June 9, 2020 & June 30, 2020 – Virtual Public Information Centre (PIC)
Transcript of Overview Presentation – Master Servicing Plan (MSP)
First Posted on June 9, 2020

This document provides documentation of the verbal content of the Virtual PIC Overview Presentation first posted on June 9, 2020. Each section starts with an indication of a slide number followed by a time stamp. The time stamp may be used to advance the video to sections of greater interest.

Slide 0 – Title Slide - 00:0:00,00

Welcome to the Virtual Public Information Centre for the Water, Wastewater and Stormwater Master Servicing Plan Update.

I will be presenting on behalf of GM BluePlan Limited, the consulting firm selected by the City of Brantford to assist with this project.

Slide I-1 – Welcome - 00:0:14,00

The Master Servicing Plan, or MSP, is one of several studies being undertaken by the City to help identify the City's long-term growth needs. The goal of the MSP is to develop a Long-Term Servicing Strategy for the City's water, wastewater, and stormwater infrastructure. The servicing strategies have been developed to ensure the maintenance of services for existing users and to support future growth.

Slide I-2 – Virtual Public Information Centre (PIC) - 00:0:37,00

In response to the advice of public health officials to limit in-person gatherings due COVID-19, this Virtual PIC has been developed. Through this Virtual PIC, you will be able to learn more about the Master Servicing Plan's Preliminary Preferred Servicing Strategies for the water, wastewater, and stormwater infrastructure and to provide comments on the Master Servicing Plan findings.

This presentation is the first of many steps to the Virtual PIC process. The public is invited to submit questions to be answered by the Master Servicing Plan team. Questions submitted before the June

23 deadline will be answered in a question and answer video posted on June 30th. Questions asked after June 23rd but before July 21st, will be answered through a Frequently Asked document.

Slide I-3 – Growth Management Assumptions - 00:1:21,00

The Master Servicing Strategy has been developed to ensure the maintenance of services for existing users as well as to support future growth. For the 2019 MSP, the servicing strategy focuses on supporting growth out to 2041.

The Master Servicing Plan's population and employment projections are based on the City's Official Plan which designates population and employment forecasts for new urban land uses and internal growth areas. The City's population is anticipated to grow by 61,300 people by 2041 for a total population of 163,000; while the City's employment is anticipated to grow by 34,110 jobs by 2041 for a total employment of 79,000.

Slide I-4 – Municipal Class EA Process - 00:2:03,00

The Master Servicing Plan Update sets out to meet the requirements of the Municipal Engineers Association, or MEA, Class Environmental Assessment process, which involves the completion of Phase 1 and Phase 2 of the Class EA process for Master Plans.

Phase 1 of the process focuses on identifying the problem and opportunities, and Phase 2 of the process involves the identification and evaluation of "Alternative Solutions".

We are currently in the second phase.

Slide I-5 – Evaluation Methodology - 00:2:29,00

This slide outlines the evaluation framework used through the MSP to identify and evaluate water, wastewater, and stormwater servicing strategies. The MSP utilizes a two-step screening and evaluation approach.

Under step one, all potential servicing concepts, to address the identified system opportunities and constraints, were considered and evaluated on the basis of each concepts overall advantages, disadvantages, and the overall favorability against other servicing concepts. Following this high level review all concepts that were found to be generally unfavorable or having significant technical challenges where screened out. All concepts that were carried forwarded were then further evaluated under step two.

Under step two, all servicing concepts that were carried forward were further developed into more detailed servicing alternatives. These alternatives were then evaluated using four major evaluation factors including Technical, Environmental, Social/Cultural, and Financial.

Under each major evaluation factor, multiple criteria, as presented on the next slide, were reviewed and scored either high (show as green), representing the most favorable conditions, medium (shown as orange), or low (shown as red), representing the least favorable conditions.

Once all alternatives were evaluated, the preliminary preferred alternative was identified using the reasoned argument approach. The reasoned argument approach does not use an overall numeric scoring system, but focuses on identifying clear and thorough rationale of trade-offs among alternatives based on each alternative's anticipated impacts and benefits. The basis of this approach is to qualitatively evaluate the relative advantages, disadvantages, impacts, and benefits of each alternative.

Slide I-6 – Evaluation Criteria - 00:4:16,00

As mentioned on the previous slide, each servicing alternative was subject to a four-point evaluation which included technical factors, environmental factors, social/cultural factors, and financial factors.

Under the environmental factors, the following criteria were considered: protects environmental features, protects wildlife and species-at-risk, minimizes climate change impacts.

Under the financial factors, the following criteria were considered: capital and life-cycle costs, operational and maintenance costs, aligns with approval and permitting process.

Under the technical factors, the following criteria were considered: meets existing and future needs, provides reliable service, minimizes and manages construction risk, supports phased expansion of the system, operational complexity, and resiliency to climate change.

Under social and cultural factors, the following criteria were considered: protects residents' quality of life, manages and minimizes construction impacts, protects cultural and archeological heritage features.

Slide MSP-1 – Water Servicing – Map Legend - 00:5:21,00

The water servicing alternatives presented in the following section include maps that highlight the strategies.

Pictured in this slide is the legend for the water servicing maps, which is applicable to all upcoming water maps.

Slide MSP-2 – Water Servicing – Existing Conditions in the Water System - 00:5:34,00

The figure to the left provides and overview of the City's existing water system. Water for the City is supplied by the City's Holmedale Water Treatment Plant, which receives and treats water from the Grand River. The City's water system is organized into three pressure districts, consisting of:

Pressure District 1 which generally includes the City's southwest including the downtown area,

Pressure District 2/3 which generally includes the City east, and

Pressure District 4 which generally includes the City's northwest.

Also shown on the figure are the future water service areas, which include the City's expansion lands to the north and east, and Tutela to the southwest. The Tutela area does have existing water servicing, but the system is currently connected to the County of Brant's Mt. Pleasant water system. In the future, the Tutela water system will be connected to the City of Brantford's water system.

To develop the water servicing concepts and the preliminary preferred solution, a review of the existing water system was conducted to determine existing and future needs. This review identified supply, storage, pumping, transmission, and pressure opportunities and constraints. Key considerations include:

Water treatment capacity to accommodate growth needs,

Water system pumping and storage capacity to accommodate growth needs,

Watermain transmission capacity to support system pressure and flows, and

Extending of water servicing to the expansion lands.

Slide MSP-3 – Water Servicing – Supply - 00:6:59,00

The graph on the left shows the City's existing water treatment plant capacity against the projected water supply needs. The treatment capacity of the Holmedale Water Treatment Plant is 100 MLD (Million Litres Per Day) as show by the black horizontal line. Historic maximum day demand within the City has fluctuated between 40 and 60 MLD as shown by the blue points. When projecting the City's long-term water supply needs, it is expected that the 2041 demands needs will be 120 MLD, exceeding the Holmedale Water Treatment Plant's capacity of 100 MLD.

Water treatment plant upgrades typically represent substantial planning and construction projects requiring multiple years of planning, design, and construction. As such, when planning for major facility upgrades, an 80% of capacity trigger, as shown by the orange line, is used for the initiation of planning and design process, and the 90% capacity triggers, as shown by the red horizontal line, is used as the project's target completion date. Based on these capacity triggers, the treatment plant upgrade process will need to commence by 2025, and upgrades being completed by 2031.

Water treatment plant upgrades are expected to consist primarily of optimization of major facility processes and expansion of minor and limiting processes. All the required upgrades will be completed within the existing property.

Slide MSP-4 – Water Servicing – Screening of Water Pressure Concepts - 00:8:20,00

Four pressure district servicing concepts were presented at the previous PIC.

Concept 1: shown on the far left, involves maintaining the current system pressure district boundaries. This concept was carried forward as it is easy to implement and potentially minimizes facility upgrade needs.

Concept 2: shown second to the left, consists of splitting the existing Pressure District 2/3 into two new pressure districts, with the goal of improving system pressures and to optimize facility needs. This concept was screened out, as it would be too difficult to implement and may complicate system operations unless additional new facilities are also constructed.

Concept 3: show second to the right, involves the expansion of Pressure District 4 eastwards to eliminate the existing Pressure District 2 and realign Pressure District 3. This concept was carried forward as it optimizes system pressures.

Concept 4: shown on the far right, consists of a substantial reconfiguration of the existing Pressure District boundaries with the objective of improving system pressures overall. This concept was screened out as it requires the most new facilities and watermains, and is the hardest to implement.

Slide MSP-5 – Water Servicing – Pressure District Boundary Alternatives - 00:9:34,00

Two Pressure District Boundary Alternatives were carried forward and further evaluated.

Alternative 1: shown on the left, generally maintains the existing water system configuration and pressure district boundaries. Under this alternative, storage increases are needed to all three pressure districts to support growth needs. Further, pump station capacity increases are needed to support growth in Pressure District 2/3 and potentially in Pressure District 4.

Under Alternative 1: the Pressure District 2/3 storage needs provides an opportunity to decommission the existing King George tank and to construct a new Elevated Tower allowing for the optimization of Pressure District 2/3's pressures and pump station operations. The location of the new Elevated Tower is shown conceptually on the figure to the left; however, the Tower's final location will be determined through a future Schedule B Environmental Assessment.

Additionally, under Alternative 1: the Pressure District 2/3 pumping needs provides an opportunity to optimize the configuration and operation of the existing Wayne Gretzky and Tollgate Pumping Stations and allows for the decommissioning of the existing Albion Pump Station. Pump station upgrades are expected to be contained within the existing properties.

The Pressure District 4 pumping upgrade needs and Pressure District's 1 storage needs are dependent on the preferred Pressure District 2/3 and Pressure District 4 storage strategies and are further reviewed and discussed on later slides.

Alternative 3: as shown on the right, consists of maximizing Pressure District 4 service area. With Pressure District 4 being extended eastward to Wayne Gretzky, generally incorporating the limits of Pressure District 2. Under this alternative, the Wayne Gretzky, Tollgate, and Northwest Pumping Stations will all require upgrades to accommodate the new system configuration and the Albion Pump Station and King George Tank will be decommissioned. Further a new water tower will be needed to support Pressure District 2/4. The location of the new water tower is shown conceptually on the figure to the right and the elevated tower's location will be determined through a future Schedule B Environmental Assessment.; however, the water tower is anticipated to be located within the northwest employment lands.

Further, the Pressure District 3 storage upgrade needs and the Pressure District 1 storage needs are dependent on the preferred Pressure District 4 storage strategy.

Slide MSP-6 – Water Servicing – Pressure District Boundary Alternatives - 00:12:01,00

Alternative 1's key advantage is its simplified implementation process, allowing for a phased expansion. Alternative 3 did have the advantage of generally improving system pressures; however, Alternative 3 is disadvantaged due to more complex implementation needs and does not support the phased expansion of the system requiring many similar upgrade projects to be completed earlier as compared to Alternative 1. Both alternatives have similar challenges related to land acquisition needs for the new water tower site.

When completing the evaluation, Alternative 1 had better technical and social/cultural factor rankings, with a high (favorable) technical ranking and medium social/cultural ranking as compared to Alternative 3. Further the two alternatives had similar high, or favorable, environmental, and financial factor rankings.

Alternative 1: existing pressure district boundaries has been recommended as the preliminary preferred alternative based on Alternative 1's overall higher ranking and due to Alternative 1's simpler implementation process.

Slide MSP-7 – Water Servicing – Pressure District 1 Storage Alternatives - 00:13:11,00

Based on the preliminary preferred water pressure district boundaries, two water storage strategies were identified to address Pressure District 1 growth needs.

Alternative 1, as shown on the left, would consist of constructing a new ground level reservoir at the Holmedale Water Treatment Plant. Alternative 2, shown on the right, would consist of enlarging the new Pressure District 2/3 elevated tank to accommodate the additional Pressure District 1 needs, and to facilitate the future transfer of water from Pressure District 2/3 to Pressure District 1 through improved zone boundaries.

Alternative 2 provides the greatest flexibility in phasing of future expansion projects. The new Pressure District 2/3 elevated tank will need to consider future servicing needs for the remaining lands within the City's municipal boundary. This would trigger the need to design and construct the new elevated tower to support these post 2041 needs, due to the tower's 50 to 100 year expected life. By leveraging the surplus elevated tank volume to support Pressure District 1 supply needs in the interim, there is the opportunity to defer Pressure District 1 reservoir needs until 2041.

Alternatives 1 and 2 had similar rankings under the technical, environmental, and social/cultural factors; while Alternative 2 had a better financial ranking, ranking as high, or favorable, as compared to Alternative 1's medium ranking.

Alternative 2 has been recommended as the preliminary preferred alternative based on its flexibility to support future servicing of the north trigger lands.

Slide MSP-8 – Water Servicing – Pressure District 4 Storage Alternatives - 00:14:48,00

Based on the preliminary preferred water district boundary strategy, two water storage strategies were identified to address the Pressure District 4 growth needs.

Alternative 1, shown on the left, would consist of constructing a new ground level reservoir at the existing Northwest Pump Station. Alternative 2, shown on the right, would consist of constructing a new elevated tower.

Alternative 2 provides improved system operations, allowing for a more efficient use of the existing pump station, improving pressure management, and allowing the system to better respond to sudden increases in demand. It is also noted that under Alternative 1, additional pump station upgrades may be required to meet future peak demands.

Alternatives 1 and 2 had similar rankings under environmental, social/cultural, and financial factors, while Alternative 2 had a higher technical raking.

Alternative 2 has been recommended as the preliminary preferred alternative based on Alternative 2's improved system efficiency and performance.

Slide MSP-9 – Water Servicing – Planned or Proposed Upgrades - 00:15:52,00

In addition to the major facility upgrades presented in the preliminary preferred servicing strategy, local water system improvements have also been identified.

As shown on the figure to the left, the remaining lands on the western boundary of the City, south of Colborne Street, are characterized by high ground elevations that exceed the service range of the existing Pressure District 1. As such, future servicing of these lands will require the construction of a new Colborne Street West Pumping Station. The pump station is anticipated to be a developer led initiative constructed to service the new development lands; however, there is an opportunity to integrate some existing properties on Colborne Street West into the new pressure district to address existing low service pressures.

As shown in the middle figure, the new employment lands to the east of Garden Avenue are characterized by low ground elevations that are outside the service range of the existing Pressure District 2/3. As such, the servicing of these lands will require the development of a new sub-pressure district to avoid high pressures. Further, a new watermain along Garden Avenue is needed to support future peak demands.

As shown on the figure to the right, the existing Strawberry Hill area is subject to pressures just above the City's minimum requirements. Future development within this area will likely trigger the need for the construction of a new pump station. It is anticipated that the pump station would only be triggered by development and would be a developer lead initiative. Any pump station would need to be sized to accommodate both new and existing properties.

Slide MSP-10 – Water Servicing – Trunk and Local Watermain Network - 00:17:25,00

Additional trunk watermain upgrades are needed to support the transmission of water to major growth areas and local watermain upgrades are needed to support local pressure and fire flow needs.

To support existing and growth needs, the following trunk watermain upgrades have been identified:

- New mains supporting the North Expansions Lands including:
  - Pressure District 4 trunks along Oak Park and Paris Road,
  - Pressure District 2/3 trunk along King George,
  - A new Pressure District 2/3 east-west trunk along Fairview Drive and Lynden Drive,
  - New trunks to Tutela along Mt Pleasant and Conklin Road, and
  - A new downtown Brantford trunk.

Local watermain upgrades to improve local pressures and fire flows will focus on leveraging the City's ongoing watermain replacement program.

Slide MSP-11 – Water Servicing – Preliminary Preferred Recommendation - 00:18:17,00

This slide shows the preliminary preferred water strategy to service growth to 2041. Several separate water servicing components are recommended that collectively make up the overall preferred strategy.

The main components that make up the preliminary preferred strategy are as follows:

- Increased treatment capacity at the Holmedale Water Treatment Plant,
- New water tower in Pressure District 2/3 to accommodate storage deficiencies in both Pressure District 2/3 and Pressure District 1,
- New water tower in Pressure District 4,
- Upgrades at Wayne Gretzky and Tollgate Pump Stations within Pressure District 2/3,
- Upgrade trunk watermains in Pressure District 1 to Tutela and the downtown,
- Upgrade watermains north to expansion lands along King George Road and upgrade watermain east-west along Lynden Road and Fairview Drive in Pressure District 2/3
- Upgrade watermains north to expansion lands along Oak Park and Paris Road in Pressure District 4
- Decommissioning of the existing King George tank and Albion Pump Station.

Slide MSP-12 – Water Servicing – Servicing Expansion Lands - 00:19:23,00

This slide shows the preliminary preferred water servicing strategy for the expansion lands, which has been presented at previous PICs. In general, the expansion lands will integrate directly into the City's water system. This strategy is further outlined in the previous water slides.

Slide MSP-13 – Wastewater Servicing – Map Legend - 00:19:38,00

The wastewater servicing alternatives presented in the following section include maps that highlight the alternative strategies.
Pictured is this slide is the legend for the wastewater servicing maps, which is applicable to all upcoming wastewater maps.

Slide MSP-14 – Wastewater Servicing – Existing Conditions in the Wastewater System - 00:19:53,00

The figure to the left provides an overview of the City's existing wastewater system. Wastewater within the City is conveyed to City's Wastewater Treatment Plant, which receives and treats wastewater before discharging the treated effluent to the Grand River. The City's wastewater system is supported by a number of pump stations.

Also shown on the figure are the future wastewater service areas, which include the City's expansion lands to the north and east, and Tutela to the southwest. The existing Tutela area does not have wastewater sewers, with properties being serviced by private septic systems.

To develop servicing concepts and the ultimate solutions, a review of the existing wastewater system was conducted to determine existing and future needs. This review identified the treatment, pumping, and transmission components. Key considerations included:

- Wastewater treatment capacity to accommodate growth,
- Wastewater pumping capacity to accommodate growth,
- Wastewater transmission capacity to support system flows, and
- Extending the wastewater servicing to the expansion lands.

Slide MSP-15 – Wastewater Servicing – Water Treatment Plant - 00:20:59,00

The graph on the left shows the City's existing wastewater treatment capacity against existing and projected treatment needs. The treatment capacity of the Wastewater Treatment Plant is 81.8 MLD (Million Litres Per Day) as shown by the black horizontal line. Historic average daily flows fluctuate between 30 and 40 MLD as shown by the purple points. When projecting the City's long-term wastewater treatment needs, it is expected that 2041 flows will be between 60 and 75 MLD, within the Wastewater Treatment Plant's 81.8 MLD capacity; however, a detailed review of the Wastewater Treatment Plant processes identified the need to upgrade and optimize individual process elements to re-establish and maintain the Treatment Plant's rated capacity. These upgrades will be completed at the existing property over the next 5-15 years.

Slide MSP-16 – Wastewater Servicing – Existing Conditions in the Wastewater System - 00:21:55,00

A review of the existing and future wastewater system performance identified major wastewater servicing needs in four areas. Each of these areas are discussed further in the following slides.

Slide MSP-17 – Wastewater Servicing – Screening of Wastewater Servicing Concepts - 00:22:08,00

Servicing concepts for each of the four wastewater need areas were presented at the previous PIC.

For the Fifth Avenue Pumping Station, as shown on the far left, two concepts were presented consisting of diverting upstream flows away from the pump station, and undertaking pump station upgrades. These options were explored further under a separate assignment and the City is in the process of designing the pump station upgrades.

For each of the three remaining areas, all presented concepts were carried forward for further evaluation and are discussed in the following slides.

Slide MSP-18 – Wastewater Servicing – Greenwich Pumping Station Alternatives - 00:22:44,00

Two wastewater alternatives for the Greenwich Street Pump Station area were carried forward and further evaluated.

The Greenwich Street Pump Station catchment has an internal flow split, where flows from the upstream catchment are split at the Jubilee siphon. Currently, the majority of flows are being conveyed across the Grand River to Catherine Avenue, with the remaining flows continuing along Grand River Ave. Under the current flow split configuration, there are existing and future capacity constraints in the Catherine Avenue sewer and downstream trunk sewer immediately upstream of the station. Further, the existing sewer on Grand River is operating near capacity. Additionally, upgrades to the Greenwich Pumping Station are needed to support Growth.

Alternative 1, shown on the left, consists of diverting more flows to the Grand River Avenue sewer. Under this alternative, capacity constraints in the Catherine Avenue system are addressed; however, this does trigger upgrades to the Grand River Avenue sewer.

Alternative 2, shown on the right, maintains the existing flow splits at the Jubilee siphon, and upgrades are completed to the downstream sewers.

In both alternatives, upgrades at the existing Greenwich Pump Station are undertaken to address growth capacity needs.

Alternative 1 better addresses system capacity issues, with the combined diversion and Grand River sewer upgrades addressing both the Catherine Ave and Grand River Ave capacity restrictions. Further, Alternative 1 reduces to total wastewater flows needing to cross under the Grand River and helps to reduce overall risk at the siphon.

Alternative 1 and 2 had similar rankings for environmental and social/cultural factors, while Alternative 1 had better technical and financial rankings.

Alternative 1 has been recommended as the preliminary preferred alternative, based on Alternatives 1’s capacity to better address the technical needs.

Slide MSP-19 – Wastewater Servicing – North Brantford Alternatives - 00:24:43,00

Two wastewater alternatives for the North Brantford Sewer Area were carried forward and further evaluated.

Flows from the King George intensification corridor are currently collected through several small gravity sewers that flow west to east, ultimately discharging into the Park Road trunk sewer. Growth along King George is expected to trigger upgrade needs to one or more of these existing sewers.

Alternative 1, shown on the left, consists of developing a new trunk sewer to service the King George area, and would consist of a new trunk sewer along King George to Fairview Drive and down Fairview Drive to Baxter Road. Under this alternative there is an option to upsize the sewer to allow for a portion of the North Expansion Lands to discharge to this new trunk sewer.

Alternative 2, shown on the right, maintains the existing sewer network and consists of localized sewer upgrades.

Alternative 1 does present a substantial opportunity to increase phasing flexibility for the North Expansion Lands. However; the alternative's new trunk sewer is significantly longer than the Alternative 2 upgrade needs, and requires a very deep sewer construction, which increases the alternative's cost and construction complexity.

Alternatives 1 and 2 have similar technical and environmental rankings, While Alternative 2 has a better social/cultural and financial ranking.

Alternative 2 has been recommended as the preliminary preferred alternative based on Alternative 2's lower cost and construction impacts.

Slide MSP-20 – Wastewater Servicing – Empey Street Pumping Station Alternatives - 00:26:19,00

Four wastewater alternatives for the Empey Pump Station were carried forward and further evaluated.

Growth flows are expected to exceed the capacity of the existing pump station. Further, upstream of the Empey Pump Station, there is a flow split at Wayne Gretzky and Henry Street. Currently, the majority of these flows are diverted away from the Empey Pump Station and directed to the gravity sewer though the Arrowdale golf course. Under current conditions the Arrowdale trunk sewer is operating near capacity and growth flows are expected to trigger capacity upgrades along a substantial portion of the downstream sewer. The sewer connecting the flow split to the Empey Pump Station has capacity to accommodate additional flows.

Alternative 1A, shown on the far left, consists of maintaining the existing sewer configuration and upgrading the downstream sewer and the Empey Pumping Station.

Alternative 1B, shown second to the left, consists of maintaining the existing flow split, but including the construction of a new trunk sewer from Henry Street to Mohawk Street.

Alternative 2, shown second to the right, consists of reconfiguring the flow split to redirect more flow to the Empey Pump Station, with the goal of diverting sufficient flows to eliminate the need for

downstream sewer upgrades. Further, under this alternative, a new deep tunneled sewer would be constructed from Empey to Mohawk Street to allow for the decommissioning of the Empey Pump Station.

Alternative 3, shown on the far right, like Alternative 2, consist of reconfiguring the flow split to redirect more flow from the Empey Pump station; with the goal of diverting sufficient flow to eliminate the need for downstream sewer upgrades. This alternative includes upgrades to the Empey Pump Station based on the increased flow needs.

Alternative 2, with the deep tunneled option, was found to be substantially more expensive than all other options and not viable from a cost perspective. For the remaining alternatives, it was found that the upgrades to the Empey station would still be required, and that the additional cost to accommodate the increased flows under Alternative 3 were minimal as compared to the upgrade costs under Alternatives 1A and 1B. Further, Alternative 3 was found to have the least construction impact with works being limited to the Empey station and the flow split at Wayne Gretzky and Henry Street.

The evaluation of alternatives found that Alternative 3 ranked high, or favourable, under all factors, with all remaining alternatives having at least two or more low, or unfavorable, rankings. As such, Alternative 3 has been recommended as the preliminary preferred alternative.

Slide MSP-21 – Wastewater Servicing – Planned Upgrades - 00:28:57,00

This slide shows local wastewater system improvements.

As shown on the figure to the left, the Fifth Avenue Station catchment is subject to high inflow and infiltration, leading to sewer and station capacity issues. These issues are expected to be further impacted by planned intensification. The City has initiated pump station upgrades to meet 2041 flow targets and includes the construction of an emergency peak flow storage tank and a new forcemain.

As shown in the middle, the Johnson Road Pump Station catchment is also subject to high inflow and infiltration rates. To meet the 2041 flow targets, the City will be implementing an inflow and infiltration reduction program to manage peak flows to the station. As well, the City will be rehabilitating the pump station to re-establish the station’s installed capacity.

As shown on the figure to the right, the Oakhill Drive trunk sewer, which supports northwest and expansion land growth flows will require upgrading to meet the 2041 growth flows.

Slide MSP-22 – Wastewater Servicing – Planned Upgrades - 00:30:00,00

Similar to the last slide, this slide shows local wastewater system improvements.

As shown on the figure to the left, substantial growth is expected in the downtown core. The City will be implementing a policy to establish minimum sewer capacity requirements to accommodate future intensification. Upgrade costs will be split between the City and growth.

As shown in the middle, the Coulbeck Trunk sewer, which accommodates flows from the North and East Expansion Lands will require upgrades along the Highway 403 crossing. Further, the sewer along Lynden Road will also require upgrades to support the East Expansion Land flows.

As shown on the figure to the right, the North Expansion Lands west of King George will be directed to the existing Oak Park trunk sewer. The alignment of the trunk sewer from Powerline Road to the existing sewer will be determined through a subsequent Schedule B EA following the completion of the MSP.

Slide MSP-23 – Wastewater Servicing – Inflow and Infiltration Reduction - 00:30:58,00

Through past investigations, the City has identified areas within the City that are subject to higher than desired rates of inflow and infiltration entering the wastewater collection system. This issue is not unique to the City of Branford but is a common issue across Ontario.

In addition to the upgrades identified within the preliminary preferred wastewater servicing strategy, the City will undertake a targeted inflow and infiltration reduction program. This program will be developed in an effort to prioritize areas with high rates of inflow and infiltration or areas with existing sewer capacity restrictions. Where feasible, the City will coordinate this work with ongoing sewer replacement programs.

Slide MSP-24 – Wastewater Servicing – Preliminary Preferred Recommendation - 00:31:38,00

This slide shows the preliminary preferred wastewater servicing strategy to support growth to 2041. Several separate wastewater servicing components are recommended that collectively make up the overall preliminary servicing strategy.

Details of the wastewater servicing strategy are summarized on the right side of this slide.

Slide MSP-25 – Wastewater Servicing – Expansion Lands - 00:31:57 ,00

This slide shows the preliminary preferred wastewater servicing strategy for the expansion lands and has been presented at previous PICs. In general, the expansion lands will integrate directly into the City's wastewater system at five key connection points:

- The Oak Park trunk sewer, that will service the majority of the lands west of King George,
- The Coulbeck trunk sewer, which will service the remaining growth lands east of King George,
- The Lynden Road sewer, which will service the East Expansion Lands,
- The Mt. Pleasant Road sewer, which will service Tutela, and
- The Woodlawn Pump Station, which will provide limited servicing to the directly adjacent lands.

Slide MSP-26 – Stormwater Servicing – Map Legend - 00:32:36,00

The stormwater servicing alternatives presented in the following section include maps that highlight the alternative strategies.

This slide shows the legend for the stormwater servicing maps, which is applicable to all upcoming stormwater maps.

Slide MSP-27 – Stormwater Servicing – Strategy & Objectives - 00:32:51,00

The figure on the left provides and overview of the City's existing stormwater system.

The City's stormwater system is composed of many parts, these include:

- The minor drainage system, typically the local sewer network that is designed to capture and convey the more frequent storm events,
- The major drainage system, typically the roadway, ditches, and drainage channels, that are designed to capture and manage flows that exceed the capacity of the local minor system,
- Stormwater management facilities that are used to provide water quality treatment of stormwater flows and to reduce peak flows entering the downstream system, and
- The dike network that is used to protect the City during periods of high Grand River flows.

When developing stormwater servicing concepts, a review of the existing stormwater system was conducted to determine existing and future needs. Key considerations include the age, condition, and performance of the City's existing stormwater infrastructure. A review of the minor system performance would indicate that the older portions of the system were designed to meet a 2-year design flow, shown in green, while the newer portions of the system were designed to meet the 5-year design flow, shown in orange. These existing performance levels were taken into account when assessing system needs.

Slide MSP-28 – Stormwater Servicing – Screening of Stormwater Servicing Concepts - 00:34:05,00

The following stormwater servicing concepts were presented at previous PICs.

These stormwater servicing concepts include:

- Status Quo, applicable to areas where there are no known or observed issues, and do not require upgrades,
- Minor System Upgrades, consisting of pipe upgrades or diversions which may be applicable to areas where there are known issues within the minor system,
- Quantity Control, such as a pond, which will store stormwater and release it slowly to ensure the pipe network or receiving outlets are not overwhelmed from peak flowrates,
- Low Impact Development strategies, consisting of decentralized methods to manage runoff quantity, peak flow, and quality
- Major System, applicable to areas where the major system does not adequately direct runoff to an outlet when the minor system is at capacity, for large storm events.

When reviewing the entire system, areas in green represent areas where the proposed servicing concept is applicable or possible, and areas in red, show areas where the servicing concept is not applicable.

Slide MSP-29 – Stormwater Servicing – Implementation Plan - 00:35:14,00

The City benefits from a significant amount of historical water and wastewater system condition and performance information. As such, this allows the City to proceed directly into the implementation of the MSP recommendations as they related to water and wastewater system; however, the City's historic stormwater information is less robust. Although the City continues to improve its stormwater system understanding; it is understood that additional investigations and studies are needed before the City can proceed with the implementation of stormwater upgrades.

As such, the stormwater strategy outlined in the MSP will be developed to a lesser degree than the wastewater and water systems. The MSP upgrade strategy is based on the best available information with the goals of identifying:

- Key areas of concern and implementation needs,
- Preliminary upgrade strategies and capital cost projections, and
- Furthur investigation and study needs

Key to the future success management of the stormwater system, is the development of an implementation plan that outlines a pathway to collect background and historical information relating to the stormwater system. With this more complete information, more accurate tools and frameworks can be developed as the basis of future planning studies.

Slide MSP-30 – Stormwater Servicing – Grand River Homedale Alternatives - 00:36:33,00

The first stormwater priority area consists of the Grand River Homedale Subcatchment. In this area trunk sewer restrictions along St. Paul Avenue and Albion Street as well as pockets of local flooding and surcharging infrastructure have been identified.

Two potential servicing alternatives were identified:

- Alternative 1, shown on the left, proposes diverting stormwater flows at Lawrence Street south to the St. Paul Avenue storm sewer, freeing up capacity within the existing Albion Street trunk sewer
- Alternative 2, shown on the right, proposes upgrading the sewer along the existing alignment

Alternative 1 requires complex construction beneath the railway and is more expensive, whereas Alternative 2 along Albion Street causes minimal disruption to the major traffic corridor. These factors result in Alternative 2 having a lower overall cost and technically complexity.

Alternative 2 has high, favorable, ranking under all factors, while Alternative 1 has three factors with a medium ranking. As such, Alternative 2 has been recommended as the preliminary preferred alternative.

Slide MSP-31 – Stormwater Servicing – Grand River Eagle Place Alternatives - 00:37:38,00

The next stormwater priority area consists of the Eagle Place Subcatchment. In this area sewer restrictions within Seventh Avenue and Sanderson Street have been identified.

Two potential servicing alternatives were identified consisting of:

- Alternative 1, shown on the left, consists of redirecting storm sewers to the west, along Seventh Avenue, to free up capacity within the downstream Seventh Avenue and Sanderson Street sewer
- Alternative 2, shown to the right, consists of upgrades to the existing infrastructure

Both alternatives solutions do not present significant technical complications; however, Alternative 1 has a lower implementation cost, and Alternative 2 has possible environmental concerns, as the additional flowrate from the currently undersized pipe system may cause outlet concerns within the ditch/channel conveying stormwater flows from the pipe network to the Grand River.

Alternative 1 had a high, favorable, ranking under all factors, while Alternative 2 has a medium financial ranking. As a result, Alternative 1 has been recommended as the preliminary preferred alternative.

Slide MSP-32 – Stormwater Servicing – Grand River Northwest Alternatives - 00:38:45,00

The next stormwater priority area consists of the Grand River Northwest Subcatchment, an area of future greenfield development north of Highway 403.

Two potential servicing alternatives were identified:

- Alternative 1, shown on the left, splits both flows east and west at Oak Park Road, with stormwater from the west of Oak Park Road conveyed towards the Grand River and stormwater from lands east of Oak Park Road conveyed south to the 403
- Alternative 2, shown on the right, directs all flows to the west

Alternative 1 is noted as having implementation and construction risks related to crossing the Highway 403 corridor.

Alternative 2 has high, favorable, or medium rankings under all factors, whereas Alternative 1 has low, unfavorable, technical and financial ranking. As a result, Alternative 2 has been recommended as the preliminary preferred alternative; however, the selected alternative will ultimately require cooperation with the development to ensure grading is possible.

Slide MSP-33 – Stormwater Servicing – Fairchild Creek Garden Alternatives - 00:39:48,00

The next stormwater priority area consists of the Fairchild Creek Garden Subcatchment. In this area, portions of stormwater north and south of Highway 403 are directed the Highway 403 drainage infrastructure. Initial assessments indicate that the Highway 403 drainage infrastructure may be undersized and causing flooding in the upstream City system.

Three potential servicing strategies were identified, consisting of:

- Alternative 1, shown on the left, would redirect flows north of the 403 along a new trunk sewer along Fairview Drive. This requires the reconfiguration of local stormwater infrastructure
- Alternative 2, shown in the middle, includes upgrading the drainage infrastructure within the 403 corridor; however, this alternative requires significant coordination with the MTO, and may not be technically or financially viable or may present implementation issues due to the ownership and/or approvals requirements
- Alternative 3, shown on the right, would divert flows south of Highway 403 along Morton Ave; however, this alternative does not address all capacity needs. As such, Alternative 3 was not considered further

Alternative 1 generally ranks higher on all categories as comparted to Alternative 2. As such, Alternative 1 has been recommended as the preliminary preferred alternative; however, consultation with the MTO is recommended to further explore the viability of Alternative 2.

Slide MSP-34 – Stormwater Servicing – Local Stormwater Servicing - 00:41:16,00

In addition to the major priority areas the following local stormwater system improvements have been identified.

As shown on the figure to the left, local sewer restrictions have been identified in the Mohawk Lake Subcatchment. The local area trunk sewers have sufficient capacity. As such, any upgrades would be limited to local sewer upgrades. We note the area is also a good candidate to implement LIDs in intensification areas to further treat water quality and reduce peak flowrates.

Shown in the middle, the City is currently undertaking a detailed investigation to address local residential complaints in the Fairchild Creek North area. The recommendations of that study are being prepared under a separate assignment and will be incorporated into the results of this Master Servicing Plan.

Shown on the figure to the right, there are several Greenfield growth areas across the City. The City is working with local developers to implement local stormwater management plans.

Slide MSP-35 – Stormwater Servicing – Dike System - 00:42:13,00

A further stormwater system consideration are the dikes along Grand River. These dikes are managed by the Grand River Conservation Authority and protect the City against flooding during high Grand River levels; however, they can also impact local drainage needs by:

- Increasing the risk of minor system flooding when the dike outlets are closed, or
- Restricting the capacity of the major system flows to outlet, due to outlet restrictions.

The City has identified the need to review these issue in greater detail under a separate study.

Slide MSP-36 – Stormwater Servicing – Expansion Lands - 00:42:44,00

This slide shows the preliminary preferred stormwater servicing for the expansion lands, which has been presented at previous PICs. It is noted that the stormwater servicing strategy for the expansion lands are preliminary and will be subject to modifications following more detailed block-level stormwater management plans.

In general, the expansion lands will be required to meet the following requirements:

- Minor system designed to meet a 5-year design flow,
- Peak flowrates at outlets will be controlled to have the post-development flowrates controlled to the pre-development peak flowrate,
- The major system will be required to convey the 100-year design storm,
- Water quality will be of concern in the expansion lands,
- The MECP Enhanced Removal of 80% of Total Suspended Solids is the requirement for all new expansion land developments,
- Multiple subcatchments outlet to coldwater creeks and will require thermal mitigation,
- Erosion control will also be required

Slide MSP-37 – Thank you for your participation! - 00:43:42,00

This concludes the Virtual PIC.

Thank you for participating, and if you wish to submit comments or would like to be added to the project's stakeholder list please contact either:

- Sharon Anderson, the Project Manager at the City of Brantford, or
- Julien Bell, the Project Manager for GM BluePlan Engineering.