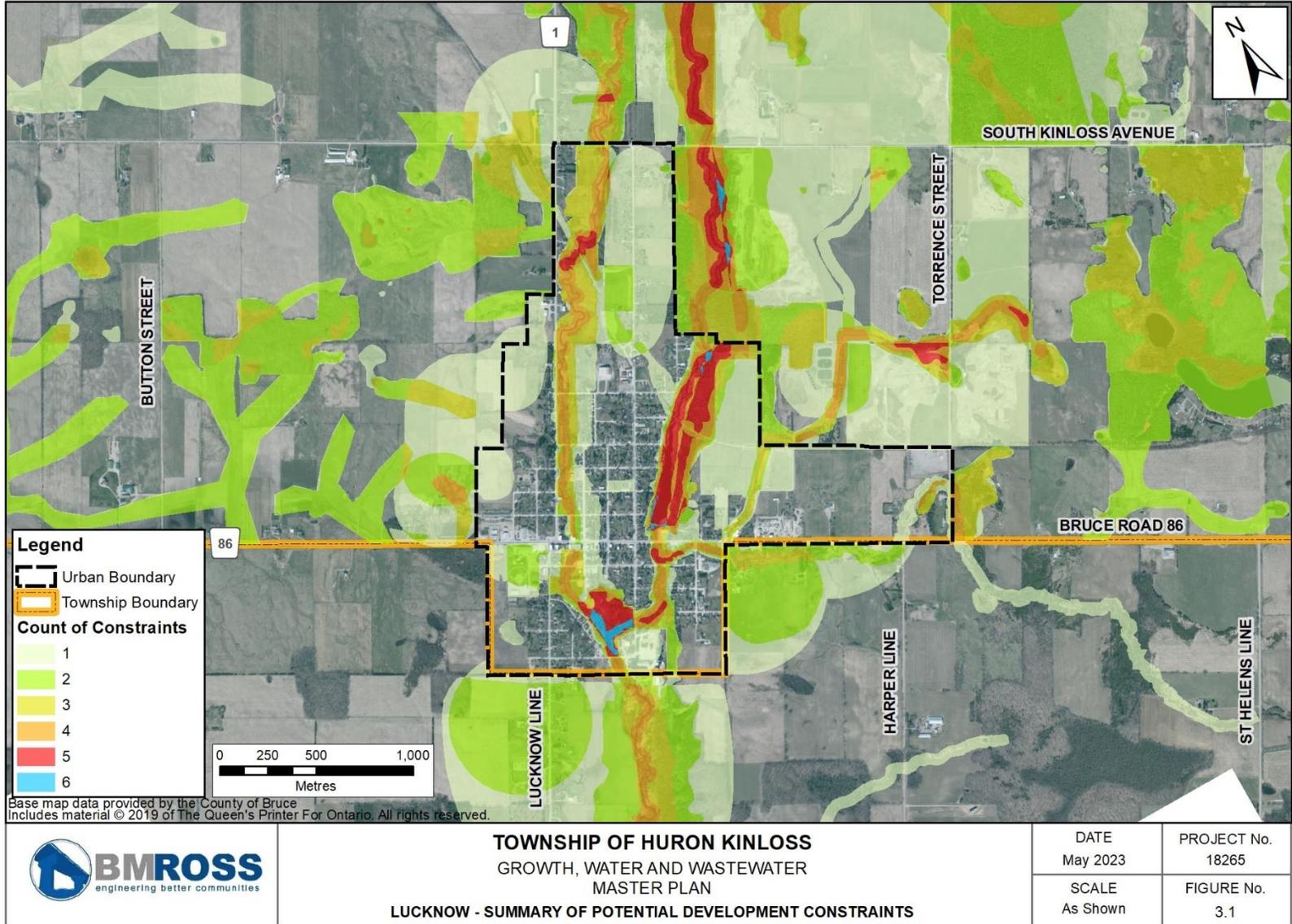
wetland, significant woodland, flooding hazards, and zoning constraints. In the northeast area of the village, the presence of aggregate resources and Dickies Creek are constraints to future development, as well as an absence of infrastructure connections. The western portion of the village has the fewest constraints to future development and may be the most feasible area for a future settlement area expansion (see Figure 3.1).

The analysis completed for Ripley identified relatively few constraints within the existing urban boundary (see Figure 3.2). This reflects relatively few natural features and zoning limitations within the current settlement area. Immediately south of the village, the hazard lands associated with the South Pine River and Minimum Separation Distance (MDS) setbacks from agricultural operations are constraints to a settlement area expansion in that direction. It is thought the area northeast of the current urban boundary has the fewest constraints outside of agricultural zoning.

In the Lakeshore area, there are a number of areas where environmental features and zoning are constraints to potential development within the settlement area (see Figures 3.3 and 3.4). These constraints generally related to significant woodland areas, environmental protection, or open space zoning. There are also a number of farms along the eastern boundary of the settlement area with MDS setbacks that will constrain future development areas, south of Concession 6. In the northern area of the lakeshore, immediately south of Saratoga Road, the presence of the Stewart Swamp constrains development opportunities. East of Lake Range Drive and north of Concession 10, there are relatively few constraints, and this area may be further considered for an expansion of the development area in the future.

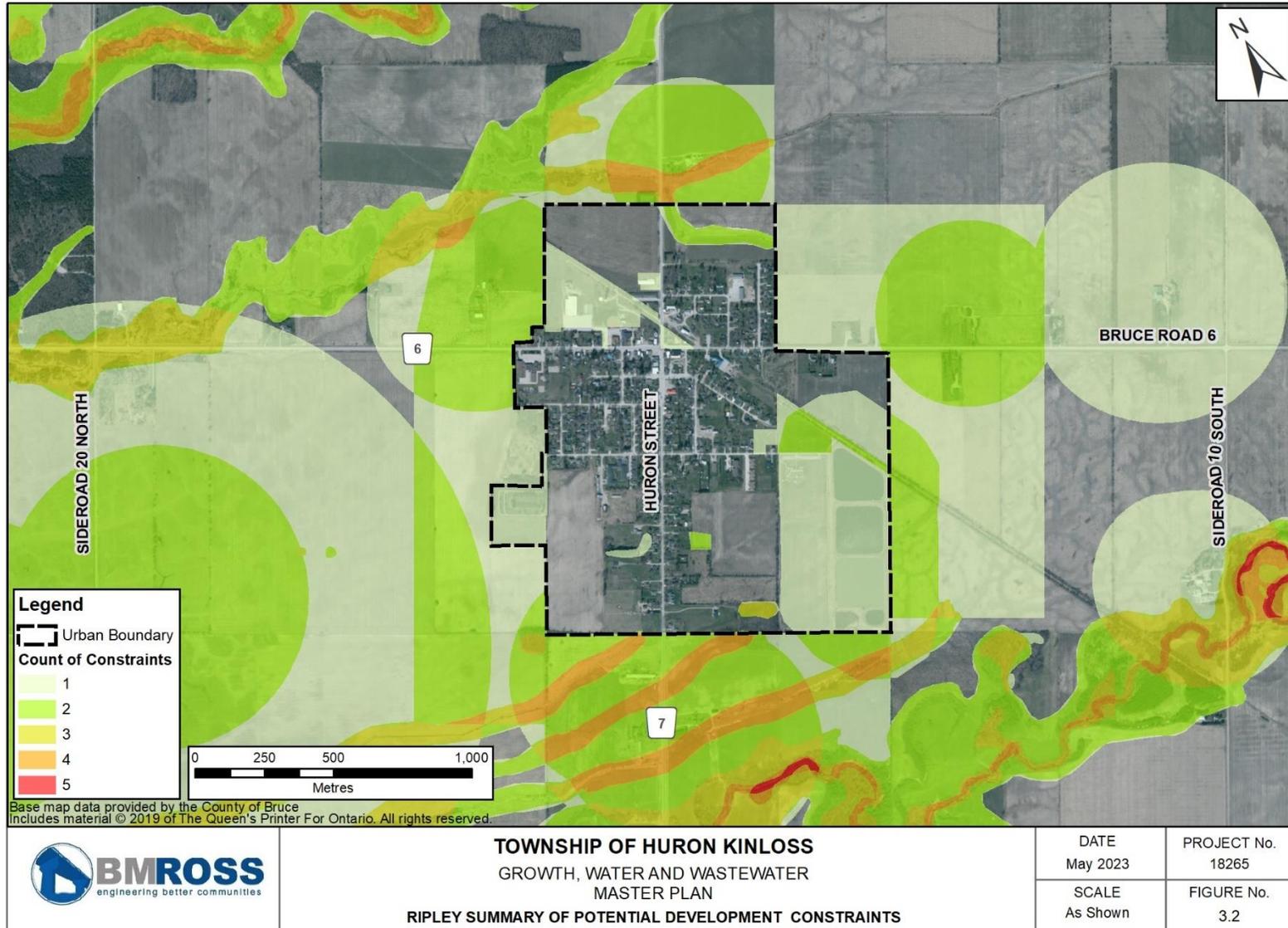
Figure 3.1 Constraint Analysis - Lucknow

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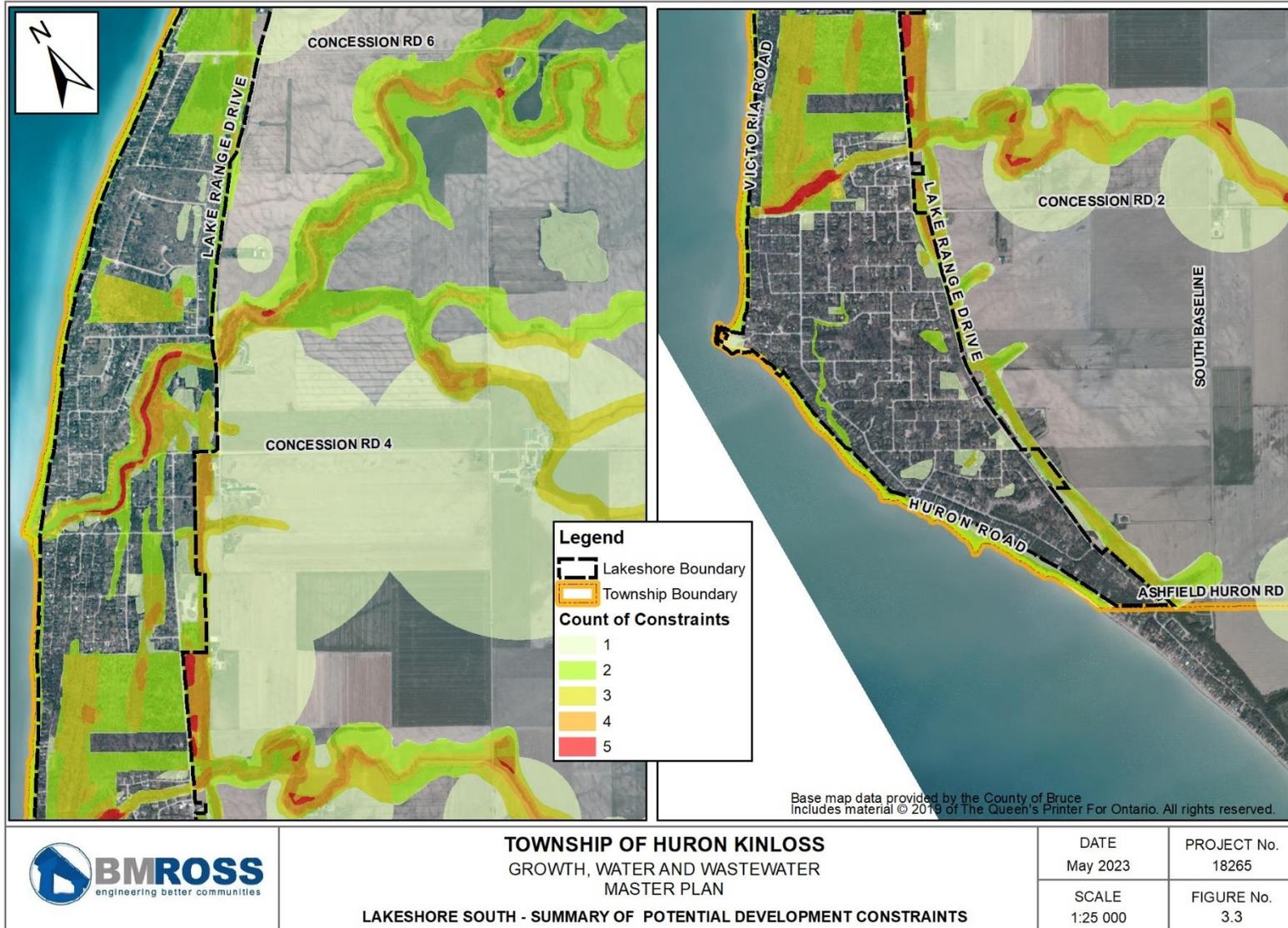
**Figure 3.2 Constraints Analysis- Ripley**

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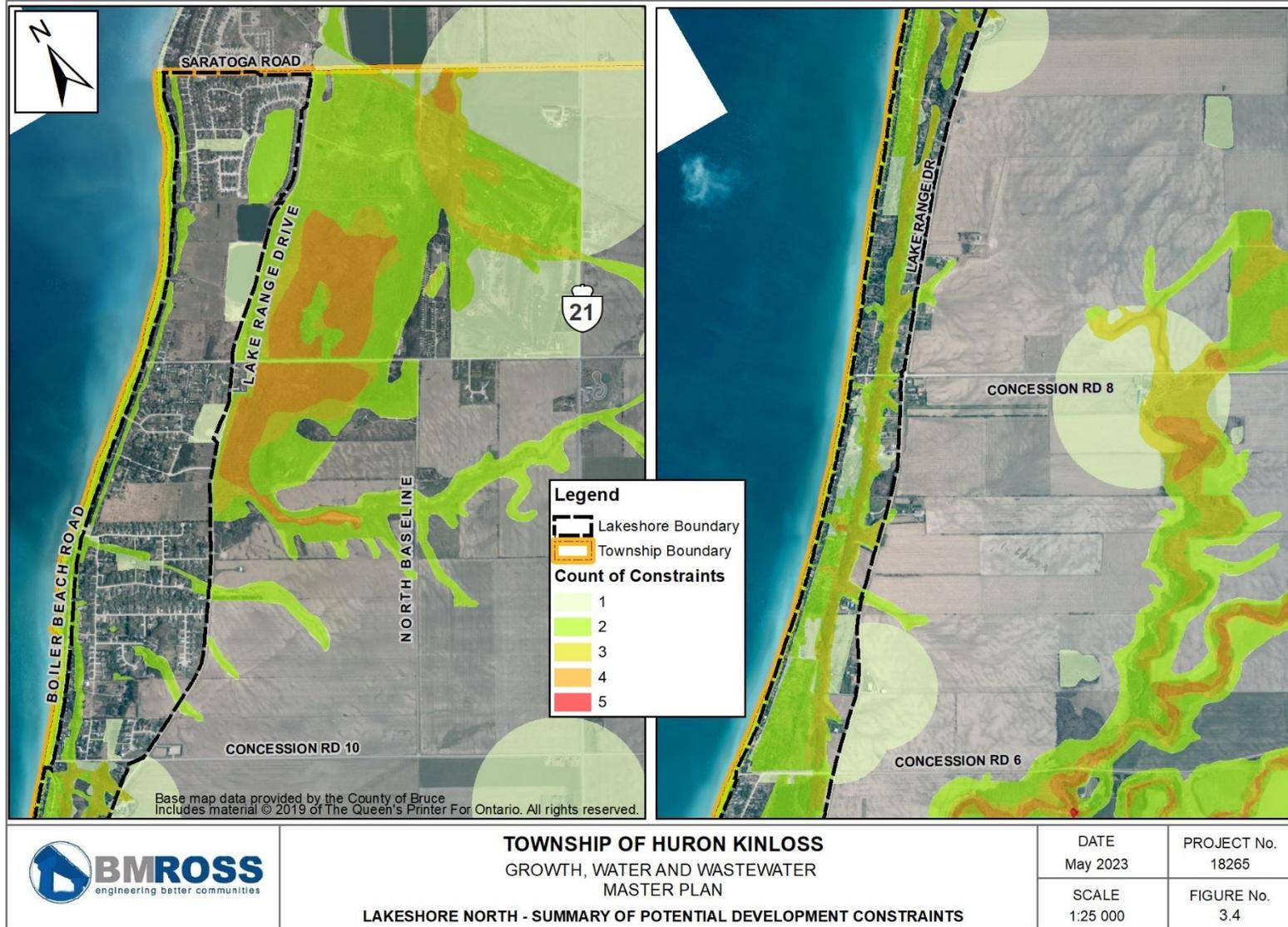
**Figure 3.3 Constraint Analysis – Lakeshore South**

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### Figure 3.4 Constraints Analysis – Lakeshore North

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## **4.0 POLICY CONSIDERATIONS**

### **4.1 Provincial Policies**

#### **4.1.1 Provincial Policy Statement (2020)**

The 2020 Provincial Planning Statement (PPS) outlines the broad land use and development goals and objectives for the province (Ministry of Municipal Affairs and Housing, 2020). Policies and land use planning decisions at the local municipal and upper-tier levels must conform to the PPS. The PPS focuses growth and development to urban and rural settlement areas and promotes careful land use to meet the full range of current and future needs in an efficient manner. It also promotes optimizing existing infrastructure.

The first policy section of the PPS promotes building strong healthy communities. The policies encourage accommodating a wide range and mix of residential types. Expansions to settlement areas should be adjacent to existing settlement areas to prevent the inefficient use of land. To further support strong communities, the PPS promotes the availability of infrastructure to support current and future need. Planning authorities are directed to ensure there is sufficient land available to accommodate development over the next 25 years, through intensification, redevelopment, and designated growth areas.

Specific policies related to development and servicing include:

#### Section 1.1: Managing and Directing Land Use to Achieve Efficient and Resilient Development and Land Use Patterns

- Sustain a healthy, liveable, and safe community by promoting efficient development and land use patterns through a servicing strategy.
- Development and land use patterns will not prevent the potential expansion of any settlement area to adjacent areas.
- Promote cost-effective development patterns to minimize servicing costs.

#### Section 1.1.3: Settlement Areas

- Planning should promote land use patterns that are appropriate for, and efficiently use, existing and planned infrastructure.
- Encouraging development and implementation of phasing policies to ensure the orderly progression of development and timely provision of infrastructure.

### Section 1.6.1: Infrastructure and Public Service Facilities

- Provision of co-ordinated, efficient, and cost-effective infrastructure that accommodates existing and future need.
- Developing servicing strategies in co-ordination with land use planning principles to ensure infrastructure is financially viable and able to meet current and future needs.
- Consider existing infrastructure and how it may be optimized.

### Section 1.6.6: Sewage and Water

- Incorporate expected growth and development and promote the efficient use and optimization of existing municipal water and sewage services.
- Development of servicing strategies that consider feasibility, financial viability, regulatory compliance requirements, sustainability, impacts of climate change, and protection of human health and the natural environment.
- Municipal servicing is the preferred form of servicing within the settlement areas.

The PPS directs growth to settlement areas. Within settlement areas, land use patterns are based on the efficient use of land as well as the planned and available infrastructure, to avoid unnecessary and uneconomical expansions. In new development areas, the PPS promotes compact form and a range of uses and densities to ensure the efficient use of infrastructure and land. Prior to an expansion of a settlement area, a Comprehensive Review must be completed to demonstrate:

- The projected needs cannot be accommodated through intensification, redevelopment and within existing designated growth areas.
- Sufficient infrastructure is planned or available and can be financially over the lifetime of the asset.
- In prime agricultural areas, the land is not used for specialty crops and alternative locations have been considered and there are no reasonable alternatives that would avoid prime agricultural areas.
- Setbacks as required through Minimum Separation Distance (MDS) guidelines are achieved and impacts to agricultural operations are mitigated.

Minor adjustments to settlement areas are permitted under the PPS, provided that there is no net increase in the settlement area, the area is appropriately serviced and prime agricultural area concerns, as noted above, are addressed.

There are also policies in the PPS promoting integrated and viable rural areas. The policies support leveraging existing assets and amenities, regeneration, and

redevelopment of brownfield sites. A range of mix of housing appropriate to rural infrastructure is supported in rural settlement areas.

Section 1.4 of the PPS has policies specific to housing. It directs that a minimum 15-year supply of land designated and available for development, including through intensification and redevelopment. A 3-year supply of residential, serviced land should be maintained.

Policies of the PPS direct municipalities to provide and plan for infrastructure to meet projected need as well as prepare for a changing climate. It supports integrating infrastructure planning with land use planning to ensure future infrastructure is cost effective over its lifetime. Generally, the use of existing infrastructure should be optimized. Section 1.6.6 outlines policies specific to water, wastewater, and stormwater infrastructure.

The preferred form of servicing for settlement areas are full municipal water and wastewater services. In areas where full services are not available, planned, or feasible, private communal services are preferred for multi unit and new lot development. Where communal services are not available, feasible, or planned, individual on-site services (i.e., wells and septic systems) may be used if site conditions are suitable with no negative long-term impacts. In settlement areas, individual services may be used to infilling and minor rounding out. Partial services are only permitted where needed to address failed individual systems or within settlement area to allow minor rounding out where site conditions are suitable and there will be no negative impacts.

At present, the Ministry of Housing and Municipal Affairs is soliciting comments on a proposed update to the 2020 PPS. The changes to the PPS have not been approved as of the publishing date of this report. The proposed changes may impact planning, land use and servicing policy requirements in the future.

#### **4.1.2 Ontario Water Resources Act**

The Ontario Water Resources Act (OWRA) regulates the use and management of groundwater, surface water and sewage works throughout the province. As defined in the Act, sewage includes drainage, stormwater, commercial, and industrial wastes. The definition of water includes wells, lakes, rivers, ponds, springs, streams, reservoirs, groundwater, and other types of watercourses. Through this Act, the Minister of Environment can issue orders with respect to contraventions of the Act. Such orders may require water or wastewater facilities to be brought into compliance, repairs or maintenance or changes to operation of facilities, removal of sewage or contamination sources, testing and sampling, provision of alternative services, submitting applications for approvals or permits, and monitoring and reporting.

Under the Act, discharge of material into or into waterbodies that may impair water quality is considered an offence. For owners of water works and sewage works the Act specifies that a Director, by order, can require repairs or rehabilitation to these works if water quality is impaired.

The OWRA requires an Environmental Compliance Approval (ECA) prior to establishing, operating, altering, extending, or replacing sewage works. This requirement extends to municipal sewage systems, sewage systems designed to have a capacity greater than 10,000 L/day, and communal sewage systems. Private, on-site systems regulated under the Building Code Act are exempt from this requirement.

Through the OWRA, the Director can require a municipality to establish, maintain, operate, repair, or replace a water or sewage works at the cost of the municipality. The Director may also define or designate areas for water and or wastewater service to control, prohibit or require the provision of these services.

#### **4.1.3 Environmental Assessment Act**

The Environmental Assessment Act sets out the requirement for projects and undertakings to undertake environmental assessments prior to implementation. Generally, this Act applies to public bodies or agencies, including municipalities. Most municipal infrastructure projects must complete Municipal Class Environmental Assessments to meet the requirements of the EA Act. The MCEA process is a standardized approach to identify problems, solutions, and potential impacts. Generally, this Act does not apply to infrastructure works installed by private developers unless the project is considered a Schedule C project under the MCEA and will provide water, wastewater, or road services to residents of a municipality. The establishment of a water treatment facility or new sewage collection or treatment system are examples of Schedule C projects that would be subject to following the MCEA process if undertaken by a private developer.

#### **4.1.4 Minimum Distance Separation Formulae and Guidelines**

The Minimum Distance Separation (MDS) Document is the tool referenced in the Planning Act, Building Code Act, Nutrient Management Act, Provincial Policy Statement, and local planning documents to minimize land use conflicts between agricultural and other land uses. The document sets out the separation distance requirements for development within prime agricultural areas and rural lands, where livestock facilities and anaerobic digesters are permitted. The intent of establishing separation distances between development and existing livestock and anaerobic digesters is to protect agricultural land for agricultural purposes. The separation distances, per the MDS formulae will vary depending on the type of livestock, number of nutrient units, type of manure system and form of development present or proposed.

There are two MDS formulae, MDS I and MDS II. For setbacks for buildings on existing lots, lot creation, surplus farm dwelling severances, and agricultural-related uses and on farm diversified uses, MDS I is used. For building permit applications for livestock facilities or anaerobic digesters, MDS II is used. MDS setbacks do not apply to infrastructure that is not expected to be impacted by existing livestock facilities or anaerobic digesters. MDS I setbacks are also not required for land use changes within approved settlement areas.

#### **4.1.5 MECP D Guidelines**

The Ministry of Environment, Conservation and Parks (MECP) has a series of guidelines for environmental land use considerations related to water and wastewater services and sensitive lands. These guidelines are known as the D-Series Guidelines and provide recommendations for land use compatibility, buffers around sewage treatment facilities, planning for sewage and water services, municipal responsibilities regarding communal services, and individual water and wastewater services.

Guideline D-1-1 outlines expectations around identifying, separating, and protecting facilities and sensitive land uses. It recommends that municipalities maintain an inventory of facilities that could have an impact on sensitive land uses (residential, institutional, outdoor recreation sites, and certain agricultural uses), such as sewage treatment facilities. Specific to sewage treatment facilities, Guideline D-2 recommends that sensitive land uses are not adjacent to municipal sewage treatment facilities. Municipal acquisition of the buffer area around sewage treatment facilities is highly recommended, but if that is not feasible, land uses should be limited through Official Plan and zoning designations. The minimum buffer distance recommended is 100 m for systems with a treatment capacity of less than 500 m<sup>3</sup>/day. For larger systems, the recommended buffer is 150 m or greater.

In accordance with the PPS, Guideline D-5 outlines the hierarchy of water and wastewater services. Development is preferred where full municipal services are available and there is sufficient uncommitted reserve capacity. Where full municipal services are not available, communal services are the next preferred method. For communal services, the Guideline recommends that the appropriateness and means of accommodating development is considered, including multiple developments or phased development. It also specifies that municipalities should plan to accept responsibility for public communal systems. Prior to approval of such systems, a hydrogeological or assimilation capacity study will be required to demonstrate suitability and no adverse impacts, as well as a municipal ownership agreement.

The requirement for a municipal responsibility agreement is specified in Guideline D-5-2. In this guideline, the MECP notes that proper design and construction are not sufficient to guarantee continued integrity of a private communal sewage system. In order to ensure proper ongoing maintenance and operations of these facilities, the MECP requires an agreement be in place between the developer and the local municipality. The agreement must stipulate the conditions under which the system is constructed, operated, and maintained. These agreements also require municipalities to assume ownership and operation of these facilities in the event of default. Through the municipal responsibility agreement, it is recommended that up-front funds are secured for capital improvements for repairs or replacement in the event of a default or municipal assumption of the facility. A municipal responsibility agreement should also include operating and maintenance standards, registration on title, easements when required, rights of municipal entry and

inspection, and a provision if the facility is transferred to the municipality, it is done so at no cost.

**The Guideline specifies that the planning authority will not consider a municipal responsibility agreement for a communal system for free hold multi-unit or lot development. For these types of developments, only municipal ownership of the communal system will be considered.**

Developments utilizing on-site water and wastewater systems must do so at a density and scale that will not adversely impact groundwater resources, per Guidelines D-5-4 and D-5-5. For developments proposing more than five units on private septic systems on lots less than 1 ha in size, nitrate studies are required to demonstrate no adverse impacts to groundwater quality. Similarly, a hydrogeological study is required for Plans of Subdivision where individual wells are proposed.

## **4.2 County Planning Policy**

The Bruce County Official Plan (Approved June 2013) serves as the upper-tier planning policy framework for municipalities within the County. The County Official Plan provides guidance on development, as well as population projections for the lower-tier municipalities (County of Bruce, 2013). This planning document must be in keeping with the policies of the PPS, and municipal official plans must conform with the County Official Plan. The goals of the County Official Plan include ensuring land and resources are used efficiently and effectively; there is orderly physical, social, environmental, and economic development; and ecologically significant areas are protected and preserved.

Through the PPS, Bruce County is the planning authority tasked with forecasting population and household growth for the lower tier municipalities. These forecasts are utilized for land use and infrastructure planning. These forecasts have been recently updated as part of the County Official Plan Review. With respect to growth and development, the policies of the Official Plan direct the forecasted growth to primary and secondary settlement areas. Similar to the PPS, new development should occur in a cohesive, efficient manner without undue impacts to the social and natural environment.

In addition to providing general planning policies for growth and protection of the natural environment, the Official Plan outlines specific requirements related to multi-year sewage and water servicing plans. For municipalities with sewage and water services, the Official Plan requires the preparation of a servicing plan to support any new Local Official Plans or as part of a review of update to an existing Local Official Plan. The Local Official Plan will incorporate the conclusions or recommendations of the servicing plan. A Sewage and Water Servicing Plan will also support:

- Local Official Plan Amendments for major new developments;
- Applications to expand settlement area boundaries;
- Planning applications with potential for significant environmental health risks that need to be addressed; or

- Any planning application with the potential to affect the carrying capacity of a regional groundwater system or the assimilative capacity of a receiving body.

Under the Bruce County Official Plan, a Sewer and Water Servicing Study must be completed to the satisfaction of the County and local municipality and may include the following:

- An assessment of appropriate types and levels of servicing to support growth, including financing, phasing, and administrative requirements;
- An analysis of hydrology and hydrogeology to determine sufficient water quantity and quality, and assimilative capacity in relation to the ecological function of the water resources;
- An assessment of existing servicing systems, including capacities, condition, required upgrades, and/or expansions;
- The long-term suitability of soil conditions where subsurface sewage treatment and disposal is considered;
- Identification of existing and potential restrictions to future growth and development;
- An assessment of impacts of growth on the natural environment; and
- An examination of the economic feasibility of any proposed servicing.

Within the Official Plan, it is recognized that there are varying patterns and approaches to development across the County. It also identifies the areas where development is not permitted to protect natural features such as: aquatic habitat, adjacent to water courses, locally significant wetlands, areas of natural and scientific interest, significant woodlands, deer wintering areas, significant wildlife habitat, and significant valleylands.

The County of Bruce is currently undertaking an update to the Official Plan. The above-noted policies may change following the completion and adoption of the Official Plan update.

### **4.3 Local Planning Policy**

The Township of Huron-Kinloss has a local Official Plan that applies to the primary, secondary and hamlet areas in the Township. Outside of these areas (i.e., in the rural areas) the governing policies are those of the Bruce County Official Plan. The intent of the Huron-Kinloss Official Plan is to guide and direct development to the year 2036, with respect to land use planning. The Official Plan outlines a number of goals including, but not limited to:

- Recognizing the rural nature of the municipality in future land use decisions, enhancing the natural and human environment, and ensuring orderly development within the Township.

- Focusing the majority of growth in Ripley, Lucknow, and the Lakeshore Settlement, where cost-effective and environmentally responsible services can be provided
- Ensuring an adequate supply of serviced and zoned land for future urban growth needs.
- Encourage and provide opportunities for a range of housing opportunities to support existing and future residents in appropriate locations.

In keeping with policies directing growth to the settlement areas of Ripley, Lucknow, and the Lakeshore. In Ripley and Lucknow, where there are full municipal services, policies promote a target of a minimum of 30% of new housing units in the form of medium and high-density units. Subdivisions are encouraged to include a range of lot sizes and dwellings unit types.

The current Official Plan policies permit secondary residential units in areas designated Residential and Hamlet, where there are appropriate sewage and water services.

In the Official Plan, natural heritage features may include: habitat of endangered or threatened species, significant wildlife habitat, wetlands, significant valleylands, Areas of Natural and Scientific Interest, significant woodlands, and fish habitat. Significant natural features are identified through the EP – Environmental Protection designation and development is generally prohibited in these areas. Areas adjacent to such features require an Environmental Impact Study (EIS) demonstrating no negative impact before development or site alteration may proceed. Development is also directed away from hazardous areas, including floodplains, steep and/or unstable slopes, organic or unstable soils, areas susceptible to erosion, and dynamic beach areas. Significant built heritage resources and cultural heritage landscapes are similarly to be conserved from development impacts.

The Official Plan establishes primary settlement areas (Lucknow and Ripley) and the Lakeshore as a secondary settlement area. The primary settlement areas are fully serviced, with a greater range of residential and non-residential uses. The Lakeshore is identified as a continuous urban area from Amberley Beach to Kincardine, where development for permanent and seasonal use is wanted in balance with protecting the shoreline environment. In the Official Plan, policies encourage new development on municipal water and sewage disposal system with the majority of growth directed to Lucknow and Ripley. For the Lakeshore area, minor infilling and rounding out is permitted in the existing settlement area boundary but new subdivisions within the boundary not prohibited.

In accordance with the Official Plan, the Township is to maintain a 10-year supply of serviced, draft approved and registered lots and a 20-year supply of residentially designated lands. Expansions to settlement areas are permitted following the completion of a comprehensive review per the requirements of the Provincial Policy Statement.

With respect to servicing, full municipal water and sewage services are preferred. Communal services are preferred in areas where full municipal services do not exist and are not feasible. On-site, individual site services may service development where communal systems are not environmentally feasible and site conditions are suitable with no negative impacts. These types of services may also only be used for infilling and minor rounding out in existing development areas. Partial services are discouraged except where required to address failed private septic or water systems in existing development or for infilling and minor rounding out.

The Official Plan outlines that communal wastewater treatment facilities may be considered and associated Responsibility Agreements entered into, providing the communal facility is owned and operated by a condominium corporation, overall lower density character is maintained, and the retention and preservation of contiguous woodlots or wetlands is assured.

There are two residential designations in the Huron-Kinloss Official Plan: Residential and Lakeshore Residential. The residential designation applies to lands in Ripley and Lucknow and permits a range and mix of housing forms and densities. In areas where municipal sewers or communal services are available, the minimum density target is 15 dwelling units per gross developable hectare to a maximum of 43 dwelling units. Multi-unit dwellings such as townhouses and apartment dwelling are also permitted in this designation. New development, in the form of larger expansions, is expected to occur in a progressive sequence to ensure efficient and continuous expansion of the urban settlement area.

The Lakeshore Residential designation is used in the Lakeshore Area and includes both permanent and seasonal residential dwelling units. A separate designation has been utilized to recognize that development in the shoreline may require additional assessments with respect to servicing, access, and natural heritage. The policies associated with Lakeshore Residential promote low rise, low density residential uses on lots of an adequate size to accommodate private septic systems. The general target density for this area is 5 units per gross developable hectare.

Under the Official Plan, municipal water lines and sanitary sewers are generally permitted in all areas. Sensitive land uses, including residences, and institutional uses should not be sited within 100 m of wastewater treatment plants.

The Huron-Kinloss Zoning By-law (Bylaw 2018-98) contains specific policies and rules for land use designations throughout the Township. Under the current Zoning By-law, in zones where single detached, semi-detached, or duplex dwellings are permitted, only one dwelling is permitted on a lot. Secondary dwelling units in accessory buildings within the Lakeshore Settlement Area are currently not permitted. The minimum lot area in the primary settlement areas is 600 m<sup>2</sup> and 1,850 m<sup>2</sup> in the Lakeshore area, with municipal water. Recent changes to the Planning Act now permit up to three residential units per lot in urban areas with full municipal services.

## 5.0 EXISTING INFRASTRUCTURE

### 5.1 Lucknow Water System

The Lucknow Water System is a groundwater-based supply and distribution system that services the village of Lucknow and approximately 10 customers south of Lucknow in the Township of Ashfield-Colborne-Wawanosh. The system is supplied by two groundwater wells, located within Lucknow.

Both wells are secure, deep bedrock wells. Well 4 is located in a wellhouse at 600 Havelock Street in roughly the centre of the community. This well was drilled in 1957 to a depth of 54.8 m and is disinfected by means of sodium hypochlorite. Well 5 is located in the southeast corner of the village and was drilled in 1967. It is 58.8 m deep and disinfected using sodium hypochlorite. The water supplied by these wells has naturally elevated sodium and fluoride (Ausable Bayfield Maitland Valley Source Protection Region, 2014). Storage for the system is currently provided by a standpipe located at 656 Wheeler Street. The standpipe was originally constructed in the 1930s and is a bolted steel structure. It has a total volume to 996 m<sup>3</sup>. The effective volume of the storage is approximately 35 m<sup>3</sup>. A pumphouse at 482 Ross Street controls the operations of the well pumps based on the water level in the standpipe. The standpipe is currently in process of being replaced by an elevated storage facility with a total and effective storage of 1,600 m<sup>3</sup>, which was tendered in July 2022 and is currently under construction.

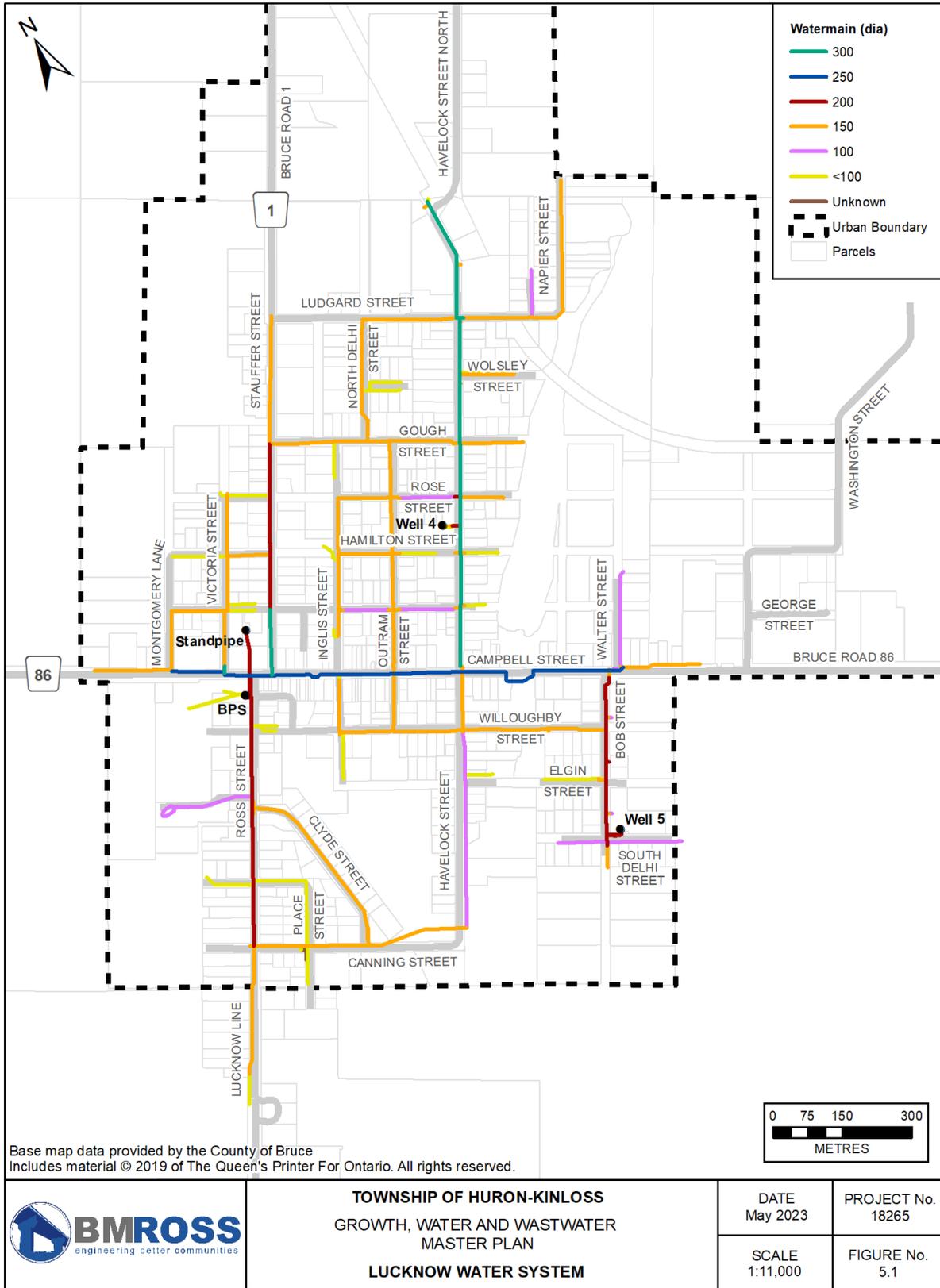
The location of the water system components is shown on Figure 5.1, including the distribution network. There are two trunk watermains, a 250 mm diameter trunk along Campbell Street from Montgomery Lane to Walter Street and a 300 mm trunk watermain from approximately the location of the soccer fields on Havelock Street south to the intersection with Campbell Street. There are also larger diameter watermains (200 mm) from the standpipe south along Ross Street and along Bob Street to the Well 5 pumphouse.

The capacity of the system, as specified by the Municipal Drinking Water License (MDWL) and Permit to Take Water (PTTW) in the following table. For the Lucknow Water System, the PTTW limits the rated capacity to 2,000 m<sup>3</sup>/day. The treatment capacity of the system was recently upgraded through a request to increase the PTTW for Well No. 5 from 1,500 m<sup>3</sup>/day to 2,000 m<sup>3</sup>/day. The firm capacity of the system, which is taken as the capacity with the largest well or pump out of service, is 935 m<sup>3</sup>/day.

**Table 5.1 – Lucknow Water Supply Rated Capacity**

Document	No.	Date	Well No. 4 (m <sup>3</sup> /day)	Well No. 5 (m <sup>3</sup> /day)
MDWL	087-103 No. 3	April 29, 2021	1,245	3,276
PTTW	5315-CK476V	October 12, 2022	935	2,000

**Figure 5.1 Lucknow Water System**



Current demands are estimated based on the maximum day flows over the last three years. Table 5.2 summarizes the maximum day demands in Lucknow between 2019 and 2021. The maximum day flow is 1,210 m<sup>3</sup>/day.

**Table 5.2 – Lucknow Water Demands 2019-2021**

<b>Year</b>	<b>Maximum Day (m<sup>3</sup>/day)</b>
2019	1,210
2020	1,081
2021	978
<b>Max.</b>	<b>1,210</b>

There are approximately 682 customers serviced by the Lucknow Water System, as determined from billing and metered customer lists provided by the Township.

### **5.1.1 Known Issues or Concerns**

The existing storage standpipe has been due for replacement for some time, but as noted above this process is currently underway.

Well No. 5 is known to be approaching the point of needing replacement. It is currently situated on a confined site with relatively poor access. When replacement does occur, it is likely that an alternate site will be desirable.

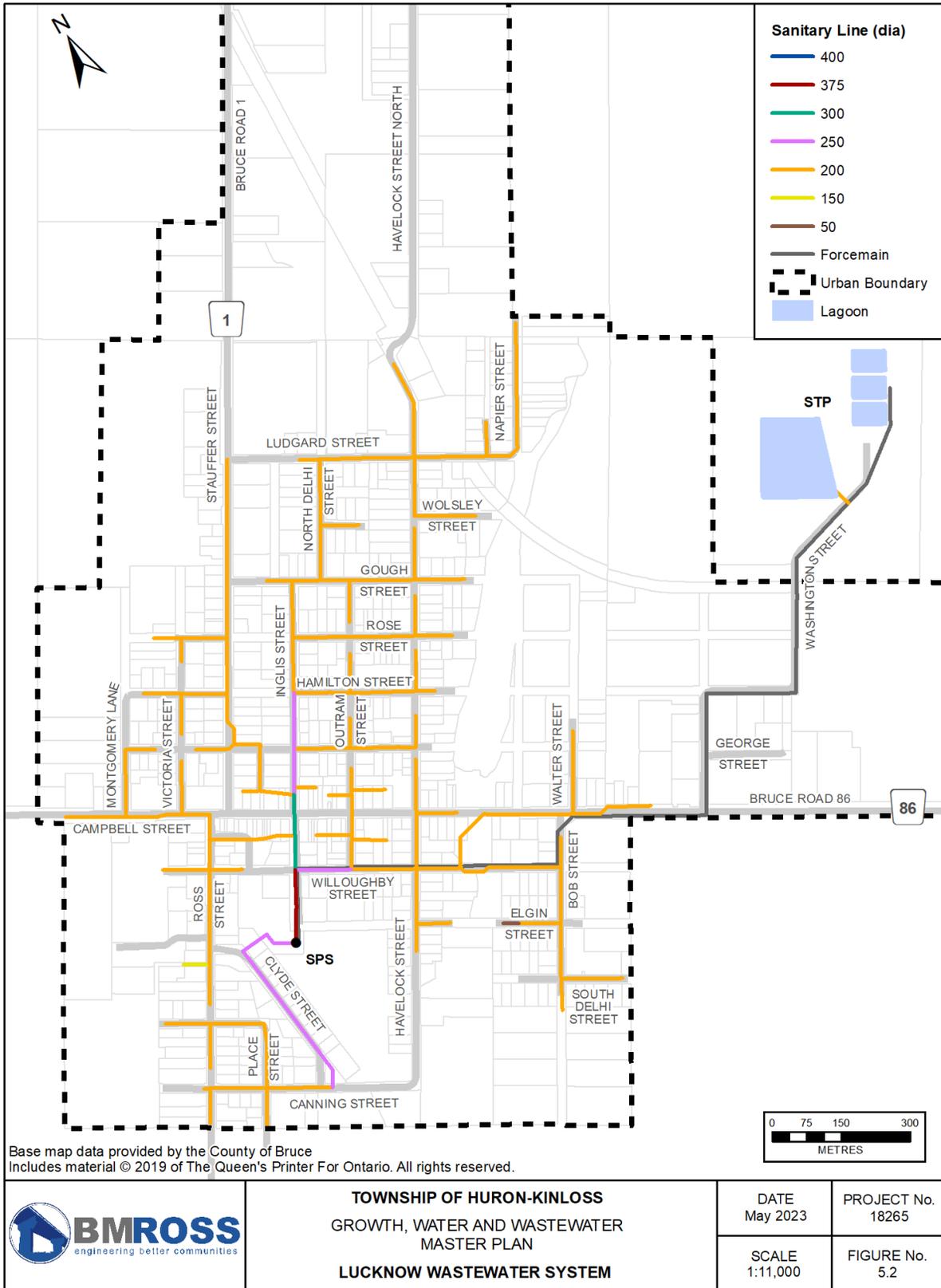
## **5.2 Lucknow Wastewater System**

There is municipal sewage collection in Lucknow and treatment is provided by an aerated lagoon system, located in the northeast corner of the village (see Figure 5.2). The system operates under ECA No. 3567-999KAF and includes a pumping station, 3 treatment lagoons, a storage lagoon and six rapid infiltration basins. The current rated capacity of the system is 750 m<sup>3</sup>/day. The sewage pumping station is located at Inglis Street has three sewage pumps and pumps sewage via a forcemain along Willoughby Street to Washington Street to the lagoons.

The collection system services the properties in Lucknow generally located south of the soccer fields on Havelock Street. Properties located north of the soccer fields on Havelock and Stauffer Streets are not serviced. The system also provides sanitary sewage services to five properties located south of Lucknow in the Township of Ashfield-Colborne-Wawanosh. Most of the sewage collection system is made up of 200 mm sewers; however, there are larger diameter sewers along Inglis Street, south of Hamilton Street.

Table 5.3 identifies the annual average flows for 2019-2021.

**Figure 5.2 Lucknow Wastewater System**



**Table 5.3 – Lucknow Sewage Flows 2019-2021**

<b>Year</b>	<b>Annual Average (m<sup>3</sup>/day)</b>
2019	575
2020	530
2021	573
<b>3-year average</b>	<b>559</b>

The current number of customers serviced by the system is 675. ECA No. 3567-999KAF stipulates average effluent concentration objectives for the aerated lagoon Cell No. 3 and monthly average effluent concentration limits for groundwater monitoring. During 2020 and 2021 the Lucknow Sewage Treatment Works effluent was consistently below the non-compliance limits as set forth in the ECA.

### **5.2.1 Bypasses and Overflows**

Annual reports for the years 2019, 2020, and 2021 were reviewed. No bypasses or overflows were reported.

### **5.2.2 Other Issues**

Maintenance of the works is carried out as needed and in recent years at the WWTP has included replacement of aerators as well as replacement of sand media in the rapid infiltration basins. This maintenance work is considered typical based on equipment age and anticipated life expectancy.

Collection system flow metering was completed in fall 2020 through spring 2021. Results of that study work were to recommend several sewer sections within the community be inspected via CCTV to help identify condition issues, as well as develop a program for maintenance hole repair.

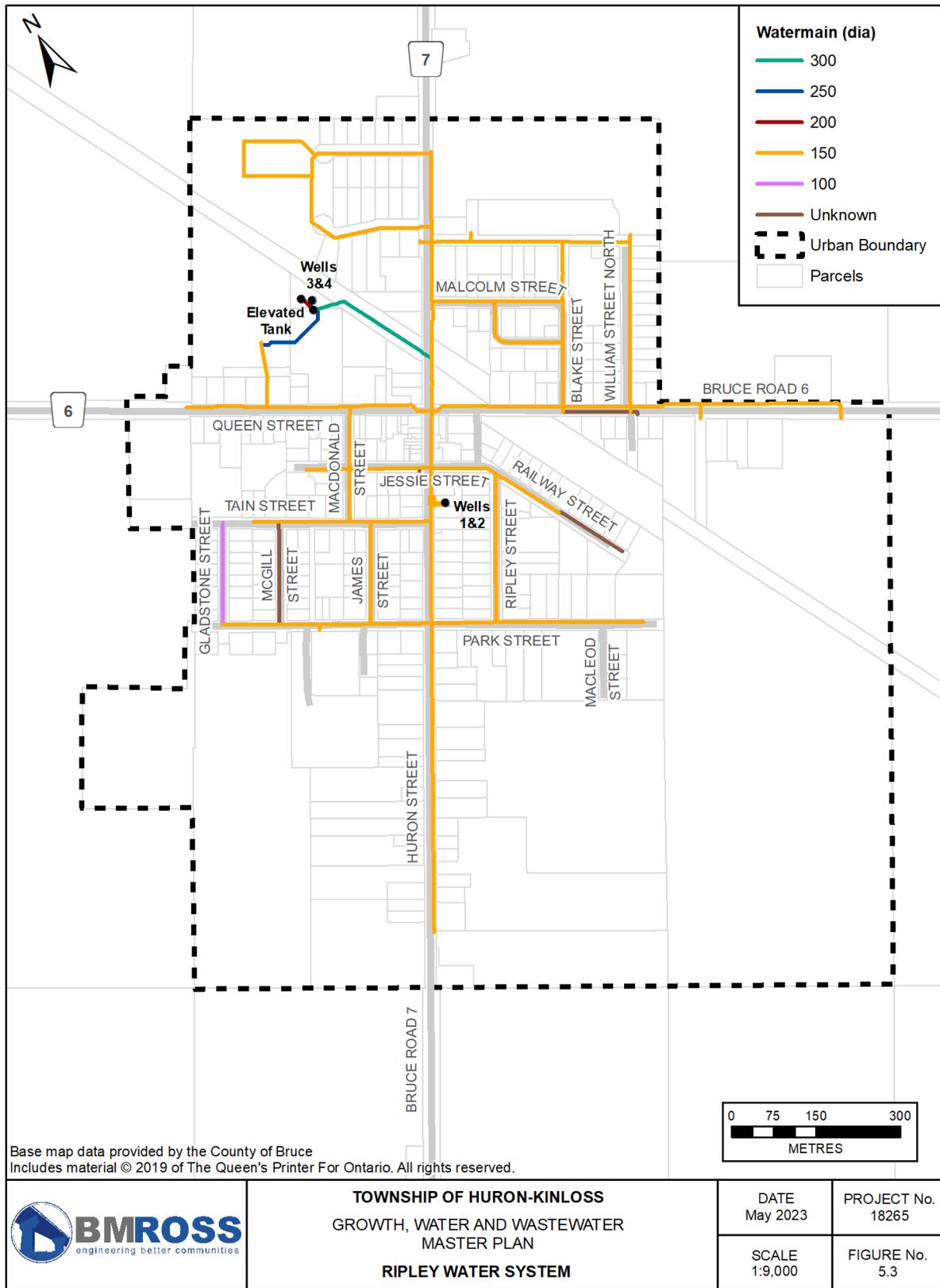
## **5.3 Ripley Water System**

The village of Ripley is supplied water from the Ripley Drinking Water System. The system consists of four groundwater wells, an elevated storage tank, and the distribution network. It supplies the entirety of the village of Ripley.

Wells 1 and 2 were drilled in 1947 and 1994, respectively, and are located adjacent to the Ripley Fire Department on Huron Street. The wells are supplying water from a deep aquifer that is naturally high in sodium and fluoride (Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region, 2015). A new elevated water storage facility was recently constructed, with a storage capacity of 1,465 m<sup>3</sup>, adjacent to the Ripley Huron Community Sports Complex. At the elevated tank site are Wells 3 and 4, drilled in 2012 and 2011, respectively.

The distribution network for the Ripley Drinking Water System is shown in Figure 5.3. The system is mostly made up of 150 mm distribution watermains, with two small sections of

**Figure 5.3 Ripley Water System**



trunk watermain recently constructed from the new elevated storage tank to Malcolm Street and to supply the Queen Street watermain. Recently, a 150 mm watermain was extended along Queen Street, from William Street to provide water service to the Ripley Industrial Park.

There are approximately 366 customers connected to the Ripley Water System.

The capacity of the system, as specified by the MDWL and PTTW are summarized in the following table. For the Ripley Water System, the PTTW limits the rated capacity to 2,880 m<sup>3</sup>/day. The firm capacity of the system is 2,250 m<sup>3</sup>/day.

**Table 5.4 – Ripley Water Supply Rated Capacity**

Document	No.	Dated	Wells 1&2	Well 3	Well 4
MDWL	087-104 No. 4	April 29, 2021	864	2,016	1,386
PTTW	4634-ANZKYM	May 31, 2017	864	2,016	1,386

Current demands are estimated based on the maximum day flow over the last three years. Table 5.5 summarizes the maximum day demands in Ripley between 2019 and 2021. The maximum day flow is 1,147 m<sup>3</sup>/day.

**Table 5.5 – Ripley Water Demands 2019-2021**

Year	Maximum Day (m <sup>3</sup> /day)
2019	1,107
2020	924
2021	1,147
<b>Max</b>	<b>1,147</b>

It is noted there was one day in 2019 with higher flows than the 1,107 m<sup>3</sup>/day reported above; on February 11<sup>th</sup> the flow was 1,229 m<sup>3</sup>/day. However, this was one of the days the newly constructed elevated tank was being commissioned (i.e., filled), which resulted in much higher flows. As such, this flow value was disregarded when considering the maximum daily flow for 2019.

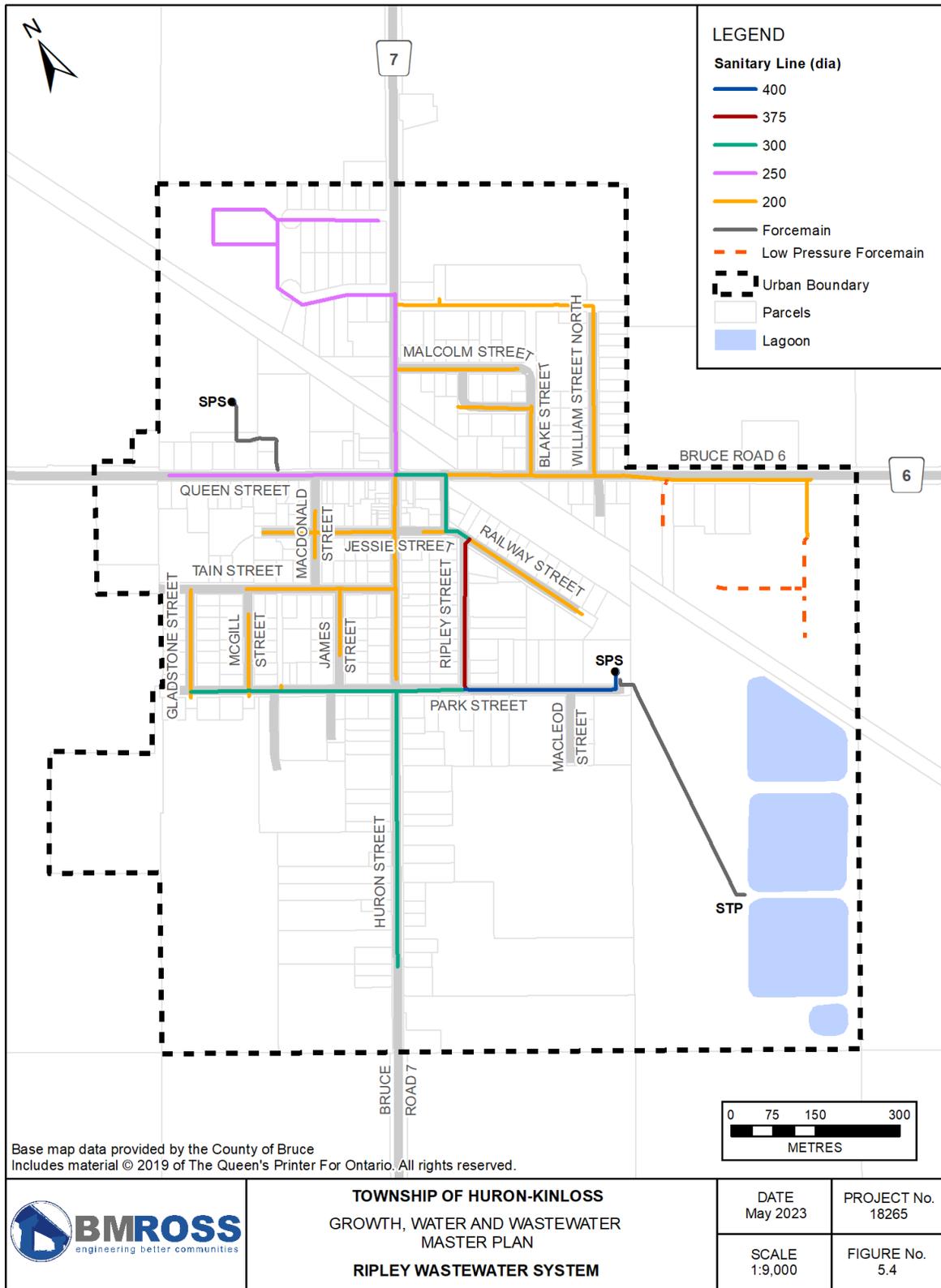
### 5.3.1 Known Issues or Concerns

There are no significant issues or concerns related to the Ripley water system. It is known that available fire flows at the eastern limit of the system, within industrial lands, is limited to values that are less than typical industrial area targets.

## 5.4 Ripley Wastewater System

Similar to Lucknow, the village of Ripley has wastewater treatment for residents provided through a lagoon-based system. The treatment components include three waste stabilization ponds, a single post aeration cells and a sub-surface diffused air aeration system, located at the eastern edge of the village (see Figure 5.4). Treated effluent from

**Figure 5.4 Ripley Wastewater System**



the system is discharged into the South Pine River, between October 15<sup>th</sup> and May 1<sup>st</sup>. The capacity of the system is an average flow of 600 m<sup>3</sup>/day, and the discharge of effluent cannot exceed 4,200 m<sup>3</sup>/day.

There are two sewage pumping stations for the system. One is located at the Ripley Huron Sports Complex and conveys sewage from that facility into the collection system at Queen Street. The other is located at the east end of Park Street and is the collection point for the system. Sewage from the entire village is conveyed to this station and then pumped to the lagoons.

The sewage collection system provides services to all developed properties in Ripley. There is a trunk sewer along Park Street from the sewage pumping station east to Ripley Street. Sewage from the north part of the community is conveyed to the sewage pumping station via 300 mm and 375 mm sewers along Queen Street to Railway Street, to Ripley Street to the Park Street trunk sewer. The west side of the community is serviced by 300 mm sewers along Park Street and Huron Street.

There are 366 customers of the Ripley Wastewater System.

Table 5.6 identifies the annual average flows for 2019-2021.

**Table 5.6 – Ripley Sewage Flows 2019-2021**

<b>Year</b>	<b>Annual Average (m<sup>3</sup>/day)</b>
2019	368
2020	355
2021	381
<b>3-Year Average</b>	<b>368</b>

From 2019-2021, there were no non-compliant averages during lagoon discharge. The treatment performance has been maintained and it is confirmed that the effluent concentration criteria have consistently been met. Although it is not possible to accurately establish reserve capacity based on effluent concentration, it is our observation that use of the hydraulic annual average flow is the best and most reasonable approximation of reserve capacity.

The ECA No. 3-0724-88-006 stipulates effluent concentration objectives and effluent concentration limits for the system. In 2019 and 2020 there were no effluent sample exceedances of the concentration objectives or limits. In 2021, one TSS sample exceeded the limit value, however, compliance is evaluated based on average value over the discharge period and therefore there were no exceedances of the effluent quality criteria. On the basis that adequate treatment is being provided, it is our opinion that evaluating reserve capacity on a hydraulic basis is reasonable.

#### **5.4.1 Bypasses and Overflows**

Annual reports for the years 2019, 2020, and 2021 were reviewed. No bypasses or overflows were reported.

#### **5.4.2 Other Issues**

Though rated for a capacity of 600 m<sup>3</sup>/day, the ECA for the plant requires that once annual average flows reach 500 m<sup>3</sup>/day, the lagoon performance and receiving stream shall be further analyzed to confirm that the rated capacity of 600 m<sup>3</sup>/day will have no negative impact on the receiver. At this time, average flows are not near 500 m<sup>3</sup>/day.

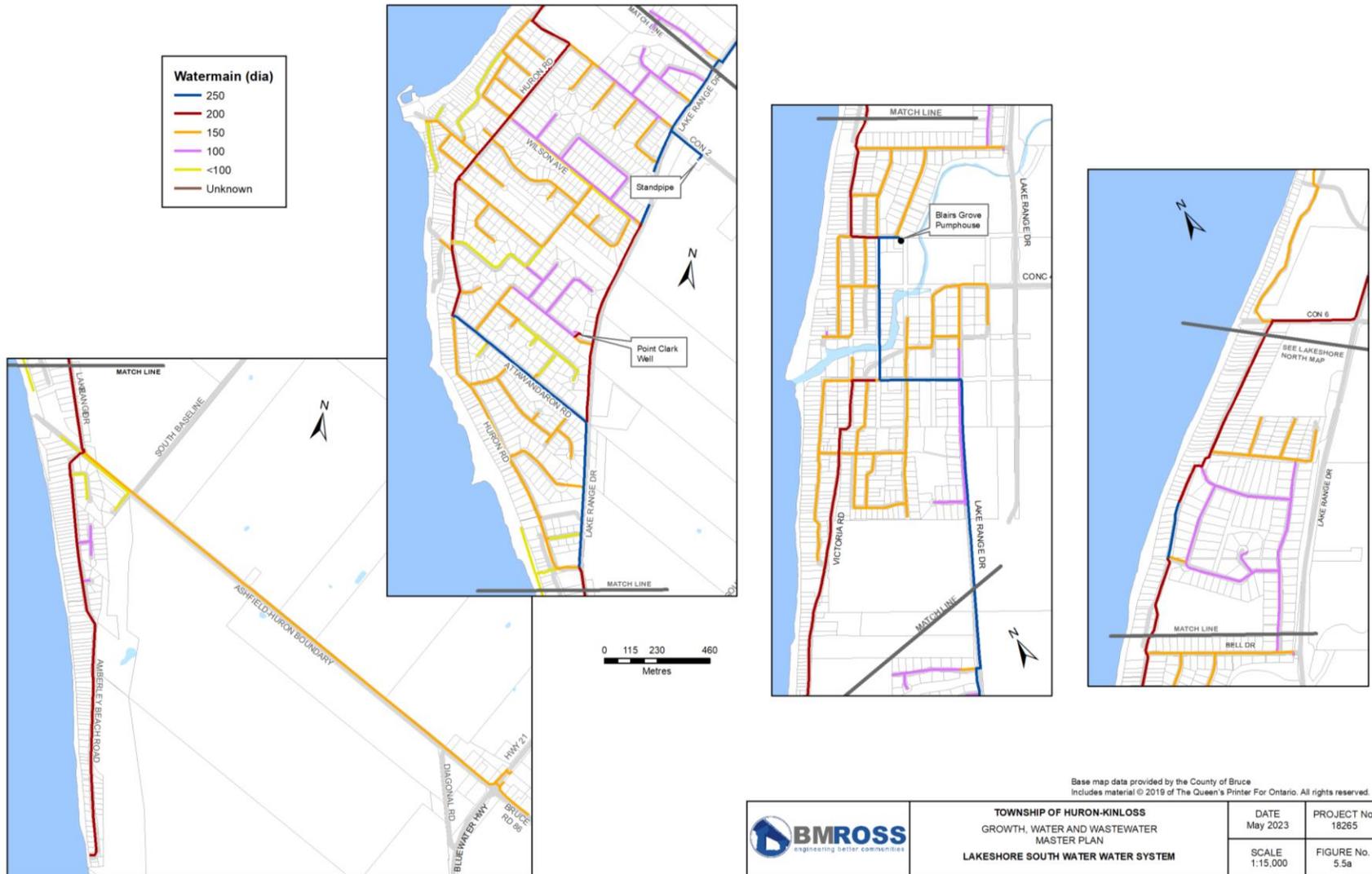
### **5.5 Lakeshore Water System**

Along the lakeshore, residents are supplied water via the Lakeshore Drinking Water System. The system supplies properties from south of the Huronville area, south of Kincardine to Point Clark. It also extends south to provide water to residents in the Courtney/Amberley Beach area and east to service the hamlet of Amberley. The maximum water supply capacity of the system is 11,634 m<sup>3</sup>/day. The system is split into two pressure zones: Lakeshore North, which includes the Huronville South and Murdock Glen wells, and Lakeshore South, which is supplied by the Point Clark and Blairs Grove wells. In total, there are five wells that supply the system. The water supplied by the wells is disinfected utilizing sodium hypochlorite. Water from these wells has relatively high naturally occurring sodium, fluoride, and iron (Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region, 2015). Storage for the system is provided in a standpipe located on Concession 2, east of Point Clark. The total volume of storage of this facility is 1,500 m<sup>3</sup>, with an effective storage of 138 m<sup>3</sup>.

Water for the Inverlyn Lake/Huronville area of the Township is provided by the Municipality of Kincardine. The Lakeshore Water Distribution System is connected to the Municipality of Kincardine Water System to allow for either system to provide supply in the case of an emergency or maintenance operations.

This water system includes an extensive distribution system that supplies the different lakeshore communities, as well as the hamlet of Amberley and the Amberley Beach area of ACW. The south pressure zone is shown in Figure 5.5A and the north in Figure 5.5B. In Point Clark, there is a 200 mm trunk watermain along Victoria Road and Huron Road south to Attawandaron Road and to the Point Clark pumphouse. Another 250 mm watermain runs along Lake Range Drive from St. Arnauld to the standpipe. There is a 250 mm watermain that runs from Point Clark, under the Pine River to Moore Street and the Blairs Grove pumphouse in Lurgan Beach. A trunk watermain runs along Bell, Vozka, and Gordon Street to Concession 6. A 200 mm trunk watermain runs along Lake Range Drive to service the Bruce Beach area. Kin-Bruce and Heritage Heights are supplied via smaller distribution mains from Boiler Beach Road. A 250 mm diameter trunk watermain connects the Huronville Pumphouse and Murdock Glen Pumphouse via Boiler Beach Road to Concession 10 (Figure 3.4C).

**Figure 5.5A – Lakeshore Water System – South Pressure Zone**



**Figure 5.5B - Lakeshore Water System – North Pressure Zone**



Base map data provided by the County of Bruce  
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	<b>TOWNSHIP OF HURON-KINLOSS</b> GROWTH, WATER AND WASTEWATER MASTER PLAN <b>LAKESHORE NORTH WATER WATER SYSTEM</b>		DATE May 2023	PROJECT No. 18265
			SCALE 1:15,000	FIGURE No. 5.5b

From the 250 mm watermain along the southern stretch of Lake Range Drive, there is a 200 mm supply main into Amberley Beach and a 150 mm supply main east to Amberley.

There are 853 customers in the north pressure zone and 1,590 in the southern pressure zone.

The capacity of the system, as specified by the MDWL and PTTW are summarized in the following tables (Tables 5.7 and 5.8). For the Lakeshore North System, the PTTW limits the rated capacity to 5,741 m<sup>3</sup>/day. The firm capacity of the system is 1,814 m<sup>3</sup>/day. For the Lakeshore South System, the MDWL limits the rated capacity to 5,893 m<sup>3</sup>/day, and the firm capacity is 2,618 m<sup>3</sup>/day.

**Table 5.7 – Lakeshore North Water Supply Rated Capacity**

Document	No.	Dated	Huronville S Well No. 2	Murdoch Glen Well
MDWL	087-102 No. 3	April 29, 2021	3,931	1,814
PTTW	3332-9N6H8L	November 13, 2014	3,927	-
PTTW	6123-A2UQBM	October 5, 2015	-	1,814

**Table 5.8 – Lakeshore South Water Supply Rated Capacity**

Document	No.	Dated	Blairs Grove	Point Clark Well No. 2&3
MDWL	087-102 No. 3	April 29, 2021	2,618	3,275
PTTW	5776-BW6SKS	December 17, 2020	2,621	-
PTTW	1852-9YQMAY	July 20, 2015	-	3,275

The current demands for the North Lakeshore and South Lakeshore system are based on the maximum day demands between 2019 and 2021. In the northern portion of the system, the maximum day demand is 2,656 m<sup>3</sup>/day, and 3,375 m<sup>3</sup>/day in the south. Tables 5.9 and 5.10 summarizes the maximum day demands in the north and south respectively.

**Table 5.9 – Lakeshore North Water Demands 2019-2021**

Year	Maximum Day (m <sup>3</sup> /day)
2019	2,037
2020	2,656
2021	2,345
<b>Max</b>	<b>2,656</b>

**Table 5.10 – Lakeshore South Water Demands 2019-2021**

<b>Year</b>	<b>Maximum Day (m<sup>3</sup>/day)</b>
2019	2,583
2020	3,375
2021	3,157
<b>Max</b>	<b>3,375</b>

### **5.5.1 Known Issues or Concerns**

Based on formulae contained in MECP Design Guidelines for Drinking Water Systems – 2008, the existing standpipe does not provide the recommended stored water volume for the existing service population. Full details of the calculations are included in the Reserve Capacity Analysis section. In summary, slightly more than 4,000 m<sup>3</sup> storage volume is recommended for the existing service population.

### **5.6 Lakeshore Wastewater Servicing**

In the Inverlyn Lake/Huronville area, sanitary sewage collection and treatment services are provided by the Municipality of Kincardine. For the remainder of properties within the Lakeshore is provided by private, on-site sewage treatment systems.

### **5.7 Reserve Capacity Analysis**

#### **5.7.1 Methodology**

For the purposes of quantifying servicing requirements for current development commitments and future growth, water demands, and wastewater flows are described in terms of Equivalent Residential Units (ERUs). An ERU is defined as the unit flow design value for an individual residential unit, including single detached units, semi-detached units, apartments, condominiums, etc.

Where non-residential flow data is not available, the total flows and total number of customers is used for the analysis. This will generally result in a slight overestimation of each residential unit servicing requirements, providing an underestimation of reserve capacity for ERUs, assuming that non-residential customers have greater demands per connection than residential customers do.

System capacities were established through a review of the MDWL and PTTW for the water systems and the ECA for the wastewater systems.

The reserve capacity of a system is calculated as:

$$\textit{Total Reserve Capacity} = \textit{Rated Capacity} - \textit{Current Usage}$$

The total reserve capacity includes “committed reserve” or the amount of capacity that is committed to future development (e.g., undeveloped lots created through a Plan of Subdivision) that is not yet built and “uncommitted reserve”. Uncommitted reserve capacity is the amount of capacity that is available for future development that has not yet been planned.

The uncommitted reserve capacity is calculated as:

$$\text{Uncommitted Capacity} = \text{Rated Capacity} - \text{Current Usage} - \text{Committed Capacity}$$

For the water supply system, the current usage was determined as the maximum daily demand over the 2019 to 2021 period. The calculations for the water reserve capacity were completed for both the rated and firm capacity. The rated capacity is defined as the maximum rate at which water may be withdrawn from the source as specified by the lower of the MDWL or PTTW. The firm capacity is the capacity of the water system with the largest well or pump out of service. For the Lakeshore Drinking Water System, the rated capacities were calculated for the Lakeshore North and Lakeshore South pressure zones.

For the wastewater treatment systems, the current usage was defined as the average of the 2019-2021 average annual daily flow. The calculations for the wastewater reserve capacity were completed based on the “rated” capacity, defined as the average daily flow which sewage works have been approved to handle. This is calculated as the cumulative total sewage flow to the sewage works during a calendar year, divided by the number of days during which sewage was flowing to the sewage treatment works that year.

### 5.7.2 Development Commitments

For the purposes of determining the uncommitted reserve capacity, Township staff provided lists of proposed and approved but unbuilt developments. The proposed developments include recent proposals that are in the very initial phases of planning and discussions with the Township staff. Development commitments also include an estimate of vacant infill lots within the service area of the municipal system. The count of vacant infill lots does not include larger parcels that could be subdivided, or an estimate of potential units on these lots, as the potential number of units can vary significantly based on density. The known development proposals (as of July 2022) and vacant infill lots are summarized in the following tables (Tables 5.11 to 5.14)

**Table 5.11 Development Commitments – Lucknow**

<b>Development Name</b>	<b>Units</b>
Nine Mile Villa	13
Mamta	70
Sommerville	6
Mann Severances	1
Scott Severances	1
Infill	42
<b>Total Commitments</b>	<b>133</b>

**Table 5.12 Development Commitments – Ripley**

<b>Development Name</b>	<b>Units</b>
Brown	110
Ripley Square	30
MacTavish Place Phase 1	28
Finlay Street	8
MacTavish Place Phase 2	52
Ripley Industrial Park	16
Ball Multiplex	2
Meadow Creek	66
Infill	19
<b>Total Commitments</b>	<b>331</b>

**Table 5.13 Development Commitments – Lakeshore North**

<b>Development Name</b>	<b>Units</b>
Inverlyn Lake	1
Heritage Heights III	6
Heritage Heights IV	1
Crimson Oak	59
Ainsdale	40
Infill	50
<b>Total Commitments</b>	<b>157</b>

**Table 5.14 Development Commitments – Lakeshore South**

<b>Development Name</b>	<b>Units</b>
Sunset	10
Kempton	9
Elliot	12
Irwin Severance	6
Infill	145
<b>Total Commitments</b>	<b>182</b>

The development commitments above do not include any future developments outside of Huron-Kinloss (i.e., in ACW). At this time, there are no known development proposals outside of Huron-Kinloss that request municipal servicing from the Township.

### **5.7.3 Water Systems Reserve Capacity**

The reserve capacity calculations for the Lucknow, Ripley and Lakeshore North and South water systems are summarized in Tables 5.15 to 5.18. The summaries include reserve calculations for the rated and firm capacities.

**Table 5.15 Reserve Capacity – Lucknow Water System**

<b>Description</b>	<b>Units</b>	<b>Rated Value</b>	<b>Calculation (Rated Capacity)</b>	<b>Value (Firm)</b>	<b>Calculation (Firm Capacity)</b>
Capacity	m <sup>3</sup> /d	2,000	-	935	-
Maximum Day Demand	m <sup>3</sup> /d	1,210	-	1,210	-
Total Reserve	m <sup>3</sup> /d	790	2,000 m <sup>3</sup> /d - 1,210 m <sup>3</sup> /d	-275	935 m <sup>3</sup> /d - 1,210 m <sup>3</sup> /d
Customer Usage	m <sup>3</sup> /d/ERU	1.77	1,210 m <sup>3</sup> /d / 682 ERU	1.77	1,210 m <sup>3</sup> /d / 682 ERU
Committed Reserve	m <sup>3</sup> /d	236	133 ERU X 1.77 m <sup>3</sup> /d/ERU	236	133 ERU X 1.77 m <sup>3</sup> /d/ERU
Uncommitted Reserve (m <sup>3</sup> /d)	m <sup>3</sup> /d	554	790 m <sup>3</sup> /d - 236 m <sup>3</sup> /d	-511	(-) 275 m <sup>3</sup> - 236 m <sup>3</sup>
Uncommitted Reserve (ERU)	ERU	312	54 m <sup>3</sup> /d / 1.77 m <sup>3</sup> /d/ERU	-	-

**Table 5.16 Reserve Capacity – Ripley Water System**

<b>Description</b>	<b>Units</b>	<b>Rated Value</b>	<b>Calculation (Rated Capacity)</b>	<b>Value (Firm)</b>	<b>Calculation (Firm Capacity)</b>
Capacity	m <sup>3</sup> /d	2,880	-	2,250	-
Maximum Day Demand	m <sup>3</sup> /d	1,147	-	1,147	-
Total Reserve	m <sup>3</sup> /d	1,733	2,880 m <sup>3</sup> /d - 1,147 m <sup>3</sup> /d	1,103	2,250 m <sup>3</sup> /d - 1,147 m <sup>3</sup> /d
Customer Usage	m <sup>3</sup> /d/ERU	3.13	1,147 m <sup>3</sup> /d / 331 ERU	3.13	1,147 m <sup>3</sup> /d / 331 ERU
Committed Reserve	m <sup>3</sup> /d	1,037	348 ERU X 3.13 m <sup>3</sup> /d/ERU	1,037	348 ERU X 3.13 m <sup>3</sup> /d/ERU
Uncommitted Reserve (m <sup>3</sup> /d)	m <sup>3</sup> /d	696	1,733 m <sup>3</sup> /d – 1,037 m <sup>3</sup> /d	66	1,103 m <sup>3</sup> – 1,037 m <sup>3</sup>
Uncommitted Reserve (ERU)	ERU	222	644 m <sup>3</sup> /d / 3.13 m <sup>3</sup> /d/ERU	-	-

**Table 5.17 Reserve Capacity – Lakeshore North Water System**

<b>Description</b>	<b>Units</b>	<b>Rated Value</b>	<b>Calculation (Rated Capacity)</b>	<b>Value (Firm)</b>	<b>Calculation (Firm Capacity)</b>
Capacity	m <sup>3</sup> /d	5,741	-	1,814	-
Maximum Day Demand	m <sup>3</sup> /d	2,656	-	2,656	-
Total Reserve	m <sup>3</sup> /d	3,085	5,741 m <sup>3</sup> /d - 2,656 m <sup>3</sup> /d	-842	1,814 m <sup>3</sup> /d - 2,656 m <sup>3</sup> /d
Customer Usage	m <sup>3</sup> /d/ERU	3.11	2,656 m <sup>3</sup> /d / 853 ERU	3.11	2,656 m <sup>3</sup> /d / 853 ERU
Committed Reserve	m <sup>3</sup> /d	489	157 ERU X 3.11 m <sup>3</sup> /d/ERU	489	157 ERU X 3.11 m <sup>3</sup> /d/ERU
Uncommitted Reserve (m <sup>3</sup> /d)	m <sup>3</sup> /d	2,596	3,085 m <sup>3</sup> /d - 489 m <sup>3</sup> /d	-1,331	(-) 842 m <sup>3</sup> - 489 m <sup>3</sup>
Uncommitted Reserve (ERU)	ERU	834	2,500 m <sup>3</sup> /d / 3.11 m <sup>3</sup> /d/ERU	-	-

**Table 5.18 Reserve Capacity – Lakeshore South Water System**

<b>Description</b>	<b>Units</b>	<b>Rated Value</b>	<b>Calculation (Rated Capacity)</b>	<b>Value (Firm)</b>	<b>Calculation (Firm Capacity)</b>
Capacity	m <sup>3</sup> /d	5,893	-	2,618	-
Maximum Day Demand	m <sup>3</sup> /d	3,375	-	3,375	-
Total Reserve	m <sup>3</sup> /d	2,518	5,893 m <sup>3</sup> /d - 3,375 m <sup>3</sup> /d	-757	2,618 m <sup>3</sup> /d - 3,375 m <sup>3</sup> /d
Customer Usage	m <sup>3</sup> /d/ERU	2.12	3,375 m <sup>3</sup> /d / 1,590 ERU	2.12	3,375 m <sup>3</sup> /d / 1590 ERU
Committed Reserve	m <sup>3</sup> /d	386	182 ERU X 2.12 m <sup>3</sup> /d/ERU	386	182 ERU X 2.12 m <sup>3</sup> /d/ERU
Uncommitted Reserve (m <sup>3</sup> /d)	m <sup>3</sup> /d	2,132	2,518 m <sup>3</sup> /d - 386 m <sup>3</sup> /d	-1,143	(-) 757 m <sup>3</sup> - 386 m <sup>3</sup>
Uncommitted Reserve (ERU)	ERU	1,004	2,132 m <sup>3</sup> /d / 2.12 m <sup>3</sup> /d/ERU	-	-

#### 5.7.4 Water Storage Reserves

Table 5.19 identifies the existing and future storage facilities and their volumes.

**Table 5.19 Water Storage Facility – Lucknow, Ripley, and Lakeshore**

Facility	Total Volume (m <sup>3</sup> )	Effective Volume (m <sup>3</sup> )
Future Lucknow Elevated Storage Tank <sup>1</sup>	1,600	1,600
Existing Lucknow Standpipe <sup>2</sup>	996	~35
Existing Ripley Elevated Storage Tank	1,465	1,465
Existing Point Clark (Lakeshore) Standpipe	1,500	~138 <sup>3</sup>

- Notes: 1. Currently under construction.  
2. To be decommissioned once new elevated tank is constructed.  
3. An operating range of 2m is typically used in the Point Clark Standpipe. The standpipe inner diameter of 9.38m is used for the calculation of effective volume.

#### 5.7.4 (a) Required Volumes

Water storage is used to provide:

- Peak flow equalization,
- Water supply for fire protection, and
- Water supply for emergencies.

The above requirements are listed in order of priority and discussed in more detail in the following sections.

#### 5.7.4 (b) Storage for Peak Flow Equalization

Normally, the water supply and treatment facilities are designed to provide supply for the “maximum day” demand. If there is insufficient storage (e.g., standpipe, reservoir) to satisfy the peak flow equalization requirements (typically taken as 25% of the maximum day demand) then peak demands must be met from surplus in the treatment facilities (i.e., water provided directly from treatment system rather than from storage).

Tables 5.20, 5.21, and 5.22 provide the peak flow equalization required for the existing and committed serviced scenarios, for Lucknow, Ripley, and Lakeshore, respectively.

**Table 5.20 Storage Requirements for Peak Flow Equalization – Lucknow**

Scenario	Volume Required(m <sup>3</sup> )
Existing	303
Existing + Commitments	361

**Table 5.21 Storage Requirements for Peak Flow Equalization – Ripley**

Scenario	Volume Required (m <sup>3</sup> )
Existing	287
Existing + Commitments	545

**Table 5.22 Storage Requirements for Peak Flow Equalization – Lakeshore System**

Scenario	Volume Required (m <sup>3</sup> )
Existing	1,508
Existing + Commitments	1,718

**5.7.4 (c) Storage for Fire Protection**

The Ministry of the Environment, Conservation and Parks Guidelines (2008) recommend the following volumes for fire protection purposes:

**Table 5.23 Storage Requirements for Fire Protection – Lucknow**

Scenario	Criteria <sup>1</sup>	Volume Required (m <sup>3</sup> )
Existing	87 L/s x 2 hours	632
Existing + Commitments	98 L/s x 2 hours	710

**Table 5.24 Storage Requirements for Fire Protection – Ripley**

Scenario	Criteria <sup>1</sup>	Volume Required (m <sup>3</sup> )
Existing	60 L/s x 2 hours	443
Existing + Commitments	79 L/s x 2 hours	636

**Table 5.25 Storage Requirements for Fire Protection – Lakeshore System**

<b>Scenario</b>	<b>Criteria<sup>1</sup></b>	<b>Volume Required (m<sup>3</sup>)</b>
Existing	160 L/s x 3 hours	1,746
Existing + Commitments	168 L/s x 3 hours	1,817

Notes: 1. Volumes are based on formulas in the MECP Guidelines (2008). Assume 2.6 persons per customer in Lucknow, Ripley, and Lakeshore for calculated number of ERU. This value is from the Veolia Annual report 2018.

**5.7.4 (d) Storage for Emergencies**

As per the MECP Guidelines (2008), emergency storage is typically taken as 25% of the total volume of peak flow equalization plus fire storage. Tables 5.26, 5.27 and 5.28 summarize the design storage values for Lucknow, Ripley, and Lakeshore, respectively.

**Table 5.26 Storage Requirements for Emergencies – Lucknow**

<b>Scenario</b>	<b>Volume Required (m<sup>3</sup>)</b>
Existing	234
Existing + Commitments	268

**Table 5.27 Storage Requirements for Emergencies – Ripley**

<b>Scenario</b>	<b>Volume Required (m<sup>3</sup>)</b>
Existing	182
Existing + Commitments	295

**Table 5.28 Storage Requirements for Emergencies – Lakeshore System**

<b>Scenario</b>	<b>Volume Required (m<sup>3</sup>)</b>
Existing	813
Existing + Commitments	884

#### 5.7.4 (e) Storage Summary

The Lucknow standpipe has a total storage of 996 m<sup>3</sup> and effective storage of ~35 m<sup>3</sup> with a new elevated tank currently being planned with 1,600 m<sup>3</sup> of total and effective storage. The Ripley elevated storage tank has a total and effective storage of 1,465 m<sup>3</sup>. The Lakeshore standpipe has a total storage of 1,500 m<sup>3</sup> and effective storage of ~138 m<sup>3</sup>. Tables 5.29, 5.30 and 5.31 summarize the individual component and total design storage volumes for Lucknow, Ripley, and Lakeshore, respectively, based on MECP Design Guidelines (2008).

**Table 5.29 Storage Summary – Lucknow**

Scenario	Volume Required for Equalization (m <sup>3</sup> )	Volume Required for Fire Protection (m <sup>3</sup> )	Volume Required for Emergency (m <sup>3</sup> )	Volume Required Total (m <sup>3</sup> )
Existing	303	632	234	1,168
Existing + Commitments	361	710	268	1,338

**Table 5.30 Storage Summary – Ripley**

Scenario	Volume Required for Equalization (m <sup>3</sup> )	Volume Required for Fire Protection (m <sup>3</sup> )	Volume Required for Emergency (m <sup>3</sup> )	Volume Required Total (m <sup>3</sup> )
Existing	287	443	182	912
Existing + Commitments	559	646	301	1,477

**Table 5.31 Storage Summary – Lakeshore System**

Scenario	Volume Required for Equalization (m <sup>3</sup> )	Volume Required for Fire Protection (m <sup>3</sup> )	Volume Required for Emergency (m <sup>3</sup> )	Volume Required Total (m <sup>3</sup> )
Existing	1,508	1,746	813	4,067
Existing + Commitments	1,743	1,826	892	4,419

#### 5.7.5 Wastewater Systems Reserve Capacity

The reserve capacity calculations for the Lucknow and Ripley wastewater treatment are summarized in Table 5.32 and 5.33.

**Table 5.32 Reserve Capacity – Lucknow Wastewater System**

Description	Units	Value	Calculation
Capacity	m <sup>3</sup> /d	750	-
Average Day Flow	m <sup>3</sup> /d	559	-
Total Reserve	m <sup>3</sup> /d	191	750 m <sup>3</sup> /d - 559 m <sup>3</sup> /d
Customer Usage	m <sup>3</sup> /d/ERU	0.82	559 m <sup>3</sup> /d / 682 ERU
Committed Reserve	m <sup>3</sup> /d	109	133 ERU X 0.82 m <sup>3</sup> /d/ERU
Uncommitted Reserve	m <sup>3</sup> /d	82	191 m <sup>3</sup> /d - 109 m <sup>3</sup> /d
Uncommitted Reserve	ERU	100	82 m <sup>3</sup> /d / 0.82 m <sup>3</sup> /d/ERU

**Table 5.33 Reserve Capacity – Ripley Wastewater System**

Description	Units	Value	Calculation
Capacity	m <sup>3</sup> /d	600	-
Average Day Flow	m <sup>3</sup> /d	368	-
Total Reserve	m <sup>3</sup> /d	232	600 m <sup>3</sup> /d - 368 m <sup>3</sup> /d
Customer Usage	m <sup>3</sup> /d/ERU	1.0	368 m <sup>3</sup> /d / 366 ERU
Committed Reserve	m <sup>3</sup> /d	331	331 ERU X 1.0 m <sup>3</sup> /d/ERU
Uncommitted Reserve	m <sup>3</sup> /d	-99	232 m <sup>3</sup> /d - 331 m <sup>3</sup> /d
Uncommitted Reserve	ERU	-99	-99 m <sup>3</sup> /d / 1.0 m <sup>3</sup> /d/ERU

### 5.7.6 Summary of Reserve Capacity Analyses

The reserve analysis of the Lucknow Water System suggests there is sufficient uncommitted capacity at this time. The replacement of the existing standpipe with a new elevated tank will increase the overall storage capacity of the system to a sufficient amount. The Lucknow wastewater system has limited uncommitted capacity available for future development.

In Ripley, the water system and water storage have sufficient capacity for existing users and future development. The wastewater treatment system is theoretically over-committed, on the basis of what is considered a development commitment.

Lakeshore North and South have larger water supply reserves available than that of Lucknow and Ripley. From the examination of water storage capacity, additional storage capacity is recommended for the Lakeshore water system.

## 6.0 VISIONING

### 6.1 Purpose

At the outset of the Master Plan, the need for a vision of future growth and development in the settlement areas of Huron-Kinloss was identified. Given that the Master Plan is examining water and wastewater servicing needs and potential strategies, an understanding of the vision for future growth and development in the settlement areas over the next 25 years was desired. The intent of the visioning was to identify the overarching goals for growth and development over the next 25 years for Ripley, Lucknow, and the Lakeshore.

### 6.2 Visioning Exercise

A visioning workshop was held with members of Huron-Kinloss Council and senior Township staff in December 2020. The workshop was a brainstorming session to broadly discuss development directions, planning considerations, and the impacts and effects related to growth and policy directions. The workshop was held virtually, due to COVID-19, utilizing the Zoom platform. The workshop started with an overview of the Master Plan process and historical information on growth and development in the Township. Following that, the attendees were split into two groups and put into breakout rooms to brainstorm ideas based on the following questions:

1. What do Lucknow, Ripley and the Lakeshore look like or how do they change over the next 20-25 years?
2. What is needed to make those changes happen in each community?

Table 6.1 summarizes the ideas and visions of how Lucknow, Ripley and the Lakeshore will develop and change in the future:

**Figure 6.1 Summary of Vision Components for Settlement Areas**

<b>Lucknow</b>	<b>Ripley</b>	<b>Lakeshore</b>
<ul style="list-style-type: none"> <li>• New development areas within the community</li> <li>• Industrial development</li> <li>• Attract young families and first-time buyers</li> <li>• Vibrant downtown</li> <li>• Potential servicing south of Lucknow – shared servicing with a potential change to the urban boundary</li> <li>• More diversity</li> <li>• Support remote working</li> <li>• More diverse residential units</li> </ul>	<ul style="list-style-type: none"> <li>• Improved downtown</li> <li>• Development in Industrial Park</li> <li>• Support remote working</li> <li>• Will attract newcomers, young families, those looking for more affordable homes compared to the Lakeshore and Kincardine</li> <li>• More diversity</li> </ul>	<ul style="list-style-type: none"> <li>• Expansion of settlement area (need for more lots) east of Lake Range</li> <li>• Communal sewage</li> <li>• More permanent residents</li> <li>• Support remote working</li> <li>• Expanded sewage services from Kincardine</li> <li>• Conflicts between development and agricultural uses, and conflict around beach access.</li> </ul>

Over the next 25 years, it is generally expected that growth will continue to occur within the settlement areas of the Township and that additional lands will be required to accommodate growth in the Lakeshore area. It is also expected that Lucknow and Ripley will attract more families, first time homebuyers and a generally more diverse population compared to the Lakeshore. The Lakeshore will continue to be a desired location for residents and that additional land will be required to accommodate future growth in this area. It is envisioned that alternative sewage servicing methods will be needed in association with the growth along the Lakeshore.

The groups were also asked what is needed to achieve these changes for each community. The responses given broadly fall into two categories: planning and assisting future developers. To meet the needs of the future, roads, water, and wastewater infrastructure to service new development areas should be planned and ready for implementation. This includes removing barriers to development and having the appropriate studies completed in advance. Removing other constraints for developers, in addition to incentives and mentoring were also identified as tools for the future.

### **6.3 Vision Statement**

From the visioning exercise conducted, the following vision statement was defined:

**Residential growth will continue in Lucknow, Ripley, and the Lakeshore area over the next 25 years. Appropriate and planned water and wastewater servicing will be in place to support future development, providing for an increased range of housing types for a more diverse population.**

## 7.0 GROWTH AND NEEDS FORECASTING

### 7.1 Current Population and Dwelling Counts

Population and dwelling data for the Township was obtained from the latest Statistics Canada Census counts. Table 7.1 summarizes population counts from 2006 to 2021 for Lucknow, Ripley, the Lakeshore and Township. Population data for the Lakeshore area is not available prior to 2006. It should also be noted that the Census population counts do not include seasonal residents who have a primary residence elsewhere. Overall, there has been a 9.25% change in the population of the Township over the latest Census period. The majority of the population growth has occurred in the Lakeshore area, with moderate growth in Lucknow and Ripley in the last five years.

**Table 7.1 Population 2006-2021 – Huron-Kinloss**

Year	Lucknow	Ripley	Lakeshore	Township
2006	1,162	654	2,164	6,515
2011	1,105	769	2,391	6,790
2016	1,121	762	2,670	7,069
2021	1,154	800	3,183	7,723
5-year change	33	38	513	654
10-year change	49	31	792	933

Table 7.2 summarizes the change in the number of total dwellings in Lucknow, Ripley, the Lakeshore and Township between 2006 and 2021. The growth in the number of dwellings follows a similar trend to population, with the greatest increase observed in the Lakeshore area.

**Table 7.2 Count of Dwellings 2006-2021 – Huron-Kinloss**

Year	Lucknow	Ripley	Lakeshore	Township
2006	529	333	2,016	3759
2011	480	345	2,158	3881
2016	508	338	2,256	4037
2021	506	342	2,352	4107
5-year change	-2	4	96	70
10-year change	26	194	194	226

### 7.2 Population and Dwelling Forecasts

Growth in population and dwellings for the Township and settlement areas over the period 2022 to 2047 was assessed using a range of available forecasts. Four recent forecasts were sourced to establish a low, medium, and high range of potential population and dwellings (in ERUs).

For the purposes of this Master Plan, the four forecasts utilized are:

- 5-year annual average number of residential building permits for Lucknow, Ripley, and the Lakeshore.
  - The number of dwelling units was forecasted for each settlement area and population was calculated based on the average dwelling density (persons per unit).
- 10-year annual average number of residential building permits for Lucknow, Ripley, and the Lakeshore.
  - The number of dwelling units (ERUs) was forecasted for each settlement area and population was calculated based on the average dwelling density (persons per unit).
- Nuclear Waste Management Organization (NWMO) – baseline forecast for Huron-Kinloss.
  - The baseline forecast assumes the Deep Geological Repository (DGR) project currently being completed for the Municipality of South Bruce does not proceed.
  - Population was forecasted for the Township as a whole. The projected growth was allocated to the settlement areas based on the current proportion of population in each area and the number of additional dwellings was calculated based on the average dwelling density (persons per unit).
- Bruce County - Plan the Bruce Good Growth – forecasts developed for the update to the Bruce County Official Plan Update for each municipality in the County.
  - Forecasted population and dwelling growth for Ripley, Lucknow, and the Lakeshore.

The forecast based on the 10-year annual average number of building permits is utilized as the low growth scenario, the NWMO baseline forecast for medium growth, and Bruce County forecast for high growth. It should be noted that an impact forecast from NWMO was also assessed, which forecasted population growth assuming the DGR proceeded in South Bruce. The forecasted population increase was less than the Bruce County forecast, so the Bruce County forecast remained the high growth forecast.

The change in population forecasted for Lucknow, Ripley and the Lakeshore over the next 25 years is shown in Table 7.3. It should be noted that the medium forecast (NWMO forecast) is greater than the high forecast for Lucknow and less than the low forecast for the Lakeshore. The NWMO forecast represents a medium growth forecast for the Township as a whole and when the forecasted population was allocated to the settlement areas based on the current proportion of populations in each area, the forecasted growth

was slightly greater than the high forecast for Lucknow and lower than the low growth forecast for the Lakeshore. The forecasts all suggest growth in the communities over the next 25 years, with a significant proportion of the growth occurring in the Lakeshore area.

**Table 7.3 Forecasted Increases in Population to 2047 – Lucknow, Ripley, and Lakeshore**

<b>Forecast</b>	<b>Lucknow (change in population 2022-2047 in persons)</b>	<b>Ripley (change in population 2022-2047 in persons)</b>	<b>Lakeshore (change in population 2022-2047 in persons)</b>
Low Growth	118	183	1,386
Medium Growth	497	307	1,348
High Growth	462	727	1,491

Residential dwelling growth was forecasted in ERUs. For the purposes of this Master Plan, it was assumed:

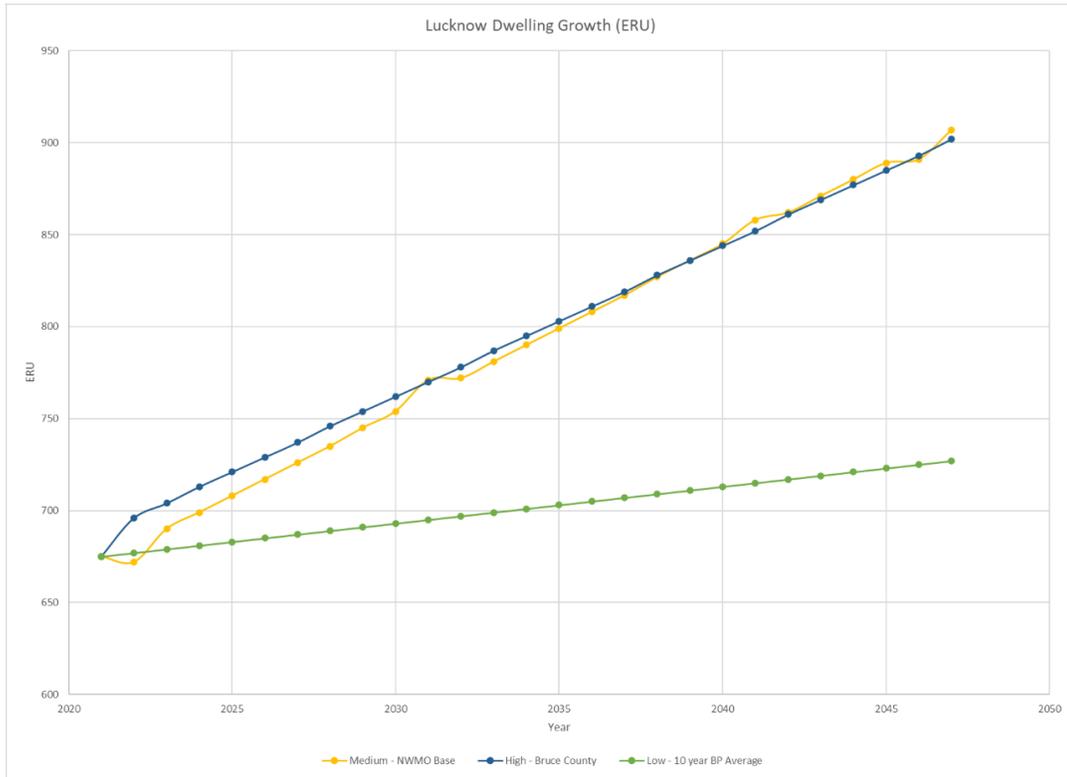
- 1 single-detached unit = 1 ERU.
- 1 row or multi unit = 0.62 ERU.
- 1 apartment unit = 0.54 ERU.

In the Lakeshore area it was assumed all future development will be in the form of single detached units, given the absence of municipal sewage services and current official plan and zoning requirements. In Lucknow and Ripley, it was assumed that 74% of new development will be single-detached units, 19% multi-units, and 6% apartments. These proportions are based on current development proposals in these areas. The number of additional ERUs over the next 25 years is summarized for each settlement area in Table 7.4. The change in ERUs in the next 25 years are shown in Figures 7.1 (Lucknow), 7.2 (Ripley) and 7.3 (Lakeshore). Similar to the forecasts for population, growth in terms of residential dwellings is expected in all the settlement areas over the next 25 years. The majority of additional dwellings are expected in the Lakeshore area.

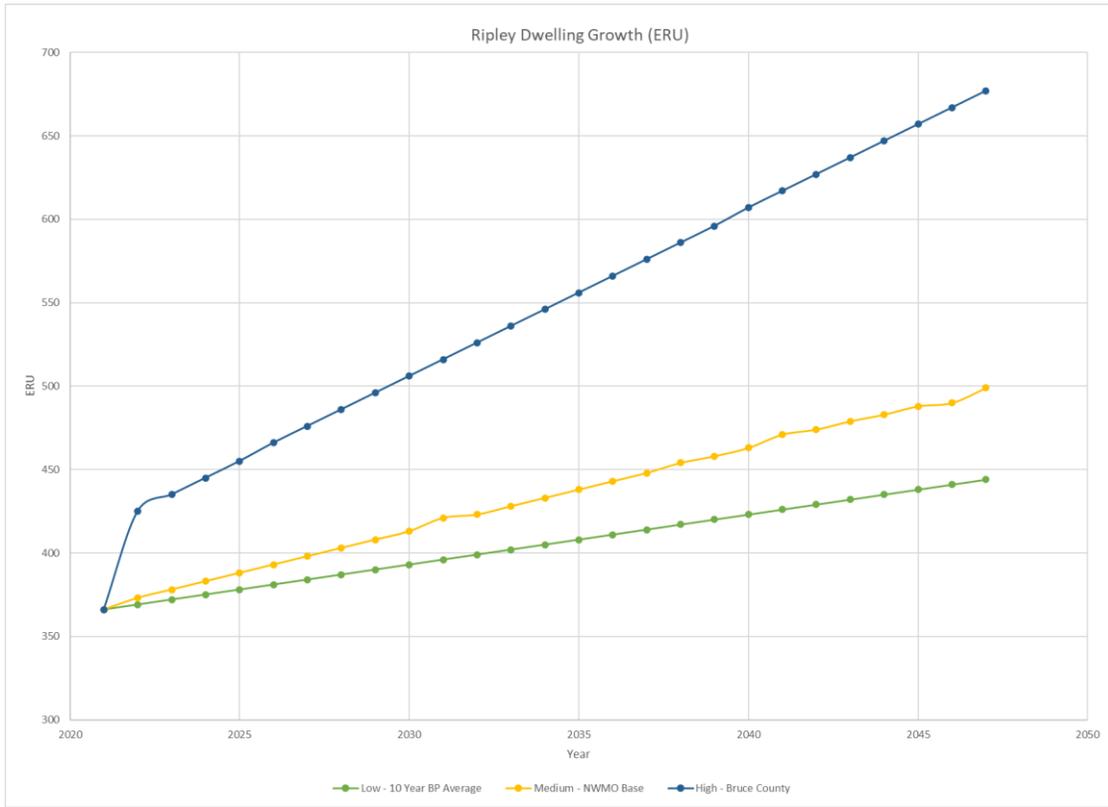
**Table 7.4 Forecasted Increase in ERU to 2047 – Lucknow, Ripley, and Lakeshore**

<b>Forecast</b>	<b>Lucknow (additional ERUs 2022-2047)</b>	<b>Ripley (additional ERUs 2022-2047)</b>	<b>Lakeshore (additional ERUs 2022-2047)</b>
Low Growth	50	75	600
Medium Growth	235	126	584
High Growth	206	252	611

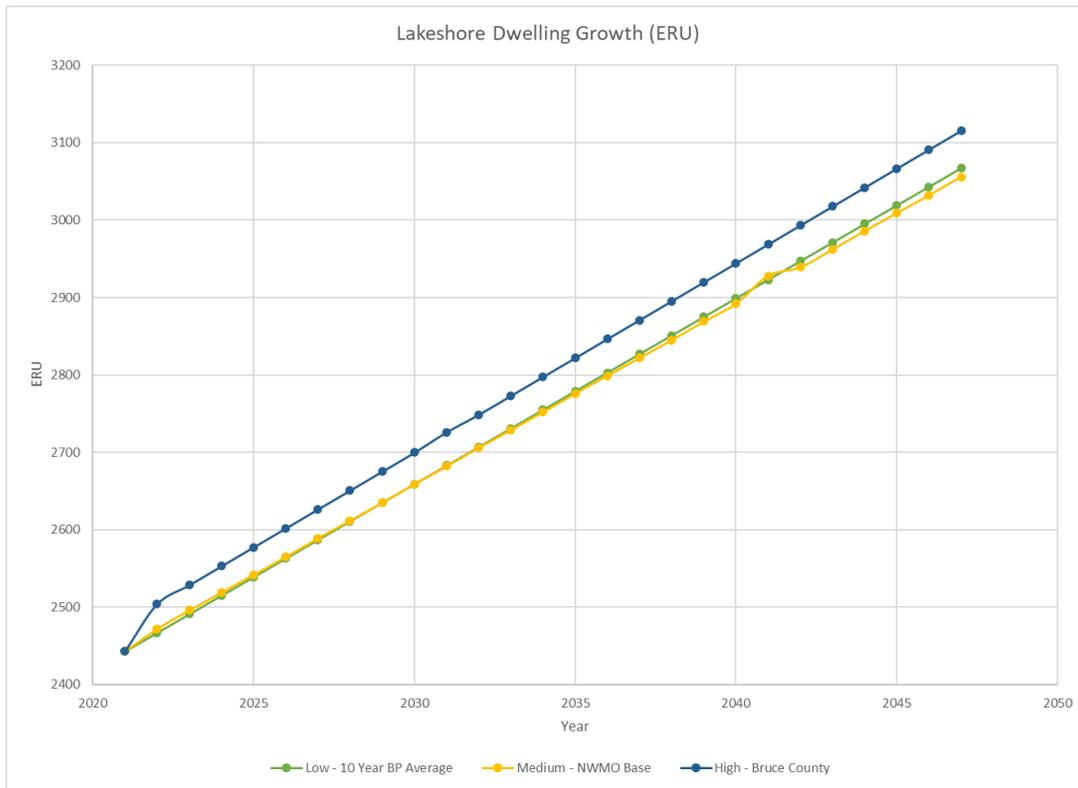
**Figure 7.1 Forecasted Growth in Dwellings – Lucknow 2022-2047**



**Figure 7.2 Forecasted Growth in Dwellings – Ripley 2022-2047**



**Figure 7.3 Forecasted Growth in Dwellings – Lakeshore 2022-2047**



### 7.3 Settlement Area Land Needs

To determine if there is a need for additional land within the settlement areas, the forecasted residential growth was compared against current development proposals, infill lots and the amount of land zoned for residential development or future development. In order to determine the housing potential associated with future or residentially zoned land, it was assumed that future development will occur at a minimum density of 15 units per gross hectare in Ripley and Lucknow, given the availability of full municipal services. In the Lakeshore settlement area, future development was assumed to occur at a density of 5 units per gross hectare. This density is specified currently as the maximum allowable density in the Township’s Official Plan and is the result of the absence of municipal sewage servicing in this area.

#### 7.3.1 Lucknow

In Lucknow, the maximum number of ERU forecasted over the next 25 years is 235 units. Table 7.5 summarizes the potential number of residential units currently within the existing urban settlement area for Lucknow.

**Table 7.5 Potential Future Units – Lucknow**

<b>Category</b>	<b>Potential No. of Units</b>
Proposed and unbuilt units	91
Infill lots	42
Vacant residential or future development lands (50.56 ha)	758
<b>Total Potential Units</b>	<b>891</b>

Based on the above assessment and lands within the current settlement area, there is land available for approximately 890 units. Given this, there appears to be sufficient space within the current settlement area of Lucknow for the forecasted growth over the next 25 years.

### **7.3.2 Ripley**

The high growth scenario for Ripley forecasts an additional 252 ERU over the next 25 years. The potential additional units and lands within the existing settlement area that could be utilized to accommodate the projected growth are summarized in Table 7.6. Based on this assessment, the proposed and future development lands could accommodate approximately 490 units which is sufficient for the projected growth over the next 25 years.

**Table 7.7.6 Potential Future Units – Ripley**

<b>Category</b>	<b>Potential No. of Units</b>
Proposed and unbuilt units	310
Infill lots	18
Vacant residential or future development lands (11 ha)	165
<b>Total Potential Units</b>	<b>493</b>

### **7.3.3 Lakeshore**

The high growth scenario forecasts an additional 611 ERU in the Lakeshore area in the next 25 years. Table 7.7 summarizes the potential developments, infill lots and potential units associated with vacant residential and future development lands in the current Lakeshore settlement area. For the purposes of this analysis, it was assumed that development will be at a lower density (5 units per gross hectare) compared to Ripley and Lucknow due to the absence of municipal sewage services.

**Table 7.7 Potential Future Units – Lakeshore**

<b>Category</b>	<b>Potential No. of Units</b>
Proposed and unbuilt units	144
Infill lots	195
Vacant residential or future development lands (42 ha)	210
<b>Total Potential Units</b>	<b>549</b>

Over the next 25 years, there appears to be a deficit of land within the Lakeshore settlement area to accommodate the projected low, medium, and high growth scenarios. Under the high growth scenario, space for 62 ERU will be required. At 5 units per hectare, this equates to 12.4 hectares (30 acres) of additional land needed to accommodate the projected growth.

## 8.0 LUCKNOW SERVICING

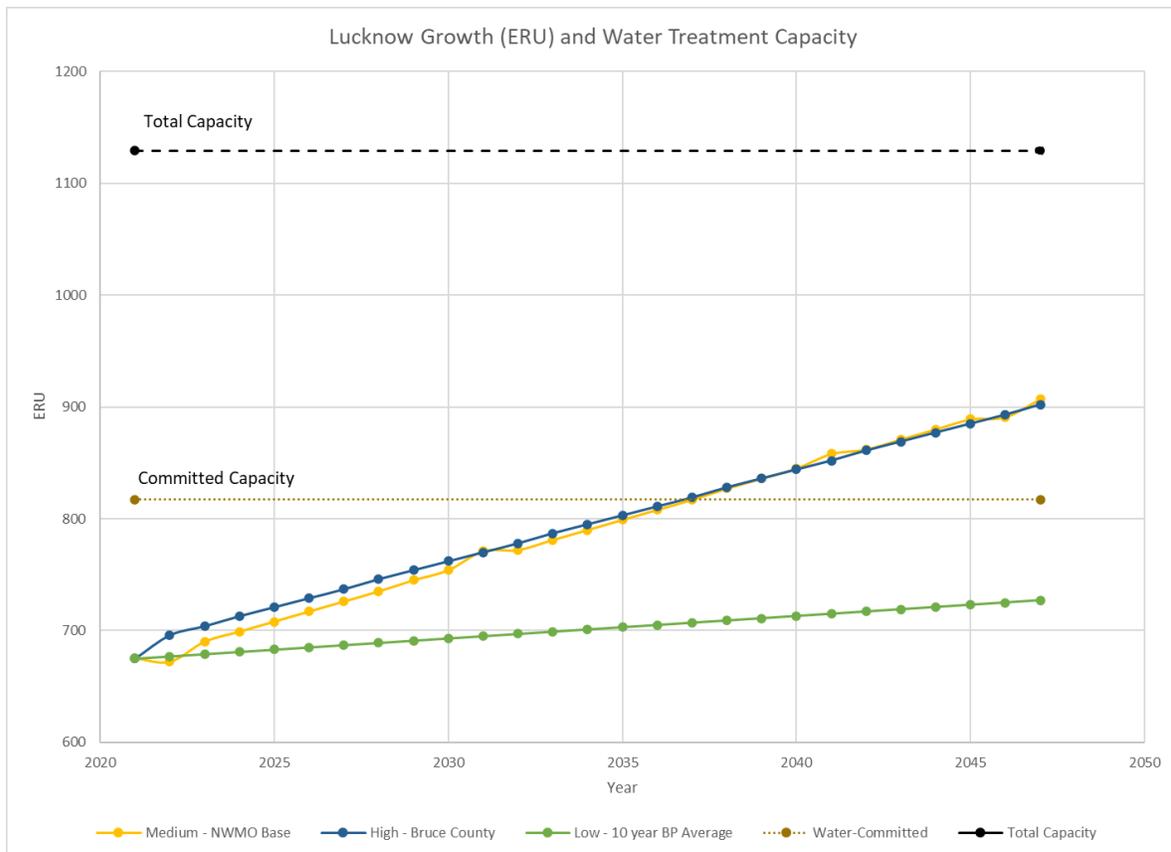
### 8.1 Water System

The existing Lucknow water system is described in Section 5.1.

#### 8.1.1 Existing and Future Water Demands

Section 5.1 contains existing water demand information for the community of Lucknow, and Section 5.7 contains reserve capacity analysis details including projected water demands for development commitments. Figure 8.1 illustrates, in terms of ERUs, the current demand, committed capacity, and projected 25 years demands compared to the rated capacity of the system. From the figure, it is shown that existing system capacity is adequate for the projected needs of the community.

**Figure 8.1 Lucknow Forecasted Growth and Water Treatment Capacity**



#### 8.1.2 Distribution System Modeling

The Lucknow water distribution system was modelled using WaterCAD® software. In general, the model was created using:

- Existing GIS data for watermain location and diameter.
- C-factors in accordance with MECP Design Guidelines for Drinking Water Systems – 2008.

- Pump characteristics based on DWWP details and discussion with operational staff.
- Storage characteristics based on the new elevated tank (currently under construction).

It is noted that five hydrant flow tests were conducted as part of another project and field data compared to model results. Based on this comparison, the model provides a conservative analysis (e.g., may underestimate actual capacity of the system).

The primary scenarios of interest in modelling are:

- Peak demand. Based on MECP Guidelines, system pressure should not be below 275 kPa.
- Maximum day demand plus fire flow. Based on MECP Guidelines, this scenario is evaluated ensuring a minimum residual system pressure of 140 kPa. There are no set criteria for fire flow rates. NFPA 291 categorizes Class C/red fire hydrants as those having available fire flow less than 500 GPM (31.5 L/s or less), Class B/orange hydrants as having 500 to 999 GPM (31.5 to 63.0 L/s), Class A/green hydrants as having 1,000 to 1,499 GPM (63.1 to 94.5 L/s), and Class AA/blue hydrants as having 1,500 or more GPM (94.6 L/s or more).

Under peak demand conditions, modelling results indicate that there are no areas with pressure below target values within the current service area. Portions of proposed development lands within the eastern, southwestern, and northwestern part of the urban boundary are noted to be at higher elevation than most of the existing development area. These higher elevation areas will need to ensure adequately sized mains and/or looping to ensure adequate pressure at peak demands.

Under maximum day plus fire flow conditions, only one existing hydrant location at the north end of Napier Street would be considered Class C/red, based on modelling results. Refer to Appendix B for results for the entire existing system. It is anticipated that extensions of the existing system via dead-end watermains, in higher elevation development lands as noted above, would have available fire flows that are less than the available flow at existing hydrants adjacent to such development lands. Future design of watermain extensions to such development areas will need to consider adequately sized watermains, and potentially looping, to maximize available fire flow.

### **8.1.3 Identified Issues and Opportunities**

The following issues and/or opportunities have been identified for the Lucknow Water System:

- The existing storage standpipe has been due for replacement for some time. Construction of a new elevated tank is currently underway.

- Well No. 5 is known to be approaching the point of needing replacement. It is currently situated on a confined site with relatively poor access. When replacement does occur, it is likely that an alternate site will be desirable.
- Generally, there are no significant issues related to the distribution system. There is adequate pressure available at peak demands based on MECP Guideline values and the system model results. Hydrants on dead-end watermain, remote from sources of supply, have lower available fire flows compared to other locations in the system, but this is the case for most systems.
- Watermain extensions to development lands, which are generally at higher elevation than the existing system and will be at increasingly further distance from sources of supply, will need to be design with proper watermain sized and/or looping in order to ensure adequate pressure during peak demands and adequate available fire flow.

It is noted that the Township does not currently mandate the use of water meters on service connections. Based on our experience, many municipalities in southwestern Ontario do require meters be installed. Water meters are useful for tracking actual water consumption for the purposes of comparison to total treated water production; significant differences between the two values can be an indicator of water loss through leaks, improper connections, missing meters, etc. whereas closely matching values indicate low level of lost water. Metered water usage can also be useful in analyzing community wastewater flows for the purposes of estimating true sewage values vs. infiltration-inflow. Water meters are also perceived to be beneficial for the purpose of encouraging water conservation; the general idea is that if users must pay for actual usage, they will be encouraged to reduce usage where possible. System-wide reductions in per capita water usage can delay the need for system supply capacity increases and even reduce the recommended storage volume for a community. In our experience, it is likely that metering will result in decreased water usage, at least initially. The level of reduction will generally be impacted by the volumetric water charge.

#### **8.1.4 Alternative Solutions/Service Strategies**

Under the MCEA process, Phases 1 and 2 require the identification of problems and/or opportunities and the evaluation of alternative solutions. For the purposes of this Master Plan, the identification and evaluation of alternative solutions will be a high-level evaluation to support future environmental assessments or studies.

The evaluation of the Lucknow Water System identified the following future project:

- Replacement of Well 5

This well has been identified for replacement in the future as a result of the condition of the well and its location. The following table (Table 8.1) summarizes alternative solutions to this identified problem and the preliminary evaluation undertaken.

**Table 8.1 Alternative Solutions – Lucknow Water System**

<b>Alternative</b>	<b>Evaluation</b>	<b>Recommendation</b>
1. Replace/Repair Well 5 at Existing Site	<ul style="list-style-type: none"> <li>• Lack of space at existing site makes replacement and repairs technically challenging.</li> <li>• This option will not address current concerns regarding the location of Well 5 site and access.</li> <li>• May not require amendments to Source Water vulnerable areas.</li> <li>• Known quantity and quality of water at this site.</li> <li>• If Well 5 cannot be used during construction, supply will be limited to sole well (Well 4).</li> </ul>	Does not address concerns regarding site access and current location of the well, therefore not recommended for future consideration.
2. Construct a New Well at a New Site	<ul style="list-style-type: none"> <li>• New site will address concerns regarding location of Well 5 and access.</li> <li>• Will require amendments to Source Water vulnerable areas.</li> <li>• Potential for different water quality and quantity.</li> <li>• Well 5 can continue to operate while new well is being constructed.</li> <li>• New site may result in Source Water Policy impacts on adjacent properties.</li> </ul>	Recommended for future consideration and evaluation through an MCEA.
3. Reduce Water Demand	<ul style="list-style-type: none"> <li>• Methods could include: a water conservation program, increased water fees, and/or water metering.</li> <li>• Does not address concerns around the condition and location of Well 5.</li> </ul>	<p>This alternative is not recommended for further consideration as solution to the replacement of Well 5.</p> <p>The Township may wish to consider water reduction measures for other purposes such as conservation.</p>
4. Limit Community Growth	<ul style="list-style-type: none"> <li>• Limit community growth based on supply from Well 4, given the condition of Well 5.</li> <li>• Reduces redundancy in the system as the system would be limited to one supply well.</li> </ul>	This alternative is not recommended for further consideration as it will not resolve concerns related to Well 5.
5. Do Nothing	<ul style="list-style-type: none"> <li>• May be implemented if other alternatives are not feasible.</li> </ul>	Must be considered as part of the MCEA process.

Given the evaluation above, it is recommended that construction of a new well at a new site is evaluated further through a Schedule B MCEA process.

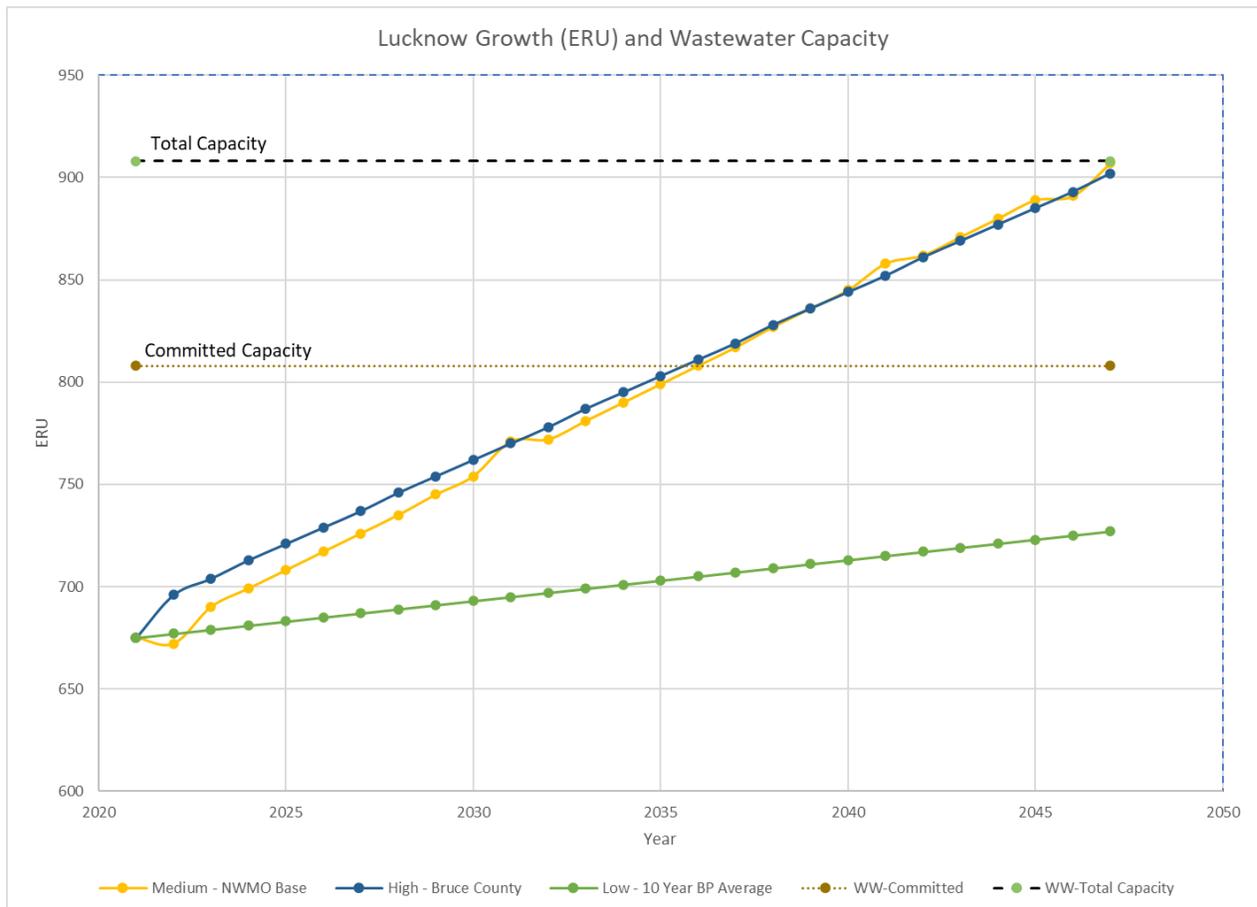
## 8.2 Wastewater Servicing

The existing Lucknow wastewater system is described in Section 5.2.

### 8.2.1 Existing and Future Wastewater Flows

Section 5.2 contains existing wastewater flow information for the community of Lucknow, and Section 5.7 contains reserve capacity analysis details including projected wastewater flows for development commitments. Figure 8.2 illustrates, in terms of ERUs, the current demand, committed capacity, and projected 25 years demands, compared to the rated capacity of the system. From the figure, it is shown that existing system capacity is adequate for the projected needs of the community; under the highest growth forecast the treatment plant would be at capacity in 2047.

**Figure 8.2 Forecasted Growth in Lucknow and Wastewater Treatment Capacity**



### **8.2.2 Collection System Capacity Review**

The historical design capacity of the existing sewer collection system was reviewed and compared to estimated current peak flows in the system. Sources of information include:

- Original sanitary design sheets (BMROSS file 72052).
- Maximum day flows for 2017 through 2021 and assumed maximum day factor of 2x average, and peak factor of 4x average.

It was also assumed that sanitary flows are relatively evenly distributed over the collection system.

The review of collection sewer capacity and existing flows did not suggest any locations where capacity is a concern. Similarly, with forecasted sewage flows for development lands added, there are no known locations where existing sewer capacity would be a constraint. However, it is noted that two sewers connect Wheeler and Ross Streets to Inglis Street, and it is suggested that the development area northwest of Montgomery Lane consider having sanitary flows directed to the existing sewer on Montgomery Lane (rather than Hamilton and/or Victoria Streets) in order to convey sewage to the southern of those connecting sewers and leave capacity in the northern connecting sewer for other future development area in the northwest part of the community.

For development area in the eastern part of the urban boundary, generally east of Washington Street, it is assumed that wastewater would be pumped via a new SPS and forcemain directly to the WWTP, as no sewers currently exist in that area.

### **8.2.3 Identified Issues and Opportunities**

The following issues and/or opportunities have been identified in relation to the Lucknow Wastewater System:

- It is forecasted that, under the highest growth forecast considered, the wastewater treatment plant will approach capacity around 2047. This is significantly distant in the future, such that it is our opinion there is no immediate need to commence with planning for a plant expansion. It is recommended that reserve capacity calculations be regularly updated, especially as development occurs. When a plant expansion is required, it is recommended that the Class EA to support that project be commenced at least 5 years prior to the forecasted need for additional capacity, because of the time required for the Class EA, design, approvals, and construction.
- Two sewer sections, one between Wheeler Street and Inglis Street and one between Ross Street and Inglis Street, have limited remaining capacity. Development north of Montgomery Lane should consider appropriate distribution of sewage flows.

#### **8.2.4 Alternative Solutions/Service Strategies**

For the Lucknow Wastewater System, there were no immediate problems or opportunities requiring an evaluation of alternative solutions identified through the Master Plan process.

## 9.0 RIPLEY SERVICING

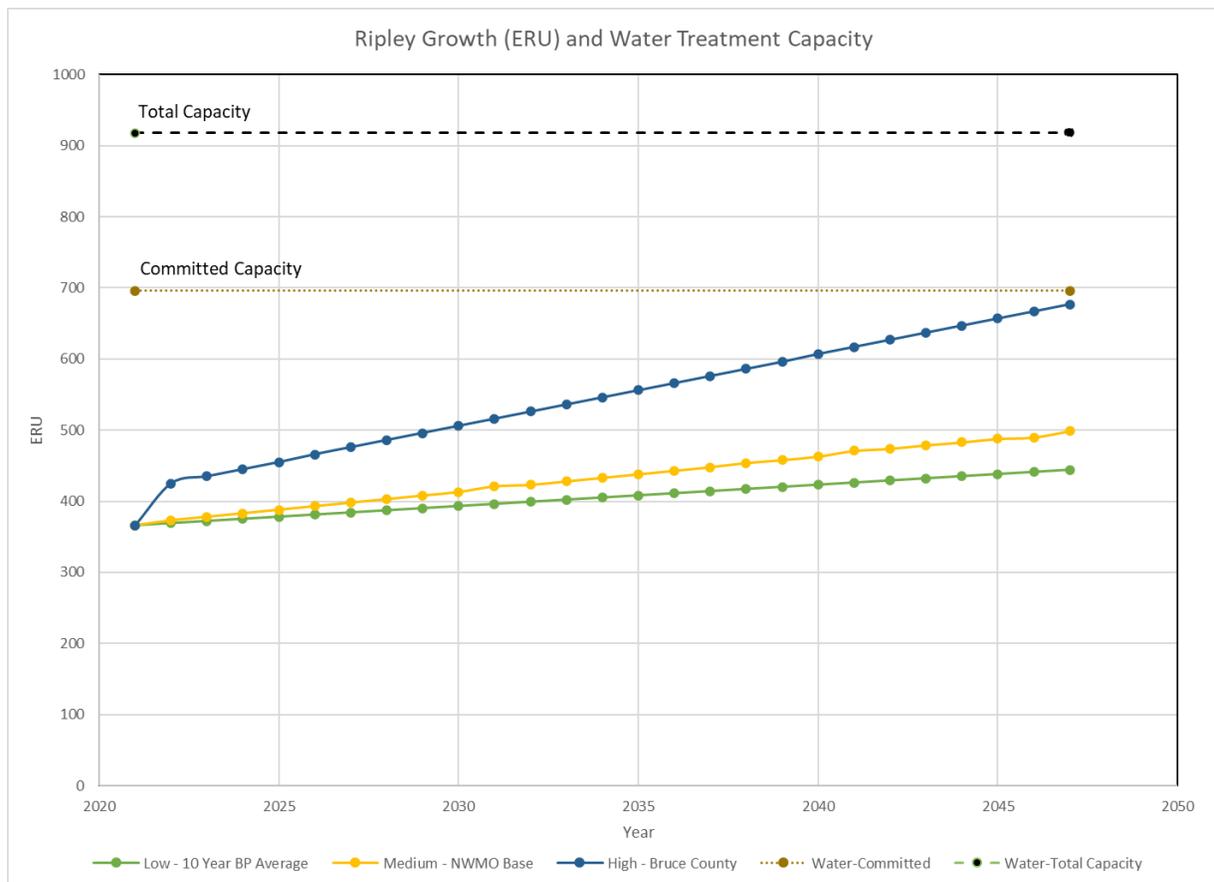
### 9.1 Water System

The existing Ripley water system is described in Section 5.3.

#### 9.1.1 Existing and Future Water Demands

Section 5.3 contains existing water demand information for the community of Ripley, and Section 5.7 contains reserve capacity analysis details including projected water demands for development commitments. Figure 9.1 illustrates, in terms of ERUs, the current demand, committed capacity, and projected 25 years demands, compared to the rated capacity of the system. From the figure, it is shown that existing system capacity is adequate for the projected needs of the community.

**Figure 9.1 Ripley Forecasted Growth and Water Treatment Capacity**



#### 9.1.2 Distribution System Modeling

The Ripley water distribution system was modelled using WaterCAD® software. In general, the model was created using:

- Existing GIS data for watermain location and diameter.

- C-factors in accordance with MECP Design Guidelines for Drinking Water Systems – 2008.
- Pump and storage characteristics based on DWWP details and discussion with operational staff.

It is noted that five hydrant flow tests were conducted as part of another project and field data compared to model results. Based on this comparison, the model provides a conservative analysis (e.g., may underestimate actual capacity of the system).

The primary scenarios of interest in modelling are the same as described for Lucknow in Section 8.1.2.

Under peak demand conditions, modelling results indicate that there are no areas with pressure below target values within the current service area. Development lands within the southern and southwestern part of the urban boundary will need to ensure adequately sized mains and/or looping to ensure adequate pressure at peak demands.

Under maximum day plus fire flow conditions, no existing hydrant locations would be considered Class C/red, based on modelling results. Refer to Appendix B for results for the entire existing system. It is noted that industrial developments commonly have fire flow requirements greater than the minimum threshold for a Class AA/blue hydrant; in Ripley, the industrial lands at the eastern part of the community have lower available fire flows.

### **9.1.3 Identified Issues and Opportunities**

There is sufficient treatment and storage capacity in the Ripley Water System to accommodate the forecasted growth. With respect to the distribution system, the following issues/opportunities were identified:

- Available fire flow is limited in the Industrial Park. The limitation is generally a result of the size of watermain connected to the Industrial Park lands.
- Potential development areas in the southern portion of Ripley will need to ensure adequately sized and/or looped watermains.

It is noted that the Township does not currently mandate the use of water meters on service connections. Based on our experience, many municipalities in southwestern Ontario do require meters be installed. Water meters are useful for tracking actual water consumption for the purposes of comparison to total treated water production; significant differences between the two values can be an indicator of water loss through leaks, improper connections, missing meters, etc. whereas closely matching values indicate low level of lost water. Metered water usage can also be useful in analyzing community wastewater flows for the purposes of estimating true sewage values vs. infiltration-inflow. Water meters are also perceived to be beneficial for the purpose of encouraging water conservation; the general idea is that if users must pay for actual usage, they will

be encouraged to reduce usage where possible. System-wide reductions in per capita water usage can delay the need for system supply capacity increases and even reduce the recommended storage volume for a community. In our experience, it is likely that metering will result in decreased water usage, at least initially. The level of reduction will generally be impacted by the volumetric water charge.

#### 9.1.4 Alternative Solutions/Service Strategies

For the Ripley Water System, the technical evaluation identified limited fire flows to the Industrial Park. Table 9.1 summarizes the alternative solutions with respect to the limited fire flows.

**Table 9.1 Alternatives Evaluated for Limited Fire Flows – Ripley Industrial Park**

Alternative	Evaluation	Recommendation
1. Replace existing watermain	<ul style="list-style-type: none"> <li>• The watermain supplying the industrial park was recently installed.</li> <li>• Other alternatives could address limited fire flow in a more cost-effective manner.</li> <li>• Industrial Park is located at the eastern-most edge of the serviced area at a 'dead-end', so the impact of replacing the watermain may be limited.</li> </ul>	Not recommended at this time.
2. Limit development to 'dry' industries.	<ul style="list-style-type: none"> <li>• Industrial Park is zoned for light industrial uses.</li> <li>• Inform potential developers that wet industries (e.g., breweries, food production) cannot be accommodated in the Industrial Park.</li> </ul>	Recommend potential developers within the Industrial Park are made aware of the fire flow limitations.
3. Encourage on-site storage and fire pumps	<ul style="list-style-type: none"> <li>• On-site water storage and installation of on-site fire pumps may be used for developments requiring additional fire flows.</li> <li>• Costs are borne by the developer.</li> <li>• Pumps and storage can be sized specifically for the development/use.</li> </ul>	Recommend this alternative for consideration by developers.

At this time, the recommended alternative solutions to addressing the limited fire flows to the Ripley Industrial Park are limiting development to dry-type industries or use of on-site water storage and fire pumps if required. These solutions can be implemented on a site-by-site basis specific to identified needs. These are considered more cost-effective measures than replacement of the existing watermain.

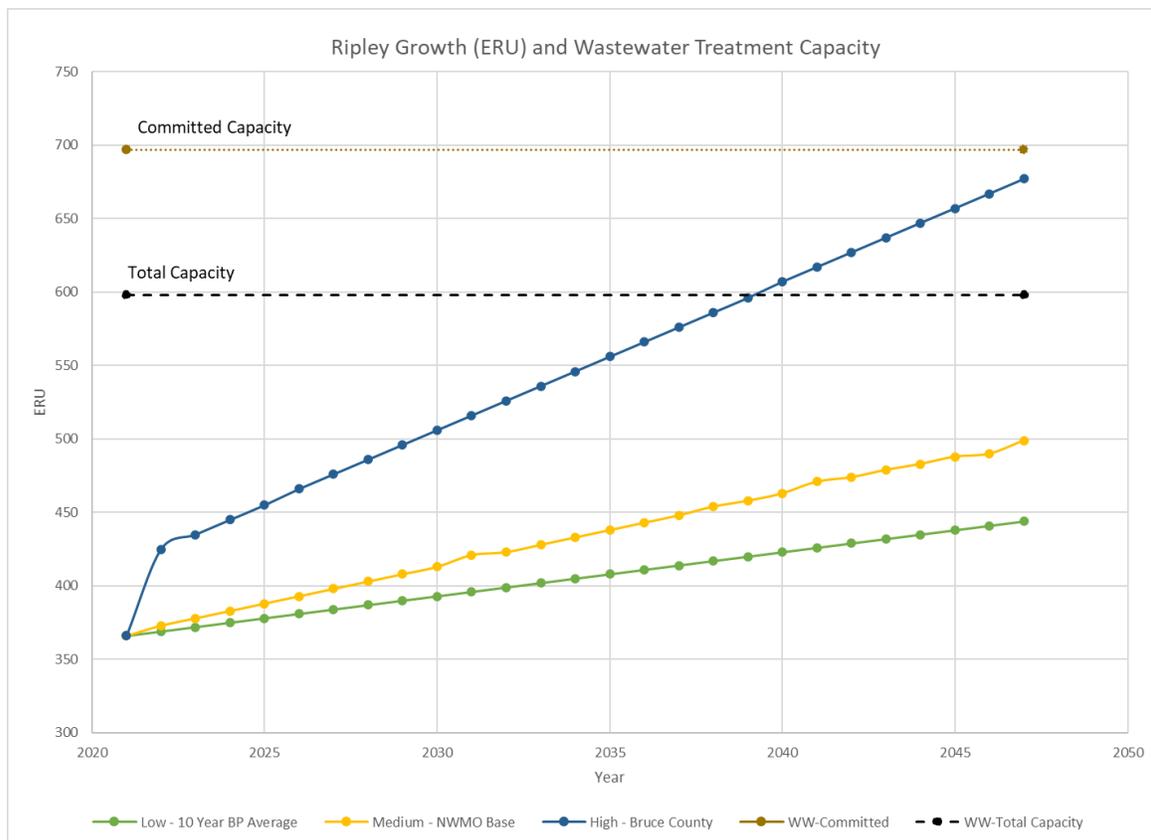
## 9.2 Wastewater Servicing

The existing Ripley wastewater system is described in Section 5.4.

### 9.2.1 Existing and Future Wastewater Demands

Section 5.4 contains existing wastewater flow information for the community of Ripley, and Section 5.7 contains reserve capacity analysis details including projected wastewater flows for development commitments. Figure 9.2 illustrates, in terms of ERUs, the current demand, committed capacity, and projected 25 years demands, compared to the rated capacity of the system. From the figure, it is shown that the existing system is theoretically over-committed and on that basis, there is a deficit in reserve capacity. However, current plant usage is only approximately 61% of plant capacity, and based on the highest growth forecast, sewage flows are not anticipated to reach plant capacity until approximately 2038.

**Figure 9.2 Ripley Forecasted Growth and Wastewater Treatment Capacity**



### **9.2.2 Collection System Capacity Review**

The historical design capacity of the existing sewer collection system was reviewed and compared to estimated current peak flows in the system. Sources of information include:

- Original sanitary design sheets (BMROSS file 82089).
- Maximum day flows for 2017 through 2021 and assumed maximum day factor of 2x average, and peak factor of 4x average.

It was also assumed that sanitary flows are relatively evenly distributed over the collection system.

The review of collection sewer capacity and existing flows did not suggest any locations where capacity is a concern. Similarly, with forecasted sewage flows for development lands added, there are no known locations where existing sewer capacity would be a constraint.

It is noted that a portion of development lands at the north end of the urban boundary will require an SPS for servicing, due to topographical constraints.

### **9.2.3 Identified Issues and Opportunities**

The following issues and/or opportunities have been identified in relation to the Ripley Wastewater System:

- The WWTP is theoretically overcommitted. It is recommended that the Township consider implementation of an allocation policy that would help prevent maintaining long-term commitments to development that is stagnant.
- It is forecasted that, under the highest growth forecast considered, the wastewater treatment plant will approach capacity around 2038. This is significantly distant in the future, such that it is our opinion there is no immediate need to commence with planning for a plant expansion. It is recommended that reserve capacity calculations be regularly updated, especially as development occurs. When a plant expansion is required, it is recommended that the MCEA to support that project be commenced at least 5 years prior to the forecasted need for additional capacity, because of the time required for the MCEA, design, approvals, and construction.

### **9.2.4 Alternative Solutions/Service Strategies**

The evaluation of the Ripley Wastewater System identified the treatment capacity of the system is theoretically overcommitted. The appropriate means of addressing this is establishment of an allocation policy that will establish how wastewater treatment capacity is committed.

Development of an allocation policy can support future infrastructure planning as it provides a mechanism for prioritizing areas for development (e.g., based on what infrastructure is in place and what is planned), or a process for establishing a queue

where capacity is limited. An allocation policy should outline a transparent process for how and when capacity is allocated and the conditions and timelines that must be met. Allocation policies often require developers to submit a separate application for capacity in conjunction with their development proposal.

Many allocation policies currently in place are based on a 'use it or lose it' approach, where if a development does not proceed within the agreed upon timelines, their capacity allocation is revoked and reallocated. Development of a policy should consider if extensions will be allowed and what the process for an extension request is. The policy should also outline the conditions when capacity will be revoked or reallocated if the developer does not meet the specified timelines for proceeding with construction.

Most policies currently in place do not guarantee capacity for the entirety of multi-phase developments that may take place over many years. For developments planned over long time frames, developers should be aware that as part of the draft plan approval process for multi-phase projects, capacity may be allocated individually for phases and capacity for an initial phase is not a guarantee of the provision of capacity for additional phases. For any multi-phase project, it is recommended that developers be required to submit individual allocation applications for each phase.

There are a number of best practices that should be considered or included when establishing a policy directing the allocation of water and wastewater capacity. The goal of any allocation policy should be to establish a process for the allocating capacity in a sustainable and logical manner. When developing a capacity allocation policy, the following should be considered:

**Who the policies apply to:**

- Consider what types of development should require a capacity allocation (or be required to apply for a capacity allocation). If capacity is very limited it may be prudent to require a capacity allocation for all types of development and building applications.
- Generally, most municipalities have allocation policies that apply to Plans of Subdivision/Condominium, Site Plan applications, Zoning By-law Amendments (including removal of a holding provision), and consent applications. The policy should also specify that an allocation may be revisited if an application is revised.
- Intensification proposals for existing properties should be evaluated for capacity needs in a manner similar to a new Plan of Subdivision.
- Some municipalities, if their capacity calculations include an allowance for infill, exempt development applications that are less than a set number of units (e.g., 2-5 ERUs).
- If existing lots of record are identified within reserve capacity calculations as committed capacity, it may be appropriate to exempt these lots from requiring a capacity allocation.

- For pre-existing development proposals, most allocation policies include a grace period (often 1-3 years) for development to proceed. If the development does not proceed before the end of the grace period, the developer must reapply for a capacity allocation.

### **How capacity will be allocated:**

- Capacity should be allocated on a first-come, first-serve basis where there is sufficient capacity. Large multi-phase developments that may take place over many years (e.g., 10+ years) should not be granted capacity for the entirety of the project at the time of approval. Only the phases that will proceed immediately (within 1-3 years) should be granted capacity.
- Many municipalities allocate capacity through a resolution of Council. Where Council approves capacity allocations, public works, planning, and administration staff work together to assess the capacity request and prepare a report for Council.
- Developers should be required to submit a separate allocation application in conjunction with development applications. For multi-phase developments, an application should be required for each phase.
- Capacity may be conditionally allocated or reserved during the draft approval process for Plans of Subdivision. Final allocation is often confirmed upon registration of Plans.
- Where capacity is limited, some municipalities limit the amount of capacity allocated per year, either to a percentage of the uncommitted capacity (e.g., 25%) or a set number of ERUs. This can provide municipalities with some measure of control around the timelines for infrastructure expansions. Municipalities should consider if such an approach would be appropriate for their allocation policy.
- Establish an expiry period for allocations if not utilized, such that unused capacity is revoked or reallocated. Typically for Plans of Subdivision/Condominium if the Plan is not registered and executed within 1 to 3 years, the capacity is revoked. For site plans, consents, and zoning amendments, if the plan/development is not registered/does not proceed within 1 to 5 years, the allocation is revoked.
- Establish a process to allow for renewal of a capacity allocation. Often capacity may be renewed for up to 1 year. Generally, the process involves a written request submitted to the municipality within a set time prior to the expiry of the allocation.
- Where development is proposed over long-term phases, municipalities may wish to consider policies allowing capacity to be retained if the developer pays the base water and/or wastewater monthly charges for the number of proposed units associated with the capacity allocation.
- For non-residential development proposals, allocation requirements (in ERUs) should be addressed on a case-by-case basis and not be based on zoning designations. This is because potential water and/or wastewater needs can vary significantly between similarly zoned uses.

- Identify when capacity is considered committed and establish this in the policy.
- Require written consent for the transfer of capacity allocations associated with property sales.
- It is recommended that any allocation policy disallow developers/property owners transferring a capacity allocation from one property to another.

Associated with the development of a policy for allocating capacity, municipalities should consider establishing criteria for prioritizing allocations. Establishing criteria provides Council, staff, and developers with clear direction on how allocation applications will be evaluated and prioritized when capacity is limited or there are competing applications. Such a policy can also be used to establish a queue if additional capacity is needed. Municipalities may also wish to establish a ranking or rating system for instances when multiple applications are received, and capacity is limited.

In municipalities with capacity allocations policies and associated prioritization criteria, these policies are often developed by staff and adopted through a motion of Council. The policies are public and are often included with development-related applications or resources.

Outside of evaluating and ranking capacity allocations, a prioritization framework can support the efficient use of existing infrastructure. Leapfrogging, or allowing development to occur beyond the current serviced area and leaving vacant lands in between, should be discouraged through any allocation prioritization policy.

## 10.0 LAKESHORE SERVICING

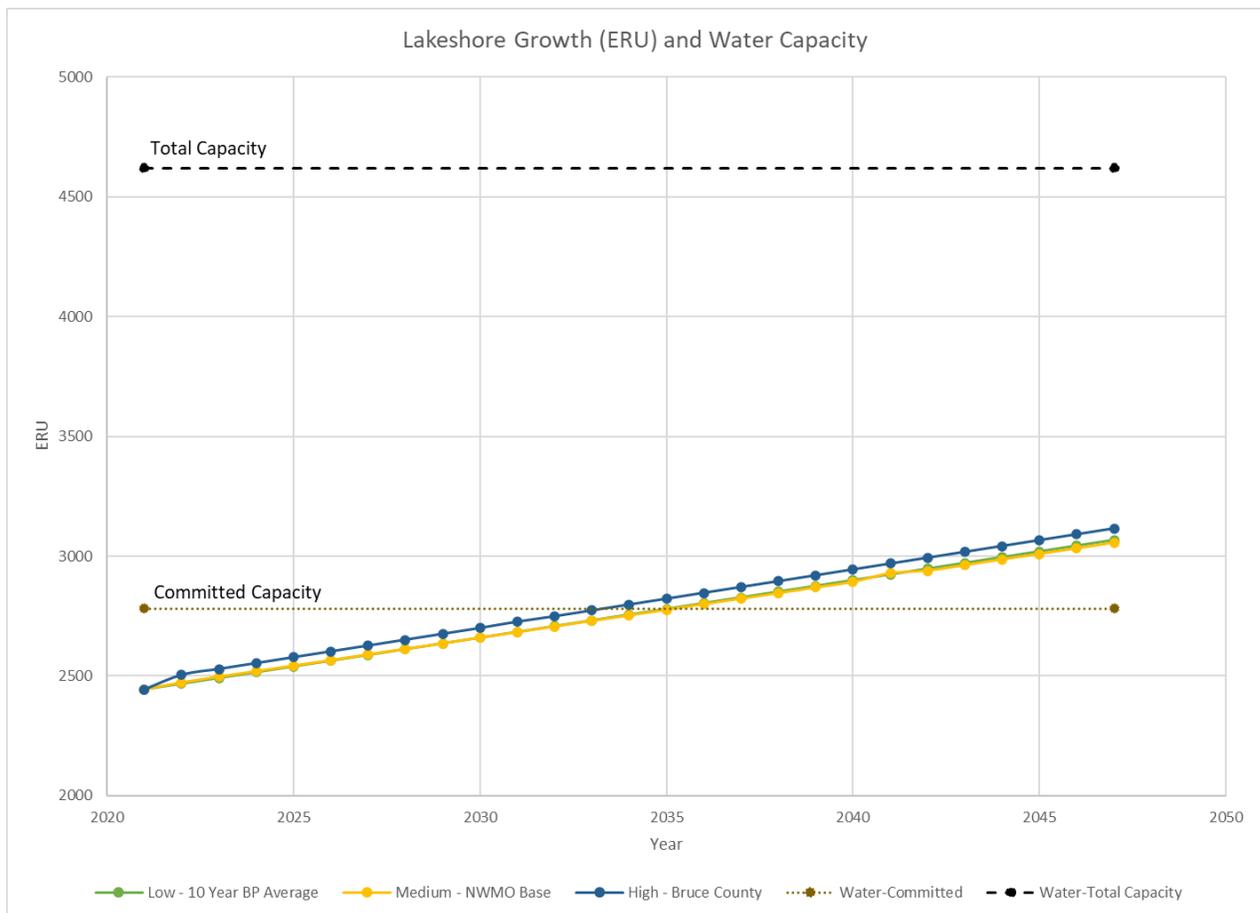
### 10.1 Water System

The existing Lakeshore water system is described in Section 5.5.

#### 10.1.1 Existing and Future Demands

Section 5.5 contains existing water demand information for the Lakeshore areas, and Section 5.7 contains reserve capacity analysis details including projected water demands for development commitments. Figure 10.1 illustrates, in terms of ERUs, the current demand, committed capacity, and projected 25 years demands, compared to the rated capacity of the system. From the figure, it is shown that existing system capacity is adequate for the projected needs of the Lakeshore area.

**Figure 10.1 Lakeshore Forecasted Growth and Water Capacity**



#### 10.1.2 Water Distribution System Modeling

The Lakeshore water distribution system was modelled using WaterCAD® software. In general, the model was created using:

- Existing GIS data for watermain location and diameter.

- C-factors in accordance with MECP Design Guidelines for Drinking Water Systems – 2008.
- Pump and storage characteristics based on DWWP details and discussion with operational staff.

It is noted that six hydrant flow tests were conducted as part of another project and field data compared to model results. Based on this comparison, the model provides a conservative analysis (e.g., may underestimate actual capacity of the system). It is also noted that the Lakeshore North and South systems were modelled independently, limiting the opportunity for flow from North to South or vice-versa in periods of high demand; this is the normal operation (i.e., isolation of the pressure zones) unless there is an emergency situation.

The primary scenarios of interest in modelling are the same as described for Lucknow in Section 8.1.2.

Under peak demand conditions, modelling results indicate that the southeasternmost part of the system, along County Road 6, will have pressures below the target minimum value of 275 kPa. This is primarily a function of topography (i.e., elevation increasing to the east) and the relatively long dead-end watermain exacerbates the issue. Development lands within the existing Lakeshore system boundary may be serviced without any projected pressure issues, but moving to the east (i.e., generally east of Lake Range Drive) results in elevation increase and pressure decrease. It is noted that some customer locations are expected to have pressures in excess of 700 kPa, which is the maximum recommended pressure per MECP Design Guidelines.

Under maximum day plus fire flow conditions, a limited number of existing hydrant locations would be considered Class C/red, based on modelling results. Refer to Appendix B for results for the entire existing system. These locations are generally at the end of dead-end watermains, and remote from sources of supply.

### **10.1.3 Identified Issues and Opportunities**

The following issues and/or opportunities have been identified for the Lakeshore Water System:

- Based on formulae contained in MECP Design Guidelines for Drinking Water Systems – 2008, the existing standpipe does not provide the recommended stored water volume for the existing service population. Slightly more than 4,000 m<sup>3</sup> storage volume is recommended for the existing service population, and slightly more than 4,400 m<sup>3</sup> for existing population plus development forecasts.
- Generally, there are no significant issues related to the distribution system. A limited number of locations are expected to have pressures below minimum recommended MECP Guideline values, and a limited number of hydrants on dead-end watermain, remote from sources of supply, would be considered Class C/red.

These low pressure and low fire flow areas are generally a result of high elevation and/or location at the end of dead-end watermains.

#### 10.1.4 Alternative Solutions/Service Strategies

The evaluation of the Lakeshore Water System identified a need for additional storage. There are a number of alternative solutions to address the identified need. The alternatives are summarized and evaluated in Table 10.1.

**Table 10.1 Alternatives Evaluated for Additional Water Storage – Lakeshore**

<b>Alternative</b>	<b>Evaluation</b>	<b>Recommendation</b>
1. Increase storage at existing storage facility	<ul style="list-style-type: none"> <li>Existing storage facility is a standpipe. Existing facility is approximately 30 years old.</li> <li>Existing facility cannot be expanded as is.</li> <li>Additional booster pumps at the standpipe will make additional volume available but there is not sufficient volume to meet the required storage amount.</li> </ul>	Not recommended at this time.
2. New storage facility	<ul style="list-style-type: none"> <li>A new storage facility can be sized to meet the existing and future storage needs.</li> <li>Can be sited to provide additional redundancy in the systems (i.e., in the north pressure zone).</li> <li>Will be an additional asset to maintain and operate.</li> </ul>	Recommended for future consideration through a MCEA process.
3. Limit Community Growth	<ul style="list-style-type: none"> <li>Does not address existing storage deficiency.</li> </ul>	Not recommended as it does not address the identified deficiency.
4. Do Nothing	<ul style="list-style-type: none"> <li>May be implemented if other alternatives are not feasible.</li> </ul>	Must be considered as part of the MCEA process.

From the above analysis, it is recommended that a new storage facility be considered for the Lakeshore Water System. A new storage facility will require a Schedule B MCEA.

## 10.2 Wastewater Servicing

There are two methods of wastewater servicing currently utilized in the Lakeshore area of the Township. Huronville, Inverlyn Lake, and the northern portion of Boiler Beach Roads have municipal sewage service from the Municipality of Kincardine. The remainder and majority of the Lakeshore area is serviced by private, individual services (septic systems). There are approximately 2,380 properties in this area serviced by a septic system.

Presently, the Township has a mandatory septic inspection program in place. Through this program, every septic system is inspected on an 8-year cycle. Properties within a WHPA-A are inspected on a 5-year cycle, as specified in the Building Code Act.

### 10.2.1 Identified Issues and Opportunities

The Lakeshore settlement area has experienced the greatest amount of growth in the Township over the last 20 years. Over the next 25 years, it is forecasted that growth in this area will continue (see Section 7.2) and that additional lands will be required to accommodate the forecasted growth (see Section 7.3.3).

The PPS does not permit partial services within settlement areas unless needed to address failed on-site sewage services and for infilling and minor rounding out. Given this, it is unlikely that additional individual private sewage services will be permitted within an expanded Lakeshore settlement area. A wastewater servicing strategy is required for the Lakeshore area.

### 10.2.2 Alternative Solutions/Servicing Strategies

Four alternative solutions were identified for a servicing strategy for the Lakeshore area. These alternatives are summarized below:

- 1. Status Quo (Do Nothing)** – This alternative would see the continued use of individual private septic systems to service residential growth within the Lakeshore settlement area. This option represents the ‘Do Nothing’ alternative that is always considered as part of the MCEA process.
- 2. Extend Services from Kincardine** – This strategy involves extending municipal sewage collection infrastructure from Kincardine and utilizing treatment capacity at the Kincardine Wastewater Treatment Plant (WWTP). It is not considered feasible that the entire Lakeshore settlement area would be serviced given the potential capacity demands and capacity of the Kincardine WWTP. This alternative considers an expanded settlement area being serviced by Kincardine.
- 3. Construct a Municipal Sewage System** – A new, conventional municipal WWTP and collection system could be constructed to service all or part of the Lakeshore settlement area. This system would be municipally owned and operated.

- 4. Decentralized/Communal Sewage Services** – Under this alternative, the existing Lakeshore area would continue to utilize private septic systems and an expanded settlement area would be serviced by a communal or decentralized sewage system. It is anticipated the communal or decentralized sewage system would be privately-owned and operated.

Communal or Decentralized Wastewater Treatment Plants (DWTP) are typically smaller treatment facilities that serve semi-urban, rural, and remote areas. Most commonly, these facilities are found where centralized treatment plants are not feasible for technical, economic, environmental, or political reasons (United States Environmental Protection Agency, 2005). DWTP is a broad term that can include on-site septic systems, communal septic systems, cluster systems, and package plants; however, for the purposes of this report, DWTP refers to communal, package plant type systems. Generally, these systems treat smaller volumes of wastewater than centralized systems and treatment occurs close to the source. Treated effluent may be released as part of a subsurface treatment process or discharged to surface water. These systems can provide enhanced treatment over private, on-site septic systems and provide treatment comparable to centralized treatment plants.

The Environmental Commissioner of Ontario (ECO) has recently examined decentralized wastewater management. The ECO identified that DWTP have lower capital and operating costs and use less energy relative to centralized sewage treatment facilities (Environmental Commissioner of Ontario, 2018). Use of a DWTP also has the potential to reduce environmental impacts associated with individual on-site septic systems by moving away from these types of systems to more enhanced treatment. However, the ECO notes that the level of treatment may not be equivalent as a more traditional, centralized treatment facility and these types of facilities produce more methane from anaerobic treatment processes (Environmental Commissioner of Ontario, 2018).

The use of DWTP requires careful consideration and evaluation of goals for growth, development, and resource protection from a community perspective, as the technical treatment options may impact these goals. Management of a DWTP, as noted in the EPA handbook, requires consideration of administration, construction, operation, and compliance responsibilities. With this in mind, the ECO has noted that “Ontario is ripe for a policy discussion on the relative merits, appropriate uses, implications and barriers of using decentralized wastewater treatment systems”, including how to facilitate the approval process, ownership, and on-going maintenance (Environmental Commissioner of Ontario, 2018).

### **10.2.3 Evaluation of Alternatives/Service Strategies**

Following the identification of potential wastewater servicing strategies for the Lakeshore area, the alternative solutions were evaluated based on technical, social, natural environment and economic perspectives. Table 10.2 summarizes the evaluation of the alternatives.

**Table 10.2 Evaluation of Alternative Solutions – Lakeshore Wastewater Servicing**

<b>Alternative</b>	<b>Technical</b>	<b>Social</b>	<b>Natural Environment</b>	<b>Economic</b>
1 – Status Quo	<ul style="list-style-type: none"> <li>• May see more advanced treatment unit type septic systems.</li> <li>• Septic inspection program should continue to monitor functioning of systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Limits future population and dwelling growth.</li> <li>• Larger lot sizes required to accommodate septic systems.</li> <li>• Limits housing type to single family detached units.</li> </ul>	<ul style="list-style-type: none"> <li>• Limiting future development to existing settlement area may result in development pressures on natural areas.</li> <li>• Larger lot sizes required to accommodate septic systems may result in increased disturbance of natural areas.</li> <li>• Inspection program for septic systems is a mitigation measure against poorly functioning systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Limits potential for future residential growth within the Lakeshore area which may impact economic growth.</li> <li>• No capital costs for the Township associated with this alternative.</li> </ul>
2 – Service from Kincardine	<ul style="list-style-type: none"> <li>• Unlikely Kincardine has capacity or desire to service entire settlement area.</li> <li>• Kincardine has its own capacity demands/needs.</li> <li>• May require pumping station(s) depending on how far sewage collection infrastructure is extended.</li> <li>• Additional infrastructure for the Township to maintain</li> </ul>	<ul style="list-style-type: none"> <li>• Would allow for an expanded settlement area and continued residential growth.</li> <li>• Potential for smaller lots, increased density in serviced area.</li> <li>• May allow for a greater range and mix of housing types.</li> <li>• Residents serviced with sewers may pay a premium for the service.</li> </ul>	<ul style="list-style-type: none"> <li>• Anticipate that majority of collection system would be installed within existing road allowances.</li> </ul>	<ul style="list-style-type: none"> <li>• Will allow for an expanded settlement area and continued residential growth.</li> <li>• Residents may be billed at a premium rate for the service.</li> <li>• Township may be asked to contribute to capital costs for maintenance at the Kincardine WWTP.</li> <li>• Costs associated with installation of collection system infrastructure may be collected through development charges.</li> </ul>

Alternative	Technical	Social	Natural Environment	Economic
3 – New Sewage System	<ul style="list-style-type: none"> <li>• Will require a Schedule C EA for a new WWTP.</li> <li>• May be a challenge to site a new WWTP given existing residences, farm operations and few receiving streams.</li> <li>• Collection system would be extensive and technically complex given the long, narrow configuration of the settlement area and topography (20+ m change along the entire area). Would likely require numerous pumping stations.</li> <li>• High level of treatment may be required due to low flows in receiving streams.</li> </ul>	<ul style="list-style-type: none"> <li>• If existing areas are serviced, residents would need to decommission septic systems and potentially change interior plumbing.</li> <li>• Extensive disturbance during construction of sewage collection system.</li> <li>• High cost to connect.</li> <li>• Would allow for a greater range and mix of housing.</li> <li>• Would support increased population and dwelling growth.</li> <li>• May be a perception of decreased water quality at beaches adjacent to outflow location.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for impacts during construction of collection system and WWTP.</li> <li>• Bypass and overflow events could impact receiving stream.</li> </ul>	<ul style="list-style-type: none"> <li>• Has the greatest capital costs.</li> <li>• Additional maintenance and operation costs for the Township.</li> <li>• Would allow for expanded settlement area and continued residential growth.</li> <li>• Adds additional assets that will require eventual replacement.</li> <li>• It may be cost prohibitive to construct a full WWTP for only the expanded settlement area.</li> </ul>

Alternative	Technical	Social	Natural Environment	Economic
<p>4 – Decentralized/ Communal Services</p>	<ul style="list-style-type: none"> <li>• Existing settlement area will continue to be serviced by septic systems and the expanded service area will be serviced by a communal/decentralized servicing.</li> <li>• Schedule C Class EA will be required for communal system.</li> <li>• Communal system can be sized and designed for need and specific site conditions.</li> <li>• Modular system could accommodate future growth.</li> <li>• Septic inspection program should continue to monitor function of septic systems in current settlement area.</li> <li>• Municipal Responsibility Agreement will be required to address potential of owner default or operational concerns.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal impact to existing residents.</li> <li>• Would allow for population and dwelling growth.</li> <li>• Would allow for an increase range and mix of housing in the expanded settlement area.</li> <li>• Allows for smaller lot sizes in area serviced by communal system.</li> <li>• Costs associated with communal system would be borne by users.</li> </ul>	<ul style="list-style-type: none"> <li>• Less disturbance compared to Alternative 3, given the smaller footprint.</li> <li>• Monitoring program could ensure system is operating at quality standard specified.</li> <li>• Continued septic inspection program would mitigate against poorly functioning systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Capital costs associated with construction of communal system will be less than a conventional WWTP.</li> <li>• Operational costs will be borne by benefiting properties.</li> <li>• Municipal Responsibility Agreement would establish security or credit required.</li> <li>• In event of default, Township may be required to assume ownership.</li> <li>• Will allow for expanded settlement area and continued residential growth.</li> <li>• Operation may be responsibility of developer/private group or Township.</li> </ul>

#### **10.2.4 Preferred Wastewater Servicing Strategies**

Over the next 25 years, it is expected there will be continued demand for residential growth in the Lakeshore that will exceed the land available within the current settlement area. Under current provincial policy, it appears unlikely that an expanded settlement area would be permitted with private individual wastewater servicing. Given this, Alternative 4 – Communal and Private Servicing is considered the preferred servicing strategy. Through this strategy, infilling within the existing settlement area would continue utilizing private septic systems and a future expansion area would be serviced through a communal or decentralized wastewater treatment system. Within the existing settlement area, the current septic inspection program should continue to demonstrate the absence of long-term issues and active management of the over two thousand septic systems along the lakeshore.

With respect to an expanded settlement area, a communal wastewater treatment system is the preferred servicing strategy. The type, size and location of the system will be dependent on the proposed development associated with the expanded settlement area. A Schedule C MCEA will be required prior to implementation. That MCEA process will evaluate technologies, the structure and scale of the system, as well as local impacts. At that time, consideration will need to be given to long-term management of the system, including ownership, financing, operations, and maintenance. It is anticipated that the Township will be required to enter into a Municipal Responsibility Agreement. This agreement should specify terms for securities required, operation and maintenance requirements and actions in the event of the owner of the system defaulting. It should also identify the long-term plans for ownership and operation (i.e., if the system is transferred to the Township or utilizes an alternative governance model).

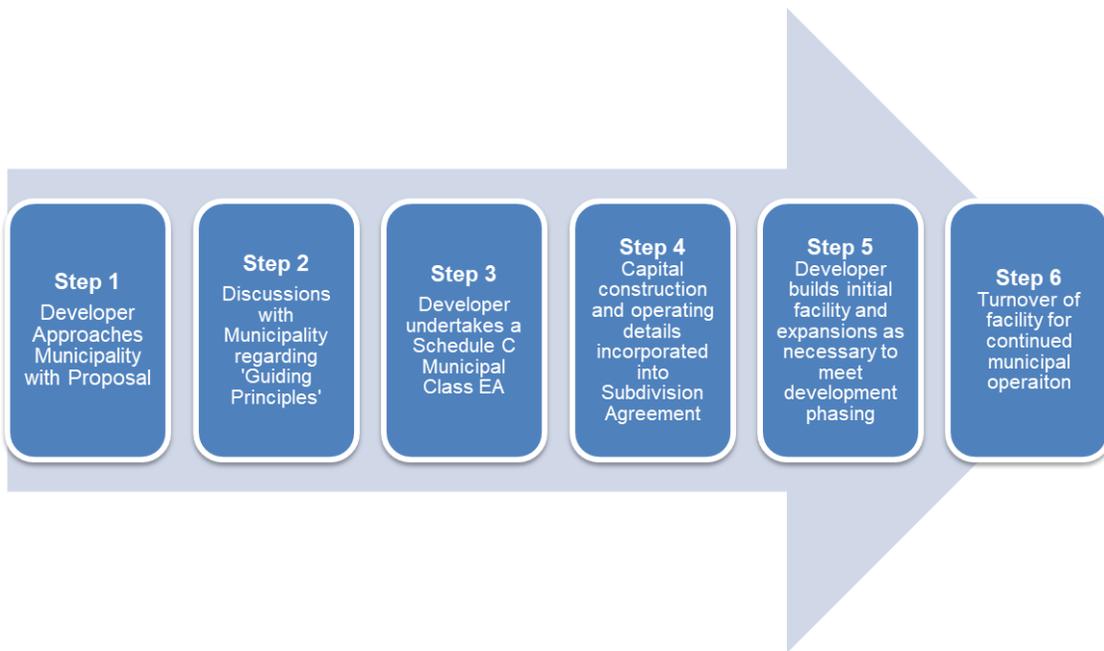
### **10.3 Considerations for Implementing a Communal Wastewater Treatment Plant**

#### **10.3.1 Mechanics of Implementation**

##### **Step 1 – Development Proposal**

A developer approaches the Township with a proposal to develop land within the Lakeshore area (see Figure 10.2). The specific location of a DWTP will not be known until it is proposed, as the Township is not driving the process. That is, there is no over-arching plan for a series of DWTPs evenly spaced throughout the Lakeshore. The development will depend on free market principles guiding development rather than government directed planning. This exception to this is a municipal proposal to develop a DWTP to respond to serious private system failures. Generally, the proposed location of a DWTP will be developer driven.

**Figure 10.2 Implementation Steps**



### **Step 2 – Discussions regarding ‘Guiding Principles’**

It is recommended that the Township develop a set of Guiding Principles for a DWTP. There are a variety of facility types and processes, and the Township may wish to pre-qualify which type(s) are acceptable. It may be technically desirable to use the same type of facility in every instance for the ease of operation and training. This may not be feasible though, based on the physical characteristics of an area which may preclude a surface or subsurface option and limit the types of facilities that are appropriate. Another item that should be incorporated into a set of guiding principles is the minimum development size to warrant consideration of this servicing option. While the use of a DWTP as a treatment solution anticipates that a number of these could be constructed across the length of the Lakeshore area, it is in the Township’s best interest to not allow an infinite number to be built. This would lead to operational capacity issues in the future. Different types of DWTP will support different levels of development, but the Township should set some minimum/maximum sizes for operational purposes. Finally, the developer should be prepared to present a financial breakdown for their proposal which considers the capital costs involved and the estimated operating costs into the future. This will allow the Township to evaluate the feasibility of the proposal and ability of the development to be self-sustainable.

### **Step 3 – Municipal Class Environmental Assessment**

Under the Municipal Class EA process, private sector developers proposing a Schedule C type project, servicing a residential development – such as construction of a new wastewater treatment facility, must complete the Schedule C EA process. Therefore, any proposal involving a new DWTP must undergo the Class EA process. The Township has

an opportunity to participate as a co-proponent with the developer. In such a case, the respective roles within the process will need to be defined. Regardless, the Township needs to be involved in the Class EA process, as they may ultimately take over responsibility for the facility.

#### **Step 4 – Capital Construction and Operating Details**

The capital construction details, cost allocations and responsibilities would be embedded into an approved Subdivision Agreement with the Township. Infrastructure facilities are often transferred to a municipality after a two-year performance/warranty period. This will be insufficient for the type and scale of this facility. In the case of the DWTP, it will be important for the Township to define when and under what circumstances they would obtain ownership and operational responsibility for a facility.

Traditionally the operating costs of a sewage system are carried by the users of the system and collected through rate charges. In the instance of a new subdivision, the uptake of building lots and construction of homes will be random and unpredictable. It will be important for the Township to have guarantees built into any Agreement to cover their operating costs after transfer of responsibility occurs. This may be accomplished through a guarantee from the developer or by an annual levy on the unoccupied lots towards the facility operation. This is a non-conventional approach but may be allowed under the Municipal Act.

#### **Step 5 – Facility Construction and Phasing**

One of the benefits of a small DWTP is the ability to expand the initial facility in phases to meet the phasing plans/demands for a subdivision. This needs to be well defined in a Subdivision Agreement as to who pays the capital costs for any expansion and when. There should be some consideration in the process given to the provision of services to nearby existing development, such as building in extra capacity and what the capital contribution to the facility will be.

#### **Step 6 – Ownership Assumption**

It is anticipated that the DWTP will become a municipal facility at some point in the future. The trigger for this turnover should be set out in the Development Agreement. The trigger could be a percent buildout of lots, or after a certain phase of the facility is constructed. What is important for the Township is to ensure that adequate financial safeguards are in place with respect to operating the facility and replacing components as they age. This type of smaller facility with different technology than the current municipal facilities may have cost concerns and non-standard maintenance demands and requirements. It is important that the Township safeguard itself as much as possible.

### **10.3.2 Review of Risk**

The previous section discussed the mechanics of implementing a DWTP. A number of considerations were presented to assist the Township in developing guiding principles to

allow for the construction of DWTPs in the Lakeshore area as an alternative to a municipally-driven, centralized system. The following table presents a risk review matrix to assist in these discussions.

**Table 10.3 – Lakeshore DWTP Servicing Risk Review Matrix**

<b>Critical Consideration</b>	<b>Risk</b>	<b>Cause of Risk</b>	<b>Mitigation for Risk</b>
Performance	Facility will not meet ECA objectives.	- Physical system is not adequate.	- Proof that system has worked at other locations with similar wastes. - Performance warranty from manufacturer.
Performance	Facility will not meet ECA objectives.	- Poor maintenance.	- Operators have familiarity with process. - There is an adequate O&M Budget. - Manufacturer is responsible for O&M.
Performance	Facility will not meet ECA objectives.	- Abnormal waste characteristics.	- Sewer use By-law is current. - Enforcement of Sewer Use By-law.
Performance	Facility will not meet ECA objectives.	- Excessive flows caused by Infiltration and Inflow.	- Careful observation of sewers and service connections prior to acceptance. - Monitoring of sewage quantity prior to acceptance. - Staged takeover of servicing.
Performance	By-passing occurs	- Excessive flows	- Careful observation of sewers and service connections prior to acceptance. - Monitoring of sewage quantity prior to acceptance. - Staged takeover of servicing.
Maintenance	Facilities are difficult to maintain.	- Lack of space for access.	- Consider this issue prior to agreeing to accept the type of system (e.g., site tours, research of other locations).
Maintenance	Facilities are difficult to maintain.	- Inadequate operator training.	- Operators must have the opportunity to be trained. - Proper O&M Manuals. - Manufacturer is responsible for O&M.
Maintenance	Inadequate funding for maintenance.	- Maintenance budget is underestimated.	- Consider this issue prior to agreeing to accept the type of system (e.g., site tours, research of other locations). - Ensure there is a proper warranty.

<b>Critical Consideration</b>	<b>Risk</b>	<b>Cause of Risk</b>	<b>Mitigation for Risk</b>
Maintenance	Inadequate funding for maintenance.	- Too few users to allocate costs to.	- Allocate operating costs to every serviced lot. - Developer retains until threshold no. of users is reached.
Maintenance	Inadequate funding for maintenance.	- Maintenance effort is too great.	- Consider this issue prior to agreeing to accept the type of system (e.g., site tours, research of other locations).
Maintenance	Sourcing parts is difficult.	- Non-standard equipment is used.	- Consider this issue prior to agreeing to accept the type of system (e.g., site tours, research of other locations).
Operating Costs	Costs per user are excessive.	- Labour effort is too great.	- Refer to Maintenance items.
Operating Costs	Costs per user are excessive.	- Too few users.	- Allocate operating costs to every serviced lot. - Developer retains ownership until threshold no. of users is reached.
Operating Costs	Costs per user are excessive.	- Cost exceeds budget.	- Consider this issue prior to agreeing to accept the type of system (e.g., site tours, research of other locations). - Consider benefit of subsidizing from all users vs. advantages of having a stand-alone rate.
Operating Costs	Costs per user are excessive.	- Energy costs are excessive.	- Ensure energy management is part of the design. - Consider this issue prior to agreeing to accept the type of system (e.g., site tours, research of other locations).
Operating Costs	Costs per user are excessive.	- Equipment needs to be replaced.	- Incorporate life-cycle costing into rate structure. - Co-ordinate replacement with staged expansions.

**10.3.3 Policy Recommendations**

From this preliminary, broad review of wastewater servicing in the Lakeshore area, DWTP is a feasible servicing solution within this area of Huron-Kinloss. The use of DWTP for sewage servicing would be a shift from the traditional approach of centralized systems through large, municipally-driven capital works projects. The use of DWTP is an alternative servicing strategy that reduces the impacts of costs incurred by the Township, as well provides flexibility to scale and expand the facility to residential development as it occurs.

This strategy is driven by developers and as such, has not been widely utilized within Ontario to date. However, with many municipalities facing similar challenges, it is recognized that there are opportunities and benefits from decentralized sewage servicing. Given this, it is recommended that the Township of Huron-Kinloss shift their sewage servicing policy to include the use of DWTPs in the Lakeshore area. In accepting this policy change, the Municipality should recognize that the entirety of the Lakeshore may not be serviced, including all the existing development, and that multiple DWTPs may be built, depending on demand.

Accepting DWTPs as a servicing strategy will require the Township to establish a set of guiding principles to manage the risk associated with the eventual transfer of ownership and responsibility. These principles should be developed with the intent of mitigating risks associated with the phasing, maintenance, operation, and costs of any facility to protect the Township following the transfer of responsibility from the developer.

The Township should consider developing **guiding principles or guidelines** that can be incorporated into discussions and agreements with developers. These principles should incorporate all aspects of a DWTP from planning and design, through to construction, operation, and municipal assumption. The following is an initial summary of considerations for the development of the guiding principles. It is expected that the guiding principles developed will be an evolving document, as new technologies and experiences are learned.

### **General Considerations**

- DWTP should only be considered within the Lakeshore area service area;
- Surface discharge DWTPs should only be considered given the soil conditions;
- Treatment process must be approved by regulatory approval agencies (e.g., Ministry of Environment, Conservation and Parks);
- Treatment processes should be designed to, and capable of, handling intermittent and low flows;
- The Township may wish to establish a minimum size of development to warrant consideration of a DWTP;
- The Township may wish to consider an area-specific sewage rate structure for these systems; and
- To reduce risks associated with operation and maintenance, the Township may wish to require a warranty from the manufacturer of the process equipment and/or the developer;

### **Guiding Principles for the EA process**

- The Township should take an active part in the MCEA process, especially with regards to the evaluation of sites, treatment processes, and size of facilities. This could take the form of co-proponency;

- A key consideration during the EA process should be long term financial feasibility;
- Township requirements related to access, and occupational health and safety should be incorporated into design; and
- Energy management requirements should be incorporated into the MCEA process.

### **Construction Principles**

- The Township should consider requiring inspections of the facility, collection system and service connections at the time of construction.

### **Implementation and Operation Principles**

- The developer should be required to submit Operation and Maintenance Manuals and monitoring reports to the Municipality for review;
- The Township could consider delegating operation and maintenance requirements to the manufacturer or another party;
- To reduce financial risks associated with operating costs, the Township should evaluate how costs are allocated and collected; and
- Continued enforcement of the Sewer Use By-law to reduce potential for issues with treatment and effluent quality.

### **Municipal Assumption Principles**

- The Township should conduct a thorough inspection of any facility prior to taking over ownership and operation;
- Consider implementing policy directing municipal take over once a certain threshold or development phase is reached;
- Develop a rate structure strategy that supports operational, maintenance and life-cycle costs for the DWTP facility; and
- Incorporate capital work projects (such as expansions for existing development) for DWTP into development charges, provided the project is being funded by the Township.

The above points are recommended as an initial starting point for planning and development of a full set of guiding principles related to the acceptance of a proposal for a DWTP. Acceptance of a DWTP will be formalized through legal agreements, following a Schedule C Municipal Class EA process led by a developer. This new servicing strategy is driven by developers and the market demand for housing in the Lakeshore area will ultimately determine the location and number of DWTPs. In the absence of accepting decentralized sewage treatment as a strategy in the Lakeshore area, status quo will be maintained and development in the area will be limited to the existing settlement area.

## **11.0 SERVICING AND GROWTH OUTSIDE OF THE SETTLEMENT AREAS**

In discussions with Huron-Kinloss Council, it was asked that the Master Plan include a discussion of the opportunities and constraints in relation to new development in the rural areas outside of existing settlement and hamlet areas. An example of such a development might include homes (permanent or seasonal) around a former rehabilitated gravel or small inland lake.

With respect to planning policy, the PPS directs new growth to existing designated growth and settlement areas. This generally discourages the establishment of new settlement areas, especially where there is a sufficient supply of vacant or development land in the existing urban boundaries. New settlement areas may be permitted if supported first through the comprehensive review process. During the comprehensive review, it must be demonstrated that the ability to accommodate growth and market demand is not available within existing settlement areas; sufficient infrastructure is planned or in place; there are no alternatives that avoid prime agriculture areas; the settlement area is in compliance with MDS formulae; and impacts from new settlement areas on existing agricultural areas are mitigated as much as possible. These policies may be a constraint to a new settlement area outside of the existing settlement areas in Huron-Kinloss, given the large supply of undeveloped lands in the urban areas as well as hamlets.

Within rural areas, the PPS promotes leveraging rural amenities and assets, promoting regeneration, and focusing growth and development in rural settlement areas. In rural settlement areas, the scale of development and provision of an appropriate level of service should be considered.

Before new infrastructure and public service facilities are constructed, the PPS directs that the use of existing infrastructure and facilities should be optimized. Any new infrastructure should also be strategically located to support effective and efficient delivery of emergency management services. Where full municipal water and sewage services are not available, private communal services are the preferred form of servicing for multi-unit or multi-lot developments. Individual private servicing may be used if site conditions are suitable over the long-term with no negative impacts.

The PPS also promotes the protection of surface water quality and quantity through implementing restrictions on development around sensitive surface water features. Development is also restricted in significant wetlands. Within the former Kinloss Township area, many of the small lakes are surrounded by provincially significant wetlands (Dickies Creek Wetland Complex, Kinloss Creek, Greenock Swamp). This limits the opportunity for development around these features.

In prime agricultural areas, lot creation is generally discouraged and is only permitted for agriculture uses, agriculture-related uses, infrastructure, and surplus farm residences. In areas where there are mineral aggregate resources, the PPS directs that aggregate operations, deposits and adjacent lands should be protected from development, unless

the resource use is not feasible, the land use serves are greater long-term public interest and public safety, health and environmental issues are addressed. Where there are mineral aggregate operations or prime agricultural land, the opportunity for lot creation for development will be constrained.

The current Bruce County Official Plan includes Inland Lake and Estate Residential designations. These designations could be applied to a development outside of the existing settlement areas. Presently, the Inland Lake designation applies to some areas around Silver Lake and Paradise Lake in Huron-Kinloss. Under the Inland Lake designation, new developments are not permitted unless it can be shown the lake can sustain the level of development without environmental degradation. Developments under this designation will require plans and studies to determine the suitability of the development.

The Estate Residential designation recognizes the potential for residential development on large lots in non-agricultural areas. These types of developments require an amendment to the County Official Plan, Plan of Subdivision, and must meet the following criteria:

- Lands must be designated 'Rural';
- Must be immediately adjacent to an existing public road that is maintained on a year-round basis, within reasonable proximity to a paved road, and will not increase traffic on gravel roads;
- Must be within an area serviced by an existing school bus route;
- Must complete a servicing study and must not utilize individual services;
- Must not be located within an environmental constraint area, mineral resource area or hazard lands;
- Must be more than 500 m away from the boundary of an aggregate or quarry operation, lagoon, or mineral resource area;
- Must meet MDS formulae; and
- Where a planning analysis demonstrates the need for development.

East of Bruce Road 1, there are lands currently designated as 'Rural' that could be redesignated for Estate Residential. The Township, in considering residential development in this area needs to weigh the potential for conflicts with other uses (e.g., agricultural and aggregate extraction). Additionally, individual water and wastewater and partial services are not permitted under this designation. Such a development would require either full municipal servicing or communal servicing. Full municipal servicing will have long-term operation and maintenance requirements and costs that will add to the Township's overall budget demands. Generally, the operation of small, isolated municipal water and wastewater systems is not cost-efficient and can result in high user costs.

Communal systems will require an agreement between the developer and the municipality to ensure proper maintenance, operation, and municipal assumption of the facilities in the event of a default.

A further consequence of encouraging development outside of existing settlement areas is increased demand on services (e.g., snow plowing, road maintenance, garbage collection, emergency services, etc.). These demands should be considered against the existing infrastructure invested in the settlement areas to provide for residential development.

A summary of the constraints and opportunities is provided in Figure 11.1.

**Figure 11.1 Constraints and Opportunities for Development Outside of Settlement Areas**

Opportunities	Constraints
<ul style="list-style-type: none"> <li>• There are a number of small inland lakes that could be a residential development opportunity</li> <li>• Could be an adaptive re-use of rehabilitated quarries/aggregate operations</li> <li>• Presents opportunity for rural development</li> <li>• Could be a locally, unique real estate market</li> <li>• Utilizes non-prime agriculture land</li> <li>• Communal servicing may reduce lot size requirements and promote more efficient development pattern</li> <li>• Development comes with recreational opportunities</li> <li>• Increase tax base</li> </ul>	<ul style="list-style-type: none"> <li>• Development restricted in and adjacent to significant wetlands, hazard areas.</li> <li>• Availability of land within existing settlement areas and hamlets for development.</li> <li>• Potential for environmental impacts related to development around inland lakes.</li> <li>• Will increase service demands and levels - roads, garbage, emergency services etc.</li> <li>• Must meet MDS formulae</li> <li>• Must avoid aggregate operations and areas of mineral deposits.</li> <li>• In estate-type developments, individual servicing and partial servicing is not permitted must use communal or full services.</li> <li>• Potential for conflict with agricultural and aggregate operations</li> </ul>

## 12.0 CONSULTATION

### 12.1 General

Public consultation represents an integral part of the master planning process. During this study, a consultation program was implemented to obtain input on key study issues from the general public, government review agencies and key stakeholders. Information gathered through this process was incorporated into the analysis of future servicing needs and the evaluation of alternative servicing strategies. The following subsections summarize the consultation program.

### 12.2 Initial Public Consultation

Initial comments were solicited from local residents by way of a public notice issue in the local newspapers, on the municipal website and municipal social media pages. The Notice of Study Commencement summarized the purpose and intent of the Master Plan and requested comments from interested persons. The notice was issued in the May 11<sup>th</sup> and 18<sup>th</sup> (2022) of the Lucknow Sentinel, Kincardine News and Kincardine Independent newspapers. The Notice was also placed on the municipal website (<https://www.huronkinloss.com>) and Facebook page.

A dedicated project site on the municipal website and their consultation platform (<https://www.haveyoursayhk.ca/water-and-waste-water-servicing-master-plan>). A copy of the Notice is included in Appendix C.

Three comments from the public were received following the issuance of the Notice. The comments received and responses are summarized in Table 12.1.

**Table 12.1 – Initial Public Comments Received**

<b>Comment Date, Source</b>	<b>Comment</b>	<b>Response</b>
May 7, 2022, Have Your Say HK website	While still in the planning stages, can you please include a Zoom presentation to explain/discuss the details of the plan for the Lakeshore communities? Drinking water quality, water control, overland runoff, drainage, and lake water quality are important issues. A question and answer session would be useful. Thank you.	Thank you for your question. There will be an open house scheduled in August, details to come: however, with this study we are only looking at where development may occur over the next 25 years to ensure we have the infrastructure in place to support it. We are looking at our current water and wastewater capacity specifically, to see what is required to support any new developments. Drainage plans, and other issues that you've mentioned would be a crucial part of the development process and would be required before any new development was approved.

<b>Comment Date, Source</b>	<b>Comment</b>	<b>Response</b>
May 8, 2022, Facebook	How will the township fund this. Will this be funded through the capital budget? Will the township enact a charge to each property owner going forward? Previous studies showed that this will result in a charge to over \$30,000 to taxpayers. How are you going to provide support to taxpayers who are retired and on a fixed income. Will future developers need to pay for these upgrades? We have put in a septic system and upgraded it, will we be allowed to continue to use it.	The development of the Master Plan is being funded through the Nuclear Waste Management Organization 2022 Learn More Program. One of the goals of the Master Plan will be to identify water and wastewater infrastructure needs/projects to allow the Township to plan for the future and budget accordingly. We want to make sure we have water and wastewater services where and when we need them. At this point, we do not know what those water and wastewater projects may be, hence the need for the Master Plan. Typically, municipal water and wastewater infrastructure projects are paid for by those benefiting from the service – including future growth (through development charges) and existing development (through reserves, rates, or local charges). Sometimes grants can be obtained to help offset costs. At this time, it is expected that the use of septic systems within the existing Lakeshore area will continue.
May 12, 2022, Telephone call to BMROSS	Asked to be added to project contact list. Owns development property along within the Lakeshore area and interested in future water servicing	Added to project contact list. Noted that water is currently available and sufficient for their development property.

**12.3 Review Agency Consultation**

Input into the study process was solicited from review agencies by way of direct mail and email correspondence. Agencies were sent a general project summary letter, which provided information on the study, outlined the Master Plan process, and the scope of investigations. The information was circulated on May 10, 2022, and agencies were requested to forward comments by June 13, 2022. A copy of the letter and list of agencies circulated is included in Appendix C.

A summary of the comments received following the initial letter is summarized in Table 12.2.

**Table 12.2 – Agency Comments**

Commenting Agency	Comments	Response
<p>Laura Romeo, Ministry of Heritage, Sport, and Culture Industries (MHSTCI), June 13, 2022</p>	<ul style="list-style-type: none"> <li>• MHSTCI understands the master plan is being done at a broad level of assessment and will require more detailed investigations at the project-specific level. A description of existing conditions related to cultural heritage resources needs to be included in the master plan document.</li> <li>• The existing conditions sub-section should indicate if the Master Plan includes areas of archaeological potential or not and acknowledge that archaeological assessments will be required for future project-specific projects. A statement should be included that archaeological assessments are to be undertaken by an archaeologist licensed under the Ontario Heritage Act.</li> <li>• MHSTCI recommends that an Existing Conditions Report be undertaken by a qualified person, which will include a historical summary of the study area’s development, identifying all known of potential build heritage resources and cultural heritage landscapes within the study area. The findings of the existing conditions report should be included in the existing conditions subsection of the master plan document.</li> <li>• Please advise MHSTCI whether any technical cultural heritage studies will be completed for this master plan and provide them to MHSTCI before issuing a Notice of Completion.</li> </ul>	<p>Noted. Given this is a high level, technical Master Plan, there will be no specific archaeological or cultural heritage assessments undertaken. Projects identified through this Master Plan will be required to complete the appropriate archaeological and cultural heritage screenings and assessments if required.</p>
<p>Adam Weishar, Director of Infrastructure and Development, Municipality of Kincardine, May 10, 2022</p>	<ul style="list-style-type: none"> <li>• Any interest will directly correlate to the connection between our systems.</li> <li>• Unaware of anything else that would be of interest from a servicing lens.</li> </ul>	<p>Noted.</p>

Commenting Agency	Comments	Response
<p>Celina Whaling-Rae, Planner, Huron County Planning and Development, May 30, 2022</p>	<ul style="list-style-type: none"> <li>• ACW would request that consideration is given to the lands designated for development in ACW, including lands south of Lucknow in particular. Cumulatively there is approximately 240 acres designated for future development south of Lucknow in ACW.</li> <li>• ACW hopes shared servicing may continue as the Township of Huron-Kinloss looks to upgrade, expand, or modify servicing in Lucknow.</li> </ul>	<p>Noted</p>
<p>Patrick Huber-Kidby, Maitland Valley Conservation Authority, June 19, 2022</p>	<ul style="list-style-type: none"> <li>• Thank you for circulating. We would be happy to provide our current hazard mapping.</li> <li>• Lucknow is generally impacted by flooding along the Nine Mile River and has some nearby wetland features and we would consider these a restraint to growth in certain areas.</li> </ul>	<p>Noted</p>
<p>Mark Badali, Ministry of Environment, Conservation and Parks, June 9, 2022</p>	<ul style="list-style-type: none"> <li>• Provided updated “Areas of Interest” document.</li> <li>• MECP is delegating procedural aspects of rights-based consultation to the proponent.</li> <li>• Require that consultation occur with: Saugeen First Nation, Nawash Unceded First Nation, and Métis Nation of Ontario (Lands and Resources Department, Region 7).</li> <li>• Copy of the report should be sent directly prior to filing of the final report and allow for 30 days for technical review.</li> <li>• Ensure a copy of final notice is sent to the ministry’s Southwest Region EA notification email account.</li> </ul>	<p>Noted</p>

Commenting Agency	Comments	Response
Carl Seider, Saugeen, Grey Sauble, Northern Bruce Peninsula SPR, May 27, 2022	<ul style="list-style-type: none"> <li>• New regulatory requirements under the Safe Drinking Water Act (Reg. 205/18) applies to municipal residential drinking water systems owners within source protection areas and works with a regulation under the Clean Water Act (Reg. 287/07) to identify when and how system owners must ensure that new or changing drinking water systems are protected by their local source protection plan.</li> <li>• These regulations apply to new wells or intakes, deepening of existing wells, or increased capacity of an existing well.</li> <li>• If any of these situations are being considered as part of the Master Plan process, please advise so staff can start the amendment process.</li> </ul>	Noted

**12.4 First Nation and Métis Consultation**

To identify First Nation and Métis communities that may have an interest in the Master Plan, the Aboriginal and Treaty Rights Information System (ATRIS) was consulted. The following communities were sent a letter outlining the project (included in Appendix C). The letter was emailed on May 10, 2022, to the following communities:

- Saugeen Ojibway Nation (SON),
- Chippewas of Nawash Unceded First Nation,
- Chippewas of Saugeen First Nations,
- Historic Saugeen Métis,
- Métis Nation of Ontario, and
- Great Lakes Métis Council.

The letter sent included information regarding the proposed Master Plan. A log of correspondence with First Nation and Métis communities is provided in Table 12.3. Copies of all correspondence sent are included within Appendix C.

**Table 12.3 – Aboriginal Community Consultation Log**

<b>First Nation/Métis Contact</b>	<b>Date</b>	<b>Type of Contact</b>	<b>Details/Response</b>
SON	May 10, 2022	Email sent by BMROSS	Project initiation letter <ul style="list-style-type: none"> <li>• No response received</li> </ul>
Chippewas of Nawash Unceded First nation	May 10, 2022	Email sent by BMROSS	Project initiation letter <ul style="list-style-type: none"> <li>• No response received</li> </ul>
Chippewas of Saugeen First Nation	May 10, 2022	Email sent by BMROSS	Project initiation letter <ul style="list-style-type: none"> <li>• No response received</li> </ul>
Historic Saugeen Métis	May 10, 2022	Email sent by BMROSS	Project initiation letter <ul style="list-style-type: none"> <li>• Response received June 16, 2022</li> </ul>
Metis Nation of Ontario	May 10, 2022	Email sent by BMROSS	Project initiation letter <ul style="list-style-type: none"> <li>• No response received</li> </ul>
Great Lakes Métis Council	May 10, 2022	Email sent by BMROSS	Project initiation letter <ul style="list-style-type: none"> <li>• No response received</li> </ul>
Historic Saugeen Métis	June 16, 2022	Email to BMROSS	No comment on Master Plan at this time, but would appreciate further updates in the future. <ul style="list-style-type: none"> <li>• Noted.</li> </ul>

## 12.5 Public Open House

A Public Open House was held on November 16, 2022, at 6 PM at the Ripley-Huron Arena. A notice advertising the meeting was placed in the Lucknow Sentinel, Kincardine News and Kincardine Independent for two weeks ahead of the meeting. The Notice was also placed on the Township’s website and Facebook page. A narrated video presentation was placed on the Township’s website and YouTube page ahead of the meeting date. At the Open House, there were panels displaying project information and study team members were available to answer questions.

There were four persons in attendance at the PIC. Study team members provided an overview of the master plan process, summarized projected growth and development and major findings related to water supply, storage and distribution, and wastewater pumping and treatment. Wastewater servicing strategies for the Lakeshore area were also summarized and reviewed. A copy of the presentation and display boards are included in Appendix C.

There were no questions or comments submitted following the open house.

### 13.0 SUMMARY OF PREFERRED SERVICING STRATEGIES & RECOMMENDATIONS

The following table (Table 13.1) provides a summary of the preferred servicing strategies and recommendations relating to identified issues or opportunities for the Lucknow, Ripley and Lakeshore water and wastewater systems.

**Table 13.1 Preferred Servicing Strategies**

<b>Facility/ Service</b>	<b>Issue/ Opportunity</b>	<b>Timing</b>	<b>Preferred Solution/ Recommendation</b>	<b>Probable Cost (2023\$)</b>	<b>MCEA Schedule</b>
Lucknow Water System	Need to replace Well 5.	5-10 years	Replace Well 5 with a new municipal well at a new site	\$150,000 for MCEA. \$1,250,000 for new well and pumphouse.	B
Lucknow Water System	Watermain sizing for future development areas	Dependent on development	Ensure appropriate watermain sizing and looping within development areas	Cost borne by development	N/A
Lucknow Wastewater System	Long-term need for additional treatment capacity	Long term (10-25 years)	Over short-term recommend updating reserve capacity calculations regularly. Over long-term, MCEA will be required for treatment expansion.	\$3,000 for regular reserve capacity update. \$200,000 for MCEA.	C
Lucknow Wastewater System	Limited sewer capacity in sections between Wheeler St. and Inglis St. and Ross St. and Inglis St.	Dependent on development	Ensure flows are routed appropriately.	Cost borne by development	N/A
Ripley Water System	Limited fire flow to the Industrial Park	Dependent on development	Promote dry industries or use of on-site storage or fire pumps	Cost borne by development	N/A

<b>Facility/ Service</b>	<b>Issue/ Opportunity</b>	<b>Timing</b>	<b>Preferred Solution/ Recommendation</b>	<b>Probable Cost (2023\$)</b>	<b>MCEA Schedule</b>
Ripley Water System	Watermain sizing for future development areas in southern part of community	Dependent on development	Ensure appropriate watermain sizing and looping within developments	Cost borne by development	N/A
Ripley Wastewater System	Theoretical overcommitment of treatment capacity	Immediately	Enact an allocation policy and regularly update reserve capacity calculations (see Section 9.2.4 for further details)	\$3,000 for regular reserve capacity update.	N/A
Ripley Wastewater System	Long-term treatment capacity	Long-term (10-25 years)	MCEA for treatment expansion will be required.	\$200,000 for MCEA.	C
Lakeshore Water System	Deficiency in water storage	5-10 years	An additional water storage facility	\$125,000 for MCEA. \$5,000,000 for new storage facility.	B
Lakeshore Wastewater System	Servicing expanded settlement area	Long-term (10-25 years)	Continued private, on-site servicing in the existing settlement area, decentralized or communal servicing in the expanded settlement area (see Section 10.3 for further details)	\$200,000 for MCEA.	C for a communal wastewater treatment plant.

## **14.0 COSTS AND FINANCING**

### **14.1 Funding of Future Projects**

#### **14.1.1 General**

Through the Master Plan process, there are a number of future projects identified relating to water and wastewater infrastructure that should be undertaken by the Township.

These projects include:

- Develop and implement allocation policies,
- Regularly update reserve capacity calculations,
- Additional water storage for the Lakeshore,
- Replacement of Well 5 in Lucknow,
- Settlement Capacity Study for the Lakeshore settlement area expansion, and
- Increased capacity at the Ripley and Lucknow WWTPs.

It should be noted that the recommendations for timing of these projects ranges from the near-term for updating reserve capacity calculations and implementing allocation policies, to within the next 5-10 years for the additional water storage, booster pumping improvements, replacement of Well 5, to the long-term (10+ years) for the increases in WWTP capacity and Settlement Capacity Study. The timing of these projects should allow the Township to build reserves and budget for these expenditures. The projects may also be financed in part through development charges or through the Municipal Act.

#### **14.1.2 Development Charges**

Municipalities have the ability to collect for the growth-related costs of capital work projects through the Development Charges Act. The Act allow municipalities to collect development charges against future development for the costs associated with the provision of infrastructure and services that benefit growth. The Township of Huron-Kinloss has a Development Charge By-law in place, and currently collects development charges related to road, water, and wastewater services among others.

In the future, should the Township plan to undertake the above-noted projects, eligible costs that benefit growth can be collected through development charges. It should be noted that not all costs associated with a particular project may be eligible for collection through development charges. When the Township undertakes a development charge background study, these projects should be considered against the current legislative requirements of the Development Charges Act.

### 14.1.3 Municipal Act

Part XII of the Municipal Act provides municipalities with broad powers to impose fees and charges via passage of a by-law. The powers, as presented in S. 391(1) of the Municipal Act authorize a municipality to impose fees or charges for:

- Services or activities provided or done by or on behalf of it.
- Costs payable by it for services or activities provided or done by or on behalf of any other municipality or local boards.
- The use of its property, including property under its control.

Municipalities use the authority of the Municipal Act to collect capital charges from water and sewage projects. Under the Act, municipalities can charge an immediate benefit to these properties who will receive a benefit at a future time. Under the Act, municipalities are permitted to pass a by-law requiring mandatory connections to the system and mandatory pay by-laws.

There are many methods available to assess and calculate a capital cost recovery rate for a project, including:

- By metres of frontage of the property,
- An area rate based on hectares,
- A fixed charge for each parcel (flat rate), or
- Any other method Council considers fair.

The Township may also pay for projects relating to water and wastewater services through capital reserves and rates as set out by the Financial Plans for the systems.

## **15.0 IMPLEMENTATION**

### **15.1 General**

This Master Plan identifies a number of future requirements for water and wastewater infrastructure (see Section 13). Upon approval of the Master Plan, the Township of Huron-Kinloss may initiate the associated studies or steps associated with the identified preliminary preferred solutions. Given that many of the identified problems/opportunities are based on future need, the progression of development will determine the timing of implementing the recommendations in this Master Plan. It is recommended that the Master Plan be reviewed on a regular basis to evaluate the accuracy of key assumptions (e.g., the rate of growth) and to confirm the suitability of the preferred solutions. The Master Plan should be modified as required to address any changes in the environmental setting, planning policies, and/or local conditions.

### **15.2 Master Plan Approval**

This Master Plan was developed following an approved Master Plan process, as set out in the MCEA document. For this study, the Master Plan process incorporated the completion of Phases 1 and 2 of the Class EA process.

The Master Plan will be approved for implementation subject to adoption by the Council of Township of Huron-Kinloss. This Master Plan identifies future projects that will need to be considered based on where and when growth proceeds. Some projects, such as the need for additional water storage, will require future MCEA studies to evaluate site-specific impacts and alternatives.

### **15.3 Requirements for Master Plan Completion**

The following activities are required in order to complete the formal MCEA process:

- Issue a Notice of Study Completion;
- Make the Master Plan Report available for public review in conjunction with the Notice of Completion;
- Obtain feedback from the public, stakeholders, and agencies;
- Address any outstanding issues resulting from the Notice of Completion; and
- Advise the Township and MECP when the process is complete.

The following activities are required in order to complete the formal MCEA process:

- Issue a Notice of Master Plan;
- Make the Master Plan Report available for public review in conjunction with the Notice of Completion;

- Obtain feedback from the public, stakeholders, and agencies;
- Address any outstanding issues resulting from the Notice of Completion; and
- Advise the Township and MECP when the process is complete.

#### **15.4 Final Public Consultation**

Upon completion of the Master Plan, a Notice of Study Completion will be circulated to stakeholders, First Nation and Métis communities, review agencies, and placed in local papers. The notice will summarize the projects identified in the Master Plan and indicate the approval process associated with moving forward with implementation.

## 16.0 SUMMARY

The Township of Huron-Kinloss initiated a Master Plan to evaluate future growth within the primary settlement areas of Ripley and Lucknow and secondary settlement area of the Lakeshore and identify water and wastewater infrastructure needs. The intent of this Master Plan is to serve as the basis for and support future infrastructure projects as identified through the study. The study process followed the procedures set out in the MCEA document, in a manner that satisfies the requirements of Master Plan Approach 1, including an inventory of existing environmental conditions, identification of broad infrastructure requirements within the study areas, and identifies preliminary alternatives for consideration for Schedule B or C projects that are required to accommodate growth.

The Master Plan summarizes the existing environmental conditions within the Township of Huron-Kinloss, as well as the existing conditions of the primary settlement areas of Ripley and Lucknow and the secondary settlement area of Lakeshore. A summary of the existing water and wastewater infrastructure was also provided. An analysis of existing population and projected future growth, based on available forecasts and data, was also performed to understand future infrastructure and land requirements.

To assess the need for additional land for settlement areas, a comparison of forecasted residential growth and the total potential number of units was conducted. Total potential units were calculated through current development proposals, infill lots and the amount of land zoned for residential or future development. Through the assessment, a deficit of land in the Lakeshore settlement area to accommodate forecasted growth over the next 25 years was identified.

For water services, the Master Plan study included a review of the existing water supply, storage and distribution infrastructure for the primary and secondary settlement areas of the Township. This assessment included an examination of existing water demands and projected future water demands and reserve capacity. The analysis of the existing water systems identified a water supply and water storage issue in Lucknow and Lakeshore respectively. In addition to considerations that should be made dependent on development.

To assess the wastewater services of the Township, the Master Plan reviewed pumping, treatment and collection infrastructure of each settlement area. The assessment included an evaluation of reserve capacity. From the assessment of existing infrastructure and projected future needs, an increase to treatment capacity of the Lucknow and Ripley systems was identified as needed in the future. Additionally, a theoretical overcommitment of the Ripley treatment capacity was identified. The expansion of the Lakeshore settlement area was identified as requiring decentralized or communal servicing which would require further studies.

A series of alternative solutions for the identified problems were evaluated. The identified problems or opportunities, based on the progression of growth and future needs include:

- Need to replace Well 5 for the Lucknow Water System.
- Watermain sizing for future development of the Lucknow Water System.
- Increasing treatment capacity of the Lucknow Wastewater System.
- Limited sewer capacity in sections of the Lucknow Wastewater System.
- Limited fire flow to the Industrial Park in Ripley.
- Watermain sizing for future development in Ripley.
- Theoretical overcommitment of treatment capacity for the Ripley Wastewater System.
- Increase treatment capacity of the Ripley Wastewater System.
- Deficiencies in water storage of the Lakeshore Water System.
- Servicing expansion of the Lakeshore Wastewater System.

Based on the preliminary alternative solutions, the Master Plan recommends:

- Replacement of Well 5 with a new municipal well at a new site in Lucknow to occur in the next 5-10 years. This project will require a Schedule B MCEA study be completed.
- Additional treatment capacity at both the Lucknow and Ripley WWTPs in the next 10-25 years. These projects will require a Schedule C MCEA study be completed. The studies should be initiated 5 years prior to the forecasted need for additional capacity.
- Dependent on development, watermain sizing and looping within development areas for Lucknow and Ripley should be evaluated. Additionally, an evaluation of sewer capacity to ensure flows are routed properly in Lucknow is recommended.
- Regular updates to the reserve capacity calculations and enacting an allocation policy for the Ripley Wastewater System should be implemented immediately.
- Dry industries or the use of on-site storage or fire pumps should be promoted in the Ripley industrial areas.
- Additional water storage will be required for the Lakeshore settlement area in the future. It is recommended that in the next 5-10 years the Township undertake a MCEA Schedule B study.
- Continuation of private, on-site servicing within the existing Lakeshore settlement area. A study should be undertaken to consider decentralized or communal servicing in the expanded settlement area.
- The Master Plan should be reviewed on a regular basis to evaluate the accuracy of key assumptions (e.g. the progression and rate of growth). The Master Plan should be updated as required to address changes to the environmental and local conditions.

A consultation program was implemented for this Master Plan to obtain input on key study issues from the general public, government review agencies and key stakeholders. Relatively few comments were received during the study.

The Huron-Kinloss Growth, Water and Wastewater Servicing Master Plan has been completed in accordance with the planning and design process of the MCEA. For this study, the Master Plan process incorporated the completion of Phases 1 and 2 of the MCEA process. The Master Plan will be approved for implementation subject to adoption by the Council of the Township of Huron-Kinloss.

All of which is respectively submitted.



Yours very truly

B. M. ROSS AND ASSOCIATES LIMITED

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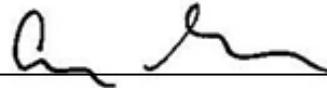


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Environmental Planner



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Andrew Garland, P. Eng.

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