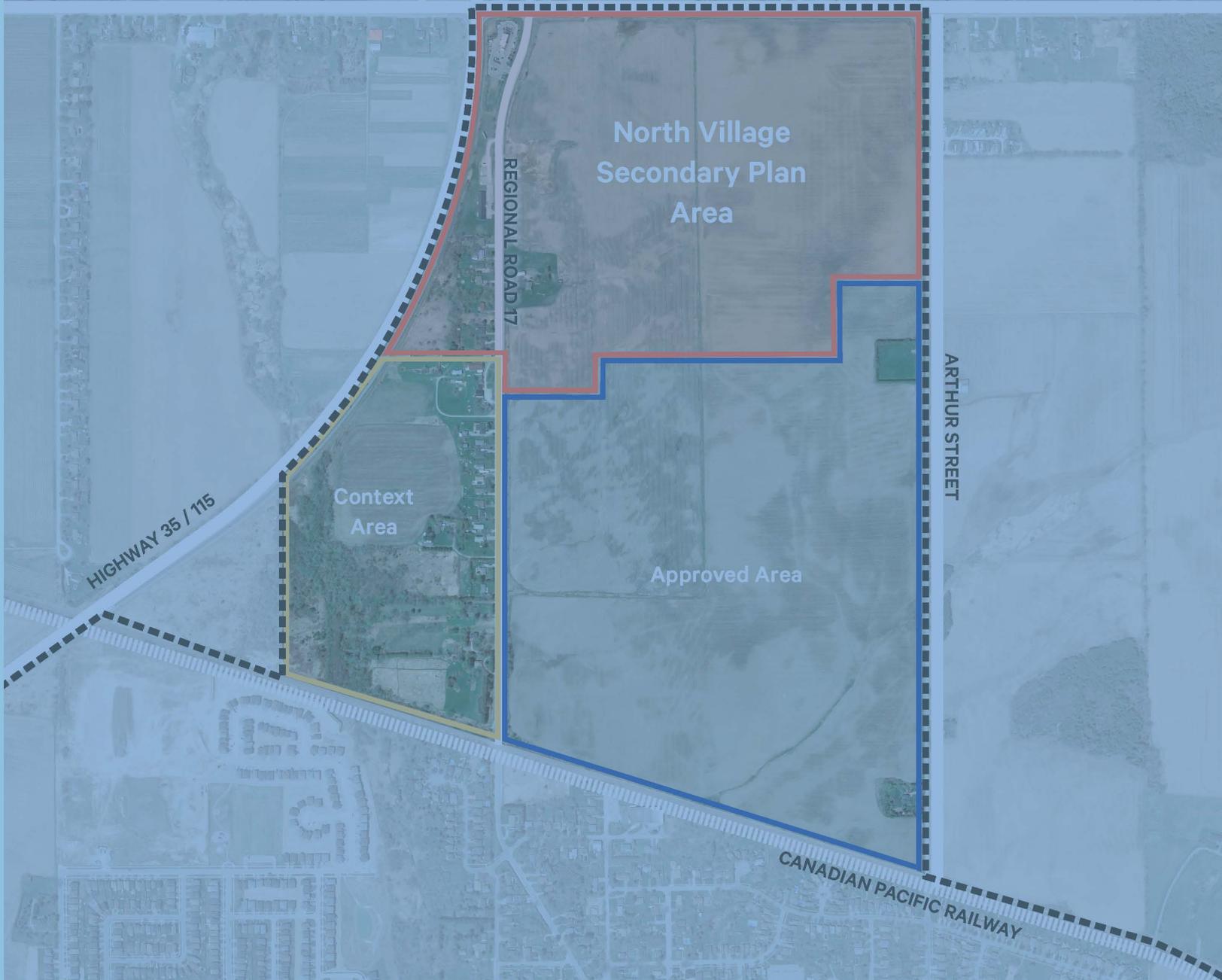


CONCESSION ROAD 3



Newcastle North Village Secondary Plan

Master Servicing Report – Phase 1 Existing Conditions

February 14, 2020





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Report Author

structure

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1. Introduction

The purpose of the Master Servicing Report is to evaluate the impacts of the proposed development on Regional and Municipal servicing infrastructure and utilities.

The Phase 1 Master Servicing Report documents the existing conditions and identifies data gaps, opportunities and constraints for consideration in the preparation of the Phase 2 and 3 Reports. The objective of the Master Servicing Report is to serve as a guide for establishing the servicing requirements for the Preferred Land Use Plan for the North Village Secondary Plan. The Master Servicing Report addresses the following infrastructure components of the planned development:

- Water supply for domestic and firefighting purposes;
- Sanitary servicing;
- Conceptual lot grading and storm drainage; and
- Stormwater management.

The following background documents were reviewed in the preparation of the Phase 1 report:

- Neighbourhood Plan – North Village Neighbourhood, Approved July 3, 2012;
- Functional Servicing Report, North Village Neighbourhood Plan, Village of Newcastle, prepared for Smooth Run Developments (Metrus) and Brookfield Homes (Ontario) Limited, prepared by Sernas Associates and dated September 2005, Revised April 2011;
- Functional Servicing and Stormwater Management Report, Proposed Subdivision Plan, Allin Property, North Village, Municipality of Clarington for Brookfield Homes (Ontario) Limited by GHD dated August 2017
- Available contour mapping of the study area;
- Region of Durham Sanitary Sewer Mapping;
- Region of Durham Water Distribution Mapping;
- Region of Durham, 2018 Development Charge Background Study, Appendix F – Regional Water Supply;
- Region of Durham, 2018 Development Charge Background Study, Appendix G – Regional Sanitary Sewage; and
- Recommended Water Servicing Solution as captured in the Municipal Class Environmental Assessment, hereafter referred to as MCEA, PIC Panels date April 9, 2019 for the Additional Water Storage and Pumping Capacity for Newcastle Urban Area prepared by Stantec.

It is our understanding that additional information is available pertaining to a 2014 watermain analysis and a 2015 stormwater management report both of which were completed by GHD for lands in the study area. These two documents were not available for review and consideration in the preparation of this report, but if made available they will be reviewed and considered in the next steps for the servicing work.

In addition to reviewing the above information, AECOM met with the Region of Durham Work's Department Staff on January 15th, 2020 to discuss the planned water / sanitary infrastructure improvements needed to facilitate the development of the Study Area's shown in Figure "1" on the following page.

For the purpose of clarity, the Project Team will be using the following terms to describe the "study area".

- North Village Secondary Plan Area = 'Project Area'



- North Village Secondary Plan Area + Draft Approved Subdivision Area (Approved Area) + Context Area = ‘Study Area’

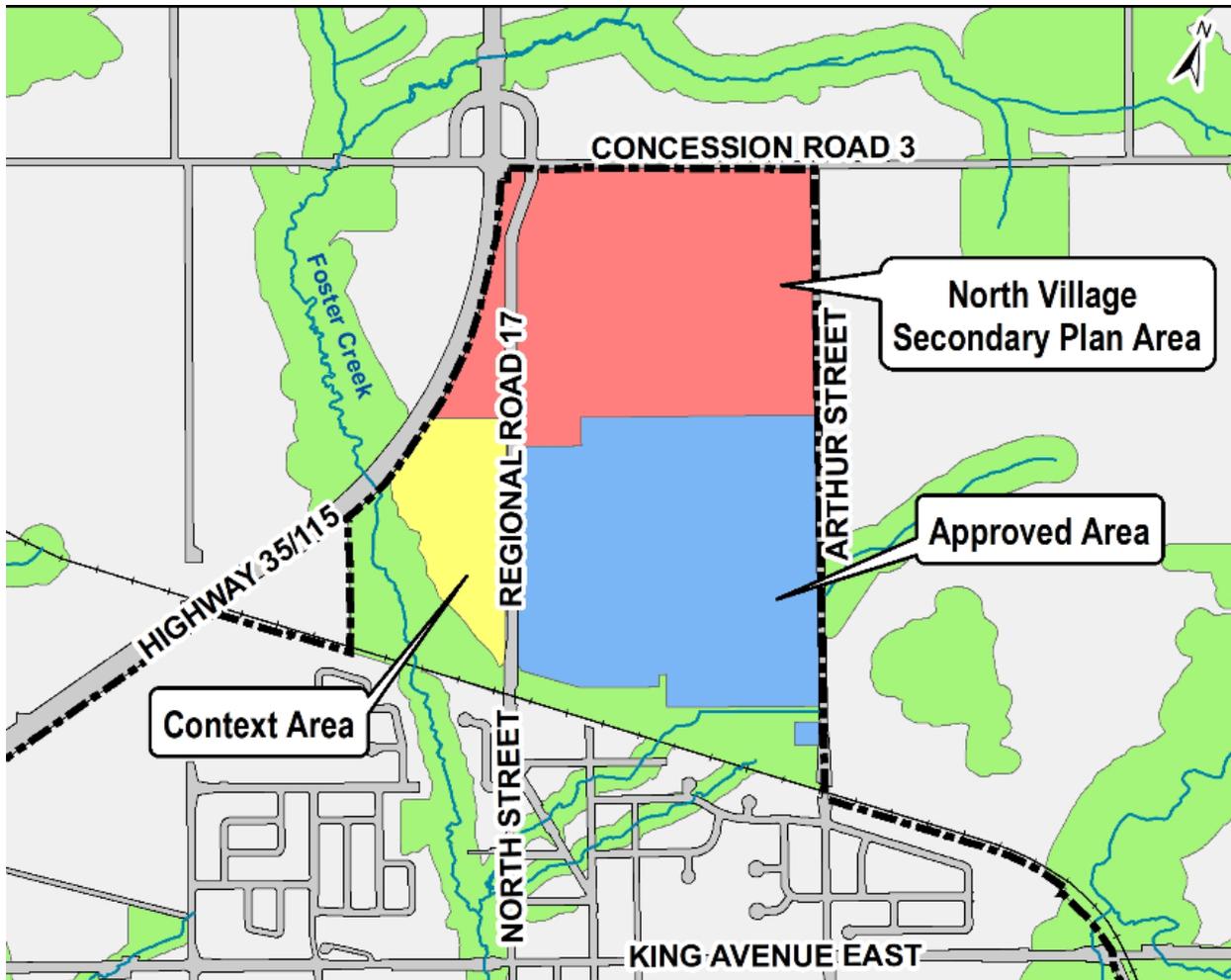


Figure 1 - Study Area

2. Water Supply

The Region of Durham owns and operates the Newcastle Drinking Water Supply System. The following sections of the report describe the existing conditions and planned improvements to the water supply and distribution system.

2.1. Existing Conditions

The Newcastle Drinking Water Supply System provides municipal water service to the Newcastle Urban Area, as well as the Brownsville, Newtonville, and Wilmot Creek communities. The existing Newcastle Service Area is serviced by a large water pressure zone (PZ1), including 1 water storage reservoir located in the Study Area. Two existing booster pumping stations boost water pressure for localized servicing south and east of the study area.



The existing Newcastle Water Pressure Zone (PZ1) is controlled by means of floating storage at the Arthur Street Reservoir located in the Study Area. The existing reservoir is over 40 years old and in good to fair condition and provides enough water storage for the existing population (approx. 9,200 people).

Growth within Water Pressure Zone 1 is constrained by elevation contour 105 metres, based on minimum fire protection needs.

Establishment of a new Water pressure zone (PZ2) is needed to address the existing service deficiencies and facilitate future growth in areas of higher elevation in the Newcastle Urban Boundary.

The following table provides a summary of the Approximate Population Projections for the service area of the Newcastle Drinking Water system.

Summary of Approximate Population Projections			
Area	Existing Population	Newcastle Urban Area (2031)	Lands Beyond Urban Boundary (Long Range)
Newcastle	9,200	23,005	90,040
Newtonville	660	660	660
Wilmot Creek	1,645	1,645	1,645
Total	11,505	25,310	92,345

Source: PIC Panels, MECA for Additional Water Storage and Pumping Capacity for Newcastle Urban Area (April 9, 2019)

AECOM discussed the planned service population for the North Village Neighbourhood Plan lands and the Region staff advised that it is their expectation that the Project Area will have a similar density as the Draft Plan Approved lands within the Study Area. Based on the Neighbourhood Plan – North Village Neighbourhood, Approved July 3, 2012, we estimate the unit count of the Project Area to be in the order of approximately 950 units. We are aware that the future planning projections and preferred land use may result in greater unit counts than the service capacity; if this happens, the estimated potential capacity constraint will need to be reviewed and resolved. It is understood that a Memorandum of Understanding exists that will require the need for additional parkland in the Project Area which would, if implemented, potentially reduce this estimated unit count.

Refer to Figure 3 at the end of this report for the existing watermain conditions within and surrounding the Project Area.

2.2. Planned Improvements

Water Supply - Storage / Pumping

The Region is conducting a MCEA for the Additional Water Storage and Pumping Capacity for the Newcastle Urban Area. The problem / opportunity statement for the MCEA is as follows:

“The municipal water supply to the Newcastle service area is currently provided by a single water pressure zone (PZ1) with one boosted area. The in-ground reservoir that provides storage for PZ1 does not provide sufficient servicing for the existing population and forecasted



North Village Secondary Plan Master Servicing Report – Existing Conditions

growth in the Newcastle Urban Area expected to 2031. As such, a Municipal Class Environmental Assessment (EA) study is being undertaken to identify an environmentally sound and sustainable solution that provides:

- A new pumping station to establish a new water pressure zone (PZ2)
- Additional water storage for the existing PZ1”

The recommended servicing solution as documented in the MCEA PIC panels is as follows:

- One new pumping station and one new reservoir on Development Block 425 within the Project Area lands. This block of land is also identified as “Potential Reservoir subject to EA” on the Neighbourhood Plan – North Village Neighbourhood, Approved July 3, 2012;
- Ancillary features, including stormwater management and staff parking;
- Space for expansion of facility, if required in the future.

The Region proposed the recommended solution on the basis that:

- The site is located within the urban area and close to existing servicing infrastructure
- The block of land is of suitable size and configuration to accommodate existing and future growth
- The site has the lowest potential to impact existing residents in the area
- The site has the highest potential to avoid impacts to the natural and cultural environments.

The MCEA acknowledged that some Developers in Newcastle are concerned that the Zone 2 Water Pumping Station being planned as part of this study will not be constructed early enough to meet their development schedules. To address this concern the Region has agreed to allow for the implementation of temporary water pumping stations as shown in Figure 2 below. The conditions for allowing such temporary facilities are as follows:

- Two small temporary pumping facilities may be constructed by the developers on their lands at their own cost, and will be removed once the Zone 2 Water Pumping Station is operational;
- The designs for these facilities will be subject to review and approval as part of the Plan of Subdivision process; and
- These temporary facilities will not have back up power. In the event of a power outage, water pressure and fire protection will be provided by a connection to Water Pressure Zone 1.

Water Supply - Treatment

With regard to the Newcastle Water Supply / Treatment Plant capacity, the planned expansion of the existing facility is in progress, the detailed design is complete and the project is ready for tender and start of construction in 2020. The plant expansion is required to facilitate build out of the Newcastle Urban Area. Allocation of capacity to Development Applications is subject to the Region’s servicing allocations policy whereby capacity is allocated at the time of signing the development agreement. The planned schedule for the completion of the Water Supply / Treatment Plant expansion is currently unknown however this information will be available after award of the construction and schedules are firm and shared with the public.

Water Supply – Conveyance

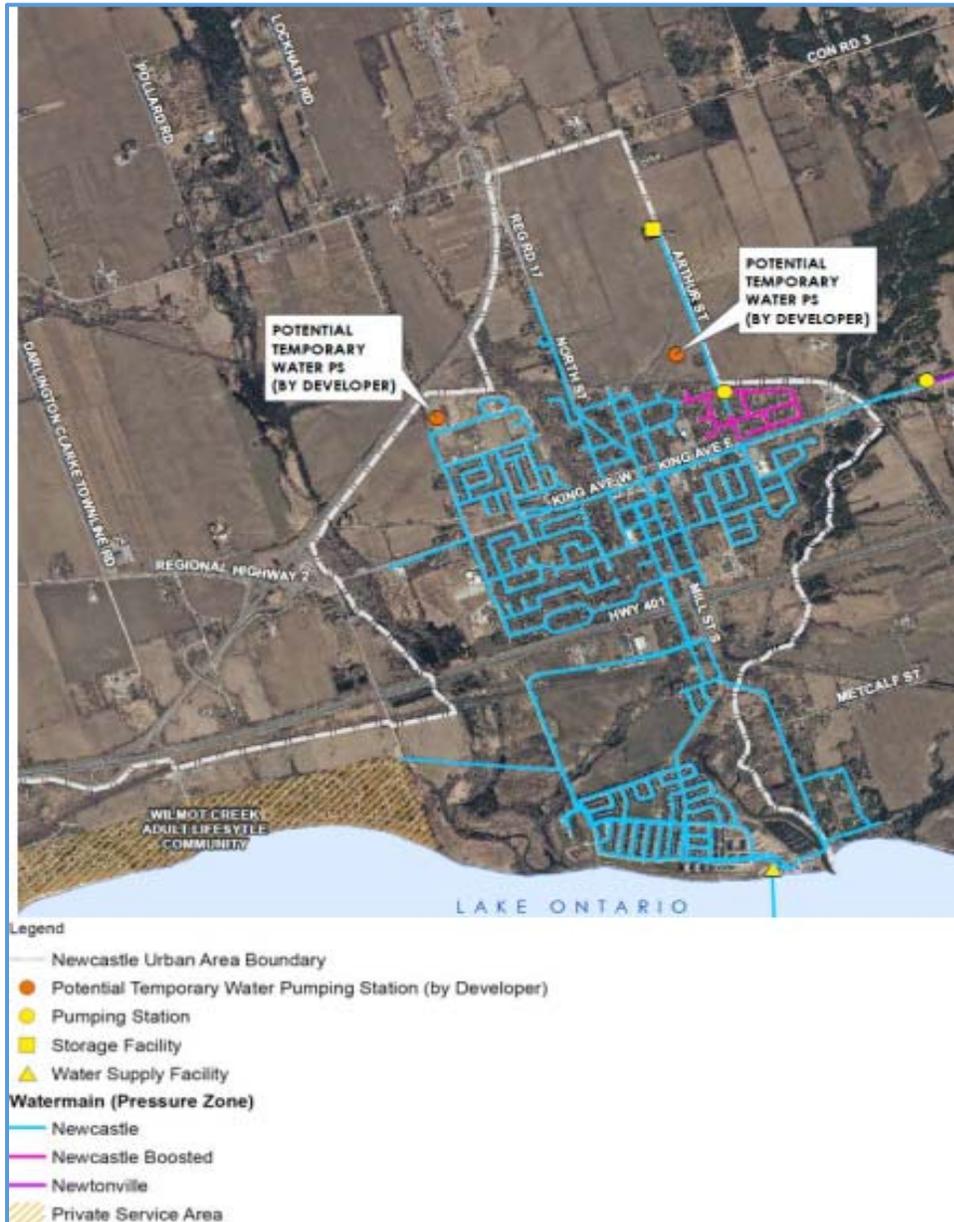
The water supply will be conveyed to the Study Area by means of new distribution watermain extending north from the existing water supply network along both North Street and Arthur Street. There is an existing 150mm watermain along North Street that will be replaced with new 400mm /



North Village Secondary Plan
 Master Servicing Report – Existing Conditions

300mm watermains along North Street from Wilmot Street to Concession Road 3. These improvements will be implemented during the detailed design and construction of the planned development in the Study Area.

To implement the Region’s recommended water storage / pumping solution as documented on the PIC panels for the MCEA for the Additional Water Storage and Pumping Capacity for the Newcastle Urban Area, the Region will need to plan, design and construct a new Pressure Zone 2 Feedermain along Arthur Street from Andrew Street to the new Pressure Zone 2 Pumping Station.





3. Sanitary Sewer

3.1. Existing Conditions

Sanitary Conveyance

There are no existing sanitary sewers servicing the study area. Refer to Figure 4.

Wastewater Treatment Plant Capacity

The expansion of the Newcastle Water Pollution Control Plant is required to facilitate the allocation of capacity to the planned development.

3.2. Planned Improvements

Sanitary Conveyance

Sanitary servicing of the Study Area will be provided by means of extending the existing 675mm Trunk Sanitary Sewer (TSS) on North St from Wilmot Street northward to approximately the north limit of the Draft Plan Approved lands in the Study Area. A minimum 450mm sanitary sewer will be required northward along the remainder of North Street to Concession Road 3. The sanitary sewer construction will be implemented with the detailed design and construction of the plans of subdivisions in the Study Area with the Region being responsible for oversizing needs.

The design of the extension of the TSS northward will include a future connection at elevation 92.25m to service the “Context Area” lands on the west side of North Street.

The reviewed Functional Servicing Report for the North Neighbourhood Lands speaks to the need for a deep east – west sanitary sewer located within the southern end of the “Draft Plan Approved” Study Area for the purpose of servicing future development east of Arthur Street, north of the CPR and south the Concession Road 3. The detailed design of the deep sub-trunk and the means of connecting the local sewage loadings will be completed during the subdivision approval process for the Draft Plan Approved lands.

There is a future development area of 166 ha, including a total population of 9,960 people, located east of Arthur Street that is to be captured and accommodated within the Brookfield/DG Group lands and outlet to the planned sanitary sewer on North Street (RR 17) as noted in the Region’s first submission comments provided to DG Group on August 6, 2015. The sanitary sewer design to be completed in support of the DG Group development lands and the sanitary sewer will need to be lowered on future Street A to accommodate these external sanitary flows.

Wastewater Treatment Plant Capacity

The Region is planning to increase plant capacity through optimization and modifications. The construction of the planned improvements are to commence in 2020 with an anticipated completion in 2022. Allocation of capacity to Development Applications is subject to the Region’s servicing allocations policy whereby capacity is allocated at the time of signing the development agreement.



4. Conceptual Lot Grading and Storm Drainage

4.1. Existing Conditions

The Study Area is generally undeveloped with the exception of the residential lots located on the west side of North Street and a residential lot on the west side of Arthur Street north of the CPR tracks. Refer to Figure 5 at the end of this report.

The topographic relief within the Study Area generally varies from 3% to 7% and as noted in the Functional Servicing Report (FSR) it is anticipated that site grading operations will result in a surplus of material to be managed on site. There is an opportunity to utilize this surplus material to construct a berm along the north side of the CPR tracks as shown on the Functional Grading Plan of the FSR.

4.2. Planned Improvement

For the Approved Area, as shown in Figure 1, the FSR notes that normal lot grading types are expected with the majority of the lots being either rear-to-front or split drainage. The FSR also notes that there will be a large number of walk-out and back split lots in the middle and southern boundaries of the neighbourhood and the occasional front walkout in isolated areas.

The following considerations should be given to the detail design of the lot grading and drainage as means to mitigate the risk of water ponding for durations greater than 24 hours and enhance informal infiltration opportunities.

- On split drainage lots implement dry well (soakaway) features to enhance infiltration and mitigate risk of nuisance drainage condition.
- For split drainage lots backing onto rear to front drainage lots side yard lots should line up to mitigate risk of nuisance drainage complaints.
- On roads with grades approaching 4% and greater provide wider side yard building setbacks on the low side of rear to front drainage lots to facilitate construction of a swale.
- Provide informal dry well (soakaway) features at the outlet of all swales (on private property).
- Ensure Low Impact Development measures (LID's) and drainage swales will not have standing water for more than 24 hours by either designing to suit known geotechnical / groundwater conditions or providing subdrainage systems to achieve the objective.

5. Stormwater Management

5.1. Existing Conditions

The Study Area is serviced by four drainage areas as shown in Figure 5 attached at the end of this report.

Drainage Areas 1 and 2 are being managed by planned SWM facilities located in the Draft Plan Approved lands of the Study Area. The planned SWM facilities will be sized to manage the runoff from both the Approved Lands and the North Village Secondary Plan Lands, as shown in Figure 5.

It is understood that there is an existing sedimentation deposition issue occurring at the existing culvert under North Street, north of the railway tracks, that services Drainage Area 1. Upon review of the contributing drainage to this existing culvert it is probable that the source of the sediment is the agricultural operations on the Secondary Plan lands. The planned development of the secondary plan lands will correct the erosion processes and the subsequent deposition of sediment at the existing



culvert by means of providing a stable land use cover and the provision of SWM facilities with sediment retention capabilities. It is recommended that the Development Agreements include conditions requiring the Developers to remove existing sediment deposits to restore the capacity of the existing culvert and monitor / remove additional deposition at the existing culvert during construction of the development through to assumption of the various development infrastructure. It is acknowledged that this condition, given multiple developers, may best be addressed by the Municipality retaining a Contractor to clean out the sediment and recover costs by means of a cost-sharing agreement.

Drainage Area 3 is located in the Draft Plan Approved lands and it has a natural watercourse feature in it that services an external drainage area on the east side of Arthur Street. The Developer of the Draft Plan of Subdivision is responsible for providing a sufficient drainage conveyance system for this existing drainage condition.

Drainage Area 4 is located in the Project Area Lands and outlets across private property to the north of Concession Road 3. The capacity of the existing drainage swale located on private property and servicing the Project Area is unknown and field investigations should be completed to assess the sufficiency of this existing condition to receive and convey drainage from the Project Area. Key to decision-making in this regard is determining if this existing drainage swale is considered a “natural watercourse” and as such subject to Riparian Rights of Drainage that extend onto the Project Area.

The Context Area on the west side of Regional Road 17 (North Street), as shown on Figure 5, consist of the following:

- Environmental Protection lands associated with Foster Creek and it’s flood plain forming the west boundary;
- Agricultural lands located between Foster Creek and Regional Road 17 (North Street); and
- Residential lots located along the west of Regional Road 17 (North Street).

The Context Area topography slopes from east to west and conveys runoff to Foster Creek by means of sheet drainage. The residential lots fronting on the west of Regional Road 17 (North Street) drain to the existing ditch along Regional Road 17 (North Street) which collects and conveys this drainage south to the existing drainage channel located along the north side of the railway corridor. All of the Context Area outlets to the existing Foster Creek culvert crossing the railway corridor. No change in land use is planned as part of this study and as such there is no need for further assessment of drainage impacts on the Context Area.

5.2. Planned Improvements

The FSR for the Approved Area land, shown on Figure 5, concluded that two SWM facilities will be designed by the Developer(s) to provide quantity control, quality control and erosion control measures for both the Approved Lands and the North Village Secondary Plan Area, as shown on Figure 5. One SWM facility will service Drainage Area 1 and the other SWM facility will service Drainage Area 2 as shown on Figure 5.

Water balance/LID requirements will need to be incorporated in the design of both the Approved Lands as well as the North Village Secondary Plan lands, as shown in Figure 1, to industry standards to provide a best effort approach in regard to LID measures approvable by the Municipality and the Ganaraska Region Conservation Authority (GRCA).

The approach to managing the site drainage from Drainage Area 4 should be as follows:



North Village Secondary Plan Master Servicing Report – Existing Conditions

- The developer shall obtain a legal opinion that Drainage Area 4 has Riparian Rights of Drainage onto the downstream lands. Upon confirmation of Riparian Rights of Drainage then maintain pre-development drainage conditions for both peak flow and volume of runoff;
- In the event that Riparian Rights of Drainage do not extend onto Drainage Area 4, then the developer shall either into an agreement for the conveyance across the downstream lands or find a new sufficient drainage outlet.
- Reference to GRCA's Technical and Engineering Stormwater Management Submissions document shall be made during the design of the planned SWM / LID measures.

Major Storm Overflow Condition:

The Municipality's drainage guidelines limit the depth of the major storm overland flow on their major storm overland flow routes to not encroach onto private property and that the depth of water at centerline of the Collector Roads to not exceed 0.15m.

Given the location of the SWM ponds at the south end of the Study Area the planned roads and major storm conveyance blocks may be receiving considerable major storm flows and detailed calculations will be required to ensure the Municipal Guidelines will be achieved by the Developers Design Consultant.

6. Conclusions and Next Steps

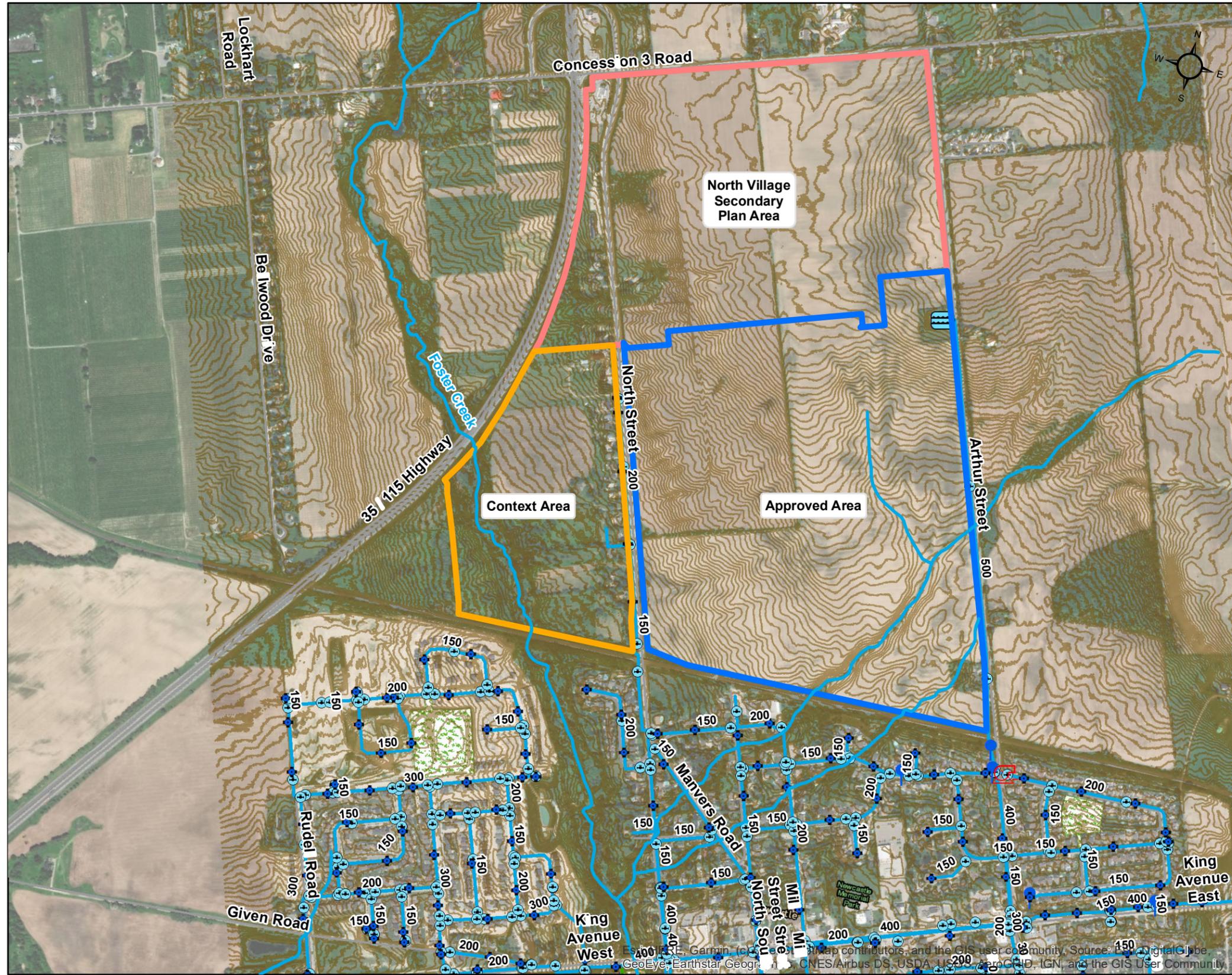
Water Supply – The Region's planned water infrastructure improvements will service the North Village Secondary Plan Area. It is understood that the infrastructure will be designed to include allowances for potential future growth in areas north and east of the North Village Secondary Plan Area.

Sanitary Sewer – The Region's planned sanitary infrastructure improvements will service the North Village Secondary Plan Area. It is understood that the infrastructure will be designed to include allowances for potential future growth in areas north and east of the North Village Secondary Plan Area.

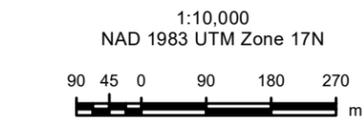
Stormwater Management - Drainage Area 1 & 2 – The development of the Approved Area lands in Figure 5 will include a SWM facility designed to manage runoff from both the Approved Area and the North Village Secondary Plan Area to the satisfaction of the Municipality, GRCA and MECP. The next step is for the Municipality to share the approved SWM Report for the development of the Approved Area with the North Village Secondary Plan study team.

Stormwater Management - Drainage Area 3 – Drainage Area 3, as shown on the Figure 5, is located entirely in the Approved Area lands and any planned activities on the North Village Secondary Plan Area will not impact Drainage Area 3. As such, no further consideration will be given to Drainage Area 3.

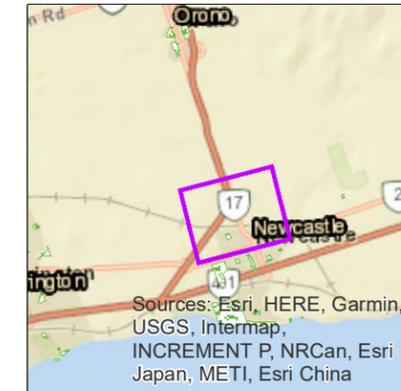
Stormwater Management - Drainage Area 4 – Drainage Area 4, as shown on the Figure 5, is located entirely in the North Village Secondary Plan Area and drains to an existing Region of Durham culvert located under Concession Road 3. The stormwater management requirements for Drainage Area 4 is a function of whether Riparian Rights of Drainage for the existing drainage feature, to which the Regional culvert under Concession Road 3 drains to, extend onto Drainage Area 4. A meeting with GRCA is being planned to discuss the issue and develop a path forward for establishing drainage objectives for Drainage Area 4.



- Legend**
- Study Area**
- Approved
 - Context
 - North Village Secondary Plan Area
 - Storage Facility
 - Water Supply Facility
 - + Water Hydrant
 - P Water Pumping Station
 - V Water Relief Valve
 - C Water Control Valve
 - Water Main
 - Contours
 - Roads
 - Trails
 - Cycling Facilities
 - Parks
 - ~ watercourse

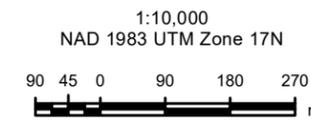
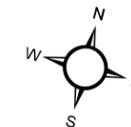


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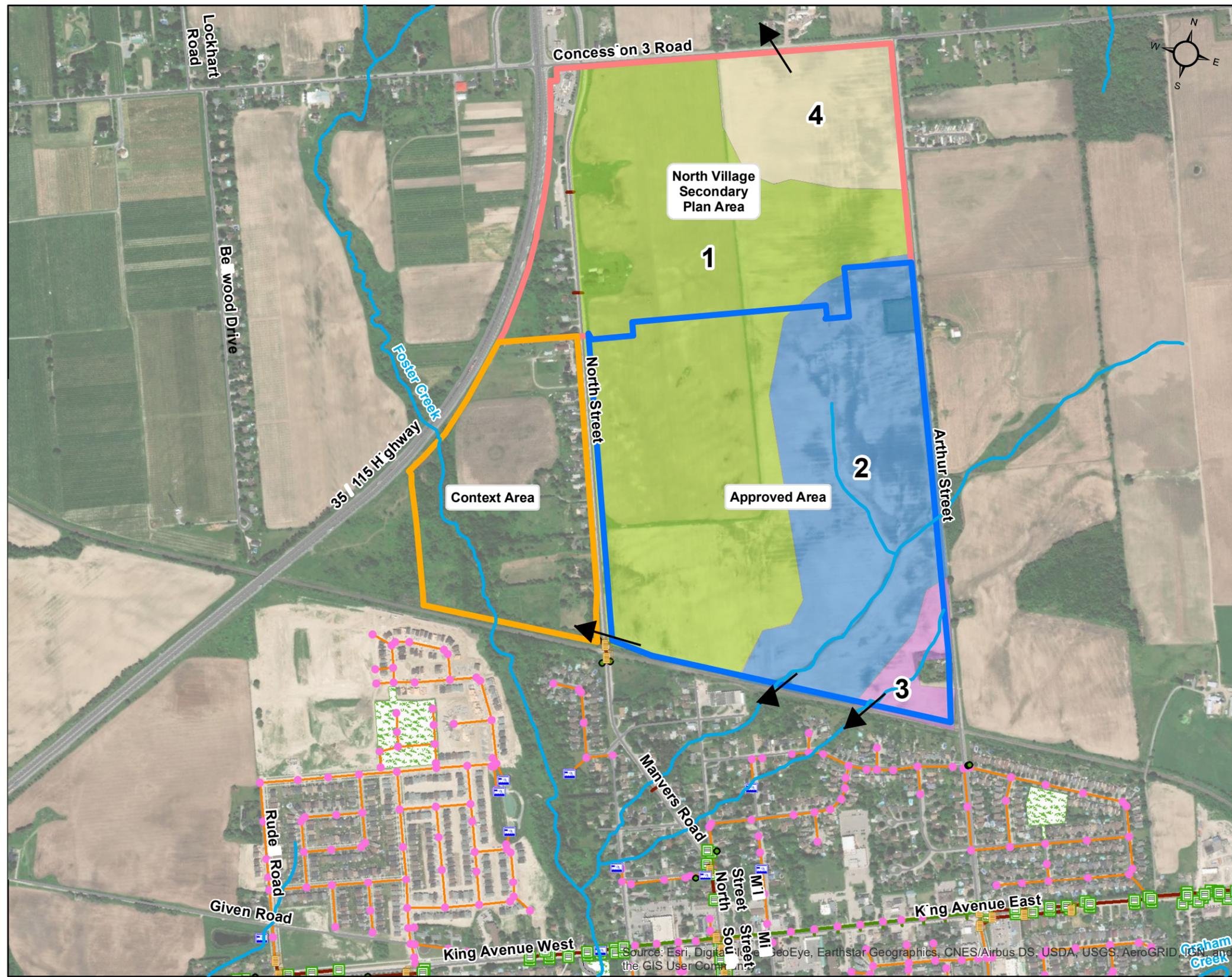


Legend

- Study Area**
- Approved Area
 - Context Area
 - North Village Secondary Plan Area
- San Chamber**
- ◆ REGIONAL SAN WWT Facility
 - PS REGIONAL SAN Pumping Station
 - ⦿ REGIONAL SAN Manhole
 - ⦿ San Manhole
 - SAN Inlet Outlet Structure
 - S REGIONAL SAN Chamber
 - REGIONAL Gravity Sewer
 - REGIONAL ForceMain
- Other Features**
- Parks
 - Cycling Facilities
 - Contours
 - Roads
 - watercourse



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- Legend**
- Study Area**
- Approved Area
 - Context Area
 - North Village Secondary Plan Area
- Drainage Areas**
- 1
 - 2
 - 3
 - 4
- Existing Outlets
 - REGIONAL Maintenance Hole
 - Storm Outfall
 - REGIONAL Inlet/Outlet
 - REGIONAL Catch Basin
 - REGIONAL Storm Main
 - REGIONAL Gravity Main
 - Storm Structure
 - Storm Conduit
 - Parks
 - Cycling Facilities
 - Roads
 - watercourse

1:10,000
 NAD 1983 UTM Zone 17N

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