

# Lucknow Drinking Water System 2023 Operation and Maintenance Annual Report

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## 1.0 INTRODUCTION AND BACKGROUND

The purpose of the 2023 Annual Report is to document the operation and maintenance data for the Lucknow Drinking Water System for review by the Ministry of the Environment, Conservation and Parks (MECP) in accordance with O. Reg. 170/03. This report covers January 1, 2023 to December 31, 2023. A copy of this report will be submitted to the owner to be uploaded to the township's website and can be provided to interested parties upon request.

## 2.0 DESCRIPTION OF WATER SYSTEM

A summary of the Lucknow Drinking Water System description is outlined below:

|  |  |
|--|--|
| Drinking Water System Number:          | 220002663  |
| Drinking Water System Name:            | Lucknow Water Distribution and Supply                              |
| Drinking Water System Owner:           | Corporation of the Township of Huron-Kinloss                       |
| Drinking Water System Category:        | Large Municipal Residential  |
| Drinking Water System Classification:  | Water Distribution and Supply Subsystem Class 2                    |
| Drinking Water System Certificate No.: | 1381   |
| Daily Maximum Water Supply Capacity:   | 1,500 m <sup>3</sup> (2,000 m <sup>3</sup> beginning Oct 12, 2022) |
| Disinfection Chemicals:                | Sodium Hypochlorite, 12%   |
| Population (Stats Can - 2021):         | 1,154  |
| Total Number of Service Connections:   | 670  |
| Estimated Seasonal Population:         | 1,675 (based on 2021 Census of 2.5 persons per household)          |
| Average Day Demand:                    | 504.53 m <sup>3</sup>  |
| Peak Day Demand:                       | 1,101.04 m <sup>3</sup>  |
| Average Capacity:                      | 33.64%   |
| Peak Capacity:                         | 73.40%   |
| Distribution Network:                  | 15.78 km (from County of Bruce GIS)                                |
| Fire Hydrants:                         | 63 (from County of Bruce GIS)                                      |
| Blow-offs:                             | 6 (from County of Bruce GIS)                                       |
| Auto-flushing Device:                  | 1 (Stauffer St)  |

The Lucknow Drinking Water Distribution and Supply Subsystem is characterized as a “secure groundwater system”. It consists of two (2) well supplies and its equipment deliver potable water to the Village of Lucknow and ten (10) Lucknow South properties in the Township of Ashfield-Colborne-Wawanosh in Huron County. The Township of Huron-Kinloss has an agreement with The Township of Ashfield-Colborne-Wawanosh, where the Lucknow South distribution system is treated as part of the Lucknow Drinking Water System (By-Law 60-2014).

Each well supply is located within its own pumphouse in the Village of Lucknow. Both sites are controlled, monitored, and alarmed through a Supervisory Control and Data Acquisition (SCADA) system which is connected to the main controller, autodialer, and server at the Ripley Municipal Office. The desktop computer used by the system’s operators is located at the Ripley Township Shed and is connected remotely to the SCADA server. As a redundancy, each site is also equipped with an auto-dialer that is independent of the SCADA system, and is used to call out alarms in the event of communications/SCADA failure. This SCADA system provides the operator with the ability to monitor current operating status of the supply and treatment equipment throughout the water system at any given time via remote access by computer or Smartphone, and to have control over operations.

The two (2) well supplies are detailed as follows:

**Site: Lucknow Well # 4 - 600 Havelock Street**

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 1 (drilled 1957)
- Depth of Wells: 54.8 m
- Well Pumps: 15 hp each (submersible)
- Disinfection: Sodium hypochlorite (12%)
- CT Requirement: 2-log, 5°C, contact watermain (1.0 BF)
- Permit To Take Water: 7631-AQYS3J, expires September 29, 2027

**Site: Lucknow Well # 5 - 381 South Delhi Street**

- Water Source: Groundwater, Non-GUDI
- Number of Production Wells: 1 (drilled 1967)
- Depth of Well: 58.8 m
- Well Pump: 50 hp (submersible)
- Disinfection: Sodium hypochlorite (12%)
- CT Requirement: 2-log, 5°C, contact watermain (1.0 BF)
- Permit To Take Water: 7631-AQYS3J, expires September 29, 2027

Both Lucknow wells are secure, deep bedrock wells that penetrate limestone aquifers. Due to the depth and structure of the aquifers, the water temperature is relatively constant (< 10°C), turbidity is low, and the water is relatively hard. The raw water is also relatively **high in naturally-occurring fluoride**, but the lead content of the raw water is well below the half-MAC (Maximum Allowable Concentration). Those who are supplied from the Lucknow DWS are made aware of the various concentrations in their drinking water by numerous means of communication from the Township of Huron-Kinloss.

Each pumphouse is equipped with a receptacle and manual transfer switch for a portable diesel generator in the event of an extended power outage. A stand-by propane generator is located at the Ripley Municipal Office for back-up power requirements for the office and SCADA server equipment.

The Lucknow DWS currently (December 2022) has a distribution network with a combination of PVC, copper, ductile, and cast iron water mains, in sizes varying between 1-inch and 12-inch diameter. A Standpipe is located at 656 Wheeler Street, is 6.7 m in diameter, 27.5 m high and has a total volume of 996 m<sup>3</sup>. The well pumps at Well # 4 and Well # 5 are automatically controlled by the water level in the Standpipe via communications located at 482 Ross Street (former pumphouse).

The Standpipe was built in 1930, making it approximately 92 years old. The Standpipe is in a state of disrepair, but is currently in operable condition. The Township of Huron-Kinloss was presented with funding from Huron-Bruce M.P.P. Lisa Thompson on Monday, April 25th, 2022 from the Investing in Canada Infrastructure Green Stream. With \$1.9 million in federal funds, another \$1.5 million from the province, and the remaining funds to be provided by the Township itself, this essential infrastructure project includes:

- approximately 225 meters of watermain replacement;
- construction of a new, elevated water storage facility;
- demolition of the existing standpipe.

### 3.0 SUMMARY OF WATER QUALITY MONITORING

The purpose of sampling and testing is to confirm that water is safe for human consumption and to provide a comprehensive track record.

#### Requirement - Drinking Water System Owner/Operating Authority

The *SDWA* also requires the Drinking Water System Owner/Operating Authority to immediately notify the MECP and the Grey Bruce Health Services office and the Huron Perth Public Health office (if applicable), that the laboratory notice has been received and that “corrective actions” are being initiated. The method of contact is by telephone to a person of authority. The Operating Authority also faxes Form 2A - Notices of Adverse Test Results and Issue Resolution (Schedule 16) within 24 hours to both agencies first to verify previous live communication. Once the issue has been resolved and to confirm that corrective actions have been completed, the Operating Authority also faxes Form 2B - Notices of Adverse Test Results and Issue Resolution (Schedule 16) within 7 days to the agencies. This reporting system provides assurance that the DWS Owner is complying with the applicable regulations and that appropriate corrective actions are being taken and are being reported.

#### 3.1 Water Treatment Equipment Operation and Monitoring

##### 3.1.1 Treated Water (Point of Entry) Free Chlorine Residuals (Grab Samples)

A total of 730 treated water grab samples were collected and analyzed for free chlorine residual at the point of entry (POE) using a Hach pocket chlorine colorimeter. **Table 1** shows the grab samples monthly average of free chlorine residual values. **Table 2** shows the on-line continuous samples monthly average (as collected by SCADA) of the free chlorine residual values.

### 3.1.2 Distribution Free Chlorine Residuals (Grab Samples)

In 2023, a total of 516 distribution residuals were collected: 364 daily grab residuals and an additional 152 weekly grab residuals were taken in conjunction with the required weekly microbiological sampling. A summary of all the residuals collected is presented in **Table 1**. South Lucknow in ACW is included in the distribution residuals.

**Table 1 - Average Treated and Distribution Free Chlorine Residuals (Grab Samples)**

| Month                 | Lucknow # 4 Treated Water | Lucknow # 5 Treated Water | Lucknow Distribution |
|-----------------------|---------------------------|---------------------------|----------------------|
| Jan                   | 1.82                      | 1.65                      | 1.41                 |
| Feb                   | 1.75                      | 1.82                      | 1.46                 |
| Mar                   | 1.78                      | 1.67                      | 1.45                 |
| Apr                   | 1.68                      | 1.57                      | 1.41                 |
| May                   | 1.60                      | 1.55                      | 1.39                 |
| Jun                   | 1.54                      | 1.60                      | 1.40                 |
| Jul                   | 1.59                      | 1.53                      | 1.37                 |
| Aug                   | 1.63                      | 1.62                      | 1.45                 |
| Sep                   | 1.58                      | 1.63                      | 1.39                 |
| Oct                   | 1.66                      | 1.72                      | 1.39                 |
| Nov                   | 1.77                      | 1.73                      | 1.48                 |
| Dec                   | 1.74                      | 1.82                      | 1.53                 |
| <b>CT Requirement</b> | <b>0.26</b>               | <b>0.27</b>               | <b>0.20</b>          |
| Annual Min            | 1.37                      | 1.20                      | 0.50                 |
| Annual Max            | 2.09                      | 2.07                      | 1.86                 |
| Annual Avg            | 1.68                      | 1.66                      | 1.43                 |
| # Samples             | 365                       | 365                       | 364                  |

**Table 2 - Average Treated Free Chlorine Residuals (On-Line Continuous from SCADA)**

| Month                 | Lucknow # 4 Treated Water | Lucknow # 5 Treated Water |
|-----------------------|---------------------------|---------------------------|
| Jan                   | 1.86                      | 1.67                      |
| Feb                   | 1.79                      | 1.86                      |
| Mar                   | 1.81                      | 1.70                      |
| Apr                   | 1.72                      | 1.57                      |
| May                   | 1.63                      | 1.56                      |
| Jun                   | 1.56                      | 1.62                      |
| Jul                   | 1.62                      | 1.54                      |
| Aug                   | 1.67                      | 1.66                      |
| Sep                   | 1.59                      | 1.64                      |
| Oct                   | 1.68                      | 1.75                      |
| Nov                   | 1.82                      | 1.78                      |
| Dec                   | 1.75                      | 1.83                      |
| <b>CT Requirement</b> | <b>0.26</b>               | <b>0.27</b>               |
| Annual Min            | 0.31                      | 0.51                      |
| Annual Max            | 2.95                      | 3.80                      |
| Annual Avg            | 1.71                      | 1.68                      |

### 3.1.3 Raw and Treated Water Turbidity

Raw water and treated water grab samples were collected and analyzed for turbidity using a portable turbidity analyzer. **Table 3** provides a summary of raw and treated water turbidity results for 2023. O. Reg. 170/03 requires raw turbidity samples to be analyzed at least once per month from each well for groundwater systems.

**Table 3 - Raw and Treated Water Turbidity Results (Monthly Average)**

| Month      | Lucknow # 4 |         | Lucknow # 5 |         |
|------------|-------------|---------|-------------|---------|
|            | Raw         | Treated | Raw         | Treated |
| Jan        | 0.23        |         | 0.17        |         |
| Feb        | 0.15        | 0.26    | 0.15        | 0.34    |
| Mar        | 0.21        | 0.24    | 0.13        | 0.20    |
| Apr        | 0.18        | –       | 0.15        | –       |
| May        | 0.17        | –       | 0.20        | –       |
| Jun        | 0.21        | –       | 0.16        | –       |
| Jul        | 0.14        | –       | 0.14        | –       |
| Aug        | 0.11        | –       | 0.17        | –       |
| Sep        | 0.14        | –       | 0.12        | –       |
| Oct        | 0.18        | –       | 0.09        | –       |
| Nov        | 0.21        | 0.27    | 0.24        | 0.25    |
| Dec        | 0.19        | 0.27    | 0.23        | 0.25    |
| Annual Min | 0.11        | 0.24    | 0.09        | 0.20    |
| Annual Max | 0.23        | 0.27    | 0.24        | 0.34    |
| Annual Avg | 0.18        | 0.26    | 0.16        | 0.26    |
| # Samples  | 13          | 4       | 14          | 4       |



### 3.2 Microbiological Sampling per Schedule 10, O. Reg. 170/03

#### 3.2.1 Raw Water Samples

Raw water samples are collected every week. A total of 96 samples were collected and analyzed for E. Coli and Total Coliform. **Tables 4 and 5** provide a summary of microbiological results performed on the raw water.

**Table 4 - Microbiological Results for Raw Water - LUCKNOW # 4**

| Month        | Total Coliform |               |                    | E. Coli   |               |                    |
|--------------|----------------|---------------|--------------------|-----------|---------------|--------------------|
|              | # Samples      | # Samples "0" | # Samples $\geq 1$ | # Samples | # Samples "0" | # Samples $\geq 1$ |
| Jan          | 5              | 5             | 0                  | 5         | 5             | 0                  |
| Feb          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Mar          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Apr          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| May          | 5              | 5             | 0                  | 5         | 5             | 0                  |
| Jun          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Jul          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Aug          | 5              | 5             | 0                  | 5         | 5             | 0                  |
| Sep          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Oct          | 5              | 5             | 0                  | 5         | 5             | 0                  |
| Nov          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Dec          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| <b>TOTAL</b> | <b>52</b>      | <b>52</b>     | <b>0</b>           | <b>52</b> | <b>52</b>     | <b>0</b>           |

**Table 5 - Microbiological Results for Raw Water - LUCKNOW # 5**

| Month        | Total Coliform |               |                    | E. Coli   |               |                    |
|--------------|----------------|---------------|--------------------|-----------|---------------|--------------------|
|              | # Samples      | # Samples "0" | # Samples $\geq 1$ | # Samples | # Samples "0" | # Samples $\geq 1$ |
| Jan          | 5              | 5             | 0                  | 5         | 5             | 0                  |
| Feb          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Mar          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Apr          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| May          | 5              | 5             | 0                  | 5         | 5             | 0                  |
| Jun          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Jul          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Aug          | 5              | 5             | 0                  | 5         | 5             | 0                  |
| Sep          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Oct          | 5              | 5             | 0                  | 5         | 5             | 0                  |
| Nov          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| Dec          | 4              | 4             | 0                  | 4         | 4             | 0                  |
| <b>TOTAL</b> | <b>52</b>      | <b>52</b>     | <b>0</b>           | <b>52</b> | <b>52</b>     | <b>0</b>           |

### 3.2.2 Treated Water (Point of Entry) Samples

One (1) treated water sample from each point of entry is taken every week and analyzed for E. Coli, Total Coliform, and Heterotrophic Plate Count (HPC). A total of 104 treated water samples were collected and analyzed for the above parameters. All samples had EC and TC results that were 0 cfu/100 mL. The range of HPC results were 0 - 30 cfu/100 mL. **Tables 6 and 7** provide a summary of all microbiological results performed on treated water.

**Table 6 - Microbiological Results for Treated Water (Point of Entry) - LUCKNOW # 4**

| Month        | Total Coliform |               |              | E. Coli   |               |              | HPC       |                |
|--------------|----------------|---------------|--------------|-----------|---------------|--------------|-----------|----------------|
|              | # Samples      | # Samples "0" | # Samples ≥1 | # Samples | # Samples "0" | # Samples ≥1 | # Samples | # Samples > 10 |
| Jan          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 0              |
| Feb          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 1              |
| Mar          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 1              |
| Apr          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 1              |
| May          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 0              |
| Jun          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| Jul          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| Aug          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 0              |
| Sep          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| Oct          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 1              |
| Nov          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| Dec          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| <b>TOTAL</b> | <b>52</b>      | <b>52</b>     | <b>0</b>     | <b>52</b> | <b>52</b>     | <b>0</b>     | <b>52</b> | <b>4</b>       |

**Table 7 - Microbiological Results for Treated Water (Point of Entry) - LUCKNOW # 5**

| Month        | Total Coliform |               |              | E. Coli   |               |              | HPC       |                |
|--------------|----------------|---------------|--------------|-----------|---------------|--------------|-----------|----------------|
|              | # Samples      | # Samples "0" | # Samples ≥1 | # Samples | # Samples "0" | # Samples ≥1 | # Samples | # Samples > 10 |
| Jan          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 0              |
| Feb          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| Mar          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 1              |
| Apr          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| May          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 1              |
| Jun          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| Jul          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 2              |
| Aug          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 1              |
| Sep          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| Oct          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 1              |
| Nov          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| Dec          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0              |
| <b>TOTAL</b> | <b>52</b>      | <b>52</b>     | <b>0</b>     | <b>52</b> | <b>52</b>     | <b>0</b>     | <b>52</b> | <b>6</b>       |

### 3.2.3 Distribution Samples

Distribution samples are collected every week and tested for E. Coli, Total Coliform, and 25% of the samples are also analyzed for Heterotrophic Plate Count (HPC). Ontario Regulation 170/03 requires 8 distribution samples plus one additional sample for every 1,000 people served by the system. A total of 155 distribution samples were collected and analyzed for TC and EC, which is above the required number of samples (n=108, based on 1,675 potential residents). A total of 103 distribution samples were analyzed for HPC (n=27, 25% of 108). Each TC and EC result from the treated water was 0 cfu/100 mL. The range of HPC results were 0 - 20 cfu/100 mL. **Table 8** provides a summary of all microbiological samples taken in the distribution system.

**Table 8 - Microbiological Results for Distribution System**

| Month        | Total Coliform |               |              | E. Coli    |               |              | HPC        |               |
|--------------|----------------|---------------|--------------|------------|---------------|--------------|------------|---------------|
|              | # Samples      | # Samples "0" | # Samples ≥1 | # Samples  | # Samples "0" | # Samples ≥1 | # Samples  | # Samples >10 |
| Jan          | 15             | 15            | 0            | 15         | 15            | 0            | 10         | 2             |
| Feb          | 11             | 11            | 0            | 11         | 11            | 0            | 7          | 0             |
| Mar          | 12             | 12            | 0            | 12         | 12            | 0            | 8          | 1             |
| Apr          | 12             | 12            | 0            | 12         | 12            | 0            | 8          | 2             |
| May          | 15             | 15            | 0            | 15         | 15            | 0            | 10         | 1             |
| Jun          | 12             | 12            | 0            | 12         | 12            | 0            | 8          | 0             |
| Jul          | 12             | 12            | 0            | 12         | 12            | 0            | 8          | 2             |
| Aug          | 15             | 15            | 0            | 15         | 15            | 0            | 10         | 3             |
| Sep          | 12             | 12            | 0            | 12         | 12            | 0            | 8          | 1             |
| Oct          | 15             | 15            | 0            | 15         | 15            | 0            | 10         | 1             |
| Nov          | 12             | 12            | 0            | 12         | 12            | 0            | 8          | 1             |
| Dec          | 12             | 12            | 0            | 12         | 12            | 0            | 8          | 1             |
| <b>TOTAL</b> | <b>155</b>     | <b>155</b>    | <b>0</b>     | <b>155</b> | <b>155</b>    | <b>0</b>     | <b>103</b> | <b>16</b>     |

## 3.3 Chemical Sampling and Testing as per Schedule 13, O. Reg. 170/03

### 3.3.1 Inorganics

Treated water samples are collected every 36 months (3 years) and analyzed for inorganics. The most recent samples for the Lucknow Drinking Water System were collected on June 22, 2021 and submitted to the laboratory for analysis of inorganics as listed in Schedule 23 (see **Table 9**). All parameters were found to be within compliance, however, the Arsenic level at both Lucknow #4 and Lucknow #5 exceeded the Half-Maximum Allowable Concentration (half-MAC). Any half-MAC exceedance must be sampled on a quarterly basis to comply with O. Reg. 170/03, Schedule 13-5(1) - Increased frequency under s.s 13-2 and 13-4. Inorganics will be sampled and analyzed again in **June 2024**.

**Table 9 - Inorganics Results**

| Parameter | Lucknow # 4<br>Treated Water (µg/L) | Lucknow # 5<br>Treated Water (µg/L) | Maximum Allowable<br>Concentration (µg/L) |
|-----------|-------------------------------------|-------------------------------------|---|
| Antimony  | 0.9 < MDL                           | 0.9 < MDL                           | 6   |
| Arsenic   | 5.2                                 | 5.8                                 | 10  |
| Barium    | 304                                 | 321                                 | 1000                                      |
| Boron     | 38                                  | 39                                  | 5000                                      |
| Cadmium   | 0.003 < MDL                         | 0.003 < MDL                         | 5   |
| Chromium  | 0.28                                | 0.27                                | 50  |
| Mercury   | 0.01 < MDL                          | 0.01 < MDL                          | 1   |
| Selenium  | 0.04 < MDL                          | 0.04 < MDL                          | 50  |
| Uranium   | 1.03                                | 0.874                               | 20  |

\*MDL = Laboratory Minimum Detection Limit

### 3.3.2 Organics

Treated water samples are collected every 36 months and tested for Schedule 24 organic parameters. The most recent samples were collected on June 22, 2021. All parameters were found to be within compliance. Organics will be sampled and analyzed again in **June 2024**. Samples results can be found in **Table 10**.

**Table 10 - Organics Results**

| Parameter                 | Lucknow # 4<br>Treated Water (µg/L) | Lucknow # 5<br>Treated Water (µg/L) | Maximum Allowable<br>Concentration (µg/L) |
|---------------------------|-------------------------------------|-------------------------------------|---|
| Benzene                   | 0.32 < MDL                          | 0.32 < MDL                          | 1   |
| Carbon Tetrachloride      | 0.17 < MDL                          | 0.17 < MDL                          | 2   |
| 1,2-Dichlorobenzene       | 0.41 < MDL                          | 0.41 < MDL                          | 200                                       |
| 1,4-Dichlorobenzene       | 0.36 < MDL                          | 0.36 < MDL                          | 5   |
| 1,1-Dichloroethylene      | 0.33 < MDL                          | 0.33 < MDL                          | 14  |
| 1,2-Dichloroethane        | 0.35 < MDL                          | 0.35 < MDL                          | 5   |
| Dichloromethane           | 0.35 < MDL                          | 0.35 < MDL                          | 50  |
| Monochlorobenzene         | 0.3 < MDL                           | 0.3 < MDL                           | 80  |
| Tetrachloroethylene       | 0.35 < MDL                          | 0.35 < MDL                          | 10  |
| Trichloroethylene         | 0.44 < MDL                          | 0.44 < MDL                          | 5   |
| Vinyl Chloride            | 0.17 < MDL                          | 0.17 < MDL                          | 1   |
| Diquat                    | 1 < MDL                             | 1 < MDL                             | 70  |
| Paraquat                  | 1 < MDL                             | 1 < MDL                             | 10  |
| Glyphosate                | 1 < MDL                             | 1 < MDL                             | 280                                       |
| Polychlorinated Biphenyls | 0.04 < MDL                          | 0.04 < MDL                          | 3   |

\*MDL = Laboratory Minimum Detection Limit

**Table 10 - Organics Results - Continued**

| Parameter                             | Lucknow # 4<br>Treated Water (µg/L) | Lucknow # 5<br>Treated Water (µg/L) | Maximum Allowable<br>Concentration (µg/L) |
|---------------------------------------|-------------------------------------|-------------------------------------|---|
| Benzo(a)pyrene                        | 0.004 < MDL                         | 0.004 < MDL                         | 0.01                                      |
| Alachlor                              | 0.02 < MDL                          | 0.02 < MDL                          | 5   |
| Atrazine+N-dealkylated<br>metabolites | 0.01 < MDL                          | 0.01 < MDL                          | 5   |
| Atrazine                              | 0.01 < MDL                          | 0.01 < MDL                          | --  |
| Desethyl Atrazine                     | 0.01 < MDL                          | 0.01 < MDL                          | --  |
| Azinphos-methyl                       | 0.05 < MDL                          | 0.05 < MDL                          | 20  |
| Carbaryl                              | 0.05 < MDL                          | 0.05 < MDL                          | 90  |
| Carbofuran                            | 0.01 < MDL                          | 0.01 < MDL                          | 90  |
| Chlorpyrifos                          | 0.02 < MDL                          | 0.02 < MDL                          | 90  |
| Diazinon                              | 0.02 < MDL                          | 0.02 < MDL                          | 20  |
| Dimethoate                            | 0.06 < MDL                          | 0.06 < MDL                          | 20  |
| Diuron                                | 0.03 < MDL                          | 0.03 < MDL                          | 150                                       |
| Malathion                             | 0.02 < MDL                          | 0.02 < MDL                          | 190                                       |
| Metolachlor                           | 0.01 < MDL                          | 0.01 < MDL                          | 50  |
| Metribuzin                            | 0.02 < MDL                          | 0.02 < MDL                          | 80  |
| Phorate                               | 0.01 < MDL                          | 0.01 < MDL                          | 2   |
| Prometryne                            | 0.03 < MDL                          | 0.03 < MDL                          | 1   |
| Simazine                              | 0.01 < MDL                          | 0.01 < MDL                          | 10  |
| Terbufos                              | 0.01 < MDL                          | 0.01 < MDL                          | 1   |
| Triallate                             | 0.01 < MDL                          | 0.01 < MDL                          | 230                                       |
| Trifluralin                           | 0.02 < MDL                          | 0.02 < MDL                          | 45  |
| 2,4-Dichlorophenoxyacetic acid        | 0.19 < MDL                          | 0.19 < MDL                          | 100                                       |
| Bromoxynil                            | 0.33 < MDL                          | 0.33 < MDL                          | 5   |
| Dicamba                               | 0.20 < MDL                          | 0.20 < MDL                          | 120                                       |
| Diclofop-methyl                       | 0.40 < MDL                          | 0.40 < MDL                          | 9   |
| MCPA                                  | 0.00012 < MDL                       | 0.00012 < MDL                       | 0.1                                       |
| Picloram                              | 1 < MDL                             | 1 < MDL                             | 190                                       |
| 2,4-Dichlorophenol                    | 0.15 < MDL                          | 0.15 < MDL                          | 900                                       |
| 2,4,6-Trichlorophenol                 | 0.25 < MDL                          | 0.25 < MDL                          | 5   |
| 2,3,4,6-Tetrachlorophenol             | 0.20 < MDL                          | 0.20 < MDL                          | 100                                       |
| Pentachlorophenol                     | 0.15 < MDL                          | 0.15 < MDL                          | 60  |

\*MDL = Laboratory Minimum Detection Limit

### 3.3.3 Trihalomethanes and Haloacetic Acids

Distribution samples are taken every three months from representative points in the distribution system and tested for Trihalomethanes (THMs) and Haloacetic Acids (HAAs). In 2023, samples were collected during the months of February, May, August, and November and results are expressed as a running annual average (RAA). The Ontario Drinking Water Quality Standards (ODWQS) has set a Maximum Allowable Concentration (MAC) of 100 µg/L for THMs and it is expressed as a running annual average (RAA). The RAA for THMs was found to be 6.9 µg/L for the Well n<sup>o</sup> 4 and 9.7 µg/L for the well n<sup>o</sup> 5. The HAA MAC is 80 µg/L. Refer to **Tables 11 and 12** for the summary of trihalomethane and haloacetic acid results.

### 3.3.4 Nitrate and Nitrite

Treated water samples are taken every three months and tested for nitrate and nitrite. In 2022, samples were collected during the months of February, May, August, and November. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Allowable Concentration (MAC) of 10 mg/L for nitrates and 1 mg/L for nitrites. The results were found to be within compliance and are summarized in **Tables 11 and 12**.

**Table 11 - Nitrate, Nitrite, THM and HAA Results at Lucknow Drinking Water System - LUCKNOW # 4**

| Month      | Nitrite (mg/L) | Nitrate (mg/L) | THMs (µg/L) | Total HAAs (µg/L) |
|------------|----------------|----------------|-------------|-------------------|
| Feb        | < 0.003        | 0.008          | 7.0         | <5.3              |
| May        | 0.003          | 0.011          | 10.0        | <5.3              |
| Aug        | < 0.003        | 0.013          | 4.3         | <5.3              |
| Nov        | <0.003         | 0.009          | 6.3         | <5.3              |
| Average    | < 0.003        | 0.010          | RAA 6.9     | <5.3              |
| Maximum    | < 0.003        | 0.013          |             | <5.3              |
| MAC (mg/L) | 1.0            | 10             | 100         | 80                |

**Table 12 - Nitrate, Nitrite, THM and HAA Results at Lucknow Drinking Water System - LUCKNOW # 5**

| Month      | Nitrite (mg/L) | Nitrate (mg/L) | THMs (µg/L) | Total HAAs (µg/L) |
|------------|----------------|----------------|-------------|-------------------|
| Feb        | 0.003          | 0.008          | 4.6         | <5.3              |
| May        | 0.004          | < 0.006        | 6.2         | <5.3              |
| Aug        | < 0.003        | 0.008          | 13.0        | <5.3              |
| Nov        | <0.003         | <0.006         | 15          | <5.3              |
| Average    | 0.003          | < 0.007        | RAA 9.7     | <5.3              |
| Maximum    | 0.004          | < 0.008        |             | <5.3              |
| MAC (mg/L) | 1.0            | 10             | 100         | 80                |

### 3.3.5 Sodium

One (1) water sample is collected from each Point of Entry (treated water) every 60 months (5 years) and analyzed for Sodium. The Ministry’s *Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, PIBS 4449e01, June 2006*, states: “The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.” These samples were collected on July 27, 2021. Results can be found in **Table 13**. The next sampling date for Sodium will be in 2026.

### 3.3.6 Fluoride

One (1) water sample is collected from each Point of Entry (treated water) every 60 months (5 years) and analyzed for Fluoride. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Allowable Concentration (MAC) of 1.5 mg/L. On September 6, 2022, samples were collected for this analysis. Both treated water samples exceeded the MAC due to naturally occurring fluoride in the aquifers. These exceedances were reported to the Grey Bruce Health Unit and the Ministry’s Spills Action Centre (AWQI # 159910 and 159911). The results are summarized in **Table 13**. The next sampling date for Fluoride will be in 2027.

**Table 13 - Sodium and Fluoride Results**

| Location                  | Sodium                     |  | Fluoride                       |                        |
|---------------------------|----------------------------|--|--------------------------------|------------------------|
|                           | Sample Date: July 27, 2021 |  | Sample Date: September 6, 2022 |                        |
|                           | Result (mg/L)              |  | Result (mg/L)                  | Resample Result (mg/L) |
| Lucknow # 4 Treated Water | 11.1                       |  | 1.69                           | 1.76                   |
| Lucknow # 5 Treated Water | 12.8                       |  | 1.59                           | 1.70                   |
| MAC (mg/L)                | 20                         |  | 1.50                           |                        |

### 3.3.7 Lead

Schedule 15.1 of Ontario Regulation 170/03 requires that samples be taken during two seasons: once between December 15 and April 15, and once between June 15 and October 15. Two (2) Lead, pH and alkalinity samples were collected on January 9, 2023. Two (2) Lead, pH and alkalinity samples were collected on July 17, 2023. These parameters are required to be sampled and analyzed again next in the 2023-2024 sampling season. Results can be found in **Table 14**.

**Table 14 - Lead Sampling Program Results**

| Season     | Alkalinity (mg/L) | pH   | Lead (µg/L) |
|------------|-------------------|------|-------------|
| Dec-Apr    | 225               | 8.18 | 0.10        |
|            | 221               | 8.13 | 0.16        |
| Jun-Oct    | 232               | 8.10 | 0.11        |
|            | 218               | 8.09 | 0.08        |
| MAC (µg/L) | –                 | –    | 10          |

## 4.0 WATER AND CHEMICAL USE

### 4.1 Chemical Usage

In 2023, the total amount of 12% sodium hypochlorite (NaOCl) used to treat the water supplied by the Lucknow wells is tabulated in **Table 15** with the average chlorine dosage.

**Table 15 - Sodium Hypochlorite Usage**

| Month          | LUCKNOW # 4   |                       | LUCKNOW # 5   |                       |
|----------------|---------------|-----------------------|---------------|-----------------------|
|                | Usage (kg)    | Average Dosage (mg/L) | Usage (kg)    | Average Dosage (mg/L) |
| Jan            | 41.21         | 4.15                  | 15.14         | 3.99                  |
| Feb            | 33.36         | 3.93                  | 12.89         | 3.98                  |
| Mar            | 38.40         | 3.67                  | 9.67          | 3.51                  |
| Apr            | 126.98        | 3.78                  | 19.34         | 3.55                  |
| May            | 41.63         | 3.80                  | 19.06         | 4.02                  |
| Jun            | 52.84         | 3.65                  | 29.01         | 4.78                  |
| Jul            | 52.00         | 3.76                  | 23.27         | 4.61                  |
| Aug            | 55.08         | 4.10                  | 18.22         | 4.22                  |
| Sep            | 48.78         | 4.06                  | 23.13         | 4.27                  |
| Oct            | 43.17         | 4.49                  | 27.47         | 3.98                  |
| Nov            | 27.33         | 4.01                  | 35.18         | 3.55                  |
| Dec            | 41.07         | 3.88                  | 25.37         | 4.08                  |
| <b>TOTAL</b>   | <b>601.85</b> |                       | <b>257.75</b> |                       |
| <b>Average</b> |               | <b>3.95</b>           |               | <b>4.04</b>           |

**Sodium Hypochlorite Grand Total Usage: 859.60 kg**  
**Sodium Hypochlorite Average Dosage: 3.99 mg/L**

### 4.2 Summary of Flow Rates, Annual Volumes and Capacities

A summary of the water supplied to the distribution system in 2022 from each well supply is provided in **Tables 16 and 17**. The combined annual volumes and capacities are provided in **Table 19**. The volumes reported for each well supply are taken from the SCADA continuous monitoring system. The following flow meters were calibrated on July 5, 2023:

Lucknow # 4: Raw water flow meter  
 Lucknow # 5: Raw water flow meter



**Table 16 - Flow Rates, Annual Volumes, and Capacities - LUCKNOW # 4**

| Month               | Raw Flow Daily Max (L/s) | Raw Flow Monthly Avg (L/s) | Raw Volume Monthly Total (m <sup>3</sup> ) | Raw Volume Daily Max (m <sup>3</sup> ) | Raw Volume Monthly Avg (m <sup>3</sup> ) | Capacity Monthly (%) |
|---------------------|--------------------------|----------------------------|--|--|--|----------------------|
| Jan                 | 13.57                    | 12.03                      | 9,882.06                                   | 419.90                                 | 318.78                                   |                      |
| Feb                 | 13.10                    | 12.04                      | 8,961.17                                   | 408.20                                 | 320.04                                   |                      |
| Mar                 | 13.09                    | 12.03                      | 10,288.84                                  | 452.00                                 | 331.90                                   |                      |
| Apr                 | 13.08                    | 12.02                      | 9,804.97                                   | 418.13                                 | 326.83                                   |                      |
| May                 | 14.36                    | 12.35                      | 11,038.69                                  | 552.38                                 | 356.09                                   |                      |
| Jun                 | 13.00                    | 11.95                      | 14,368.48                                  | 690.76                                 | 478.95                                   |                      |
| Jul                 | 13.29                    | 11.90                      | 14,090.12                                  | 583.42                                 | 454.52                                   |                      |
| Aug                 | 12.94                    | 11.84                      | 13,007.93                                  | 561.40                                 | 419.61                                   |                      |
| Sep                 | 13.14                    | 11.63                      | 10,174.87                                  | 563.74                                 | 339.16                                   |                      |
| Oct                 | 12.98                    | 10.80                      | 8,951.37                                   | 698.19                                 | 288.75                                   |                      |
| Nov                 | 12.96                    | 9.48                       | 6,755.72                                   | 642.75                                 | 225.19                                   |                      |
| Dec                 | 12.19                    | 10.83                      | 10,319.30                                  | 521.61                                 | 332.88                                   |                      |
| <b>PTTW Max</b>     | <b>14.42</b>             | <b>14.42</b>               | <b>28,439.58</b>                           | <b>935</b>                             |  |                      |
| <b>Annual Max</b>   | <b>14.36</b>             |                            |  | 698.19                                 |  | 74.70%               |
| <b>Annual Avg</b>   |                          | 11.57                      |  |  | 348.75                                   | 37.40%               |
| <b>Annual Total</b> |                          |                            | <b>127,643.52</b>                          |  |  |                      |

\*Flow exceedances are due to instantaneous spikes related to pump startup.

**Table 17 - Flow Rates, Annual Volumes, and Capacities - LUCKNOW # 5**

| Month               | Raw Flow Daily Max (L/s) | Raw Flow Monthly Avg (L/s) | Raw Volume Monthly Total (m <sup>3</sup> ) | Raw Volume Daily Max (m <sup>3</sup> ) | Raw Volume Monthly Avg (m <sup>3</sup> ) | Capacity Monthly (%) |
|---------------------|--------------------------|----------------------------|--|--|--|----------------------|
| Jan                 | 38.33                    | 36.61                      | 3,734.96                                   | 254.13                                 | 120.48                                   |                      |
| Feb                 | 38.54                    | 37.09                      | 3,213.79                                   | 162.32                                 | 114.78                                   |                      |
| Mar                 | 40.82                    | 38.05                      | 2,738.04                                   | 167.79                                 | 88.32                                    |                      |
| Apr                 | 40.82                    | 38.81                      | 3,405.92                                   | 185.02                                 | 113.53                                   |                      |
| May                 | 40.33                    | 38.60                      | 4,846.03                                   | 414.09                                 | 156.32                                   |                      |
| Jun                 | 40.55                    | 38.54                      | 7,636.52                                   | 667.40                                 | 254.55                                   |                      |
| Jul                 | 149.22                   | 38.53                      | 5,378.99                                   | 486.89                                 | 173.52                                   |                      |
| Aug                 | 39.27                    | 36.28                      | 636.33                                     | 168.67                                 | 20.53                                    |                      |
| Sep                 | 40.16                    | 31.97                      | 4,645.37                                   | 447.62                                 | 154.85                                   |                      |
| Oct                 | 39.85                    | 29.25                      | 6,621.00                                   | 897.00                                 | 213.59                                   |                      |
| Nov                 | 38.97                    | 22.73                      | 8,014.00                                   | 1,027.00                               | 267.12                                   |                      |
| Dec                 | 36.91                    | 28.76                      | 5,639.00                                   | 438.00                                 | 181.92                                   |                      |
| <b>PTTW Max</b>     | <b>37.90</b>             | <b>37.90</b>               | <b>45,625</b>                              | <b>1,500</b>                           | <b>-</b>                                 | <b>-</b>             |
| <b>Annual Max</b>   | <b>149.22</b>            |                            |  | 1,027                                  |  | 68.50%               |
| <b>Annual Avg</b>   |                          | 34.60                      |  |  | 154.96                                   | 10.30%               |
| <b>Annual Total</b> |                          |                            | <b>56,510</b>                              |  |  |                      |

\*Flow exceedances are due to instantaneous spikes related to pump startup or shutdown, July exceedance was due to Flow Meter calibration

**Table 18 - Flow Rates, Annual Volumes and Capacities - LUCKNOW # 4 AND # 5 COMBINED**

| Month           | Raw Volume Monthly Total (m <sup>3</sup> ) | Raw Volume Daily Max (m <sup>3</sup> ) | Raw Volume Monthly Avg (m <sup>3</sup> ) | Capacity Monthly (%) |
|-----------------|--|--|--|----------------------|
| Jan             | 13,617                                     | 525.67                                 | 439.26                                   |                      |
| Feb             | 2,175                                      | 535.47                                 | 434.82                                   |                      |
| Mar             | 13,027                                     | 500.34                                 | 420.22                                   |                      |
| Apr             | 13,211                                     | 504.67                                 | 440.36                                   |                      |
| May             | 15,885                                     | 948.05                                 | 512.41                                   |                      |
| Jun             | 2,2005                                     | 1,061.52                               | 733.50                                   |                      |
| Jul             | 19,469                                     | 866.84                                 | 628.04                                   |                      |
| Aug             | 13,644                                     | 580.99                                 | 440.14                                   |                      |
| Sep             | 14,820                                     | 692.29                                 | 494.01                                   |                      |
| Oct             | 15,573                                     | 1,023.41                               | 502.35                                   |                      |
| Nov             | 14,769                                     | 1,101.04                               | 633.63                                   |                      |
| Dec             | 15,959                                     | 686.12                                 | 514.79                                   |                      |
| <b>PTTW Max</b> | <b>45,625</b>                              | <b>1,500.00</b>                        | <b>-</b>                                 |                      |
| Annual Max      |  | 1101.04                                |  | 73.40%               |
| Annual Avg      |  |  | 516.15                                   | 33.64%               |
| Annual Total    | <b>184,153.36</b>                          |  |  |                      |

### 4.3 System Capacity (O. Reg. 170/03, Schedule 22-2 (3) Continued)

The following is a comparison of the annual volumes to the rated capacity and flow rates approved in the systems' PTTW, DWWP and MDWL. The total system capacity represents the percentage capacity of the sum of all the water produced in relation to the total system volume permitted. A summary of the totals for all the well supplies is presented in **Table 19**.

**Table 19 - Total Volumes of All Well Supplies**

| Location (Well Supply)                                    | Total Volume for 2023 (m <sup>3</sup> ) |
|---|---|
| Lucknow Well # 4  | 127,643.52                              |
| Lucknow Well # 5  | 56,510.00                               |
| <b>Total Rated Capacity, PTTW (m<sup>3</sup>)</b>         | <b>547,500.00</b>                       |
| Grand Total (all well supplies), Actual (m <sup>3</sup> ) | 184,153.36                              |
| Overall Operating Capacity, Actual %                      | 33.64%                                  |

## 5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

The following summarizes water system improvements and routine and preventative maintenance for the Lucknow Drinking Water System Supply:

### Both Sites:

Routine and preventative maintenance performed as per Jobs Plus schedule.  
Flow meter calibrations completed.  
Georgian Bay Fire and Safety inspections completed.  
Ministry Drinking Water Inspection conducted.  
Semi-annual flushing and annual valve turning completed.  
Backflow preventer testing completed.  
New Water Tower was placed in service November 23 (Old water Tower was demolished).

### Lucknow # 4:

December: New CI17 Installed

### Lucknow # 5:

March: New PTTW  
August: Upgrades for a frequency drive on the well pump was completed  
December: Repaired Injector  
New CI17 installed

## 6.0 MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS INSPECTIONS AND REGULATORY ISSUES (Schedule 22-2 (2))

- A list of Capital Items for 2023 was submitted to the Township of Huron-Kinloss and approved by council on March 21, 2022.
- DWQMS Management Review was conducted on June 26, 2023 (for the 2022 year).
- DWQMS Internal Audit was conducted between July 23, 2023.
- DWQMS Complete Risk Assessment was started but not completed in 2023 due to staffing time constraints.
- DWQMS External Audit (off-site) was conducted on July 21, 2022.
- An Emergency Response Exercise was conducted by the Township in September 2023 and Veolia was asked to participate.
- MECP Drinking Water Inspection of South Lucknow (ACW) was conducted on April 13, 2022 and awarded a rating of 100.00% (previous rating was 100.00%).
- MECP Drinking Water Inspection was conducted from May 5 to July 13, 2023 and awarded a rating of 92.37% (previous rating was 100%). There were several non-compliances noted:

- The Lucknow standpipe is in disrepair and needs to be replaced. At the time of the inspection the Lucknow Standpipe Replacement project was well underway. Owner representative, Jane Eybergen, Public Works Administrative Assistant provided the following statement regarding this project: "It is running on schedule and is expected to be commissioned in December 2023."
- It is expected the new Lucknow standpipe will be operational for the next inspection cycle. - *Completed*
  
- Where required continuous monitoring equipment, used for the monitoring of chlorine residual and/or turbidity triggered an alarm or an automatic shut-off, a qualified person did not respond in a timely manner and/or did not take appropriate actions.
- By July 20, 2023, the operating authority shall provide the author of this report documentation that demonstrates operators have reviewed the standard operating procedure (SOP) to ensure compliance to O. Reg. 170/03 6-5 (1)1-4. - *Completed*
  
- All changes to the system registration information were not provided within ten (10) days of the change.
- Subsequent to the site inspection the new Compliance Coordinator immediately updated the profile information and submitted it to the ministry. - *No further action is required*
  
- Records did not confirm that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.
- By July 20, 2023, the operating authority shall provide the author of this report documentation that demonstrates operators have reviewed the standard operating procedure (SOP) to ensure compliance to O. Reg. 170/03 6-3 (1). - *Completed*

There was (1) Adverse Water Quality Incident in the Lucknow DWS in 2023:

- AWQI #163838 - Chlorine Analyzer failed, which gave incorrect readings. - Once replaced and calibrated the readings were in compliance.

## 7.0 WELL LEVELS (PTTW)

The Lucknow DWS has a Permit To Take Water (PTTW), which dictates the capacity that each well is permitted to supply, as well as specific monitoring parameters. In addition to flow, static well levels are taken on a weekly basis to monitor the performance of the aquifer. **Table 20** provides a summary of the static well levels recorded in 2023.

**Table 20 - Static Well Levels (PTTW) - Monthly Averages**

| Month | Lucknow Well # 4 | Lucknow Well # 5 |
|-------|------------------|------------------|
|       | Average          | Average          |
| Jan   | 6.47             | 6.00             |
| Feb   | 6.85             | 5.80             |
| Mar   | 6.81             | 5.80             |
| Apr   | 6.14             | 5.54             |
| May   | 6.54             | 6.24             |
| Jun   | 6.65             | 6.83             |
| Jul   | 6.69             | 6.49             |
| Aug   | 6.97             | 6.58             |
| Sep   | 6.90             | 6.77             |
| Oct   | 6.83             | 6.69             |
| Nov   | 6.57             | 6.13             |
| Dec   | 6.19             | 6.21             |
| Min   | <b>5.82</b>      | <b>5.34</b>      |
| Max   | <b>7.43</b>      | <b>7.24</b>      |
| Avg   | <b>6.58</b>      | <b>6.25</b>      |

## 8.0 SOURCE WATER PROTECTION (*Clean Water Act, 2006*)

A Drinking Water Source Protection Assessment (DWSPA) Report was generated for the Ausable Bayfield Maitland Valley Source Protection Region by the Conservation Authority Source Protection Office. This report identifies vulnerable areas, recharge areas, and potential threats to help protect existing and future sources of drinking water from contamination and overuse. This report can be found on-line at:

<http://home.waterprotection.ca/source-protection-plan/assessment-reports/saugeen-valley/>

The DWSPA report states: “The WHPA extends south-eastward from the wells to include about 7.7 km along the south Huron-Kinloss border and into Ashfield-Colborne-Wawanosh. WHPA-A, the 100 m radius around the wells, falls entirely within Huron-Kinloss. However, a small portion of WHPA-B, located in ACW, has a vulnerability score of 10. The remainder of WHPA-B has a vulnerability score of 8 or 6. The section of WHPA-C that falls into ACW has a vulnerability score of 8, 6 or 4. Finally, WHPA-D has a vulnerability score of 6 or less.”

In conclusion, as stated in the DWSPA Report: “No issues with wells or conditions resulting from past activities were identified within the WHPA.”

## 9.0 SOUTH LUCKNOW - SUMMARY OF DATA

### 9.1 Water Treatment Equipment, Operation and Monitoring

#### 9.1.1 Distribution Free Chlorine Residuals (Grab Samples)

A total of 49 distribution residuals were collected in conjunction with weekly microbiological sampling. A summary of all the residuals collected is presented in **Table 21**.

**TABLE 21 - Average Distribution Free Chlorine Residuals - SOUTH LUCKNOW (ACW)**

| Month                 | Residual (mg/L) |
|-----------------------|-----------------|
| Jan                   | 1.39            |
| Feb                   | 1.31            |
| Mar                   | 1.36            |
| Apr                   | 1.26            |
| May                   | 1.24            |
| Jun                   | 1.24            |
| Jul                   | 1.13            |
| Aug                   | 1.05            |
| Sep                   | 1.09            |
| Oct                   | 1.19            |
| Nov                   | 1.50            |
| Dec                   | 1.48            |
| <b>CT REQUIREMENT</b> | <b>0.20</b>     |
| <b>Annual Min</b>     | <b>1.02</b>     |
| <b>Annual Max</b>     | <b>1.76</b>     |
| <b>Annual Avg</b>     | <b>1.27</b>     |

#### 9.1.2 Microbiological Results for Distribution System

Distribution samples are collected every week and tested for E. Coli (EC), Total Coliform (TC), and at least 25% of the samples are also analyzed for Heterotrophic Plate Count (HPC). South Lucknow is regarded as part of the Lucknow Drinking Water System as outlined in ACW Municipal By-Law 60-2014. Results are shown in **Table 22**.

**Table 22 - Microbiological Results - Distribution - SOUTH LUCKNOW (ACW)**

| Month        | Total Coliform |               |              | E. Coli   |               |              | HPC       |               |
|--------------|----------------|---------------|--------------|-----------|---------------|--------------|-----------|---------------|
|              | # Samples      | # Samples "0" | # Samples ≥1 | # Samples | # Samples "0" | # Samples ≥1 | # Samples | # Samples >10 |
| Jan          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0             |
| Feb          | 3              | 3             | 0            | 3         | 3             | 0            | 3         | 0             |
| Mar          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 1             |
| Apr          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0             |
| May          | 5              | 5             | 0            | 5         | 5             | 0            | 5         | 0             |
| Jun          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0             |
| Jul          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 2             |
| Aug          | 5              | 5             | 0            | 5         | 5             | 0            | 4         | 0             |
| Sep          | 4              | 4             | 0            | 4         | 4             | 0            | 4         | 0             |
| Oct          | 5              | 5             | 0            | 5         | 5             | 0            | 4         | 0             |
| Nov          | 3              | 3             | 0            | 3         | 3             | 0            | 2         | 0             |
| Dec          | 4              | 4             | 0            | 4         | 4             | 0            | 3         | 0             |
| <b>TOTAL</b> | <b>49</b>      | <b>49</b>     | <b>0</b>     | <b>49</b> | <b>49</b>     | <b>0</b>     | <b>45</b> | <b>3</b>      |

## 9.2 Chemical Sampling and Testing as per Schedule 13, O. Reg. 170/03

### 9.2.1 Trihalomethane (Schedule 13, s. 13-6)

Distribution samples are taken quarterly (every 3 months) from representative points in the distribution system and tested for Trihalomethanes (THMs). In 2023, samples were collected during the months of February, May, August, and November. The Ontario Drinking Water Quality Standards (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and it is expressed as a Running Annual Average (RAA). Refer to **Table 23** for the summary of the THM results and RAA for the South Lucknow samples.

**Table 23 - Trihalomethane (Schedule 13, s. 13-6) Results - SOUTH LUCKNOW (ACW)**

| Month       | THMs ( µg/L)<br>2022 | THMs ( µg/L)<br>2023 | RAA  |
|-------------|----------------------|----------------------|------|
| February    | 7.6                  | 7.5                  | 9.6  |
| May         | 9.8                  | 10                   | 10.1 |
| August      | 13                   | 14                   | 10.4 |
| November    | 10                   | 12                   | 10.9 |
| MAC ( µg/L) | 100                  | 100                  | 100  |

### 9.2.2 Lead (Schedule 15.1) - O. Reg. 170/03, s. 11 (6) (g)

Schedule 15.1 of Ontario Regulation 170/03 requires that the samples be taken during two (2) seasons: once between December 15 and April 15, and once between June 15 and October 15. By-Law 60-2014 was amended in November 2015 to ensure that this lead sampling requirement is included in the Agreement between Ashfield-Colborne-Wawanosh and Huron-Kinloss. In 2023, samples were collected from South Lucknow and analyzed for lead, pH, and alkalinity. These results are presented in **Table 24**.

**Table 24 - Lead Sampling Program (Schedule 15.1) Results**

| Season     | Location            | Alkalinity | pH   | Lead (µg/L) |
|------------|---------------------|------------|------|-------------|
| Dec -Apr   | South Lucknow (ACW) | 222        | 8.19 | 0.15        |
| Jun - Oct  | South Lucknow (ACW) | 219        | 8.11 | 0.14        |
| MAC (µg/L) |                     | –          | –    | 10          |

### 10.0 Summary of Flow Rates, Annual Volumes and Capacities (O. Reg. 170/03, Schedule 22-2(3))

Water supplied to South Lucknow in 2023 is monitored by flow meters located at residences on Lucknow Line. These meter readings are viewed quarterly. A summary of these volumes is provided in **Table 25**. The historical usage is presented in Figure 11.

**Table 25 - Flow Meter Readings - SOUTH LUCKNOW (ACW)**

| Location           | Previous | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter | Annual Usage (m <sup>3</sup> ) |
|--------------------|----------|-------------|-------------|-------------|-------------|--------------------------------|
| 86637              | No Meter | No Meter    | No Meter    | No Meter    | No Meter    | No Meter                       |
| 86663              | 11,874   | 12,040      | 12,184      | 12,235      | 12,336      | 462                            |
| 86667              | 10,662   | 10,720      | 10,814      | 10,921      | 11,006      | 344                            |
| 86673              | 10,772   | 10,819      | 10,862      | 10,905      | 10,948      | 176                            |
| 86681              | 3,837    | 3,908       | 3,980       | 4,043       | 4,115       | 278                            |
| 86687              | 4,747    | 4,784       | 4,837       | 4,867       | 4,903       | 156                            |
| 86699              | 7,422    | 7,457       | 7,482       | 7,508       | 7,530       | 108                            |
| 86705              | 8,649    | 8,676       | 8,708       | 8,739       | 8,768       | 119                            |
| 86690              | 6,210    | 6,210       | 6,210       | 6,210       | 6,210       | meter not working              |
| 86658-B            | No Meter | No Meter    | No Meter    | No Meter    | No Meter    | No Meter                       |
| 86714-1            | 1,009    | 1,044       | 1,077       | 1,109       | 1,141       | 132                            |
| 86714-2            | 1,063    | 1,078       | 1,092       | 1,103       | 1,115       | 52                             |
| 86714-3            | 1,128    | 1,150       | 1,173       | 1,196       | 1,219       | 91                             |
| <b>GRAND TOTAL</b> |          |             |             |             |             | 1,918                          |